Personal Research Database

Part J-1

By

Prof. Yuh-Shan Ho

Last data updates: 10/01/12

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[Title: Journal of China-Japan Friendship Hospital 1089](#_Toc317162970)

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# Title: Jahrbucher fur Nationalokonomie und Statistik

Full Journal Title: Jahrbucher fur Nationalokonomie und Statistik

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ursprung, H.W. and Zimmer, M. (2007), Who is the “Platz-Hirsch” of the German economics profession? A citation analysis. *Jahrbucher fur Nationalokonomie und Statistik*, **227** (2), 187-208.

Full Text: [2007\Jah Nat Sta227, 187.pdf](2007/Jah%20Nat%20Sta227,%20187.pdf)

Abstract: In this paper, we investigate the informational content of citation-based research evaluations. To illustrate our analysis we refer to the 2005 Handelsblatt ranking of German academic economists. We make extensive use of the recently developed Hirsch-index and relate citation incidence to publication success, career age, and the topicality of the individual researchers’ field of specialization. We arrive at the conclusion that citation-based indicators provide a very incomplete picture of research performance. To obtain acceptable bibliometric research evaluations, citation based indicators need to be complemented with indicators that measure publication success more directly.

Keywords: Bibliometric, Bibliometric Research, Citation, Citation Analysis, Collaboration, Economics Profession, Hirsch Index, Indicators, Performance Evaluation, Publication, Rankings, Research, Research Performance, Research Productivity, Researchers

# Title: Japan Hospitals

Full Journal Title: Japan Hospitals

ISO Abbreviated Title:

JCR Abbreviated Title: Jpn Hosp

ISSN: 0910-1004

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Odaka, T., Akazawa, K., Sakamoto, M., Kinukawa, N., Kamakura, T., Nishioka, Y., Itasaka, H., Watanabe, Y. and Nose, Y. (1993), The research trend of life sciences in Japanese universities based on literature database search. *Japan Hospitals*, **12**, 63-65.

Abstract: We searched literature databases regarding the four Japanese universities that published the highest number of life science papers. The databases used in this study were MEDLINE and EMBASE. As a result, there was a 30% difference in the number of papers among the four universities.

Keywords: Database, Databases, Life, Life Sciences, Literature, MEDLINE, Papers, Research, Research Trend, Science, Sciences, Trend, Universities

# Title: Japanese Circulation Journal-English Edition

Full Journal Title: Japanese Circulation Journal-English Edition

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0047-1828

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Tseng, W.P. (1982), A survey on deaths of patients with stroke. *Japanese Circulation Journal-English Edition*, **46** (6), 638-640.

# Title: Japanese Journal of Cancer Research

Full Journal Title: [Japanese Journal of Cancer Research](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=09105050)

ISO Abbreviated Title: Jpn. J. Cancer Res.

JCR Abbreviated Title: Jpn J Cancer Res

ISSN: 0910-5050

Issues/Year: 12

Journal Country/Territory: Ireland

Language: English

Publisher: Elsevier Sci Ireland Ltd

Publisher Address: Customer Relations Manager, Bay 15, Shannon Industrial Estate Co, Clare, IR

Subject Categories:

Oncology: Impact Factor

Yang, C.Y., Chiu, H.F., Chiu, J.F., Tsai, S.S. and Cheng, M.F. (1997), Calcium and magnesium in drinking water and risk of death from colon cancer. *Japanese Journal of Cancer Research*, **88** (10), 928-933.

Full Text: [J\Jap J Can Res88, 928.pdf](J/Jap%20J%20Can%20Res88,%20928.pdf)

Abstract: The possible association between the risk of colon cancer and the levels of calcium and magnesium in drinking water from municipal supplies was investigated in a matched case-control study in Taiwan, All eligible colon cancer deaths (1714 cases) of Taiwan residents from 1989 through 1993 were compared with deaths from other causes (1714 controls), and the levels of calcium and magnesium in drinking water of these residents were determined. Data on calcium and magnesium levels in drinking water throughout Taiwan were obtained from the Taiwan Water Supply Corporation. The control group consisted of people who died from other causes and the controls were pair-matched to the cases by sex, year-of-birth, and year-of-death. The adjusted odd ratios (95% confidence interval) were 0.79 (0.64-0.98) for the group with water calcium levels between 24.4 and 42.3 mg/liter and 0.58 (0.47-0.73) for the group with calcium levels of 42.4 mg/liter or more. The adjusted odd ratios were not statistically significant for the relationship between magnesium levels in drinking water and colon cancer. The results of the present study show that there Is a significant protective effect of calcium intake from drinking water against colon cancer.

Keywords: Colon Cancer, Drinking Water, Calcium, Magnesium, Epidemiology, Epithelial-Cell Proliferation, Colorectal-Cancer, Cardiovascular Mortality, United-States, Diet, Epidemiology, Inhibition, Hardness, Acids

Yang, C.Y., Cheng, M.F., Tsai, S.S. and Hsieh, Y.L. (1998), Calcium, magnesium, and nitrate in drinking water and gastric cancer mortality. *Japanese Journal of Cancer Research*, **89** (2), 124-130.

Full Text: [J\Jap J Can Res89, 124.pdf](J/Jap%20J%20Can%20Res89,%20124.pdf)

Abstract: The possible association between the risk of gastric cancer and the levels of calcium, magnesium, and nitrate in drinking water from municipal supplies was investigated in a matched case-control study in Taiwan. Records of gastric cancer deaths among eligible residents in Taiwan from 1987 through 1991 were obtained from the Bureau of Vital Statistics of the Taiwan Provincial Department of Health. Controls were deaths from other causes and were pair-matched to the cases by sex, year-of-birth, and year-of-death. Each matched control was selected randomly from the set of possible controls for each case. Data on calcium, magnesium, and nitrate levels in drinking water throughout Taiwan were obtained from the Taiwan Water Supply Corporation. The municipality of residence of the cases and controls was assumed to be the source of the subject’s calcium, magnesium, and nitrate exposure via drinking water. The subjects were divided into tertiles according to the levels of calcium, magnesium, and nitrate in their drinking water. The results of the present study show that there is a significant positive association between drinking water nitrate exposure and gastric cancer mortality. The present study also suggests that there was a significant protective effect of calcium intake from drinking water on the risk of gastric cancer. Magnesium also exerts a protective effect against gastric cancer, but only for the group with the highest levels.

Keywords: Gastric Cancer, Drinking Water, Calcium, Magnesium, Nitrate, Stomach-Cancer, Esophageal Cancer, Sodium-Chloride, Well-Water, High-Risk, China, Carcinogenesis, Migration, Nitrite, Taiwan

# Title: Japanese Journal of Clinical Oncology

Full Journal Title: [Japanese Journal of Clinical Oncology](http://jjco.oxfordjournals.org/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shimoyama, M., Fukuda, H., Saijo, N., Yamaguchi, N. and members of the Committees for the Japan Clinical Oncology Group (JCOG) (1998), Japan Clinical Oncology Group (JCOG). *Japanese Journal of Clinical Oncology*, **28** (3), 158-162.

Full Text: [1998\Jap J Oph28, 158.pdf](1998/Jap%20J%20Oph28,%20158.pdf)

Abstract: The Japan Clinical Oncology Group (JCOG) is a cooperative oncology group with the aims of conducting, developing, coordinating and stimulating clinical research in Japan on the treatment of cancer and related problems, The purpose of JCOG is to establish and improve the standard of cancer treatment, mainly in solid cancer, through the testing of new therapeutic regimens or combined modalities, using drugs that are newly-approved or already commercially available. Research sponsored by JCOG is accomplished mainly through the execution of large, prospective, randomized, multicenter, clinical trials, In this way, JCOG facilitates the passage of new clinical trial discoveries into state-of-the-art treatment.

Keywords: JCOG, Clinical Trial, Committee, Data Center, Statistical Center, T-Cell Leukemia, Advanced Gastric-Cancer, Major Prognostic Factors, Phase-Ii Evaluation, Lung-Cancer, Adjuvant Chemotherapy, Mitomycin-C, Group Trial, Lymphoma, Cisplatin

# Title: Japanese Journal of Ophthalmology

Full Journal Title: [Japanese Journal of Ophthalmology](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=00215155)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0021-5155

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Rahman, M., Sakamoto, J. and Fukui, T. (2003), Japan’s share of published research in ophthalmology. *Japanese Journal of Ophthalmology*, **47** (2), 221-224.

Full Text: [J\Jap J Oph47, 221.pdf](J/Jap%20J%20Oph47,%20221.pdf)

Abstract: Purpose: This study was conducted to determine Japan’s share of published research in ophthalmology during the last decade.

Methods: Ophthalmology journals with higher impact factors were accessed through the Medline database to elicit the number of articles published in 1991-2000 that originated in various countries, including Japan. The proportion of articles with a higher grade of evidence (randomized controlled trials/clinical trials, cohort studies, and case-control studies) was determined for Japan and compared with the average values of the total articles published in these journals. In addition, the percentage of published research from the 20 top-ranking countries was calculated, showing the trend over time.

Results: Of the total articles (21,327), Japan’s share in the selected ophthalmology journals was 6.5% (1,387 articles), ranking third in the world, following the USA (51.5%) and the UK (11.3%). The recent increase in the share was statistically significant for Japan (P=.01). However, the proportionate value of clinical research evidence was lower for Japan-originated articles than the average value for the total clinical research articles in these journals.

Conclusions: Appropriate measures should be taken in the ophthalmology field in Japan to increase the number of clinical research papers with a higher grade of evidence.

Keywords: Grade of Evidence, Impact Factor, Medline, Published Ophthalmology Research

# Title: Japanese Journal of Toxicology and Environmental Health

Full Journal Title: Japanese Journal of Toxicology and Environmental Health

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0013-273X

Issues/Year:

Journal Country/Territory:

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Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Adachi, A., Takagi, S., Komiyama, T., Tanaka, T., Nakatani, M., Muguruma, R. and Okano, T. (1999), Removal efficiency and mechanism of organochlorine compounds by rice bran. *Japanese Journal of Toxicology and Environmental Health*, **45** (1), P24.

# Title: JAPCA-the International Journal of Air Pollution Control and Hazardous Waste Management

Full Journal Title: JAPCA-the International Journal of Air Pollution Control and Hazardous Waste Management

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Rollins, R., Logan, T.J., Midgett, M.R., Jernigan, J.R. and Peeler, J.W. (1987), An assessment of the long-term performance of gas continuous emission monitoring systems. *JAPCA-the International Journal of Air Pollution Control and Hazardous Waste Management*, **37** (1), 27-33.

# Title: JETP Letters

Full Journal Title: JETP Letters

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Volovik, G.E. (1993), Superconductivity with lines of GAP nodes: Density of states in the vortex. *JETP Letters*, **58** (6), 469-473.

Full Text: [1993\JETP Let58, 469.pdf](1993/JETP%20Let58,%20469.pdf)

Abstract: The density of states (DOS) produced by the vortices in the superconductors with the lines of zeros in the electronic energy spectrum is calculated with application to high-temperature superconductors. The DOS of the isolated vortex is is-proportional-to N(F)xi.min {R,lambda}, where N(F) is the DOS of the normal metal, xi is the coherence length, lambda is the penetration depth, and R is the distance between the vortices. Only a small part of the DOS results from the fermions which are localized in the vortex core. The symmetry of the isolated vortex line in superconductors in which the gap corresponds to the GAMMA3 representation is discussed.

Keywords: Multidisciplinary, Physics

# Title: Jikeikai Medical Journal

Full Journal Title: Jikeikai Medical Journal

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Yamazaki, S. (1995), Ranking of research institutions in life sciences in Japan. *Jikeikai Medical Journal*, **42** (2), 167-173.

Abstract: Japan’s medical research organizations have been evaluated based on the total output of papers, and the annual paper output per head, in international publications listed in MEDLINE database for the first half of 1993. The rankings of Japanese medical research organizations were identified. A comparison between the national medical schools and private medical schools shows that the former have much higher productivities, largely because the latter are far less active, and emphasize clinical services rather than research. Compared with high productivity of the schools of medicine and pharmaceutical sciences, the paper production at dental schools is low and research performance is poor. This survey shows that the paper output per head can provide a measure for evaluating scientific activity in Japan. Evaluation of research performance is coming to be seen as an integral part of science. Bibliometric evaluation provides unbiased judgment, not by an inner circle of peers but by neutral outside observers.

# Title: Jilin Daxue Xuebao (Lixue Ban)

Full Journal Title: [Jilin Daxue Xuebao (Lixue Ban)](http://www.ceps.com.tw/ec/ecJnlIntro.aspx?jnlcattype=1&jnlptype=4&jnltype=29&Jnliid=1279&newIssueiid=5439)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Guo, P., Ma, X.F., Kang, C.L., Li, J., Wang, Y. and Liu, N.Y. (1996), Studies on thermodynamics and kinetics of Pb2+ and Cd2+ adsorption onto dominant dead bacteria in natural water. *Jilin Daxue Xuebao (Lixue Ban)*, **2** (4), 49-58.

Abstract: The adsorption of Cd2+ and Pb2+ onto dominant dead bacteria in natural water was studied. The results show that when Langmuir and Freundlich isotherm models were tried to represent the equilibrium data of Cd2+ and Pb2+ adsorption onto dominant dead bacteria, equilibrium data fitted very well to both the models in the studied concentration range of Cd2+ and Pb2+ The kinetic processes of the adsorption included fast phase and slow phase. Pseudo first-order and pseudo second-order kinetic models were also applied to experimental data on the basis of assuming that the external mass transfer limitations in the system can be neglgected and the adsorption is sorption controlled. The slow phase obeyed the second-order rate expression.

Keywords: Dominant Bacteria, Lead(II), Cadmium(II) Kinetic Models of Second-Order Adsorption

# Title: JISSI: The International Journal of Scientometrics and Informetrics

Full Journal Title: JISSI: The International Journal of Scientometrics and Informetrics

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Kademani, B.S. and Kalyane, V.L. (1996), Bibliometric indicators for publication productivity analysis of an individual scientist. *JISSI: The International Journal of Scientometrics and Informetrics*, **2** (4), 49-58.

Full Text: [J\JISSI2, 49.pdf](J/JISSI2,%2049.pdf)

Keywords: Scientometrics, Science of Science, Individual Scientist, Biobibliometrics, Scientific Research Output, Research Productivity

# Title: JOCCA-Surface Coatings International

Full Journal Title: JOCCA-Surface Coatings International

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? (1997), Millennium Inorganic Chemicals appoints John C Day as Vice President: Safety, Health, Environment and Responsible Care. *JOCCA-Surface Coatings International*, **80** (12), 548.

# Title: Johns Hopkins Apl Technical Digest

Full Journal Title: Johns Hopkins Apl Technical Digest

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Berl, W.G. (1986), The 22 most frequently cited apl publications. *Johns Hopkins Apl Technical Digest*, **7** (2), 221-232.

Full Text: 1986\Joh Hop Apl Tec Dig7, 221.pdf

Keywords: Publications

? Murphy, J.C. (1987), The 22 most frequently cited apl publications-5. *Johns Hopkins Apl Technical Digest*, **8** (2), 282-283.

Full Text: 1987\Joh Hop Apl Tec Dig8, 282.pdf

? Berl, W.G. (1987), The 22 most frequently cited apl publications - Afterthoughts. *Johns Hopkins Apl Technical Digest*, **8** (2), 284-285.

Full Text: 1987\Joh Hop Apl Tec Dig8, 284.pdf

Keywords: Publications

# Title: The Joint International Conference on “Sustainable Energy and Environment (SEE)”

? Leevijit, T., Wisutmethangoon, W., Prateepchaikul, G., Tongurai, C. and Allen, M. (2004), A second order kinetics of palm oil transesterification. *The Joint International Conference on “Sustainable Energy and Environment (SEE)”,, Hua Hin, Thailand*, 277-281.

Full Text: [2004\Joi Int Con SEE, 277.pdf](2004/Joi%20Int%20Con%20SEE,%20277.pdf)

Abstract: Transesterification of palm oil with methanol in the presence of NaOH as a catalyst was conducted in a well-mixed batch reactor at the reported optimum reaction condition [1]. Samples were collected during the reaction and analyzed by thin layer chromatography/flame ionization detector (TLC/FID) to determine the weight percentages of reaction compositions on glycerol free basis. The experimental mole concentrations were calibrated and fitted to a mathematical model of a second-order kinetics without shunt reaction. The reaction rate constants were determined. The effect of mass transfer could be observed that it was eliminated; thus, the obtained reaction rate was a true intrinsic rate of a homogeneous reaction. This kinetics coupled with the obtained reaction rate constants provided a satisfactory mechanism with the experimental result. The overall goodness of fit to predict the weight percentage of methyl esters in the product during the reaction was quantified through two standards: the correlation coefficient (R2) and the mean relative deviation (MRD). The R2 was 0.9936 and the MRD was 1.835%. Although, transesterification of palm oil consisted of three stepwise and reversible reactions, the reaction rate constants revealed that the forward reactions were the most important. In addition, the maximum purity at the equilibrium was 99.1 %wt. Equilibrium lay towards the products. Thus, glycerol separation was not a significant factor for producing saleable biodiesel by batch process.

Keywords: Biodiesel, Palm Oil, Kinetics, Transesterification, Triglycerides, Methyl Esters

# Title: JOM-Journal of Metals

Full Journal Title: JOM-Journal of Metals

ISO Abbreviated Title:

JCR Abbreviated Title: Jom-J Metals-

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Belton, G.R. (1975), Langmuir adsorption, Gibbs adsorption-isotherm, and interfacial kinetics in liquid-metal systems. *JOM-Journal of Metals*, **27** (12), A21.

# Title: Jornal de Pediatria

Full Journal Title: [Jornal de Pediatria](http://www.scielo.br/scielo.php?script=sci_issues&pid=0021-7557&lng=en&nrm=iso)

ISO Abbreviated Title:

JCR Abbreviated Title: J Pediatr (Rio J)

ISSN: 0021-7557

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Blank, D., Buchweitz, C. and Procianoy, R.S. (2005), Impact of SciELO and MEDLINE indexing on submissions to *Jornal de Pediatria*. *Jornal de Pediatria*, **81** (6), 431-434.

Full Text: [2005\Jor Ped81, 431.pdf](2005/Jor%20Ped81,%20431.pdf)

Abstract: OBJECTIVE: To evaluate the impact of SciELO and MEDLINE indexing on the number of articles submitted to Jornal de Pediatria. METHODS: Analysis of total article submission, submission of articles from foreign countries and acceptance figures in the following periods: stage I - pre-website (Jan 2000-Mar 2001); stage II - website (Apr 2001-Jul 2002); stage III - SciELO (Aug 2002-Aug 2003); stage IV - MEDLINE (Sep 2003-Dec 2004). RESULTS: There was a significant trend toward linear increase in the number of submissions along the study period (p = 0.009). The number of manuscripts submitted in stages I through IV was 184, 240, 297, and 482, respectively. The number of submissions was similar in stages I and II (p = 0.148), but statistically higher in Stage III (p < 0.001 vs. Stage I and p = 0.006 vs. Stage II) and Stage IV (p < 0.001 vs. stages I and II, and p < 0.05 vs. stage III). The rate of article acceptance decreased during the study period. The number of original articles published has been stable since the 2001 March/April issue (n = 10), when the journal reached a printed page limit, leading to stricter judgment criteria and a relative decrease in acceptance rate. The number of foreign submissions in stages I through IV was 1, 2, zero and 17, respectively, with p < 0.001 for the comparison of stage IV with previous stages. CONCLUSIONS: SciELO indexing was associated with an increase in Brazilian manuscript submissions to Jornal de Pediatria, whereas MEDLINE indexing led to an increase in both Brazilian and foreign submissions.

Keywords: Acceptance, Comparison, Criteria, Impact, Indexing, IV, Journal, MEDLINE, Methods, Scielo, Trend

? Blank, D., Rosa, L.O., Gurgel, R.Q. and Goldani, M.Z. (2006), Brazilian knowledge production in the field of child and adolescent health. *Jornal de Pediatria*, **82** (2), 97-102.

Full Text: [2006\Jor Ped82, 97.pdf](2006/Jor%20Ped82,%2097.pdf)

Abstract: OBJECTIVES: To assess (a) the trend of MEDLINE citation of pediatrics articles associated with Brazilian institutions from 1990 through 2004; (b) the number of Brazilian pediatrics articles published in journals with the highest impact factor; and (c) the regional distribution of institutions. METHODS: PubMed search limited to ages 0 to 18 years, English language, MEDLINE and humans subsets, Brazilian affiliation. For each year, we compared the articles retrieved to the whole of MEDLINE citations with the same search limits, except for affiliation, as well as to the total Brazilian scientific production cited in MEDLINE, without age limits. We made a descriptive analysis, and used the chi-square test for trend. Data concerning publication in journals with the highest impact factor were aggregated into three-year periods. RESULTS: A total of 7,222 Brazilian pediatrics articles were listed in MEDLINE from 1990 through 2004, corresponding to 0.95% of all articles concerning the age group from 0 to 18 years. There was a fivefold increase in the absolute number of Brazilian articles along the study period. The ratio of Brazilian to total articles increased from 0.51 to 1.60% (p < 0.01). Scientific knowledge production remains strongly concentrated in the Southeast of Brazil. CONCLUSION: Brazilian research activities in pediatrics have had a steady upward trend, which relates to the proportional growth of the Brazilian scientific production as a whole.

Keywords: Adolescent, Adolescent Health, Affiliation, Age, Analysis, Brazil, Chi-Square, Child, Citation, Citations, Distribution, Field, Growth, Health, Humans, Impact, Impact Factor, Institutions, Journals, Knowledge, MEDLINE, Methods, Objectives, Pediatrics, Publication, Pubmed, Regional, Research, Scientific Production, Trend

? Goldani, M.Z., Gurgel, R.Q., Blank, D., Gerolin, J. and Mari, J.J. (2007), Pursuing efficiency: International visibility of the scientific production of Brazilian graduate programs in child and adolescent health from 1998 through 2003. *Jornal de Pediatria*, **83** (5), 436-440.

Full Text: [2007\Jor Ped83, 436.pdf](2007/Jor%20Ped83,%20436.pdf)

Abstract: Objective: To assess the trend in the number of published articles by Brazilian graduate programs in child and adolescent health and the proportion of such publications cited in MEDLINE and Thomson Scientific’s Journal Citation Reports (ICR), using the former database as a proxy for efficiency and the latter as an indicator of visibility. Methods: We assessed the trends of 14 graduate programs concerning the number of theses, dissertations, and articles cited in MEDLINE and JCR, through secondary data from the latest two triennial evaluations carried out by the Brazilian Federal Agency for the Improvement of Higher Education (Coordenac (a) over tildeo de Aperfeicoamento de Pessoal de Nivel Superior, CAPES) between 1998 and 2000 and between 2001 and 2003. Results: The number of published articles increased (1,520 to 1,917), as did the median number of articles cited both in MEDLINE (32.5 to 45) and in JCR (24.5 to 27). The median number of dissertations rose from 19.5 to 26.5; the median number of theses went up from 12 to 13.5. The median number of faculty advisors decreased (21.5 to 18.4). Conclusion: Graduate programs in child and adolescent health became more efficient in producing knowledge through the publication of more articles with broader international visibility. Such trend was contradictorily accompanied by a diminishing number of advisors.

Keywords: Adolescent, Adolescent Health, Child, Data, Database, Efficiency, Faculty, Graduate, Health, Indicator, International, Journal Citation Reports, Knowledge, MEDLINE, Publication, Publications, Scientific Production, Trend, Trends, Visibility

? Mota, D.M. and Barros, A.J.D. (2008), Toilet training: Methods, parental expectations and associated dysfunctions. *Jornal de Pediatria*, **84** (1), 9-17.

Full Text: 2008\Jor Ped84, 9.pdf

Abstract: Objective: To review both the scientific literature and lay literature on toilet training, covering parents’ expectations, the methods available for achieving bladder and bowel control and associated morbidities. Sources: Articles published between 1960 and 2007, identified via the MEDLINE, Cochrane Collaboration, ERIC, Web of Science, LILACS and SciELO databases plus queries on the Google search engine; a search of related articles, references of articles, by author and of pediatrics societies. A total of 473 articles were examined and 85 of these were selected for this review. Summary of the findings: Parents have unrealistic expectations about the age at which diapers can be withdrawn, not taking child development into account. Toilet training strategies have not changed over recent decades, and in the majority of countries the age at which children are trained has been postponed. Training methods are rarely used. Starting toilet training prematurely and stressful events during this period can extend the training process. Children who have not been trained correctly present with enuresis, urinary infection, voiding dysfunction, constipation, encopresis and refusal to go to the toilet more frequently. Literature intended for lay parents is both abundant and adequate, available in book form and on the Internet, but it is not widely available to the Brazilian population. Just three international pediatrics societies have published guidelines on toilet training. Conclusions: Toilet training is occurring later in the majority of countries. The training methods that exist are the same from decades ago and are rarely used by mothers and valued little by pediatricians; incorrect training can be a causative factor for bladder and bowel disorders, which in turn cause problems for children and their families.

Keywords: Anticipatory Guidance, Articles, Author, Bladder Control, Child, Children, Cochrane, Collaboration, Constipation, Control, Databases, Development, Early-Childhood, Families, Guidelines, Infection, Internet, Literature, Medline, Mothers, Nocturnal Enuresis, Normal-Children, Parents, Pediatrics, Pelvic-Floor Therapy, Rapid Method, Review, Scielo, Science, Sources, Stool, Training, Voiding Pattern, Web of Science

# Title: Journal of Academic Librarianship

Full Journal Title: [Journal of Academic Librarianship](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6556&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=a850fff4fc75772ac300ee20284e061e)

ISO Abbreviated Title: J. Acad. Librariansh.

JCR Abbreviated Title: J Acad Libr

ISSN: 0099-1333

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Elsevier Science Inc

Publisher Address: 655 Avenue of the Americas, New York, NY 10010

Subject Categories:

Information Science & Library Science: Impact Factor 0.671, 17/55 (2001) SSCI

? Voos, H. and Dagaev, K. (1976), Are all citations equal? Or did we *Op. Cit.* your idem? *Journal of Academic Librarianship*, **1** (6), 19-21.

Full Text: [1960-80\J Aca Lib1, 19.pdf](1960-80/J%20Aca%20Lib1,%2019.pdf)

Abstract: This article discusses a study conducted to try and make use of citations more precise and useful. Implicit in citation analysis are two assumptions: all citations have prima facie equal value, and multiple citations to the same article are assumed within a citing article and are not counted more than once. A sample of papers were selected from the article, The 1970 Papers Most Frequently Cited From 1970-73. The paper listed 30 articles of which the first two and the last two were selected. The Science Citation Index was consulted, and each citing article was examined to determine where in its text the source article was cited, how many op. cits. to that source article occurred, and the total number of op. cits. in the citing articles. There are obvious indications that it is possible to calculate the value of a citation to a searcher using both the location and the op. cit. function, which makes it worthy of further research. Time does not have an effect on value. Different disciplines exhibit different citation patterns, and would be useful in studying the sociology of science, on non-science.

? Potter, W.G. (1988), Of making many books there is no end: Bibliometrics and libraries. *Journal of Academic Librarianship*, **14** (4), 1-3.

Full Text: [1988\J Aca Lib14, 1.pdf](1988/J%20Aca%20Lib14,%201.pdf)

Abstract: Talks about bibliometrics, an area of library and information science that deals with quantitative analysis and statistics. Types of classic bibliometric studies; Information on Lotka’s law for the analysis of the productivity of authors; Validity and application of Bradford’s law.

Schaffer, T. (2004), Psychology citations revisited: Behavioral research in the age of electronic resources. *Journal of Academic Librarianship*, **30** (5), 354-360.

Full Text: [J\J Aca Lib30, 354.pdf](J/J%20Aca%20Lib30,%20354.pdf)

Abstract: This bibliometric study focused on the research needs of psychology faculty and quantified the availability throughout the library of articles cited recently by the faculty. More than social sciences faculty generally, psychology faculty report relying on the journal literature rather than on the monographic literature. Less than one- third of the articles cited were available online and 89% of these were found in Ebsco databases, Science Direct, JSTOR, or society publications with deep backfiles.

? Lyons, L.E. (2005), A critical examination of the assessment analysis capabilities of OCLC ACAS. *Journal of Academic Librarianship*, **31** (6), 506-516.

Full Text: [2005\J Aca Lib31 506.pdf](2005/J%20Aca%20Lib31%20506.pdf)

Abstract: Over 500 libraries have employed OCLC’s iCAS and its successor Automated Collection Assessment and Analysis Services (ACAS) as bibliometric tools to evaluate monograph collections. This examination of ACAS reveals both its methodological limitations and its feasibility as an indicator of collecting patterns. The results can be used to maximize the assessment capabilities of ACAS.

Keywords: Analysis, Assessment, Bibliometric, Collection Analysis CD, Examination, Indicator, Libraries, Limitations, Tools

? Buchanan, R.A. (2007), *Science Citation Index Expanded*: The effect of journal editorial policies. *Journal of Academic Librarianship*, **33** (5), 532-539.

Full Text: [2007\J Aca Lib33, 532.pdf](2007/J%20Aca%20Lib33,%20532.pdf)

Abstract: Citation attributes were found to be strongly associated with the omission of citations from the cited article lists in 603 SCIE records from six chemistry journals. By requiring well-documented citations and by making it easier to identify where one citation ends and the next one begins, journals can help minimize the number of omitted citations from citation databases.

Keywords: Chemistry, Citation, Citations, Databases, Editorial Policies, Errors, Impact, Journal, Journals, Persistence, Policies, Records, Science Citation Index, Stability, URLS

? Matuozzi, R.N. (2009), Documentation: A history and critique of attribution, commentary, glosses, marginalia, notes, bibliographies, works-cited lists, and citation indexing and analysis. *Journal of Academic Librarianship*, **35** (3), 285-286

Full Text: [2009\J Aca Lib35, 285.pdf](2009/J%20Aca%20Lib35,%20285.pdf)

Keywords: Attribution, Bibliographies, Citation, History

? Mukherjee, B. (2010), Assessing Asian scholarly research in library and information science: A quantitative view as reflected in Web of Knowledge. *Journal of Academic Librarianship*, **36** (1), 90-101.

Full Text: [2010\J Aca Lib36, 90.pdf](2010/J%20Aca%20Lib36,%2090.pdf)

Abstract: This paper highlights the quantitative performance of scholarly LIS research in Asian countries based on articles published during 2001-2007 in journals indexed by the Social Science Citation Index of Web of Knowledge. The quantitative performance of Asian countries has been judged and compared on the basis of various quantitative indicators: (a) size of scientific activity measured by volume of production in various types of publications during the period of study, (b) authorship pattern and collaboration of scientific activity measured by co-authorship and the amount of national and international collaboration, (c) the pattern of citations measured by counting the cited and citing references of published articles, and (d) a newly developed metrics-research performance. The results show that during the last seven years, the publication rate has increased twofold and, among the Asian countries, the authors of the People’s Republic of China contributed the greatest number of articles, followed by Taiwan and South Korea. There is also an increasing trend toward collaborative research among Asian authors, with most of the collaboration occurring either among authors from the same country or with authors of non-Asian origin. The research performance analysis indicates that articles written by authors from South Korea received the highest number of citations, followed by Taiwan. Although the quantity of articles published by authors of Taiwan and South Korea is higher than Singapore and Israel, the articles contributed by authors from these latter two blocks appear in higher-impact journals. These findings show the increasing contribution made by Asian scholars to the international LIS literature, and the quality of that research.

Keywords: Articles, Authorship, Authorship Pattern, Bibliometric Analysis, China, Citation, Citation Analysis, Citations, Co-Authorship, Collaboration, Collaborative Research, Contribution, Counting, Developing-Countries, European-Union, Indicators, Infectious-Diseases, International Collaboration, Israel, Journals, Korea, LIS, Literature, People’s Republic of China, Perspective, Physics Publications, Publication, Publication Rate, Publications, Research, Research Performance, Science, Science Citation Index, Social Science Citation Index, Web of Knowledge

? Williams, D.E. (2010), Measuring academic research: How to undertake a bibliometric study. *Journal of Academic Librarianship*, **36** (4), 362-363.

Full Text: [2010\J Aca Lib36, 362.pdf](2010/J%20Aca%20Lib36,%20362.pdf)

Keywords: Bibliometric

? Xiao, N. (2010), The evaluation of research by scientometric indicators. *Journal of Academic Librarianship*, **36** (6), 554-555.

Full Text: [2010\J Aca Lib36, 554.pdf](2010/J%20Aca%20Lib36,%20554.pdf)

Keywords: Research

? Huang, M.H. and Lin, C.S. (2011), A citation analysis of western journals cited in Taiwan’s library and information science and history research journals: From a research evaluation perspective. *Journal of Academic Librarianship*, **37** (1), 34-45.

Full Text: [2011\J Aca Lib37, 34.pdf](2011/J%20Aca%20Lib37,%2034.pdf)

Abstract: This article examines citations of Western journals in eight LIS journals and six history journals published in Taiwan. The findings show that both the Western journals’ impact factor values and whether they are included in JCR may not necessarily indicate their real use in Taiwan’s LIS and history research especially in history research.

Keywords: Bibliometric Analysis, Citation, Citations, Communication Journals, Evaluation, History, Humanities, Impact, Impact Factor, Impact Factors, Journals, Library and Information Science, LIS, Quality, Rankings, Research, Research Performance, Science, Social-Sciences, Specialty, Taiwan, Universities

? Hussey, S.R. (2011), Stop plagiarism: A guide to understanding and prevention. *Journal of Academic Librarianship*, **37** (2), 186.

Full Text: 2011\J Aca Lib37, 186.pdf

Keywords: Plagiarism

# Title: Journal of Academic Libraries

Full Journal Title: [Journal of Academic Libraries](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=DXTS&NaviLink=%e5%a4%a7%e5%ad%a6%e5%9b%be%e4%b9%a6%e9%a6%86%e5%ad%a6%e6%8a%a5)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1002-1027

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Cai, R.H. and Shi, F.Y. (2002), A review on the compilation of a guide to the core journal of China. *Journal of Academic Libraries*, **5**, 2-5.

Full Text: [2002\J Aca Lib5, 2.pdf](2002/J%20Aca%20Lib5,%202.pdf)

Keywords: Core Journal, Bibliometric Research, Academic Journal Evaluation

# Title: Journal of the Academy of Marketing Science

Full Journal Title: [Journal of the Academy of Marketing Science](http://www.springerlink.com/content/120573/?p=82b2351d681647f39aa5f1ca0327fc37&pi=0)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Uslay, C., Morgan, R.E. and Sheth, J.N. (2009), Peter Drucker on marketing: An exploration of five tenets. *Journal of the Academy of Marketing Science*, **37** (1), 47-60.

Full Text: [2009\J Aca Mar Sci37, 47.pdf](2009/J%20Aca%20Mar%20Sci37,%2047.pdf)

Abstract: The authors review Peter Drucker’s contributions to marketing theory and practice. A bibliometric analysis of Drucker’s academic influence in marketing is presented. The five main tenets that are derived from the bibliometric study are expanded upon as follows: (1) The Marketing Concept: Creating Value for Customers; (2) Broadened Role of Marketing in Society: Corporate Social Responsibility, Consumerism, Social Marketing, and Lessons from Non-Profit Organizations; (3) Contributions to Marketing Strategy: The Obvious and Not So Obvious; (4) Marketing-Innovation Interface: New Product Development; (5) Future of Globalization: Rise of Non-National Enterprises.

Keywords: Academic, Analysis, Authors, Bibliometric, Bibliometric Analysis, Bibliometric Study, Bibliometrics, Business, Consumerism, Consumerist Movement, Corporate Entrepreneurship, Corporate Social Responsibility, Corporation, Drucker, Entrepreneurship, Established Firms, Globalization, Influence, Knowledge, MAR, Marketing, Marketing Concept, Marketing Strategy, Marketing Theory, Non-Profit Organizations, Nonprofit Organizations, Performance, Practice, Research Propositions, Responsibility, Review, Role of Marketing, Social Responsibility, Strategy, Theory, Theory and Practice, Tribute

? Chabowski, B.R., Mena, J.A. and Gonzalez-Padron, T.L. (2011), The structure of sustainability research in marketing, 1958-2008: A basis for future research opportunities. *Journal of the Academy of Marketing Science*, **39** (1), 55-70.

Full Text: [2011\J Aca Mar Sci39, 55.pdf](2011/J%20Aca%20Mar%20Sci39,%2055.pdf)

Abstract: Recent changes in the business environment have prompted marketing scholars to pay particular attention to sustainability as a topic of inquiry. Despite the progress made in the study of sustainability, there is a paucity of research on the topic in premier marketing journals. To address this issue, we focus on marketing-related journals and assess the intellectual structure of sustainability research in detail. Drawing on social network theory, we perform an extensive co-citation analysis using multidimensional scaling to examine 76,342 citations made in 1,320 sustainability-focused articles from 36 journals over 51 years (1958-2008). This study specifies that the topics of citizenship behavior, stakeholder theory, corporate performance, and the triple bottom line are integral sustainability research areas. In addition, the results indicate five required topics for examining sustainability in the marketing context: external-internal focus, social-environmental emphasis, legal-ethical-discretionary intent, marketing assets, and financial performance. Supported by the capabilities-based resource perspective, the sustainability-focused typology and framework advanced provide directed structure for future research.

Keywords: Analysis, Behavior, Bibliometric Analysis, Business, Changes, Citations, Citizenship, Co-Citation, Co-Citation Analysis, Cocitation, Competitive Advantage, Consumer Product Responses, Context, Corporate Environmental Performance, Corporate Environmental Responsibility, Corporate Responsibility, Corporate Social Performance, Corporate Social Responsibility, Corporate Social-Responsibility, Environment, Environmental Performance, Financial Performance, Framework, Institutional Entrepreneurs, Intellectual Structure, Intellectual Structure, Journals, Longitudinal Analysis, Marketing, Marketing-Finance Interface, Multidimensional, Multidimensional Scaling, Network, Network Analysis, Performance, Progress, Research, Resource-Based View, Scaling, Shareholder Value, Social, Social Network Theory, Structure, Sustainability, Theory, Triple Bottom Line

# Title: Journal of the Acoustical Society of America

Full Journal Title: [Journal of the Acoustical Society of America](http://scitation.aip.org/dbt/dbt.jsp?KEY=JASMAN)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Viator, J.A. and Pestorius, F.M. (2001), Investigating trends in acoustics research from 1970-1999. *Journal of the Acoustical Society of America*, **109** (5), 1779-1783.

Full Text: [2001\J Aco Soc Ame109, 1779.pdf](2001/J%20Aco%20Soc%20Ame109,%201779.pdf)

Abstract: Text data mining is a burgeoning field in which new information is extracted from existing text databases. Computational methods are used to compare relationships between database elements to yield new information about the existing data. Text data mining software was used to determine research trends in acoustics for the years 1970, 1980, 1990, and 1999. Trends were indicated by the number of published articles in the categories of acoustics using the Journal of the Acoustical Society of America (JASA) as the article source. Research was classified using a method based on the Physics and Astronomy Classification Scheme (PACS). Research was further subdivided into world regions, including North and South America, Eastern and Western Europe, Asia, Africa, Middle East, and Australia, New Zealand. In order to gauge the use of JASA as an indicator of international acoustics research, three subjects, underwater sound, nonlinear acoustics, and bioacoustics, were further tracked in 1999, using all journals in the INSPEC database. Research trends indicated a shift in emphasis of certain areas, notably underwater sound, audition, and speech. JASA also showed steady growth, with increasing participation by non-US authors, from about 20% in 1970 to nearly 50% in 1999. (C) 2001 Acoustical Society of America.

Keywords: Acoustics, Africa, Asia, Data, Data Mining, Data-Mining, Database, Databases, Europe, Field, Growth, Indicator, Information, International, Journals, Methods, Mining, North, PAC, PACS, Participation, Research, Software, Source, South America, Trends, World

# Title: Journal of Addictive Diseases

Full Journal Title: Journal of Addictive Diseases

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Fareed, A., Casarella, J., Amar, R., Vayalapalli, S. and Drexler, K. (2010), Methadone maintenance dosing guideline for opioid dependence, a literature review. *Journal of Addictive Diseases*, **29** (1), 1-14.

Full Text: [2010\J Add Dis29, 1.pdf](2010/J%20Add%20Dis29,%201.pdf)

Abstract: To date, methadone dosing is still an issue of debate and controversy among clinicians who are involved in methadone maintenance programs. The authors conducted a literature review to update clinicians about this issue and provide recommendations for proper methadone dosing. Studies eligible for inclusion in the review were retrieved from the PubMed database by searching for reports published between 1990 and September 2008 using the major medical subject headings Methadone (all fields) and dose. Only articles written in English were included. Additional reports were identified from the reference lists of retrieved articles and by manual review of the tables of contents of journals on drug of abuse included in the psychiatry and substance abuse subject category listing 2008 of the Journal Citation Reports. Abstracts of medical meetings were excluded. Twenty-four articles were included in the review. Twelve are randomized, controlled, or double-blind clinical trials, 10 are non-randomized and observational studies, and 2 are meta-analyses. Currently, the consensus is to have a goal for methadone dosing in the range of 60 to 100 mg daily. For patients who continue to use illicit opiates while prescribed this dose range, clinicians may consider doses greater than 100 mg daily. However, this is not the current consensus but rather is based on the limited promising data the authors have; it could be considered if the benefits outweigh the risks for some patients.

Keywords: Author, Authors, Citation, Clinical Trials, Doing Guideline, Follow-Up, Heroin-Addicts, Higher-Dose Methadone, HIV Risk, Injection-Drug Users, Journal, Journal Citation Reports, Journals, Levomethadyl Acetate, Literature, Literature Review, Medical, Methadone, Mortality-Rates, Psychiatry, Pubmed, QTC Interval Prolongation, Randomized-Trial, Review, Subject Category, Torsade-de-Pointes

# Title: Journal of Adhesion

Full Journal Title: Journal of Adhesion

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Evans, J.M. (1973), Sorption of iodine onto corona-modified polyethylene. *Journal of Adhesion*, **5** (1), 29-37.

# Title: Journal of Adhesion Science and Technology

Full Journal Title: [Journal of Adhesion Scifvence and Technology](http://www.vsppub.com/journals/jn-JouAdhSciTec.html)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Raetzsch, M., Jacobasch, H.J., Freitag, K.H., Grundke, K. and Hermel, G. (1989), Modification of filler matrix interactions by adsorption of surfactants and its effect on the strength of high-density polyethylene chalk composites. *Journal of Adhesion Science and Technology*, **3** (8), 595-607.

Full Text: J Adh Sci Tec3, 595

Keywords: Chalk

? Ruckenstein, E. and Chen, J.H. (1992), Surfactant modification of the surface energetics of hydrophobic polymers and protein adsorption. *Journal of Adhesion Science and Technology*, **6** (6), 611-623.

Full Text: J Adh Sci Tec6, 611

Abstract: A low interfacial free energy between a polar surface and water is expected to lead to a smaller amount of protein adsorbed. However, nonpolar surfaces have high interfacial free energies with water. They can acquire lower interfacial free energies by modifying the polar and dispersion components of their surface free energy so that they approach those of water. The two-phase method, in which an aqueous solution of surfactant and chloroform constitute the two-phase system, can be used for the modification of the hydrophobic surface. The hydrophobic polymer is immersed for a short time in chloroform (which is a solvent for the polymer). This allows disentanglement of the surface chains. Subsequently, the polymer is pulled out through the solvent-water interface and further through the water phase. The monolayer of adsorbed surfactant present at the water-chloroform interface is thus transferred to the surface of the polymer. The hydrophobic chains of the surfactant and polymer entangle and the polar head groups orient towards the water phase. Protein adsorption experiments carried out with albumin and fibrinogen showed that the amounts of protein adsorbed on unmodified PMMA surfaces can be significantly higher than those on SDS- and Brij 35-modified surfaces. The sequence for adsorption is unmodified surface > SDS-modified surface > Brij 35-modified surface.

Keywords: Adsorption, Albumin, Copolymers, Deposition, Dispersion, Energy, Hydrophobic Polymer, Interface, Lead, Modification, Polymer, Protein, Protein Adsorption, Solid-Surfaces, Surface, Surface Free Energy, Surface Modification, Surfaces, Surfactant, Water

? Boury, F. and Proust, J.E. (1992), Modification of the surface free-energy components of a polymer by adsorption of poly(oxyethylene)-poly(oxypropylene) block copolymers. *Journal of Adhesion Science and Technology*, **6** (12), 1359-1369.

Full Text: J Adh Sci Tec6, 1359

Abstract: To study the wettability-increasing effect of poloxamer adsorption on calcium alginate microfibres, poloxamer films were deposited from aqueous solution on glass substrates and on glass coated with calcium alginate. By measuring the contact angles with water, glycerol, and diiodomethane, an estimate could be made of the dispersion (Lifshitz-van der Waals) and acid-base surface free energy components of these composite surfaces. By depositing different A-B-A block co-polymer surfactants (where A is more hydophilic than B), it is possible to increase the wettability of polar or non-polar solid surfaces by non-polar or polar liquids, respectively. This increase in wettability is obtained by the adsorption of the co-polymer surfactant via the hydrophilic blocks on polar substrates or by the adsorption of the co-polymer surfactant via the hydrophobic blocks on apolar substrates. However, possible reorientations of the A or B blocks towards the test liquid, which are enhanced at a high adsorption level, by the flexibility of the blocks can induce an increase in the wettability of both (polar or non-polar) substrates by both (polar or non-polar) liquids.

Keywords: Adsorption, Alginate, Block Copolymer, Calcium, Colloidal Particles, Composite, Contact Angles, Contact-Angle, Copolymer, Dispersion, Energy, Films, Hydrophilic, Liquid, Liquids, Made, Microfiber, Poloxamer, Polymer Film, Surface, Surface Free Energy, Surfaces, Surfactant, Surfactants, Water, Wettability, Wetting

Espinosa-Jiménez, M., Padilla-Weigand, R., Ontiveros-Ortega, A., Perea-Carpio, R., Ramos-Tejada, M.M. and Chibowski, E. (2002), Investigation of the Polyamide 6,6 dyeing process with Acid Blue 45 dye. Part I. Thermodynamics of Acid Blue 45 adsorption. *Journal of Adhesion Science and Technology*, **16** (3), 285-301.

Full Text: [J\J Adh Sci Tec16, 285.pdf](J/J%20Adh%20Sci%20Tec16,%20285.pdf)

Abstract: Among the many synthetic fibres, polyamides are one of the most important. Improvement in the adsorption/absorption strength of a dye to and inside the yams is therefore very important for their practical applications. In this study, the kinetics and thermodynamics of the sorption process of Acid Blue 45 on Polyamide 6,6 (Nylon 6,6) were investigated. The sorption was conducted at 293, 303, and 313±0.1 K for 48 h from 10-5-10-4 M solutions in the presence of 10-3 M NaCl. From the kinetic experiments it was found that this time was sufficient to attain the adsorption equilibrium. The first stage of the sorption (up to 160 min) can be well described by a first-order kinetic equation by its numerical fitting to the experimental results. It is a spontaneous process in which the rate of sorption and the sorbed amount increase with increasing temperature. However, it is a relatively slow endothermic process (positive enthalpy of sorption); thus, it must be entropy-driven to produce a negative free energy of sorption. From the sorption isotherms and calculated thermodynamic functions it can be concluded that at higher temperatures (303 - 313 K), more polar groups of Polyamide 6,6 are accessible for the dye molecules, which may be due to a glass transition. Data on the zeta potential changes and surface free energy components of Polyamide 6,6 will be presented in Part H of this study, which may help in a better understanding of the sorption process.

Keywords: Polyamide 6,6, Acid Blue 45 Dye, Adsorption, Kinetics, Thermodynamic of Sorption, Surface Free-Energy, N-Cetylpyridinium Chloride, General Treatment, Leacril Fibers, Cationic Dye, Tannic-Acid, Sorption, Classification, Kinetics, Isotherm

Espinosa-Jiménez, M., Padilla-Weigand, R., Ontiveros-Ortega, A., Perea-Carpio, R., Ramos-Tejada, M.M. and Chibowski, E. (2002), Investigation of the Polyamide 6,6 dyeing process with Acid Blue 45 dye. Part II. Surface free energy, zeta potential and dye/polyamide interactions. *Journal of Adhesion Science and Technology*, **16** (3), 303-316.

Full Text: [J\J Adh Sci Tec16, 303.pdf](J/J%20Adh%20Sci%20Tec16,%20303.pdf)

Abstract: Synthetic fibres are now of great importance for textile production. In Part I of this study, the kinetic and thermodynamic functions of the sorption process for Acid Blue 45 on Polyamide 6,6 (Nylon 6,6) were studied; in Part II, the surface free energy components for the polymer and the dye were investigated. If van Oss et al.’s approach to the surface free energy components is used, the results obtained show that the surface of Polyamide 6,6 is a monopolar electron-donor surface. Also, the dye, when compressed as pellets, shows practically only electron-donor character. But these values are debatable, as both acidic and basic sites are present on the polyamide surface. The isoelectric point for the polyamide appears at pH 3, while for the dye in its saturated aqueous solution it is at pH 2. Therefore both surfaces are negatively charged in a broad pH range. Nevertheless, the adsorption takes place, which means that the attractive forces are higher than the electrostatic repulsive forces. As the adsorption takes place in spite of the mostly electron-donor character of both surfaces and the same sign of the electrical charge, this places doubt on the validity of such determined components, But on the other hand, it may be concluded that the adsorption process on the bare polyamide surface is of a chemical nature. For example, interactions may occur between the -COOH end-groups of the polyamide and the -OH groups of the dye, as well as between the -NH2 end-groups of the polyamide and -SO3Na of the dye, which are much stronger than electrostatic repulsive forces. The two electron-donor sites do not interact repulsively. The increase in sorption with increasing temperature (Part 1) and practically no desorption of the dye from the polyamide surface for lower coverages (when dyed from a solution of concentration up to 10-3 M) support the above conclusion.

Keywords: Polyamide 6,6, Acid Blue 45 Dye, Surface Free Energy, Zeta Potentials, Thin-Layer Wicking, Interfacial-Tensions, Cationic Dye, Tannic-Acid, Components

? Sato, Y. and Murahara, M. (2004), Protein adsorption on PTFE surface modified by ArF excimer laser treatment. *Journal of Adhesion Science and Technology*, **18** (13), 1545-1555.

Full Text: [2004\J Adh Sci Tec18, 1545.pdf](2004/J%20Adh%20Sci%20Tec18,%201545.pdf)

Abstract: Poly(tetrafluoroethylene) (PTFE) is a material that causes only a few rejections in a living body but has low tissue affinity. A soft tissue implant material that not only has high biocompatibility but also excellent bondability has been developed by photo-chemically incorporating OH functional groups on the PTFE surface with ArF excimer laser irradiation. Protein adsorption on untreated and treated samples was evaluated by scanning electron microscopy (SEM) and attenuated total reflection Fourier-transform infrared (ATR-FT-IR) spectroscopy, with bovine serum albumin (ALB) and fibrin (FIB) solutions. It has been found that protein adsorption increases with the increase in the OH group density on the PTFE surface. The maximum adsorption of both ALB and FIB was found on the PTFE sample treated with a laser fluence of 20 mJ/cm2 and a shot number of 2000, whose water contact angle was 28 degrees; the quantities of both ALB and FIB adsorbed increased by a factor 2 as compared with untreated sample.

Keywords: Ablation, Adhesion Improvement, Adsorption, Albumin, ARF Excimer Laser, Behavior, Biocompatibility, Bovine, Contact Angle, Density, Electron Microscopy, Fibrin, Fibrin Free, Functional Groups, Glaucoma Implant, Hydrophilic, Irradiation, Membrane, Microscopy, Modified, Oh, Photochemical Modification, Photochemical Surface Modification, Polymers, Protein, Protein Adsorption, PTFE, Scanning Electron Microscopy, SEM, Serum, Spectroscopy, Surface, Treatment, Water

# Title: Journal of Adolescent Health

Full Journal Title: [Journal of Adolescent Health](http://www.sciencedirect.com/science/journal/1054139X)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1054-139X

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Guilamo-Ramos, V., Litardo, H.A. and Jaccard, J. (2005), Prevention programs for reducing adolescent problem behaviors: Implications of the co-occurrence of problem behaviors in adolescence. *Journal of Adolescent Health*, **36** (1), 82-86.

Full Text: [2005\J Ado Hea36, 82.pdf](2005/J%20Ado%20Hea36,%2082.pdf)

Abstract: Purpose: To examine the correlations between multiple risk behaviors in adolescent populations to document the extent to which problem behaviors are intercorrelated and to identify factors associated with variations in these correlations. Methods: Studies from 1977 through the end of 1999 that included two or more problem behaviors in adolescents were identified by literature searches using the PsychLit database, Social Sciences Citation Index, manual journal searches and “ancestry” approaches. The behaviors studied were alcohol use, marijuana use, illicit drug use, cigarette smoking, general deviant behavior, and sexual activity. Included studies reported correlation coefficients between variables. Results: Across all studies, the mean correlation between any two pairs of problem behaviors was 0.35, with a standard deviation of 0.28. This suggests that, on average, about two-thirds of the variation in problem behavior is the result of unique rather than common causes. The magnitude of the correlations varied as a function of the age of the adolescent, with lower correlations being evident for older adolescents. In addition, the magnitude of the correlation varied as a function of when the study was conducted, with studies of past generations showing stronger connections between risk behaviors than current generations. Conclusions: The data suggest that there is considerably more unique variation in classic adolescent problem behaviors than common variation. (C) 2005 Society for Adolescent Medicine. All rights reserved.

Keywords: Adolescence, Adolescent, Adolescents, Age, Alcohol, Alcohol Use, Behavior, Correlation, Correlations, Data, Database, Drug, Drug Use, Function, General, Journal, Literature, Marijuana, Populations, Rights, Risk, Risk Behaviors, Smoking, Standard

# Title: Journal of Advanced Nursing

Full Journal Title: [Journal of Advanced Nursing](http://www.swetswise.com/eAccess/viewTitleIssues.do?titleID=110561), [Journal of Advanced Nursing](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=jan)

ISO Abbreviated Title: J. Adv. Nurs.

JCR Abbreviated Title: J Adv Nurs

ISSN: 0309-2402

Issues/Year: 12

Journal Country/Territory: England

Language: English

Publisher: Blackwell Science Ltd

Publisher Address: P O Box 88, Osney Mead, Oxford OX2 0NE, Oxon, England

Subject Categories:

Nursing: Impact Factor 0.797, 10/42 (2001) SSCI

Mallik, M. (1997), Advocacy in nursing: A review of the literature. *Journal of Advanced Nursing*, **25** (1), 130-138.

Full Text: [J\J Adv Nur25, 130.pdf](J/J%20Adv%20Nur25,%20130.pdf)

Molassiotis, A. (1997), A conceptual model of adaptation to illness and quality of life for cancer patients treated with bone marrow transplants. *Journal of Advanced Nursing*, **26** (3), 572-579.

Full Text: [J\J Adv Nur26, 572.pdf](J/J%20Adv%20Nur26,%20572.pdf)

Abstract: A conceptual model of adaptation to illness/treatment and quality of life in cancer and especially bone marrow transplant patients is presented. The process from the diagnosis of a life-threatening disease to adaptation to it is divided into five stages. This process starts with the initial stimuli (stressor) and the appraisal/perception of that as a threat (stage I), and continues with the reaction to the stressor, if it is perceived as a threat (stage II). This is the time that, if manipulation of the stressor with appropriate interventions occurs, prevention of ineffective coping and/or maladjustment to illness is possible. The third stage refers to the coping with the illness (adaptive or maladaptive coping), followed by the degree of adaptation to illness and satisfaction with daily life (quality of life). Depending on interventions applied at this stage, the outcome can be either adjustment to illness or maladjustment and low quality of life (final stage). In every stage of the process, certain physiological, psychological, social and developmental variables are important, and these are described, based on research findings. Assessment of these variables is necessary for more effective planning of care and application of nursing interventions. Such a model can provide a conceptual framework for the assessment and evaluation of quality of life in cancer/bone marrow transplant patients and can help health professionals, and nurses in particular, to develop their own assessment tools and plan care and/or interventions based on such a holistic assessment.

Keywords: Long-Term Survivors, Of-Life, Adult Survivors, Chemotherapy, Interventions, Oncology, Model, Adaptation, Quality of Life, Cancer, Bone Marrow Transplantation

Mallik, M. (1998), Advocacy in nursing: Perceptions and attitudes of the nursing elite in the United Kingdom. *Journal of Advanced Nursing*, **28** (5), 1001-1011.

Full Text: [J\J Adv Nur28, 1001.pdf](J/J%20Adv%20Nur28,%201001.pdf)

Abstract: In recent years, patient advocacy has been claimed as an integral part of the nurse’s role in health care delivery in the United Kingdom (UK). Support from the nursing leadership/elite is seen as important in the promulgation and diffusion of any ‘new’ role in nursing. This paper explores the perceptions and attitudes of nurse leaders in the UK to the adoption of the patient advocate role as an ‘innovation’ in nursing. Using a qualitative methodology, semi-structured interviews with six of nursing’s ‘elite’ were conducted over a period of 5 months. Results revealed contradictions and paradoxes within the views of the elite. Although leaders recognized patient advocacy as a role integral to the moral value system in nursing enhanced by the nurse-patient relationship, they objected to the professionalization of the role, seeing an exclusive claim to patient advocacy as intensifying interprofessional conflicts in health care. It is argued that unless professionalized, the individual nurse will continue this potentially risky activity without adequate authority or support systems. The results overall question the role of the nursing leadership in the diffusion of innovations in nursing.

Knutsson, S., Engberg, I.B. (1999), An evaluation of patients’ quality of life before, 6 weeks and 6 months after total hip replacement surgery. *Journal of Advanced Nursing*, **30** (6), 1349-1359.

Full Text: [J\J Adv Nur30, 1349.pdf](J/J%20Adv%20Nur30,%201349.pdf)

Abstract: Annually, throughout the world, more than 800 000 primary total hip replacement surgery procedures are performed on patients suffering from hip joint arthrosis. Since 1991, approximate to 11 000 of these procedures are performed annually in Sweden. This study aimed to investigate any changes in the patients’ life quality 6 weeks and 6 months after their total hip replacement surgery had been performed, compared to that immediately prior to the operation. It also aimed to examine the reason for surgery, the types of prostheses used, postoperative pain, complications and the actual usage of ambulation support. The Sickness Impact Profile self-appraisal instrument, together with personal patient interviews have been used as the basis of the research. A total of 51 patients responded to the quality of life instrument prior to their operation, 47 of these participated 6 weeks after the operation, and 40 patients 6 months after the operation. Significant differences in patients’ total, physical and psychosocial quality of life 6 months postoperatively compared to the situation prior to the operation were found, but not between the situation before and 6 weeks after the total hip replacement surgery. The majority of patients were of the opinion that it was more important that the pain had disappeared or decreased, than any overall increase in the quality of life. Postoperative complications occurred within 6 weeks, and even after 6 months some patients still suffered from these.

Keywords: Sickness Impact Profile, Health-Status Measure, Of-Life, Telephone, Interviews, Quality of Life, Hip Replacement, Nursing Care, Physiotherapy, Surgery

Jakobsson, L., Hallberg, I.R. and Loven, L. (2000), Experiences of micturition problems, indwelling catheter treatment and sexual life consequences in men with prostate cancer. *Journal of Advanced Nursing*, **31** (1), 59-67.

Full Text: [J\J Adv Nur31, 59.pdf](J/J%20Adv%20Nur31,%2059.pdf)

Abstract: Men with prostate cancer (n = 25) were interviewed, focusing on experiences of micturition problems, indwelling catheter treatment and sexual life consequences. Narrations were found to be practical and technical descriptions rather than emotional, and experiences were described with reduction and negligence regarding personal well-being and the impact of problems. Phenomenological-hermeneutic analysis was used and findings ordered in subthemes and themes of meaning. Micturition problems, catheter treatment and sexual life problems were all phenomena that radically affected the clients’ autonomy and life quality and changed the life continuum. Impact from the disease was either accepted or not and related to what had already been borne in life. Experiences were linked together, each of them giving rise to feelings of physical deterioration and fear of ridicule, and hidden from others. Maintaining self-image and social role was important and connected with the degree of perceived deprivation of life content. Responsibility for medical decisions was left to professionals while everyday problems with micturition, catheters and sexual life were regarded as the men’s sole responsibility. Findings were interpreted to mean that comparing the personal situation with that of others worse off made the life situation look better. The clinical implication of this study was that because the men came forward with their problems when given time to talk in their own way these areas should be given time and interest in the nursing care. Interpretation did not provide a unified picture of problems. Thus, nurses will have to seek men’s individual experience actively and give legitimacy to patients’ problems by opening up opportunities to speak about otherwise concealed problems. Then it may be possible to provide solutions that may ease the men’s burdens.

Keywords: Care Episodes, Nurses, Quality, Health, Qualitative Interview, Lived Experience, Micturition, Catheter Treatment, Sexual Life, Phenomenological-Hermeneutic Analysis, Nursing Practice, Prostate Cancer

Robinson, J. (2000), Effective health care and policy action: The example of health visiting. *Journal of Advanced Nursing*, **32** (6), 1315-1317.

Full Text: [J\J Adv Nur32, 1315.pdf](J/J%20Adv%20Nur32,%201315.pdf)

Robinson, J. (2001), This issue of *JAN*. *Journal of Advanced Nursing*, **34** (2), 149-150.

Full Text: [J\J Adv Nur34, 149.pdf](J/J%20Adv%20Nur34,%20149.pdf)

Traynor, M., Rafferty, A.M. and Lewison, G. (2001), Endogenous and exogenous research? Findings from a bibliometric study of UK nursing research. *Journal of Advanced Nursing*, **34** (2), 212-222.

Full Text: [J\J Adv Nur34, 212.pdf](J/J%20Adv%20Nur34,%20212.pdf)

Abstract: Endogenous and exogenous research? Findings from a bibliometric study of UK nursing research

Aims of the study. This paper uses the findings of a recent bibliometric analysis of published UK nursing research to ask whether the field is characterized by a fundamental split between two underlying areas of research interest. These can be termed ‘endogenous’ and ‘exogenous’. The former term describes research which tends to be concerned with problems and issues to do with nursing as a profession; the latter is concerned with problems and issues centring around the nursing of patients.

Design/methods. papers in the Wellcome Trust’s Research Outputs Database (ROD), a database of UK biomedical research, were analysed. Nursing papers published between 1988 and 1995 numbered 1845, just less than 1% of the total papers in the ROD.

Results/findings. Analysis of the subfield identified that nursing research was atypical of biomedical research as a whole in a number of ways. One difference was that usually in biomedical research there is a general correlation between numbers of funders acknowledged on a paper, numbers of authors, and esteem of the journal in which a paper appears. In nursing there was, if anything, a tendency for highly esteemed papers to have fewer authors and be less likely to have acknowledged funding. However, the apparently endogenous and exogenous papers have quite different characteristics. This paper explores this apparent difference and possible reasons for this difference and will briefly compare nursing research with some other newly emerging social and academic groups.

Conclusions. Thinking of nursing research outputs in this way can provide insight into the existence of different reward systems influencing nurse researchers. However, it is impossible to draw too confident a differentiation without reading each individual paper and making judgements about whether they are ‘endogenous’ or ‘exogenous’, a practice generally beyond the scope of bibliometric practice.

Keywords: Bibliometric Analysis, Bibliometrics, Citation, Education, Funding, Journal Esteem, Nursing Research, Research, Science, United Kingdom

Lok, C.K.W., Chan, M.T.V. and Martinson, I.M. (2001), Risk factors for citation errors in peer-reviewed nursing journals. *Journal of Advanced Nursing*, **34** (2), 223-229.

Full Text: [2001\J Adv Nur34, 223.pdf](2001/J%20Adv%20Nur34,%20223.pdf)

Abstract: Background. Citation errors are common among nursing journals. But, there are no data regarding the factors that predispose to these errors. Objective. To determine the risk factors that predispose to citation error in peer-reviewed nursing journals. Methods. Five hundred and fifty references were selected randomly from articles published in eleven nursing journals for the year 1998. The incidences of major and minor citation errors were determined by comparing with the original articles. The relative odds of citation errors for the number of authors, collaborating institutions and the length of the reference list were calculated, The correlation between the scientific quality of the journal (by means of journal impact factor and immediacy index) and the incidence of citation error were also determined. Results. The incidence of citation errors is comparable to those reported previously. Long reference lists in articles written by a single author predicted strongly the occurrence of minor citation errors. Journals with a high impact factor and immediacy index tend to contain fewer minor mistakes. None of these factors affect the incidence of major errors. Conclusion. Contributors to journals should be aware of the various risk factors for citation errors. Citation accuracy may be improved by modifying these factors.

Keywords: Accuracy, Anesthesia, Authors, Citation, Citation Error, Citation Errors, Correlation, Data, Error, Errors, Immediacy Index, Impact, Impact Factor, Incidence, Index, Institutions, Journal, Journal Impact, Journal Impact Factor, Journal Impact Factors, Journals, Length, Minor, Nursing, Nursing Journals, Peer-Reviewed, Quality, Quality of, Reference, Reference Accuracy, Reference Lists, Reference Standards, References, Risk, Risk Factors, Writing Standards

? Marshall, M.J. and Hutchinson, S.A. (2001), A critique of research on the use of activities with persons with Alzheimer’s disease: A systematic literature review. *Journal of Advanced Nursing*, **35** (4), 488-496.

Full Text: [2001\J Adv Nur35, 488.pdf](2001/J%20Adv%20Nur35,%20488.pdf)

Abstract: Topic. The topic of this paper concerns the use of therapeutic activities with persons with Alzheimer’s disease (AD). Purpose. The purpose is to present a critique of the research on these activities, with an emphasis on methodology. Organizing construct and scope. Nursing literature identifies a number of purposes for activities for persons with AD. Activities should be therapeutic, enhance quality of life, arrest mental decline, and generate and maintain self-esteem. Other purposes of activities for this population are to create immediate pleasure, re-establish dignity, provide meaningful tasks, restore roles, and enable friendships. Activities may be more important to the psychological state of well-being of persons with dementia than the general physical and social environments in which they live. Sources. The literature reviewed was identified with the use of computer data bases (Medline - 1991-March 2001; Cumulative Index of Nursing and Allied Health Literature (CINAHL) - 1991-March 2001; and PsychLit - 1988-March 1999). In addition, data bases of Science Citation Index and Social Science Citation Indexes as they appear in the computer base, Web of Science, were searched for 1992-2001. The time period for each search was determined by the manner in which the literature was grouped for inclusion in the particular database. Hand searches of 11 selected journals included the years 1993-2001. The search dates were selected to reflect the time period when the largest number of studies on activities and AD have appeared in the professional literature. We critique a total of 33 studies. Conclusions. While researchers have demonstrated interest in the use of activities with persons with AD, theoretical and methodological difficulties, unclear findings and gaps exist, including a lack of emphasis on gender, ethnic, racial or cultural differences. Sampling issues involving diagnosis and staging complicate the research on individuals with AD. Case studies, single subject experimental designs, and tightly controlled quasi-experimental and experimental designs are needed to advance knowledge in this important area.

Keywords: Activities, AD, Alzheimer’S Disease, Art Therapy, Behavior, Citation, Computer, Database, Dementia, Diagnosis, Elderly, Exercise, Exercise, Games, Gender, Intervention, Journals, Knowledge, Level, Literature, Literature Review, Medline, Methodology, Movement, Music, Music Activities, Nursing-Home Residents, People, Professional, Program, Reminiscence, Research, Researchers, Review, Rhythm, Sampling, Science, Science Citation Index, Self-Esteem, Severe Dementia, Sources, State, Systematic Review, Therapy, Topic, Web of Science

Pardo, C., Reolid, M., Delicado, M.V., Mallebrera, E. and Garcia-Meseguer, M.J. (2001), Nursing research in Spain: Bibliometrics of references of research papers in the decade 1985-1994. *Journal of Advanced Nursing*, **35** (6), 933-943.

Full Text: [J\J Adv Nur35, 933.pdf](J/J%20Adv%20Nur35,%20933.pdf)

Abstract: Background. Spain is one of the few European countries to have recently totally incorporated the study of nursing into the university sector. Bibliometric studies may be of a great help for the consolidation of nursing research.

Aim of the study. The aim of this paper is to describe bibliographic references in Spanish nursing research papers and their evolution over a decade.

Method. The method consists of a retrospective bibliometric study of a sample (cluster sampling) of 622 research papers (original papers and review papers), which were contained in the Spanish nursing journals Enfermeria Cientifica, Revista ROL de Enfermeria, Enfermeria Clinica and Enfermeria Integral, and published from 1985 to 1994. The journal Nursing Research was selected for qualitative comparative purposes. A series of classic bibliometric indexes were used.

Results. The mean of references per paper is 10.64±10.42; this increased over time (P < 0.001). Review papers have more references (P < 0.001). Price index (percentage of references published during the last 5 years) is 44% and the Insularity (percentage of references published in same country as the article) is 55%. References to journals predominate (58.6%), with a growing tendency for references to Spanish nursing journals, although they are still scarce (18.1% of the references to journals). Spanish is the language of most of the references (60.3%), the second language being English (36.1%).

Conclusions. Bibliographic references in Spanish nursing research papers are scarce and not very specific: this happens both in regard to Nursing Research and to publications in other national and international science areas. However, there is an increasing tendency of references (including references to nursing journals) in the period analysed. The age of the references places Spanish nursing in ail intermediate position between the ‘hard’ sciences and the humanities; and, according to the type of documentation used, we find it halfway between experimental and natural sciences, and technologies and social sciences. There has been a slight increase in references in English in recent years.

Keywords: Bibliometrics, Spanish Nursing Research, Analysis of References, Bibliographic References

Jakobsson, L., Hallberg, I.R. and Loven, L. (2001), Bibliometrics and a culture of measurement. *Journal of Advanced Nursing*, **36** (2), 167-168.

Full Text: [J\J Adv Nur36, 167.pdf](J/J%20Adv%20Nur36,%20167.pdf)

Keywords: Measurement, Science

Robinson, J. (2001), Looking back over 2001: News on JAN’s development. *Journal of Advanced Nursing*, **36** (6), 713.

Full Text: [J\J Adv Nur36, 713.pdf](J/J%20Adv%20Nur36,%20713.pdf)

Hewitt, J. (2002), A critical review of the arguments debating the role of the nurse advocate. *Journal of Advanced Nursing*, **37** (5), 439-445.

Full Text: [J\J Adv Nur37, 439.pdf](J/J%20Adv%20Nur37,%20439.pdf)

Abstract: A critical review of the arguments debating the role of the nurse advocate

Aims of the paper. This paper critically reviews the arguments for and against undertaking the role of nurse advocate.

Background. Advocacy has become a popular concept in nursing literature over the past two decades. By addressing issues of power and accountability, conclusions are drawn about the risks facing nurses who would practice patient advocacy.

Methods. Review and analysis of theoretical debate.

Results. Empirical evidence is sparse and philosophical arguments predominate in the field of patient advocacy. Humanistic arguments that promote advocacy as a moral imperative are compelling. However, in reality nurses appear to lack the power base to comply except by covert means. Informed consent with a knowledge of the consequences of undertaking such an intervention is as relevant to the nurse as it is to the patient.

Conclusion. Nurses need to be empowered first, if they are to empower their patients. There may however, be more suitable candidates for the role of patient advocate and nurses should recognize that they do not have a monopoly on ethical decision making.

van Teijlingen, E. and Hundley, V. (2002), Getting your paper to the right journal: A case study of an academic paper. *Journal of Advanced Nursing*, **37** (6), 506-511.

Full Text: [J\J Adv Nur37, 506.pdf](J/J%20Adv%20Nur37,%20506.pdf)

Abstract: Background. The scientific community views the publication of academic papers as a means of disseminating information, ensuring transparency and good practice in terms of research utilization. However, the choice of journal in which to publish is frequently influenced by other, less obvious, factors. This paper describes the lengthy route taken to get a methodological paper about pilot studies into print.

Aim and method. This paper shares some of our experiences and discusses the lessons that we learned about the process of getting into print. A case study approach is adopted to help the reader understand the different influences on this process.

Findings. Our methodological paper was submitted to six different academic journals before it was finally accepted for publication. The choice of journal was influenced by the need to reach an appropriate academic audience, the estimated turn around time (the time taken between submission of a paper and its subsequent publication) and the level of academic credibility of the journal (often assessed by the journal’s Impact Factor). Publishing in ‘high impact’ academic journals assumed considerable importance for us in view of the UK Research Assessment Exercise (RAE). However, the consequence of going down the journal status hierarchy was that we lost about 1 year through submitting, rewriting according to each of the journal’s specific requirements and resubmitting. The case study also demonstrates that getting into print often depends on a range of factors, not just the quality of the written text.

Conclusions. Getting a paper published may depend not only on the intrinsic quality of the paper, but also whether it is submitted to the ‘right’ academic journal. Moreover, if journals do not take certain papers (e.g. ones with negative findings or those reporting multi-disciplinary studies) then this can lead to publication bias.

Watson, R. (2002), Exemplary research for nursing and midwifery. *Journal of Advanced Nursing*, **38** (5), 536.

Full Text: [2002\J Adv Nur38, 536.pdf](2002/J%20Adv%20Nur38,%20536.pdf)

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Full Text: [2003\J Adv Nur42, 463.pdf](2003/J%20Adv%20Nur42,%20463.pdf)

Abstract: Aims of the paper. This paper aims to analyse critically a selective review of the literature on tiredness and fatigue in health and illness. This analysis is then applied to the experience of the new mother in the postnatal period. Background and rationale. Although the twin concepts of tiredness and fatigue are well known in both sickness and health, our understanding of them is less complete. This paradox of familiarity and lack of understanding applies particularly to the postnatal period. Method. A literature search was undertaken using MEDLINE, CINAHL and Web of Science. The search terms ‘tiredness’, ‘fatigue’ and ‘post natal’ were used. Findings. This search of the literature produced a small number of articles. Few of these, however, addressed the problem of tiredness or fatigue in the postnatal period, suggesting that this problem needs more research attention. Conclusions. On the basis of this analysis, it is suggested that childbirth education could be extended to foster more realistic expectations and more effective coping skills to facilitate women’s adjustment to motherhood. The possibility of midwives educating mothers about the need to access, recruit and delegate some household activities to willing helpers is addressed. We propose that midwives can help women to have more realistic expectations about life after the birth, by providing advice and legitimating the need for support and the use of coping mechanisms to assist the transition to motherhood.

Keywords: Activities, Analysis, Attention, Childbirth, Childbirth Education, Education, Fatherhood, Fatigue, Literature, Medline, Metaanalysis, Midwifery, Motherhood, Mothers, Postnatal, Postnatal Period, Postpartum Depression, Research, Review, Science, Sleep, Tiredness, Web of Science, Women, Womens Health

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Full Text: [2005\J Adv Nur50, 315.pdf](2005/J%20Adv%20Nur50,%20315.pdf)

Abstract: Aim. This paper presents a critical review of research literature on the impact of international placements on the lives and practice of nurses. Background. Health care institutions are progressively more aware of the need to respond to diverse patient populations and cultivate leaders to enrich the nursing profession, both locally and globally. One response has been to establish international exchange programmes for nursing students to give them experience of different cultures and health care systems. Methods. A search of the literature from 1980 to 2003 using electronic databases was undertaken using the databases CINAHL, ERIC, British Nursing Index, Web of Science, the BIDS Social Science Citation Index and MEDLINE. The keywords used were ‘international exchange experience’, ‘international studies’, ‘international education’, ‘international placement(s)’, ‘exchange programme(s)’, combined with I nurses/nursing’, combined with ‘evaluation’, ‘practice’, ‘education’ and/or ‘policy’. The papers retrieved used both qualitative and quantitative approaches and were scrutinized for recurring themes. Findings. Nurses reported significant changes in their personal development, perspectives on nursing practice and critical appraisal of health care systems. They also indicated an increased appreciation and sensitivity towards cultural issues and cross-cultural care. Moreover, differences in placement programmes, such as duration, preparation and debriefing were found to have affected the reported overall international placement experience. However, the primary effects of international placements were identified as personal development and transcultural adaptation. Conclusion. Students should be exposed to a variety of nursing experiences within the host country. This would give them a broad spectrum for comparisons between cultures, nursing practice and health care delivery in those cultures. Therefore, educational institutions are strongly encouraged to provide opportunities for students to participate in nursing care and education in another country.

Keywords: Abroad, Adaptation, Baccalaureate Nursing-Students, Citation, Collaboration, Critical Appraisal, Culture, Databases, Developing-Countries, Development, Education, Evaluation, Exchange Program, Experiences, Health, Health Care, Health Care Delivery, Impact, International Placement, Leaders, Literature, Literature Review, Methods, Nurses, Nursing, Papers, Participation, Perspective, Policy, Practice, Preparation, Primary, Professional, Quantitative, Research, Review, Science, Science Citation Index, Students, Web of Science

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Full Text: [2005\J Adv Nur51, 382.pdf](2005/J%20Adv%20Nur51,%20382.pdf)

Abstract: Aim. This paper presents a review of the qualitative literature which examines the experiences of patients with coronary heart disease. The paper also assesses whether the experiences of both female and male patients are reflected in the literature and summarizes key themes. Background. Understanding patients’ experiences of their illness is important for coronary heart disease prevention and education. Qualitative methods are particularly suited to eliciting patients’ detailed understandings and perceptions of illness. As much previous research has been ‘gender neutral’, this review pays particular attention to gender. Methods. Published papers from 60 qualitative studies were identified for the review through searches in MEDLINE, EMBASE, CINAHL, PREMEDLINE, PsychINFO, Social Sciences Citation Index and Web of Science using keywords related to coronary heart disease. Findings. Early qualitative studies of patients with coronary heart disease were conducted almost exclusively with men, and tended to generalize from ‘male’ experience to ‘human’ experience. By the late 1990s this pattern had changed, with the majority of studies including women and many being conducted with solely female samples. However, many studies that include both male and female coronary heart disease patients still do not have a specific gender focus. Key themes in the literature include interpreting symptoms and seeking help, belief about coronary ‘candidates’ and relationships with health professionals. The influence of social roles is important: many female patients have difficulties reconciling family responsibilities and medical advice, while male patients worry about being absent from work. Conclusions. There is a need for studies that compare the experiences of men and women. There is also an urgent need for work that takes masculinity and gender roles into account when exploring the experiences of men with coronary heart disease.

Keywords: Disease, Education, Experience, Family, Female, Gender, Health, Health Professionals, Heart, Human, Literature, Male, Medical, MEDLINE, Men, Methods, Papers, Patients, Pattern, Prevention, Qualitative, Research, Responsibilities, Review, Social, Symptoms, Web of Science, Women, Work

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Full Text: [2005\J Adv Nur51, 502.pdf](2005/J%20Adv%20Nur51,%20502.pdf)

Abstract: Aims. This paper reports an analysis of recruitment and response rates in published nursing research in three peer reviewed nursing journals in 2002. We wished to establish if the deficits in reporting nursing research identified a decade earlier had been addressed. Background. This analysis was informed by our personal experiences of research which produced widely differing response rates. An examination of the literature revealed a lack of consensus on desirable response rates in nursing research. Previous analyses have shown deficits in describing participants, sampling methods and reporting recruitment. Methods. Papers reporting empirical research in three nursing journals in 2002 were reviewed in terms of a number of variables including research methodology, respondent type, recruitment method, response rate, location, and data collection method. Nominal coding was used as necessary. Data were analysed using the Statistical Package for Social Sciences and a variety of descriptive statistics were employed. Results. Half of the papers did not report a response rate. Of those which did, over three-quarters of both qualitative and quantitative studies had response rates of 60% or more. Research conducted in hospital and educational settings produced higher response rates than those in community settings. Studies with response rates of less than 60% did not always refer to their rates in the study limitations, and low response rates do not appear to be a barrier to publication. Conclusion. Reporting of sampling, recruitment and response rates in nursing research must be improved to support nursings’ claim to be an evidence-based profession and to underpin clinical governance requirements. Only through improvements in the quality of nursing research publications can knowledge be extended and a better-informed research community be created.

Keywords: Analyses, Analysis, Barrier, Clinical, Coding, Collection, Community, Consensus, Data, Data Collection, Evidence Based, Evidence-Based, Examination, Governance, Hospital, Improvement, Journals, Knowledge, Literature, Location, Methodology, Methods, Nursing, Papers, Peer-Reviewed, Profession, Publication, Publications, Qualitative, Quality, Quality of, Rates, Recruitment, Reporting, Research, Sampling, Sampling Methods, Statistics, Support

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Full Text: [2005\J Adv Nur52, 328.pdf](2005/J%20Adv%20Nur52,%20328.pdf)

Abstract: Aims: This paper reports a review conducted to identify the factors in the indoor environment that have an evidence-based link with the exacerbation or development of asthma and to identify measures that healthcare professionals can promote to reduce exposure to these risk factors in the home. Background: The indoor environment, particularly at home, has been recognized as a major source of exposure to allergens and toxic chemicals. Exposure to allergens and toxins is thought to exacerbate respiratory conditions, in particular, asthma. Methods: Searches were made of health and indoor environment databases, including Cochrane Library, National Health Services Centre for Reviews and Assessment Reports, British Medical Journal, CINAHL and Ovid library, MEDSCAPE/MEDLINE, EMBASE, INGENTA, Science Citation Index, Web of Science. Searches were also made of other Internet-based resources, including those of international and government bodies. The following keywords were used: Allergens, allergen avoidance, asthma, asthma prevention, cat, damp, Der p 1, dog, environmental control, house dust mites, indoor air quality, indoor environment, meta analysis, mould, pets, remedial actions, respiratory illnesses and systematic reviews. Findings: There is evidence of a link between asthma and a small number of indoor environmental factors. There is currently only reasonable evidence for one causative factor for asthma in the indoor environment and that is house dust mite allergen. Although there are many studies of different remedial actions that can be taken in the home, often these give evidence of reduced risk of exposure but not clinical improvement in asthma. Although there is a lack of medical evidence for the reduction of known sensitizers such as mould, this is because of a dearth of research rather than evidence of no association. Conclusion: There is some evidence of a link between the indoor environment and asthma. There are measures, which could be promoted by healthcare professionals to alleviate asthmatic symptoms.

Keywords: Air-Cleaners, Airborne Molds, Allergen Avoidance, Analysis, Assessment, Asthma, Cat Allergen, Chemicals, Children, Citation, Cochrane, Control, Databases, Development, Dog Allergen, Double-Blind, Embase, Environment, Environmental, Health, Health Education And Promotion, Health Visiting, Healthcare Professionals, Homes, House-Dust Mite, Indoor Environment, Journal, Literature, Literature Review, Mattress Encasings, Mechanical Ventilation, Medical, Meta-Analysis, Methods, Prevention, Research, Review, Risk, Risk Factors, Science, Science Citation Index, Symptoms, Systematic, Systematic Reviews, Web of Science

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Full Text: [2006\J Adv Nur54, 217.pdf](2006/J%20Adv%20Nur54,%20217.pdf)

Abstract: Aim. This paper reports a review which draws together findings from studies targeting parents’ temperature-taking, antipyretic administration, attitudes, practices and information-seeking behaviours. Background. Parents’ concerns about the harmful effects of fever have been reported for more than two decades. These concerns remain despite successful educational interventions. Method. MEDLINE, CINAHL, PsycINFO, PsycARTICLES and Web of Science databases were searched from 1980 to 2004 during November 2004. The search terms were fever, child, parent, education, knowledge, belief, concern, temperature, antipyretic and information, and combinations of these. Findings. In the 1980s, studies were mainly descriptive of small single site samples of parents with a febrile child seeking assistance from healthcare professionals. From 1990, sample sizes increased and multi-site studies were reported. Educational interventions were designed to increase knowledge and reduce unnecessary use of health services. One 2003 study targeted knowledge and attitudes. Parental knowledge about normal body temperature and the temperature that indicates fever is poor. Mild fever is misclassified by many as high, and they actively reduce mild fever with incorrect doses of antipyretics. Although sonic parents acknowledge the benefits of mild fever, concerns about brain damage, febrile convulsions and death from mild to moderate fever persist irrespective of parental education or socioeconomic status. Many base their fever management practices on inaccurate temperature readings. increased use of antipyretics to reduce fever and waking sleeping febrile children for antipyretics or sponging reflects heightened concern about harmful effects of fever. Educational interventions have reduced unnecessary use of healthcare services, improved knowledge about fever and when to implement management strategies, and reduced incorrect parental accuracy of antipyretic dosing. Information-seeking behaviours in fever managernent differ according to country of origin. Conclusion. Despite successful educational interventions, little has changed in parents’ fever management knowledge, attitudes and practices. There is a need for interventions based on behaviour change theories to target the precursors of behaviour, namely knowledge, attitudes, normative influences and parents’ perceptions of control.

Keywords: Accuracy, Acetaminophen, Antipyretic Therapy, Attitudes, Brain, Child, Children, Control, Databases, Education, Fever, Health Services, Healthcare Professionals, Home, Information, Information Seeking, Interventions, Knowledge, Literature, Literature Review, Management, Medication Management, Normal, Nurses, Parent, Parental Attitudes, Parenting, Parents, Perceptions, Phobia, Planned Behavior, Preschool-Children, Public Health Nursing, Review, Science, Socioeconomic Status, Theories, Web of Science

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Full Text: [2007\J Adv Nur60, 359.pdf](2007/J%20Adv%20Nur60,%20359.pdf)

Abstract: Aim. This paper is a report of a literature review of the determinants of health and health behaviour relevant to coronary heart disease risk for women living on a low income. Background. Coronary heart disease is now recognized as the biggest killer of women in both developed and developing countries. As in men, women’s mortality rates for coronary heart disease seem to be directly related to income inequality and social deprivation. Method. The MEDLINE, British Nursing Index, CINAHL, Cochrane Library, Psychinfo and Web of Science databases were searched from 1996 to 2006 using the search terms ‘women and CHD risk’, ‘women and health behaviour’, ‘women low income and health behaviour’, ‘women low income and smoking’, ‘women low income and diet’ and ‘women low income and exercise’. In relation to the wider determinants of health ‘women low income and CHD’, ‘women education and CHD’, ‘women employment and CHD’ and ‘women housing and CHD’. Seminal research reports before this period were included if they proved highly influential on later research. A narrative review was conducted. Findings. All the wider determinants of health considered had a negative impact on heart disease risk for women living on low incomes. The latter also appears to have a negative impact on health behaviour. Conclusion. Although the impact of the wider determinants of health on coronary heart disease risk are well-understood, their impact on health behaviour (specifically diet, exercise and smoking) is less well-understood. If effective interventions are to be designed to tackle inequalities in health, then this deficiency needs to be addressed urgently.

Keywords: Cardiovascular-Disease, Childhood, Cochrane, Coronary Heart Disease, Databases, Deprivation, Determinants, Developing Countries, Disease, Disease Risk, Education, Effective Interventions, Employment, Exercise, Follow-Up, Health Behaviour, Health Inequalities, Impact, Income, Interventions, Literature, Literature Review, Men, Mortality, Nursing, Physical-Activity, Poverty, Prevention, Research, Review, Risk, Science, Smoking, Social, Socioeconomic Determinants, Web of Science, Whitehall-II, Women

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Full Text: [2008\J Adv Nur61, 232.pdf](2008/J%20Adv%20Nur61,%20232.pdf)

Abstract: Aim. This paper is a report of an analysis of the concept of teamwork. Background. Teamwork is seen as an important facilitator in delivering quality healthcare services internationally. However, research studies of teamwork in health care are criticized for lacking a basic conceptual understanding of what this concept represents. A universal definition for healthcare settings and professionals is missing from published literature. Method. Walker and Avant’s approach was used to guide this concept analysis. Literature searches used bibliographic databases (MEDLINE, CINAHL, Web of Science, Proquest CSA), internet search engines (GoogleScholar), and hand searches. Literature published between 1976 and 2006 was reviewed but only material in English was included. Findings. Based on the analysis undertaken, teamwork is proposed as a dynamic process involving two or more healthcare professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning, or evaluating patient care. This is accomplished through interdependent collaboration, open communication and shared decision-making, and generates value-added patient, organizational and staff outcomes. Conclusion. Praising the value of teamwork without a common understanding of what this concept represents endangers both research into this way of working and its effective utilization in practice. The proposed definition helps reconcile discrepancies between how this concept is understood by nurses and doctors, as well as allied health professionals. A common understanding can facilitate communication in educational, research and clinical settings and is imperative for improving clarity and validity of future research.

Keywords: Analysis, Bibliographic, Bibliographic Databases, Collaboration, Collaboration, Communication, Concept Analysis, Databases, Decision Making, Decision-Making, Health Care, Health-Care, Healthcare Professionals, Intensive-Care Units, Literature, Management, Nurses, Nursing, Outcomes, Patient Outcomes, Perceptions, Physicians, Practice, Research, Satisfaction, Science, Shared Decision Making, Teams, Teamwork, Utilization, Validity, Web of Science

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Full Text: [2008\J Adv Nur61, 711.pdf](2008/J%20Adv%20Nur61,%20711.pdf)

Abstract: Aim. This paper is a report of a concept analysis of empathy. Background. It is widely accepted that an empathetic response is necessary for nurses to deliver adequate pain relief and therapeutic care. Previous work suggests that empathy is a learned behaviour, and thus can be blocked if necessary to diminish personal distress. Methods. A computerized search of the CINAHL, MEDLINE, PsycINFO, and Web of Science databases from 1980 to 2007 was conducted, using the keywords pain and empathy, both alone and in combination. Similar concepts such as sympathy, caring and compathy were included if the database distinguished between these concepts. Twenty-five relevant articles were reviewed and Rodgers evolutionary concept analysis process was used to clarify the concept. Findings. The recent observation that a mirror-like neural response occurs in the brain of a person witnessing another in pain provides compelling evidence that empathetic arousal may occur independent of the previously described attributes of prior experience or learned cognitive appraisal. Conclusion. While the empathetic response of care providers plays a central role in the recognition and treatment of pain, nurses are taught that regulation of this response is important to protect themselves against the traumatic effects of seeing patients in pain. However, there is emerging evidence that some elements of empathetic arousal are autonomic and therefore unable to be fully controlled; this may have important implications for nurses’ vulnerability.

Keywords: Analysis, Areas, Attention, Brain, Concept Analysis, Cortex, Databases, Distress, Empathy, Healthcare Professionals, Humans, Impact, Medline, Methods, Modulation, Neural Mechanisms, Nurses, Nursing, Nursing Knowledge, Observation, Others Pain, Pain, Rodgers, Science, Treatment, Vulnerability, Web of Science

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Full Text: [2008\J Adv Nur63, 132.pdf](2008/J%20Adv%20Nur63,%20132.pdf)

Abstract: Aim. This paper is a report of a literature review to identify research involving interventions to improve medication adherence in people with multiple co-existing chronic conditions. Background. The importance of managing co-existing, chronic conditions in people of all ages is critical to prevent adverse health outcomes. Data sources. Databases, including Cumulative Index of Nursing and Allied Health Literature, MEDLINE, PUBMED and Web of Science were searched for the period January 1997-2007 using the combined keywords adherence, compliance, drug therapy, medication, clinical trial, randomized controlled trial, intervention, chronic condition, chronic disease, multiple morbidity and comorbidity. References of retrieved papers were also considered. Methods. The inclusion criteria were: English language, oral medication adherence, self-administered medications, multiple prescribed medications for three or more chronic conditions and randomized controlled trials lasting at least 3 months. Results. Studies examining medication adherence in people with multiple chronic conditions targeted people over 70 years of age, and were primarily focused on the management of polypharmacy and reducing healthcare costs. Adherence was measured using different tools and estimates of adherence, and interventions were predominantly delivered by pharmacists. The evidence for effective interventions to enhance medication adherence in multiple chronic conditions was weak, and psychosocial interventions were absent. Conclusion. Interventions that improve medication adherence for people with multiple chronic conditions are essential, given the increased prevalence of these conditions in people of all ages. Outcomes of improved adherence, such as disease control and quality of life, require investigation. Psychosocial interventions engaging people in medication self-management offer potential for improved patient outcomes in complex diseases.

Keywords: Adherence, Chronic Condition, Chronic Disease, Clinical Trial, Comorbidity, Compliance, Control, Costs, Databases, Depression, Disease, Drug, Effective Interventions, Elderly Patients, Health, Health Outcomes, Impact, Intervention, Interventions, Literature, Literature Review, Management, Medication, Medication Adherence, Methods, Morbidity, Nursing, Osteoarthritis, Outcomes, Papers, Patient Outcomes, Patient-Adherence, Pharmaceutical Care, Pharmacists, Pharmacy-Based Provision, Prevalence, Psychosocial, Pubmed, Quality of Life, Randomized Controlled Trial, Randomized Controlled Trials, Randomized Controlled-Trial, References, Research, Review, Science, Self-Management, Systematic, Systematic Review, Therapy, Web of Science

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Full Text: [2009\J Adv Nur65, 957.pdf](2009/J%20Adv%20Nur65,%20957.pdf)

Abstract: Protocolized vs. non-protocolized weaning for reducing the duration of mechanical ventilation in critically ill adult patients: Cochrane review protocol. This paper is a report of the protocol for a review to identify, critically appraise and synthesize the best current evidence supporting the use of weaning protocols compared to non-protocolized practice in liberating patients from mechanical ventilation. Patients experiencing difficulty in weaning require a longer hospital stay and have higher morbidity and mortality. Consequently, efforts to reduce weaning time are desirable to reduce the duration of ventilation and related complications. Standardized weaning protocols are safe and effective in reducing the time spent on mechanical ventilation. Notwithstanding, the evidence supporting their use in practice is inconsistent. The discordant results of studies may reflect the fact that protocols vary in composition and are implemented in different environments by various healthcare providers. The objectives of this review are to compare the total duration of mechanical ventilation between patients weaned using protocols vs. non-protocolized practice; to ascertain differences between protocolized and non-protocolized weaning with regards to mortality, adverse events, quality of life, weaning duration, ICU and hospital stay; and to explore variation in outcomes by the type of ICU, the type of protocol and approach to delivering the protocol. We will search the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library), MEDLINE, EMBASE, CINAHL, ISI Web of Science and LILACS. In addition, we will endeavour to identify unpublished data and contact first authors of studies included in the review to obtain information on unpublished studies or work in progress. This review will provide much needed direction for healthcare professionals in intensive care in terms of both research and practice.

Keywords: Adult, Adults, Authors, Care, Clinical-Trials, Cochrane, Cochrane Review Protocol, Controlled-Trial, Critical Care, Discordant, Embase, Healthcare Professionals, Hospital, ICU, Information, Intensive Care, ISI, Mechanical Ventilation, Medline, Metaanalysis, Morbidity, Mortality, Non-Protocolized Weaning, Nursing, Outcomes, Pneumonia, Practice, Protocol, Protocolized Vs, Quality of Life, Research, Review, Science, Support, System, Web of Science

? Flemming, K. (2010), Synthesis of quantitative and qualitative research: An example using Critical Interpretive Synthesis. *Journal of Advanced Nursing*, **66** (1), 201-217.

Full Text: [2010\J Adv Nur66, 201.pdf](2010/J%20Adv%20Nur66,%20201.pdf)

Abstract: P>Title. Synthesis of quantitative and qualitative research: an example using CriticalInterpretive Synthesis. Aim. This paper is a report of a Critical Interpretive Synthesis to synthesize quantitative research, in the form of an effectiveness review and a guideline, with qualitative research to examine the use of morphine to treat cancer-related pain. Background. Critical Interpretive Synthesis is a new method of reviewing, developed from meta-ethnography, which integrates systematic review methodology with a qualitative tradition of enquiry. It has not previously been used specifically to synthesize effectiveness and qualitative literature. Data sources. An existing systematic review of quantitative research and a guideline examining the effectiveness of oral morphine to treat cancer pain were identified. Electronic searches of Medline, CINAHL, Embase, PsychINFO, Health Management Information Consortium database and the Social Science Citation Index to identify qualitative research were carried out in May 2008. Review methods. Qualitative research papers reporting on the use of morphine to treat cancer pain were identified. The findings of the effectiveness research were used as a framework to guide the translation of findings from qualitative research using an integrative grid. A secondary translation of findings from the qualitative research, not specifically mapped to the effectiveness literature, was guided by the framework. Results. Nineteen qualitative papers were synthesized with the quantitative effectiveness literature, producing 14 synthetic constructs. These were developed into four synthesizing arguments which drew on patients’, carers’ and healthcare professionals’ interpretations of the meaning and context of the use of morphine to treat cancer pain. Conclusion. Critical Interpretive Synthesis can be adapted to synthesize reviews of quantitative research into effectiveness with qualitative research and fits into an existing typology of approaches to synthesizing qualitative and quantitative research.

Keywords: African-Americans, Cancer, Cancer Pain, Cancer Pain, Carers, Citation, Comfort, Critical Interpretive Synthesis, Experiences, Lessons, Literature, Literature Review, Management, Meta-Ethnography, Methodology, Morphine, Morphine, Nursing, Papers, Qualitative Research, Quantitative Research, Research, Research Papers, Review, Reviewing, Science, Science Citation Index, Systematic Review, Systematic Review Methods, Systematic Reviews, Tuberculosis

? St-Pierre, I. and Holmes, D. (2010), The relationship between organizational justice and workplace aggression. *Journal of Advanced Nursing*, **66** (5), 1169-1182.

Full Text: [2010\J Adv Nur66, 1169.pdf](2010/J%20Adv%20Nur66,%201169.pdf)

Abstract: P>Title. The relationship between organizational justice and workplace aggression. Aim. This paper is a discussion of the links between organizational justice and workplace aggression. Background. Managers have been identified as key players in implementing and maintaining an organizational culture of trust and justice. Employees who perceive themselves to be victims of injustice may rebel, using various means to ‘punish’ the source of the injustice. Data sources. Literature review of publications in English and French from the early 1960 to 2009, including books, was conducted. Bibliographic databases searched for journal articles were Cumulative Index to Nursing and Allied Health Literature, Current Content, EMBASE, MEDLINE, PsycINFO and Web of Science. Discussion. The work environment and roles of nursing managers have changed considerably in the last 20 years, resulting in challenging working conditions for nursing managers. These can have an impact on their ability to create a trusting and fair culture, and can mean that they themselves be considered victims of organizational injustice. Implications for nursing. The failure of many re-engineering projects has been linked to a lack of consideration of the impact of perception of justice when implementing change. In addition, perception of organizational justice has the potential to influence many organizational outcomes, such as perception of respect and trust. As justice is a founding principle of biomedical ethics, principles of justice, equity and fairness must be upheld in practice in accordance with the requirements of professional codes of ethics. Conclusion. The concept of justice is linked to the founding principles of biomedical ethics, and these must be upheld in order to practise in accordance with professional codes of ethics and conduct.

Keywords: Behavior, Bibliographic, Bibliographic Databases, Biomedical, Culture, Databases, Embase, Environment, Ethics, Exchange, Fair, Health, Impact, Injustice, Journal, Literature Review, Model, Nurse Managers, Nursing, Nursing Managers, Organizational Justice, Outcomes, Perception, Practice, Professional, Publications, Review, Roles, Science, Web of Science, Work, Work Environments, Workplace Aggression

? Sangster-Gormley, E., Martin-Misener, R., Downe-Wamboldt, B. and DiCenso, A. (2011), Factors affecting nurse practitioner role implementation in Canadian practice settings: An integrative review. *Journal of Advanced Nursing*, **67** (6), 1178-1190.

Full Text: [2011\J Adv Nur67, 1178.pdf](2011/J%20Adv%20Nur67,%201178.pdf)

Abstract: P>Aim. To review the literature about the Canadian experience with nurse practitioner role implementation and identify influencing factors. Background. Although nurse practitioners have been in existence for more than 40 years, their integration into healthcare systems has been challenging. While frameworks exist to guide implementation of these roles, clear identification of factors influencing role implementation may inform best practices. Given that Canada has witnessed considerable growth in nurse practitioner positions in the past decade, an exploration of its experience with role implementation is timely. Data sources. A review of Canadian literature from 1997 to 2010 was conducted. Electronic databases including CINAHL, Cochrane Database of Systematic Reviews, Health Source: Nursing Academic Edition, MEDLINE, Social Science Index, PUBMED, Web of Science and PsychINFO and government and professional organization websites were searched. Methods. An integrative review was performed guided by Whittemore and Knafl’s method. Results. Ten published studies and two provincial reports were included. Numerous facilitators and barriers to implementation were identified and analysed for themes. Three concepts influencing implementation emerged: involvement, acceptance and intention. Involvement is defined as stakeholders actively participating in the early stages of implementation. Acceptance is recognition and willingness to work with nurse practitioner. Intention relates to how the role is defined. Conclusion. This integrative review revealed three factors that influence nurse practitioner role implementation in Canada: involvement, acceptance and intention. Strategies to enhance these factors may inform best practice role implementation processes.

Keywords: Acceptance, Barriers, Barriers, Canada, Cochrane, Concept Development, Databases, Facilitators, Framework, Health, Health-Care, Integrative Review, Involvement, Literature, Long-Term-Care, Methods, Nurse Practitioner, Nursing, Practice, Professional, Pubmed, Review, Role Implementation, Science, Systematic, Web of Science, Websites

? Choi, Y.S., Lawler, E., Boenecke, C.A., Ponatoski, E.R. and Zimring, C.M. (2011), Developing a multi-systemic fall prevention model, incorporating the physical environment, the care process and technology: A systematic review. *Journal of Advanced Nursing*, **67** (12), 2501-2524.

Full Text: 2011\J Adv Nur67, 2501.pdf

Abstract: Aims. This paper reports a review that assessed the effectiveness and characteristics of fall prevention interventions implemented in hospitals. A multi-systemic fall prevention model that establishes a practical framework was developed from the evidence. Background. Falls occur through complex interactions between patient-related and environmental risk factors, suggesting a need for multifaceted fall prevention approaches that address both factors. Data sources. We searched Medline, CINAHL, PsycInfo and the Web of Science databases for references published between January 1990 and June 2009 and scrutinized secondary references from acquired papers. Review methods. Due to the heterogeneity of interventions and populations, we conducted a quantitative systematic review without a meta-analysis and used a narrative summary to report findings. Results. From the review, three distinct characteristics of fall prevention interventions emerged: (1) the physical environment, (2) the care process and culture and (3) technology. While clinically significant evidence shows the efficacy of environment-related interventions in reducing falls and fall-related injuries, the literature identified few hospitals that had introduced environment-related interventions in their multifaceted fall intervention strategies. Conclusion. Using the multi-systemic fall prevention model, hospitals should promote a practical strategy that benefits from the collective effects of the physical environment, the care process and culture and technology to prevent falls and fall-related injuries. By doing so, they can more effectively address the various risk factors for falling and therefore, prevent falls. Studies that test the proposed model need to be conducted to establish the efficacy of the model in practice.

Keywords: Author, Balance, Care, Culture, Databases, Effectiveness, Efficacy, Environment, Environmental, Falls, Hospitalized-Patients, Hospitals, Injuries, Inpatients, Intervention, Interventions, Literature, Medline, Meta Analysis, Meta-Analysis, Model, Nursing, Older Adults, Papers, Patient Falls, Patient Safety, Physical Environment, Practice, Prevention, Process, Program, Quantitative, Randomized Controlled-Trial, Reduction, Retrospective Analysis, Review, Risk, Risk Factors, Risk-Factors, Science, Strategy, Systematic, Systematic Review, Technology, USA, Web of Science, Web-of-Science

? Fryer, C., Mackintosh, S., Stanley, M. and Crichton, J. (2012), Qualitative studies using in-depth interviews with older people from multiple language groups: Methodological systematic review. *Journal of Advanced Nursing*, **68** (1), 22-35.

Full Text: [2012\J Adv Nur68, 22.pdf](2012/J%20Adv%20Nur68,%2022.pdf)

Abstract: Aim. This paper is a report of a methodological review of language appropriate practice in qualitative research, when language groups were not determined prior to participant recruitment. Background. When older people from multiple language groups participate in research using in-depth interviews, additional challenges are posed for the trustworthiness of findings. This raises the question of how such challenges are addressed. Data sources. The Cumulative Index to Nursing and Allied Health Literature, Scopus, Embase, Web of Science, Ageline, PsycINFO, Sociological abstracts, Google Scholar and Allied and Complementary Medicine databases were systematically searched for the period 1840 to September 2009. The combined search terms of ethnic, cultural, aged, health and qualitative were used. Review methods. In this methodological review, studies were independently appraised by two authors using a quality appraisal tool developed for the review, based on a protocol from the McMaster University Occupational Therapy Evidence-Based Practice Research Group. Results. Nine studies were included. Consideration of language diversity within research process was poor for all studies. The role of language assistants was largely absent from study methods. Only one study reported using participants preferred languages for informed consent. Conclusion. More examples are needed of how to conduct rigorous in-depth interviews with older people from multiple language groups, when languages are not determined before recruitment. This will require both researchers and funding bodies to recognize the importance to contemporary healthcare of including linguistically diverse people in participant samples.

Keywords: Aged, Authors, Cancer, Cultural Diversity, Databases, Different Ethnic-Groups, Disparities, Funding, Google Scholar, Health, Inequalities, Informed Consent, Interpreters, Interviews, Issues, Language Barriers, Literature, Methodological Review, Nursing, Occupational, Older People, Pain, People, Practice, Process, Protocol, Qualitative, Qualitative Research, Quality, Recruitment, Research, Researchers, Review, Rigour, Science, Scopus, Services, Systematic, Systematic Review, Translation, University, Web of Science, Web-of-Science

# Title: Journal of Advanced Oxidation Technologies

Full Journal Title: Journal of Advanced Oxidation Technologies

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kumar, K.V. and Porkodi, K. (2007), Modeling the diffusion mechanism and the reaction kinetics for the photocatalytic degradation of acid red 151 aqueous solutions by ZnO: Comparison of linear and non-linear methods. *Journal of Advanced Oxidation Technologies*, **10** (2), 447-455.

Abstract: Batch processes were carried out for the photocatalytic degradation of Acid Red 151 from its aqueous solution using ZnO catalyst at different initial dye concentrations. The process was found to be diffusion controlled for the first 15-20 minutes (before irradiation) with an average diffusion coefficient of 6.759×10-6 cm2/s. The photocatalytic degradation kinetics was analyzed using the first order, second order and Langmuir-Hinshelwood expressions by linear and non-linear method. The four types of second order kinetic and Langmuir-Hinshelwood kinetic models were also discussed. Non-linear method is a better way to obtain the kinetic parameters. The photocatalytic degradation process was found to follow first order kinetics at lower substrate concentrations and second order kinetics at higher substrate concentrations.

Keywords: Acid, Acid Red 151, Aqueous Solution, Aqueous Solutions, Catalyst, Concentrations, Decolorization, Degradation, Degradation Kinetics, Diffusion, Diffusion Coefficient, Doped TiO2, Dye, First Order, First Order Kinetics, Irradiation, Kinetic, Kinetic Models, Kinetic Parameters, Kinetics, Linear, Mechanism, Methods, Models, Non-Linear, Non-Linear Method, Nonlinear, Order, Parameters, Photocatalytic Degradation, Process, Reaction, Reaction Kinetics, Second Order, Second Order Kinetics, Solutions, Sorption Isotherm, Substrate, Suspensions, Thin-Film, Titanium-Dioxide, ZnO

# Title: Journal of Advanced Zoology

Full Journal Title: Journal of Advanced Zoology

ISO Abbreviated Title: J. Adv. Zool.

JCR Abbreviated Title: J Adv Zool

ISSN: 0253-7214

Issues/Year: 2

Journal Country/Territory: India

Language: English

Publisher: Assn Advan Zoology

Publisher Address: Azadanagar Colony Rustampur, Gorakhpur 273001, India

Subject Categories:

Zoology: Impact Factor

? Gupta, P.K. and Singh, J. (1984), Biology of bean stemfly (Ophiomyia-phaseoli Tryon, diptera, agromyzidae). *Journal of Advanced Zoology*, **5** (1), 34-41.

# Title: Journal of Advertising

Full Journal Title: Journal of Advertising

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Beard, F.K. (1984), Peer evaluation and readership of influential contributions to the advertising literature. *Journal of Advertising*, **31** (4), 65-75.

Full Text: [J\J Adv31, 65.pdf](J/J%20Adv31,%2065.pdf)

Abstract: Prior research on advertising literature consists primarily of studies of journal article authorship and author productivity, journal content and quality, and citation patterns. Absent from this stream of research is direct evidence of the influence of individual authors and their works in the form of peer evaluation and readership. For this study, a priori lists of influential books and articles were used in a survey of U.S. advertising educators and academic researchers. The results reveal a core of research-based and practice-oriented contributions of widely recognized importance and influence. The findings also provide 1. valuable lists of readings for current and future students and educators, 2. direct evidence of the quality of individual literary contributions, and 3. useful insights into the theoretical, intellectual, and practical foundations of the field.

? Pasadeos, Y. (1985), A bibliometric study of advertising citations. *Journal of Advertising*, **14** (4), 52-59.

Full Text: [1985\J Adv14, 52.pdf](1985/J%20Adv14,%2052.pdf)

Abstract: A bibliometric investigation identified citation patterns in advertising-related articles published during 1981-83 in a num- ber of core journals and conference proceedings in advertising, marketing, consumer research and communication. Business publications and psychology publications were found to have accounted for more than half of the 6,312 citations coded in this study. Although the raw data indicated that the Journal of Marketing Research and the Journal of Advertising Research were historically the most-cited journals, a method that con- trols for differences in years of publication, number of articles published per year and frequency of self-citations detected an increased impact, in recent years, on the part of the Journal of Advertising and of consumer-research publications.

Keywords: Bibliometric, Citations

? Pasadeos, Y., Phelps, J. and Kim, B.H. (1998), Disciplinary impact of advertising scholars: Temporal comparisons of influential authors, works and research networks. *Journal of Advertising*, **27** (4), 53-70.

Full Text: [1998\J Adv27, 53.pdf](1998/J%20Adv27,%2053.pdf)

Abstract: In a bibliometric study of the advertising literature, the authors identified the most-cited writers, most-cited published works, and co-citation networks for 1982-1985 and 1992-1995. Such connections among scholars can be used to identify, streams of research in advertising; some of these streams show temporal progressions. The 10,526 citations indicate that a handful of works from the 1960s and 1970s continue to have an impact on the advertising literature, whereas a large and interconnected body of work from the 1980s has had more recent impact. These findings may indicate greater paradigmatic rigor in recent years.

Keywords: Article Productivity, Authors, Bibliometric, Bibliometric Study, Brand Attitude, Citation Analysis, Citations, Co-Citation, Cognitive Response, Consumer Research, Impact, Information-Content, Literature, Mass-Communication Scholars, Mediating Acceptance, Research, Television Commercials, Temporal, United-States

? Zou, S.M. (2005), Contributions to international advertising research: An assessment of the literature between 1990 and 2002. *Journal of Advertising*, **34** (1), 99-110.

Full Text: [2005\J Adv34, 99.pdf](2005/J%20Adv34,%2099.pdf)

Abstract: Research in the field of international advertising has produced a large volume of literature. Although some attempts have been made in the past to review this stream of research, there has been no attempt to assess the contributions to this literature by individuals and institutions. This study assesses the contributions of individual researchers and institutions from 1990 to 2002, based on their publications in major advertising, marketing, and international business journals, and the Social Science Citation Index (SSCI). The findings of this study offer researchers a unique view of this field and some directions for future research.

Keywords: Assessment, Business, Citation, Journals, Literature, Publications, Research, Researchers, Review, Science, Science Citation Index, Social Science Citation Index, SSCI

? Kim, J. and McMillan, S.J. (2008), Evaluation of Internet advertising research - A bibliometric analysis of citations from key sources. *Journal of Advertising*, **37** (1), 99-112.

Full Text: [2008\J Adv37, 99.pdf](2008/J%20Adv37,%2099.pdf)

Abstract: How has scholarly research shaped the Internet advertising field since the mid 1990s? This study addresses that broad question with a bibliometric analysis of academic literature on Internet advertising. By examining most-cited authors and papers, as well as co-citation patterns, a general picture of the field can be drawn. This analysis sets a baseline that will enable future scholars to see where the field of Internet advertising research began and trace its shift over time.

Keywords: AD, Advertising, Analysis, Attitude, Bibliometric, Bibliometric Analysis, Citations, Co-Citation, Cocitation, Commercials, Field, General, Interactivity, Internet, Involvement, Literature, Networks, Papers, Publication Productivity, Research, Responses, Sites, Sources, World-Wide-Web

# Title: Journal of Aerosol Science

Full Journal Title: [Journal of Aerosol Science](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5810&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=4cc3837cf6d960e4930c268934161980)

ISO Abbreviated Title: J. Aerosol. Sci.

JCR Abbreviated Title: J Aerosol Sci

ISSN: 0021-8502

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Journal Country/Territory: England

Language: Multi-Language

Publisher: Pergamon-Elsevier Science Ltd

Publisher Address: The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England

Engineering, Chemical: Impact Factor 2.071, 2/117 (2000); Impact Factor 1.895, 7/126 (2002)

Engineering, Mechanical: Impact Factor 2.071, 2/102 (2000); Impact Factor 1.895, / (2002)

Environmental Sciences: Impact Factor 2.071, 11/127 (2000); Impact Factor 1.895, / (2002)

Meteorology & Atmospheric Sciences: Impact Factor 2.071, 9/40 (2000); Impact Factor 1.895, / (2002)

Notes: highly cited

? Kulmala, M., Vehkamaki, H., Petaja, T., Dal Maso, M., Lauri, A., Kerminen, V.M., Birmili, W. and McMurry, P.H. (2004), Formation and growth rates of ultrafine atmospheric particles: A review of observations. *Journal of Aerosol Science*, **35** (2), 143-176.

Full Text: [2004\J Aer Sci35, 143.pdf](2004/J%20Aer%20Sci35,%20143.pdf)

Abstract: Over the past decade, the formation and growth of nanometer-size atmospheric aerosol particles have been observed at a number of sites around the world. Measurements of particle formation have been performed on different platforms (ground, ships, aircraft) and over different time periods (campaign or continuous-type measurements). The development during the 1990s of new instruments to measure nanoparticle size distributions and several gases that participate in nucleation have enabled these new discoveries. Measurements during nucleation episodes of evolving size distributions down to 3 nm can be used to calculate the apparent source rate of 3-nm particles and the particle growth rate. We have collected existing data from the literature and data banks (campaigns and continuous measurements), representing more than 100 individual investigations. We conclude that the formation rate of 3-nm particles is often in the range 0.01-10 cm-3 s-1 in the boundary layer. However, in urban areas formation rates are often higher than this (up to 100 cm-3 s-1), and rates as high as 104-105 cm-3 s-1 have been observed in coastal areas and industrial plumes. Typical particle growth rates are in the range 1-20 nm h-1 in mid-latitudes depending on the temperature and the availability of condensable vapours. Over polar areas the growth rate can be as low as 0.1 nm h-1. Because nucleation can lead to a significant increase in the number concentration of cloud condensation nuclei, global climate models will require reliable models for nucleation. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Aerosol-Size Distributions, Alpine Site Jungfraujoch, Atmospheric Aerosols, Condensation Growth, Condensation Nucleus Counter, Differential Mobility Analyzer, Dimethyl Sulfide, Free Troposphere, Lead, Marine Boundary-Layer, Nucleation, Number Concentration, Ternary Nucleation, Urban Background Area

# Title: Journal of Aesthetics and Art Criticism

Full Journal Title: Journal of Aesthetics and Art Criticism

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Goldblatt, D. (1984), Self-plagiarism. *Journal of Aesthetics and Art Criticism*, **43** (1), 71-77.

Full Text: [1984\J Aes Art Cri43, 71.pdf](1984/J%20Aes%20Art%20Cri43,%2071.pdf)

# Title: Journal of Affective Disorders

Full Journal Title: [Journal of Affective Disorders](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=4930&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=f76f3bc541d780a7631427af426311f9)

ISO Abbreviated Title: J. Affect. Disord.

JCR Abbreviated Title: J Affect Disorders

ISSN: 0165-0327

Issues/Year: 12

Journal Country/Territory: Netherlands

Language: English

Publisher: Elsevier Science BV

Publisher Address: PO Box 211, 1000 AE Amsterdam, Netherlands

Subject Categories:

Clinical Neurology Psychiatry: Impact Factor

Atkinson, M.J. and Caldwell, L. (1997), The differential effects of mood on patients’ ratings of life quality and satisfaction with their care. *Journal of Affective Disorders*, **44** (2-3), 169-175.

Full Text: [J\J Aff Dis44, 169.pdf](J/J%20Aff%20Dis44,%20169.pdf)

Abstract: The recent directives to improve both the quality and the efficiency of mental health service delivery systems have emphasized the need for evidence based treatment efficacy data, yet recent evidence suggests that quality of life data may be confounded with psychiatric symptomatology. The objective of the current inquiry was to determine whether responses to patient satisfaction measures are equally effected by mood-congruent response bias. Thirty-seven patients from a mood disorders clinic in an urban acute care hospital were asked to rate their current mood, satisfaction with their care, and quality of life. While patient rating of mood were highly correlated with specific quality of life scales and predicted 21% of the variance in global quality ratings, the more objective satisfaction indicators were not. For the clinician, these data suggest that clinically depressed patients may view their support system and care givers in negative or biased perspective. (C) 1997 Elsevier Science Ireland, Ltd.

Keywords: Congruent, Depression, Moderators, Judgment, Memory, Affective Disorders, Mood-Congruence, Self-Report Bias, Outcome Indicators, Quality of Life, Patient Satisfaction

? López-Muñoz, F., Vieta, E., Rubio, G., García-García, P. and Alamo, C. (2006), Bipolar disorder as an emerging pathology in the scientific literature: A bibliometric approach. *Journal of Affective Disorders*, **92** (2-3), 161-170.

Full Text: [2006\J Aff Dis92, 161.pdf](2006/J%20Aff%20Dis92,%20161.pdf)

Abstract: Background: To carry out a bibliometric study on the scientific publications in relation to bipolar disorder. Methods: Using the EMBASE and MEDLINE databases, we selected those documents whose title included the descriptors bipolar disorder\*, bipolar illness, bipolar patient\*, bipolar mani\*, bipolar depress\*, bipolar spectrum, manic-depressive\*, and rapid cycling. We applied some bibliometric indicators, as Price’s Law on the increase of scientific literature, or the participation index (PI) of the different countries. The bibliometric data have also been correlated with some social and health data from the countries that are most prolific in biomedical scientific production, such as number of physicians, total per capita expenditure on health and overall volume of production in the field of psychiatry. Results: A total of 4270 original documents published between 1980 and 2004 were downloaded, of which 1825 corresponded to aspects related to drug therapy. Our results state fulfilment of Price’s Law, with scientific production on bipolar disorder showing exponential growth (correlation coefficient r=0.947, as against an r=0.849 after linear adjustment). The drugs most widely studied. are lithium (1351 documents), valproate (544), carbamazepine (493), lamotrigine (240), and olanzapine (210). United States is the most productive country (participation index, PI=44.2), followed by the United Kingdom (14.4), Netherlands (9.1) and France (4.1). Conclusion: The publications on bipolar disorder and mood stabilizers have undergone exponential growth over the last 25 years, without evidence a saturation point. (c) 2006 Elsevier B.V. All rights reserved.

Keywords: Anticonvulsants, Antipsychotics, Bibliometric, Bibliometric Indicators, Bibliometric Study, Bibliometry, Bipolar Disorder, Carbamazepine, Correlation, Cycling, Databases, Depression, Drug, Drugs, France, Growth, Health, Index, Indicators, Lithium, Mania, Medline, Mood, Mood Stabilizers, Participation, Pathology, Physicians, Placebo, Production, Psychiatry, Publications, Saturation, Scientific Production, Scientific Publications, Social, Therapy, United Kingdom, United States

? Luppa, M., Heinrich, S., Angermeyer, M.C., König, H.H. and Riedel-Heller, S.G. (2007), Cost-of-illness studies of depression: A systematic review. *Journal of Affective Disorders*, **98** (1-2), 29-43.

Full Text: [2007\J Aff Dis98, 29.pdf](2007/J%20Aff%20Dis98,%2029.pdf)

Abstract: Background: Depression is it very common disease with substantial economic consequences. This paper reviews all published cost-of-illness studies of depression worldwide. Methods: A systematic search of cost-of-illness Studies of depression in the databases MEDLINE, Web of Science, Cochrane Library, and PSYNDEXplus was conducted. Identified Studies were classified by their basic characteristics. Costs reported were inflated in original Currency to the year 2003 and then converted into US-dollar using purchasing power parities (US$ PPP). Additionally, national-costs were converted in costs per case and per inhabitant. Results: 24 papers with notable methodical differences were identified and classified by their basic characteristics. Summary estimates from the Studies for the average annual costs per case ranged from $1000 to $2500 for direct costs, from $2000 to $3700 for morbidity costs and from $200 to $400 for mortality costs. The basic quantity of interest in COI-studies of depression was stated. Limitations: Methodical differences limited comparison Substantially. Conclusions: Depression is associated with a high economic burden. Conducting COI-studies of depression along the line noted in the review could help provide the opportunity to expose differences in costs associated with different approaches to disease management. (c) 2006 Elsevier BN. All rights reserved.

Keywords: Affective-Disorders, Aid, Burden, Cochrane, Comorbidity, Cost of Illness, Costs, Databases, Decision-Making, Depression, Disease, Disease Management, Economic Burden, Economic Burden, Germany, Health-Care, Interest, Management, Medline, Methods, Morbidity, Mortality, Papers, Primary-Care Patients, Review, Science, Systematic, Systematic Review, Web of Science

? López-Muñoz, F., Vieta, E., Rubio, G., García-García, P. and Alamo, C. (2007), Erratum to “Bipolar disorder as an emerging pathology in the scientific literature: A bibliometric approach” [Journal of Affective Disorders 92/2–3 (2006) 161–170]. *Journal of Affective Disorders*, **99** (1-3), 287.

Full Text: [2007\J Aff Dis99, 287.pdf](2007/J%20Aff%20Dis99,%20287.pdf)

Keywords: Bibliometric, Pathology

? Tényi, T., Trixler, M. and Csábi, G. (2009), Minor physical anomalies in affective disorders. A review of the literature. *Journal of Affective Disorders*, **112** (1-3), 11-18.

Full Text: [2009\J Aff Dis112, 11.pdf](2009/J%20Aff%20Dis112,%2011.pdf)

Abstract: Background: The increased frequency of WAS may be external markers of abnormal brain development in affective disorders. Methods: A MEDLINE, psychInfo and Web of Science search was evaluated to collect all publications oil the prevalence of minor physical anomalies in bipolar affective disorder and unipolar major depression. Aims: As reports on the prevalence of MPAs in affective disorders were controversial, were based on highly different number of patients and were evaluated by the use of Scales with different sensitivities, we considered as important to review the current state of knowledge and to recommend directions to Further research. Results: 14 publications on 12 studies were found after a careful literature search. 5 studies have dealt with the prevalence of WAS in bipolar affective disorder, 3 have reported oil examinations among patients with unipolar major depression, while 5 publications oil 3 studies combined patients with bipolar affective disorder, schizoaffective disorder and unipolar major depression. I study was published on the prevalence of WAS among mood disorders, without the differentiation of the data of patients with bipolar affective disorder and unipolar major depression. Limitations: Few studies with relatively small size were published, there is no data oil the distinction between bipolar I and bipolar II disorders. Conclusion: The reviewed data suggest a higher probability of the role of,in aberrant neurodevelopment in bipolar affective disorder and a smaller in Unipolar major depression. (c) 2008 Elsevier B.V. All rights reserved.

Keywords: 1st-Episode Psychosis, Biological Markers, Biological Markers, Bipolar Affective Disorder, Bipolar Disorder, Brain, Brain Development, Depression, Development, Developmental Precursors, Differentiation, Disorder, Frequency, Internal Consistency, Knowledge, Literature, Major Depression, Medline, Methods, Minor Physical Anomalies, Mood, Mood Disorders, Neurodevelopment, Prevalence, Publications, Research, Review, Schizoaffective Disorder, Schizophrenic-Patients, Science, Specificity, Unipolar Major Depression, Waldrop Scale, Web of Science

? Braquehais, M.D. and Sher, L. (2010), Posttraumatic stress disorder in war veterans: A discussion of the *Neuroevolutionary Time-depth Principle*. *Journal of Affective Disorders*, **125** (1-3), 1-9.

Full Text: [2010\J Aff Dis125, 1.pdf](2010/J%20Aff%20Dis125,%201.pdf)

Abstract: Introduction: Trauma is a universal phenomenon. Violence is a type of trauma and war is one of the ways in which violence is expressed. The “Neuroevolutionary Time-depth Principle” of innate fears, based on prevalence data, suggests that high rates of posttraumatic stress disorder (PTSD) after combat exposure can be due to the fact that this fear-stress response appeared as a reaction to inter-group male-to-male and intra-group killings after the rising of population densities in the Neolithic period. Material and methods: Studies of PTSD prevalence available in MEDLINE, Institute for Scientific Information Databases (Science Citation Index Expanded, Social Sciences Citation Index, and Arts and Humanities Citation Index), EMBASE, and Cochrane Library were identified and reviewed. Results: Prevalence data of PTSD deeply vary from one country to another, even in groups exposed to similar stressors. Moreover, war is not a uniform and unchanged phenomenon and not all war stressors are similar because some of them are known to lead to PTSD more than others. Discussion: We argue that psychosocial narratives deeply influence our biological response to trauma and violence, shaping the genotypical response to trauma. Great differences in prevalence may be in part due to this fact. We also suggest that personal preconceptions and socio-cultural interests may also be playing a critical role in the theories developed to explain the nature of our response to violence. Conclusion: A comprehensive model for war-related PTSD should integrate both genotypical and phenotypical findings. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: Brain, Citation, Clinical-Practice, Databases, Evolution, Major Depression, Mental-Health, National Comorbidity Survey, Posttraumatic Stress Disorder, Prevalence, Science Citation Index, Science Citation Index Expanded, Social Support, Suicidal-Behavior, Symptoms, Terrorist Attack, Trauma, Trauma, War

? Holzel, L., Harter, M., Reese, C. and Kriston, L. (2011), Risk factors for chronic depression: A systematic review. *Journal of Affective Disorders*, **129** (1-3), 1-13.

Full Text: [2011\J Aff Dis129, 1.pdf](2011/J%20Aff%20Dis129,%201.pdf)

Abstract: Background: One of five patients with an acute depressive episode develops chronic depression. Risk factors for a current depressive episode to become chronic are insufficiently known. This review was conducted to examine which factors represent a risk factor for the development of chronic depression for patients diagnosed with a depressive episode. Method: MEDLINE, Psycinfo, ISI Web of Science, CINHAL and BIOSIS Previews were searched up until September 2007, complemented by handsearching in the December 1987 to December 2007 issues of Journal of Affective Disorders and investigating reference lists of included articles and existing reviews. On the basis of a formal checklist, two investigators independently decided which studies to include or exclude. Results: 25 relevant primary studies with a total of 5192 participants were included in the systematic review. Overall the methodological quality of the included studies was found to be sufficient. Data synthesis was performed via vote counting. The following risk factors were identified: younger age at onset, longer duration of depressive episode, and family history of mood disorders. Psychological comorbidity i.e. anxiety disorders, personality disorders and substance abuse, low level of social integration, negative social interaction and lower severity of depressive symptoms repeatedly appeared concurrently with chronic depression. Limitations: Most included studies were cross-sectional thus drawing causal conclusions with regard to risk factors proved to be difficult. Conclusion: Risk factors for a current depressive episode to become chronic were identified. To date only few significant longitudinal studies on this topic are available. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Anxiety, Chronic Disease, Comorbidity, Depression, Depressive Disorder, Development, Disorder, Early-Onset Dysthymia, Episodic Major Depression, Family, Follow-Up, History, ISI, Journal, Longitudinal Studies, Mood, National Comorbidity Survey, Outpatients, Personality, Population, Primary, Psychological, Review, Risk, Risk Factors, Science, Social, Symptoms, Systematic, Systematic Review, Web of Science

? Oestergaard, S. and Moldrup, C. (2011), Optimal duration of combined psychotherapy and pharmacotherapy for patients with moderate and severe depression: A meta-analysis. *Journal of Affective Disorders*, **131** (1-3), 24-36.

Full Text: [2011\J Aff Dis131, 24.pdf](2011/J%20Aff%20Dis131,%2024.pdf)

Abstract: Background: To investigate the most effective duration of combined psychotherapy and pharmacotherapy for achieving remission and preventing relapse in depressive patients as compared to pharmacotherapy alone. Methods: A systematic review of English articles using PUBMED, EMBASE, Web of Science, the Cochrane Library, and PsychINFO was performed in September 2009. Clinical studies comparing pharmacotherapy alone with pharmacotherapy in combination with a psychological intervention for depression treatment that reported response, remission or relapse as outcomes were included in the analysis. For each of the studies, clinical binary outcomes such as response, remission or relapse were extracted. Results: All pooled analyses were based on random-effects models. Twenty-one article describing the influence of additional psychotherapy on remission and 15 articles reporting the influence on relapse in depression were included in the analysis. Patients receiving combined treatment experienced remission more often than those receiving pharmacotherapy alone, with the highest odds ratio OR, 2.36: 95% CI, 1.58-3.55 observed at 4 months after commencing the treatment. Patients receiving pharmacotherapy alone also demonstrated a higher risk for relapse compared to those receiving combined treatment. Limitations: We restricted our search to only English language publications. Studies investigating relapse or recurrence rates are often of small size. Conclusion: Pharmacotherapy enhanced with psychotherapy is associated with a higher probability of remission and a lower risk of relapse, as compared to antidepressants alone for depression treatment. Receiving psychotherapy in both the acute and continuation phases is the most effective option. Further research is needed to investigate the influence of additional psychotherapy on different patients. (C) 2010 Elsevier BM. All rights reserved.

Keywords: Analysis, Antidepressant Treatment, Antidepressants, Cochrane, Cognitive-Behavioral Therapy, Combined Psychotherapy And Pharmacotherapy, Depression, Embase, Follow-Up, Interpersonal Psychotherapy, Intervention, Late-Life Depression, Long-Term Treatment, Major Depression, Meta-Analysis, Methods, Outcomes, Pharmacotherapy, Primary-Care, Psychotherapy, Publications, Pubmed, Randomized-Controlled-Trial, Ratio, Recurrence, Recurrent Depression, Remission, Research, Review, Risk, Science, Systematic, Systematic Review, Treatment, Treatment Outcomes, Web of Science

? Provencher, M.D., Hawke, L.D. and Thienot, E. (2011), Psychotherapies for comorbid anxiety in bipolar spectrum disorders. *Journal of Affective Disorders*, **133** (3), 371-380.

Full Text: [2011\J Aff Dis133, 371.pdf](2011/J%20Aff%20Dis133,%20371.pdf)

Abstract: Background: Comorbid anxiety disorders are highly prevalent in bipolar disorder and have been shown to have serious negative impacts on the course of illness. The pharmacological treatment of anxiety can interact with the bipolar disorder and has not been proven effective. As such, many have recommended the psychological treatment of anxiety. This paper reviews the literature on psychological treatments for anxiety comorbid to bipolar disorder. Method: The Medline, PsychInfo and Web of Science databases were thoroughly examined for relevant treatment studies. Results: Despite frequent recommendations in the literature, surprisingly few have studied the psychological treatment of comorbid anxiety in bipolar disorders. Nevertheless, preliminary results suggest that comorbid anxiety disorders can be effectively treated in a bipolar clientele using cognitive-behavioral therapy, mindfulness-based cognitive-behavioral therapy or relaxation training. In contrast, interpersonal, family therapy and psychoeducation alone would not seem to be beneficial treatment alternatives for anxiety. Cognitive-behavioral therapy appears to reduce the symptoms of obsessive-compulsive disorder, generalized anxiety disorder, panic disorder, post-traumatic stress disorder and general symptoms of anxiety among patients with bipolar disorder. However, the long-term maintenance of anxiety treatment effects may be somewhat reduced and adaptations may be called for to augment and sustain benefits. Conclusions: There is an urgent need for randomized controlled trials of different forms of psychotherapy for anxiety disorders comorbid to bipolar disorder. Until such trials are available, the most promising approach would appear to be the sequential or modular CBT-based treatment of the anxiety disorder. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Anxiety, Anxiety Disorders, Bipolar Disorder, Cognitive Behavioral Therapy, Cognitive-Behavioral Therapy, Comorbidity, Databases, Disorder, Family, Generalized Anxiety Disorder, I Disorder, Literature, Medline, Panic Disorder, Patients, Posttraumatic Stress, Posttraumatic Stress Disorder, Posttraumatic-Stress-Disorder, Prevalence, Psychological, Psychosocial Treatment, Psychotherapy, Quality-of-Life, Randomized Controlled Trials, Recommendations, Science, Severe Mental-Illness, Step-BD, Stress, Survey Replication, Symptoms, Therapy, Training, Treatment, Treatment Enhancement Program, Web of Science

? Mann, R. and Gilbody, S. (2011), Validity of two case finding questions to detect postnatal depression: A review of diagnostic test accuracy. *Journal of Affective Disorders*, **133** (3), 388-397.

Full Text: [2011\J Aff Dis133, 388.pdf](2011/J%20Aff%20Dis133,%20388.pdf)

Abstract: Background: Postnatal depression (PND) is a serious condition associated with negative consequences for the wellbeing of mother and infant. In the UK routine screening for PND is not currently recommended, although the use of two case finding questions in routine practice to identify PND has been advocated in policy guidance. The diagnostic test accuracy (DTA) of the two questions has been reviewed in general population samples; however a review of their validity in postnatal populations is unknown. The aim of this rapid review was to identify studies of DTA of two case finding questions (2CFQ) for PND detection. Methods: DTA studies were included which compared the 2CFQ to gold standard diagnostic criteria. Sources searched included Medline, PsychInfo, Medion, ARIF and cited reference search via Web of Science. Results: Seven studies were identified which used a two question instrument to detect PND. Only one study compared the 2CFQ to standardised diagnostic criteria in a USA postnatal population. The test reported 100% sensitivity and 62% specificity at 4 postnatal weeks. The test was excellent at ‘ruling out’ PND given a negative response to both questions. False positive rates were high indicating unnecessary follow-up for a substantial number of women. Conclusion: The review found limited evidence for use of the 2CFQ approach to detect PND. Further primary research should be undertaken to assess the DTA of the 2CFQ approach recommended for use in UK postnatal populations; this will ultimately inform the utility of current UK policy guidance. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Acceptability, Accuracy, Case-Finding, Depression, Diagnosis, Diagnostic Test, Follow-Up, Instruments, Maternal Depression, Medline, Metaanalysis, Methods, Perinatal Depression, Policy, Postnatal, Postnatal Depression, Postpartum Depression, Practice, Primary, Primary-Care, Research, Review, Science, Screening, Sensitivity, Sources, Specificity, UK, USA, Validity, Web of Science, Well-Child Visits, Women

? Lipsman, N. and Lozano, A.M. (2011), The most cited works in major depression: The ‘Citation classics’. *Journal of Affective Disorders*, **134** (1-3), 39-44.

Full Text: [2011\J Aff Dis134, 39.pdf](2011/J%20Aff%20Dis134,%2039.pdf)

Abstract: Background: The biomedical literature is growing exponentially, with thousands of articles published each day. While the majority of published papers are of incremental value, every field also has a select, relatively small number of works that have presented important conceptual advances and have had a profound influence. We were interested in identifying such papers in the field of Major Depression. Objective: To determine which and what type of articles in the field of Major Depression are citation classics, defined as having received equal to or exceeding 400 citations in the biomedical literature, as a surrogate marker for their impact in the field. Methods: An online database of research publications was searched using a free, publicly accessible, and downloadable software. The terms “Depression” or “Depressive” were queried in the title of publications with no date restrictions. Out of scope publications not dealing with Major Depression or mood disorders were not considered. Results: 243 citation classics representing the top cited manuscripts (approximately 0.1% of 240,000) in the field of Major Depression were identified. These highly cited works fell into six categories: scales/measures, medical psychiatry, clinical trials/management, mechanisms/translational studies, imaging investigations and epidemiological/population health studies. The journals in which citation classics are published are diverse, but typically are general psychiatric or medical publications. Conclusions: Despite the size of the field, there is a relatively parsimonious collection of citation classics in the field of Major Depression. These deal primarily with the mechanisms and epidemiology of the disease, with papers dealing with depression management accounting for the fastest growing group of citation classics. (C) 2011 Elsevier B.V. All rights reserved.

Keywords: Biomedical, Biomedical Literature, Citation, Citation Analysis, Citation Classics, Citations, Classics, Depression, Disease, Epidemiology, Highly-Cited, Imaging, Impact, Journals, Literature, Major Depression, Management, Manuscripts, Mechanisms, Medical, Methods, Mood, Papers, Psychiatry, Publications, Research, Software

# Title: Journal of Aging and Physical Activity

Full Journal Title: Journal of Aging and Physical Activity

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Lidor, R., Miller, U. and Rotstein, A. (1999), Is research on aging and physical activity really increasing? A bibliometric analysis. *Journal of Aging and Physical Activity*, **7** (2), 182-195.

Abstract: In Light of the dramatic increase in the older adult population, we analyzed publications on aging and physical activity during the last 3 decades, based on (a) the ratio of the number of publications on aging to the total number of publications and the ratios of (b) the total number of publications on physical activity and aging and (c) the number of such publications in 6 selected journals to the number of publications on physical activity in general. Our findings indicate that few changes have occurred during the last 3 decades with regard to the volume of publication on aging and physical activity. Two conclusions can be reached: (a) The interest of researchers in exercise and sport sciences does not reflect that of society at large concerning older adults, and (b) an in-depth analysis should be conducted to study the periodicals that are published not only in the area of exercise and sport sciences but also in other related areas such as medicine, psychology, and health.

Keywords: Aging, Analysis, Bibliometric, Bibliometric Analysis, Journals, Medicine, Periodicals, Physical Activity, Publication, Publications, Research, Sciences

# Title: Journal of Agricultural Engineering Research

Full Journal Title: [Journal of Agricultural Engineering Research](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6837&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=bc4560a271a27532516f08a0ba9351ac)

ISO Abbreviated Title: J. Agr. Eng. Res.

JCR Abbreviated Title: J Agr Eng Res

ISSN: 0021-8634

Issues/Year: 12

Journal Country/Territory: England

Language: English

Publisher: Academic Press Ltd

Publisher Address: 24-28 Oval Rd, London NW1 7DX, England

Subject Categories:

Agriculture Engineering: Impact Factor

Nicholson, R.J. and Brewer, A.J. (1997), Estimates of volumes and exposed surface areas of stored animal manures and slurries in England and Wales. *Journal of Agricultural Engineering Research*, **66** (4), 239-250.

Full Text: [J\J Agr Eng Res66, 239.pdf](J/J%20Agr%20Eng%20Res66,%20239.pdf)

Abstract: Estimates of animal manure (solid material) and slurry (liquid material) stored on farms are needed by the Ministry of Agriculture, Fisheries and Food (MAFF) for compiling national inventories of gaseous emissions. Data needed for this purpose include the total volume and surface area of stored manures and slurries from different livestock species. Existing sources of data were reviewed but have limitations in the context of an emissions inventory. Suppliers of prefabricated stores were approached for numbers and sizes of stores sold since 1970. ADAS pollution control consultants made informed estimates of the geographic distribution of methods of storage in use in England and Wales for manure and slurry from dairy cows, other cattle and pigs. This information was combined with June 1992 census figures to provide estimates of volumes (raw and diluted) and exposed surface areas of stored manures and slurries. ADAS livestock consultants were used to interpret census data and provide estimates of the distribution of poultry manure handling methods. A computer spreadsheet was used to store and process this data and is available to allow future adjustments or sensitivity analyses. In this paper, these estimates are reported on a national basis but they were originally gathered separately for each of 15 areas and appended to a report produced for MAFF. These detailed figures are available on request. The majority of diluted livestock slurry is stored in earth-banked lagoons, with an estimated total volume of 15.5 Mm3 and an estimated surface area of 7.0 Mm2. The total volume of stored solid manure is 14.9 Mm3 with an estimated surface area of 11.9 Mm2 The estimates were compared with data from other sources and show an acceptable level of agreement.

Sun, G., Gray, K.R. and Biddlestone, A.J. (1998), Treatment of agricultural wastewater in downflow reed beds: Experimental trials and mathematical model. *Journal of Agricultural Engineering Research*, **69** (1), 63-71.

Full Text: [J\J Agr Eng Res69, 63.pdf](J/J%20Agr%20Eng%20Res69,%2063.pdf)

Abstract: This paper presents an examination of the performance of a full-scale downflow reed-bed system for the treatment of high-strength agricultural wastewater with BOD5 in the range 400-1500 mg/l. The effects of organic loading, hydraulic loading and the frequency of intermittent feeding on the treatment results were identified. The removal of organic matter in terms of BOD5 and COD averaged 74.3 and 53.0%, respectively. These removal rates appeared to increase with organic loading and feeding frequency but decrease with hydraulic loading. Percentage removals of suspended solids, NH4-N and PO4-P were 39.6, 23.1 and 34.7%, respectively. Organic pollutants, expressed as BOD5, were postulated to be retained in the downflow reed beds when the influent flow flushed through the beds; they were then aerobically decomposed by micro-organisms during the intervals between intermittent feeding when oxygen can diffuse into the beds more readily. A mathematical model was developed to describe this treatment mechanism based on an assumption that the pollutants are removed from the wastewater by the consecutive processes of adsorption and aerobic decomposition. The values of the constants for the model were derived from the experimental data. Comparison between the experimental and calculated results demonstrates that the mathematical model can be used for design purposes.

Keywords: Constructed Wetlands, Systems

Sun, D.W. and Byrne, C. (1998), Selection of EMC/ERH isotherm equations for rapeseed. *Journal of Agricultural Engineering Research*, **69** (4), 307-315.

Full Text: [J\J Agr Eng Res69, 307.pdf](J/J%20Agr%20Eng%20Res69,%20307.pdf)

Abstract: Twelve sources of equilibrium moisture content (EMC)/equilibrium relative humidity (ERH) data for rapeseed were identified from which 668 experimental points were extracted. Among them, ten sources covered a wide range of temperatures, thus producing 21 sub-sets of data suitable for the evaluation of EMC/ERH isotherm equations. Four commonly cited rapeseed EMC/ERH equations, i.e. modified Henderson, modified Chung-Pfost, modified Halsey and modified Oswin equations were compared for their ability to fit these data sub-sets based on the residual sum of squares (RSS), standard error of estimate (SEE) and mean relative deviation (MRD). The comparisons show that the modified Halsey equation is the best equation for describing the EMC/ERH isotherms of rapeseed. The modified Halsey equation was then used to fit the data sets merging all the data for adsorption, desorption and the combined data set in turn. The best fitted coefficients for both equilibrium relative humidity h(r)=f(M, T) and equilibrium moisture content M =f(h(r), T)are given, where T is the temperature. These fitted equations are based on a large data set and therefore provide a useful basis for future work on drying and storage of rapeseed. (C) 1998 Silsoe Research Institute.

Keywords: Moisture-Content, Canola, Equilibrium, Humidity

# Title: Journal of Agricultural & Environmental Ethics

Full Journal Title: Journal of Agricultural & Environmental Ethics

ISO Abbreviated Title: J. Agric. Environ. Ethics

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Subject Categories:

Agriculture: Impact Factor 0.326, 16/28 (2001)

Environmental Sciences: Impact Factor 0.053, 125/126 (1999); Impact Factor 0.333, 109/127 (2000); Impact Factor 0.326, 111/129 (2001)

History & Philosophy of Science: Impact Factor 0.326, 12/31 (2001)

? Pimentel, D. (1995), Amounts of pesticides reaching target pests: Environmental impacts and ethics. *Journal of Agricultural & Environmental Ethics*, **8** (1), 17-29.

Abstract: Less than 0.1% of pesticides applied for pest control reach their target pests. Thus, more than 99.9% of pesticides used move into the environment where they adversely affect public health and beneficial biota, and contaminate soil, water, and the atmosphere of the ecosystem. Improved pesticide application technologies can improve pesticide use efficiency and protect public health and the environment.

# Title: Journal of Agricultural and Food Chemistry

Full Journal Title: [Journal of Agricultural and Food Chemistry](http://pubs3.acs.org/acs/journals/TOC.page?incoden=jafcau&indecade=&involume=0&inissue=0)

ISO Abbreviated Title: J. Agric. Food Chem.

JCR Abbreviated Title: J Agr Food Chem

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Journal Country/Territory: United States

Language: English

Publisher: Amer Chemical Soc

Publisher Address: 1155 16th St, NW, Washington, DC 20036

Subject Categories:

Agriculture, Multidisciplinary: Impact Factor 1.560, 1/28 (2000); Impact Factor 1.576, 1/28 (2001); Impact Factor 1.915, 1/28 (2002); Impact Factor 2.102, 1/29 (2003); Impact Factor 2.327, 1/29 (2004); Impact Factor 2.507, 1/31 (2005); Impact Factor 2.469, 2/44 (2009)

Chemistry, Applied: Impact Factor1.560, 9/55 (2000); Impact Factor 1.576, 9/58 (2001); Impact Factor 1.915, 6/59 (2002); Impact Factor 2.102, 7/57 (2003); Impact Factor 2.327, 5/58 (2004); Impact Factor 2.507, 6/64 (2005); Impact Factor 2.469, 10/64 (2009)

Food Science & Technology: Impact Factor 1.560, 8/95 (2000); Impact Factor 1.576, 9/94 (2001); Impact Factor 1.915, 4/92 (2002); Impact Factor 2.102, 5/94 (2003); Impact Factor 2.327, 6/94 (2004); Impact Factor 2.507, 2/93 (2005); Impact Factor 2.469, 10/118 (2009)

Thomas, G.W. (1963), Kinetics of chloride desorption from soils. *Journal of Agricultural and Food Chemistry*, **11** (3), 201-203.

Full Text: [J\J Agr Foo Che11, 201.pdf](J/J%20Agr%20Foo%20Che11,%20201.pdf)

Abstract: Chloride spreads with depth of penetration in soils resulting in an increasing vertical distribution and a diminishing average concentration. If adsorption occurs, the distribution of chloride becomes skewed rather than normal, and the length of the trailing edge is dependent upon the amount of adsorption. The peak itself does not shift, however. Washing a quantity of chloride out of a soil begins at the same rate whether the soil is a chloride adsorber or not. A break in chloride concentration vs. milliliters of wash water occurs only with materials which adsorb chloride. If the data are plotted as first-order reactions, there is a distinct break in the curve with chloride adsorbers; this second curve, if extrapolated, gives an intercept corresponding to adsorbed chloride. The intercept varies as factors influencing adsorption are varied. Plotting elution curves as first-order reactions gives the same results. Such a plot shows that the position of the peak will not shift unless all chloride is adsorbed.

? Bailey, G.W. and White, J.L. (1964), Review of adsorption and desorption of organic pesticides by soil colloids with implications concerning pesticide bioactivity. *Journal of Agricultural and Food Chemistry*, **12** (4), 324-332.

Full Text: [1960-80\J Agr Foo Che12, 324.pdf](1960-80/J%20Agr%20Foo%20Che12,%20324.pdf)

Abstract: The literature pertaining to the adsorption and desorption of organic pesticides by soil colloids has been reviewed. Such factors as soil or colloid type, physico-chemical nature of the pesticide, soil reaction, nature of the saturating cation on the colloid exchange site, soil moisture content, nature of formulation, and temperature all directly influence the adsorption of pesticides by soil systems, whereas the physical properties of soil as a substrate and climate exert a more indirect influence. The role that each factor plays is discussed in detail. The nature of soil water as it affects the availability of herbicides at the root surface is treated.

Keywords: Adsorption, Desorption

Lambert, B.R. (1967), Functional relation between sorption in soil and chemical structure. *Journal of Agricultural and Food Chemistry*, **15** (3), 572-576.

Full Text: [J\J Agr Foo Che15, 572.pdf](J/J%20Agr%20Foo%20Che15,%20572.pdf)

Abstract: By utilizing an equilibrium constant which considers soil-organic matter as the sorbing medium. a functional relationship between sorption in soil and chemical structure has been developed for certain classes of chemicals. This relationship is based upon extrathermodynamic linear free energy approximations and uses the parachor as an approximate measure of the molar volume of the chemicai under consideration. Distribution equilibria between soil and water for a number of chemical homologs of two different chemical classes were used to establish the relationship. The result is a natural consequence of the informative chromatographic model for movement and sorption of chemicals applied to the soil.

Bartha, R. (1971), Fate of ferbicide-derived chloroanilines in soil. *Journal of Agricultural and Food Chemistry*, **19** (2), 385-387.

Full Text: [J\J Agr Foo Che19, 385.pdf](J/J%20Agr%20Foo%20Che19,%20385.pdf)

Abstract: Uniformly 14C-ring-labeled 3’,4’-dichloropropionanilide (propanil) and 4-chloroaniline were utilized for tracing the fate and persistence of herbicidederived aromatic moieties in soil. Only low percentages of 14C were lost due to mineralization and volatilization of chloroanilines. At a 5 ppm application rate, 73 % of propanil ring-carbon became bound to the soil. At 500 ppm only 54% were immobilized, and a corresponding increase in solvent-extractable metabolites was observed. Evidence is presented to support the contention that the bulk of the immobilized residues consists of intact chloroanilines that are chemically bonded tcj humic substances. Projection of mineralization rates observed in short term experiments indicate that complexing may extend the residual life of chloroanilines in soil to as much as 10 years.

Biggar, J.W., Mingelgrin, U. and Cheung, M.W. (1978), Equilibrium and kinetics of adsorption of picloram and parathion with soils. *Journal of Agricultural and Food Chemistry*, **26** (6), 1306-1312.

Full Text: [J\J Agr Foo Che26, 1306.pdf](J/J%20Agr%20Foo%20Che26,%201306.pdf)

Abstract: The kinetics of adsorption of pesticides on soils is examined utilizing a flow-type system. The pesticide- soil systems included picloram and parathion reacting with Palouse silt loam and Panoche clay loam. Values of the relative adsorption constant, *ko,* which is independent of the initial solution concentration, flow rate, and soil mass at 25 “C were 0.644, 0.441, 0.546, and 0.359 for the reactions picloram with Palouse silt, parathion with Panoche clay, parathion with Palouse silt, and picloram with Palouse silt acidified to pH 3, respectively. From the temperature dependence of *ko* the activation energies, *E a,* were 2.7, 1.3, and 4.3 kcal/mol for the first three systems. Mechanisms of interaction based on experimental results and thermodynamic considerations emphasize the importance of organic matter for picloram adsorption and both clay and organic matter in the adsorption of parathion. Properties of the pesticides and the soil components were considered in proposing the mechanisms.

Torre, M., Rodriguez, A.R. and Sauracalixto, F. (1992), Study of the interactions of calcium-ions with lignin, cellulose, and pectin. *Journal of Agricultural and Food Chemistry*, **40** (10), 1762-1766.

Full Text: [J\J Agr Foo Che40, 1762.pdf](J/J%20Agr%20Foo%20Che40,%201762.pdf)

Abstract: Interactions of calcium ions with insoluble (lignin and cellulose) and soluble (pectin) fiber constituents were systematically investigated in vitro as a function of several physicochemical variables: initial concentration of calcium in solution, pH, and the amount of fiber constituent. The investigation was carried out under experimental conditions which may be achieved in physiological circumstances. Lignin exhibited a high affinity for calcium ions in solution. The amount of bound metal rose with increasing initial calcium concentration, pH, and quantity of fiber. It seemed that proton-ionizable functional groups of lignin were involved in calcium retention by this polymer. The interaction of cellulose and pectin with Ca2+ was very weak; calcium could probably be retained by adsorption to the surface of these polysaccharides.

Keywords: D-Galacturonic Acid, Dietary Fiber, Oligomeric Fragments, Iron-Binding, Zinc, pH, Cations, Copper, Bioavailability, Magnesium

Lam, W.W., Kim, J.H., Sparks, S.E., Quistad, G.B. and Casida, J.E. (1993), Metabolism in rats and mice of the soil fumigants metham, methyl isothiocyanate, and dazomet. *Journal of Agricultural and Food Chemistry*, **41** (9), 1497-1502.

Full Text: [J\J Agr Foo Che41, 1497.pdf](J/J%20Agr%20Foo%20Che41,%201497.pdf)

Abstract: Isotopic labeling of metham, methyl isothiocyanate (MITC), and dazomet with (CH3)-C-13 and (CH3)-C-14 and of metham and MITC with (C=S)-C-13 provided the materials for metabolite identification by C-13 NMR and quantitation by HPLC analysis and radiocarbon counting. Rats and mice were treated intraperitoneally and the metabolites studied at 48 h. Most of the (CH3)-C-14 label for each compound in mice appears in urine (58-80%) or is retained in the body (8-12%), particularly the liver and kidney. The major metabolites in each case from rats are S-(N-methylthiocarbamoyl)glutathione in the bile and S-(N-methylthiocarbamoyl)mercapturic acid in the urine, whereas from mice the mercapturate is a minor metabolite. Methylamine is a major urinary component following treatment with methylamine or dazomet (rats and mice) or metham (mice) but not with MITC. Detoxification by conjugation, with glutathione (GSH) appears to involve direct reaction for MITC, GSH S-transferase-catalyzed reaction for metham, and the intermediacy of either MITC or metham for dazomet.

Keywords: Isocyanate, Glutathione, Invivo

Coward, L., Barnes, N.C., Setchell, K.D.R. and Barnes, S. (1993), Genistein, daidzein, and their beta-glycoside conjugates - antitumor isoflavones in soybean foods from american and asian diets. *Journal of Agricultural and Food Chemistry*, **41** (11), 1961-1967.

Full Text: [J\J Agr Foo Che41, 1961.pdf](J/J%20Agr%20Foo%20Che41,%201961.pdf)

Abstract: A method is described for the separation and analysis of isoflavone beta-glycoside conjugates and aglucones in various foods derived from soybeans. After initial extraction using 80% aqueous methanol and defatting of the extract with hexane, the isoflavones were analyzed by gradient elution reversed-phase high-pressure liquid chromatography. Their structures were confirmed by fast atom bombardment ionization mass spectrometry and by proton nuclear magnetic resonance spectroscopy. The results reveal that most Asian and American soy products, with the exception of soy sauce, alcohol-extracted soy protein concentrate, and soy protein isolate, have total isoflavone concentrations similar to those in the intact soybean. Asian fermented soy foods contain predominantly isoflavone aglucones, whereas in nonfermented soy foods of both American and Asian origin isoflavones are present mainly as beta-glycoside conjugates. Since the much larger estimated daily intake of these isoflavones by Asians compared to Americans is similar on a body weight basis to the isoflavones in soybean-containing diets which inhibit mammary tumorigenesis in animal models of breast cancer, it is possible that dietary isoflavones are an important factor accounting for the lower incidence and mortality from breast cancer in Asian women.

Keywords: Breast-Cancer, Possible Roles, Phytoestrogens, Estrogens, Chemoprevention, Identification, Products, Lignans

Rosen, C.J., Bierman, P.M. and Olson, D. (1994), Swiss-chard and alfalfa responses to soils amended with municipal solid-waste incinerator ash: Growth and elemental composition. *Journal of Agricultural and Food Chemistry*, **42** (6), 1361-1368.

Full Text: [J\J Agr Foo Che42, 1361.pdf](J/J%20Agr%20Foo%20Che42,%201361.pdf)

Abstract: The effects of three municipal solid waste (MSW) incinerator ashes on soil chemical properties, plant growth, and elemental composition of Swiss chard (Beta vulgaris L.) and alfalfa (Medicago sativa L.) were investigated in greenhouse pot experiments. Ash rates of 13.1, 16.2, and 26.7 g kg-1 of soil, based on their available K content, were compared with K fertilizer, P fertilizer, P + K fertilizer, and nonamended controls. Plant dry matter production in ash-amended soil was similar to or greater than that in fertilized soil. Responses varied with crop and ash type, but increases occurred in MSW ash treatments for soil pH, soluble salts, extractable soil P, K, Ca, Na, Cu, Zn, Mo, Cd, and Pb, and plant tissue (leaf plus stem) concentrations of P, K, Ca, Mg, Na, B, Cu, Zn, Mo, and Cd. No phytotoxic effects were observed, but some alfalfa treatments exceeded livestock dietary tolerances for Mo (>5 mg kg-1) and Cd (>0.5 mg kg-1).

Keywords: Refuse, Cadmium

Waterhouse, A.L. and Towey, J.P. (1994), Oak lactone isomer ratio distinguishes between wines fermented in American and french oak barrels. *Journal of Agricultural and Food Chemistry*, **42** (9), 1971-1974.

Full Text: [J\J Agr Foo Che42, 1971.pdf](J/J%20Agr%20Foo%20Che42,%201971.pdf)

Abstract: A procedure that involves solvent extraction, evaporation, and gas chromatographic analysis can be used to distinguish between wines fermented in Amercan oak and wines fermented in French/European oak. The parameter that makes the distinction is the ratio of cis- to trans-beta-methyl-gamma-octalactone (oak lactone). Other studies of oak have reported oak lactone ratios different from ours, which we attribute to the complex lactone/acid/ester equilibria in aqueous ethanol solutions, reactions that are not allowed to equilibrate in typical laboratory analyses. However, by taking the equilibration kinetics into account, it should be possible to adapt this procedure to determine the origin of oak wood samples as well as wine and spirit samples that have been aged in oak.

Keywords: Wine, Oak Lactone, Barrel, Gas Chromatography

Locke, M.A., Gaston, L.A. and Zablotowicz, R.M. (1997), Acifluorfen sorption and sorption kinetics in soil. *Journal of Agricultural and Food Chemistry*, **45** (1), 286-293.

Full Text: [J\J Agr Foo Che45, 286.pdf](J/J%20Agr%20Foo%20Che45,%20286.pdf)

Abstract: Factors which influence kinetics of sorption for acifluorfen, a postemergence herbicide, in soil were evaluated. Twelve soils of varying characteristics were used in this study. Sorption kinetics experiments with 5.86 µM C-14-labeled (19.6 Bq mL-1) acifluorfen were conducted for equilibration times up to 96 h. Sorption was rapid for all soils, and most soils reached a pseudo-equilibrium after 24-48 h of equilibration. Apparent sorption increased at later times, possibly reflecting sorption of acifluorfen or metabolites, since acifluorfen is subject to biotransformation. Further investigation comparing sorption at 4 and 25°C indicated that microbial metabolism was occurring for some soils at equilibration times longer than 24-48 h. Aminoacifluorfen was observed in methanol extracts of soils equilibrated 96 h. Soils were equilibrated for 24 h with C-14-labeled acifluorfen (2.6-65.8 µM, 19.5 Bq mL-1) to obtain sorption isotherms. Capacity for acifluorfen sorption in these soils generally increased with increasing soil organic carbon content, cation exchange capacity, and soil acidity.

Keywords: Herbicide Acifluorfen, Binding Ability, Adsorption, Desorption, Degradation, Penetration, Sodium, Herbicide, Acifluorfen, Diphenyl Ether, Sorption, Organic Carbon, Tillage

Ferraz, A., Souza, J.A., Silva, F.T., Gonçalves, A.R., Bruns, R.E., Cotrim, A.R. and Wilkins, R.M. (1997), Controlled release of 2,4-d from granule matrix formulations based on six lignins. *Journal of Agricultural and Food Chemistry*, **45** (3), 1001-1005.

Full Text: [J\J Agr Foo Che45, 1001.pdf](J/J%20Agr%20Foo%20Che45,%201001.pdf)

Abstract: Six lignins were used to obtain granular controlled release matrix formulations of the herbicide 2,4-d (2,4-dichlorophenoxyacetic acid). The water insoluble lignins were sourced from sugar cane (Saccharum officinarum) bagasse and Eucalyptus sp. and Pinus sp. woods. Each lignin was characterized by its functional groups and molecular weight distributions. The formulations were prepared by melting the 2,4-d and mixing in the lignins individually and then granulating (to 0.7-1.0 mm) the glassy matrix. Release rates determined in static water were correlated to a diffusion-controlled mechanism according to the square root of time. Principal component regression of the slopes of these lines showed that these depend inversely on the molecular weight and the total and aliphatic hydroxyls of the lignins. For the other functional groups (aromatic hydroxyls, methoxyls, and carbonyls), the higher their contents, the higher the diffusion and release rates.

Keywords: Controlled-Release, 2,4-d, Lignin, Chemical Structure, Release Rates, Metribuzin, Adsorption, Alachlor

Lemke, S.L., Grant, P.G. and Phillips, T.D. (1997), Adsorption of zearalenone by organophilic montmorillonite clay. *Journal of Agricultural and Food Chemistry*, **46** (9), 3789-3796.

Full Text: [1998\J Agr Foo Che46, 3789.pdf](1998/J%20Agr%20Foo%20Che46,%203789.pdf)

Abstract: Acidic montmorillonite clay was chemically modified via exchange with various ammonium- and pyridinium-based organic cations. These organo clays were then shown to adsorb zearalenone (ZEN) with an efficacy related to the exchanged cation hydrophobicity, as gauged by estimated critical micelle concentration values (cmc) and length of the alkyl chain. ZEN adsorption was greatest for clay samples that had been modified by interlayer exchange with cations possessing 16-carbon alkyl chains: hexadecyltrimethylammonium (HDTMA) and cetylpyridinium (CP). Isothermal analysis of ZEN adsorption (at 37°C, pH 6.5) indicated that the clay exchanged with CP at a level of less than or equivalent to the cation exchange capacity (CEC) binds ZEN primarily by a partition process. In contrast, clay exchanged at the 1.5 CEC level gave an S-shaped curve with at least two plateaus, suggesting additional mechanisms of adsorption. A capacity (Q(max)) and distribution coefficient (K-d) for the first site were estimated. At acid pH, the adsorption capacity for 1.5 CEC CP clay decreased and the isotherm shape predicted a simple partition process. Conversely, the shape remained curved at alkaline pH, suggesting an adsorption site. These data imply an adsorption mechanism at neutral pH that involves hydrophobic attraction of ZEN into the interlayer in addition to multisite binding of the anionic form to hydroxyl groups on the edge of the clay via ion-dipole interactions and electrostatic attraction to excess exchanged surfactant cations.

Keywords: Adsorption, Cetylpyridinium, Isotherm, Mycotoxin, Organo Clay, Zearalenone, Sorption, Mycotoxins, Cations, Swine, Water

Adachi, A., Ikeda, C., Takagi, S., Fukao, N., Yoshie, E. and Okano, T. (2001), Efficiency of rice bran for removal of organochlorine compounds and benzene from industrial wastewater. *Journal of Agricultural and Food Chemistry*, **49** (3), 1309-1314.

Full Text: [J\J Agr Foo Che49, 1309.pdf](J/J%20Agr%20Foo%20Che49,%201309.pdf)

Abstract: Rice bran was found to effectively adsorb several organic compounds, such as dichloromethane, chloroform, carbon tetrachloride, trichloroethylene, tetrachloroethylene, and benzene. Equilibrium adsorption isotherms conformed-to the Freundlich type (log-log linear). The adsorption of dichloromethane and chloroform by rice bran was observed over the range of pH 1-11. Therefore, rice bran is applicable for treatment of wastewater over a wide pH range. Dichloromethane was successfully removed from water samples with an average removal efficiency of 70% after 60 min when rice bran was added to water samples containing from 0.006 to 100 mg/L dichloromethane. The removal of these organochlorine compounds and benzene by rice bran was attributed to the uptake by intracellular particles called spherosomes. Here, we report the results of a fundamental study of the efficiency of rice bran for removal of organochlorine compounds and benzene using a batch system on the laboratory scale, and describe elucidation of the mechanism of removal of these compounds by rice bran.

Keywords: Dichloromethane, Chloroform, Benzene, Rice Bran, Spherosome, Water

Watanabe, E., Kanzaki, Y., Tokumoto, H., Hoshino, R., Kubo, H. and Nakazawa, H. (2002), Enzyme-linked immunosorbent assay based on a polyclonal antibody for the detection of the insecticide fenitrothion. Evaluation of antiserum and application to the analysis of water samples. *Journal of Agricultural and Food Chemistry*, **50** (1), 53-58.

Full Text: [J\J Agr Foo Che50, 53.pdf](J/J%20Agr%20Foo%20Che50,%2053.pdf)

Abstract: For development of an indirect competitive enzyme-linked immunosorbent assay (ELISA) for the organophosphorus insecticide fenitrothion, the specificity of the antiserum R-3 generated with the bifunctional hapten, LysMNPA (2-[[[(3-methyl-4-nitrophenyl)oxy]methylcarbonyl]amino]-6-(2,4-dinitrophenyl)aminohexanoic acid) and the application to the residual analysis of some water samples were evaluated. At optimized ELISA conditiond, the quantitative working range was from 1 to 39 ng/mL with a limit of detection of 0.3 ng/mL and an IC50 value of 6 ng/mL. Cross-reactivity to structurally similar organophosphorus compounds and related chemicals was determined. The antiserum R-3 showed significant cross-reactivity with fenitrooxon and 3-methyl-4-nitrophenol, which have a 3-methy-4-nitrophenoxy group as common structures, but showed relatively low cross-reactivity with other compounds. Each water sample (river water, tap water, purified water, and bottled water) had a matrix effect and was investigated by adding Tween 20 in the assay buffer. These four kinds of water samples were fortified with fenitrothion at several concentration levels and were directly analyzed with only dilution with an equal volume of antiserum solution. The mean recovery was 105.9%, and the mean coefficient of variation was 10.9%. The results suggested that the developed ELISA would be very suitable for a preliminary screening for fenitrothion in water samples at such low levels.

Keywords: Elisa, Fenitrothion, Fenitrooxon, 3-Methyl-4-Nitrophenol, Bifunctional Hapten, Tween 20, Water Analysis, Nitrogen-pHosphorus Detection, Gas-Chromatography, Organophosphorus Insecticides, Monoclonal-Antibody, Azinphos-Methyl, Fruit Juice, Immunoassay, Pesticides, Optimization, Carbaryl

Yu, P.Q., McKinnon, J.J., Christensen, C.R., Christensen, D.A., Marinkovic, N.S. and Miller, L.M. (2003), Chemical imaging of microstructures of plant tissues within cellular dimension using synchrotron infrared microspectroscopy. *Journal of Agricultural and Food Chemistry*, **51** (20), 6062-6067.

Full Text: [J\J Agr Foo Che51, 6062.pdf](J/J%20Agr%20Foo%20Che51,%206062.pdf)

Abstract: Synchrotron radiation-based Fourier transform infrared microspectroscopy (SR-FTIR) is an advanced bioanalytical technique capable of exploring the chemistry within microstructures of plant and animal tissues with a high signal to noise ratio at high ultraspatial resolutions (3-10 μm) without destruction of the intrinsic structures of a tissue. This technique is able to provide information relating to the quantity, composition, structure, and distribution of chemical constituents and functional groups in a tissue. The objective of this study was to illustrate how the SR-FTIR technique can be used to image inherent structures of plant tissues on a cellular level (pixel size, similar to10 μm×10 μm). The results showed that with the extremely bright synchrotron light, spectra with high signal to noise ratios were obtained from areas as small as 10 μm×10 μm in the plant tissue, which allowed us to “see” plant tissue in a chemical sense on a cellular level. The ultraspatial resolved imaging of plant tissues by stepping in pixel-sized increments was obtained. Chemical distributions of plant tissues such as lignin, cellulose, protein, lipid, and total carbohydrate could be mapped. These images revealed the chemical information of plant intrinsic structure. In conclusion, SR-FTIR can provide chemical and functional characteristics of plant tissue at high ultraspatial resolutions. The SR-FTIR microspectroscopic images can generate spatially localized functional group and chemical information within cellular dimensions.

Keywords: Synchrotron, Infrared Microspectroscopy, Chemical Imaging, Plant Tissue, Feed Chemistry, Ultraspatial Resolutions

Minamisawa, M., Minamisawa, H., Yoshida, S. and Takai, N. (2004), Adsorption behavior of heavy metals on biomaterials. *Journal of Agricultural and Food Chemistry*, **52** (18), 5606-5611.

Full Text: [J\J Agr Foo Che52, 5606.pdf](J/J%20Agr%20Foo%20Che52,%205606.pdf)

Abstract: We have investigated adsorption of Cd(II) and Pb(II) at pH 2-6.7 onto the biomaterials chitosan, coffee, green tea, tea, yuzu, aloe, and Japanese coarse tea, and onto the inorganic adsorbents, activated carbon and zeolite. High adsorptive capabilities were observed for all of the biomaterials at pH 4 and 6.7. In the adsorption of Cd(II), blend coffee, tea, green tea, and coarse tea have comparable loading capacities to activated carbon and zeolite. Although activated carbon, zeolite, and chitosan are utilized in a variety of fields such as wastewater treatment, chemical and metallurgical engineering, and analytical chemistry, these adsorbents are costly. On the other hand, processing of the test biomaterials was inexpensive, and all the biomaterials except for chitosan were able to adsorb large amounts of Pb(II) and Cd(II) ions after a convenient pretreatment of washing with water followed by drying. The high adsorption capability of the biomaterials prepared from plant materials is promising in the development of a novel, low-cost adsorbent. From these results, it is concluded that heavy metal removal using biomaterials would be an effective method for the economic treatment of wastewater. The proposed adsorption method was applied to the determination of amounts of Cd(II) and Pb(II) in water samples.

Keywords: Plant Materials, Cd(II), Pb(II), Blend Coffee, Tea, Green Tea, Coarse Tea, Zeolite, Activated Carbon, Yuzu, Aloe, Chitosan, Atomic-Absorption-Spectrometry, Green-Tea Particles, Aqueous-Solutions, Ion Adsorption, Removal, Chitosan, Furnace, Mercury(II), Adsorbent, Surface

? Manthey, J.A. (2004), Fractionation of orange peel phenols in ultrafiltered molasses and mass balance studies of their antioxidant levels. *Journal of Agricultural and Food Chemistry*, **52** (25), 7586-7592.

Full Text: [2004\J Agr Foo Che52, 7586.pdf](2004/J%20Agr%20Foo%20Che52,%207586.pdf)

Abstract: Orange peel molasses, a byproduct of juice production, contains high concentrations of phenols, including numerous flavanone and flavone glycosides, polymethoxylated flavones, hydroxycinnamates, and other miscellaneous phenolic glycosides and amines. Extensive fractionation of these phenols was achieved by adsorption, ion exchange, and size exclusion chromatography. Size exclusion chromatography effectively separated the different classes of flavonoids in ultrafiltered molasses, including the polymethoxylated flavones, flavanone-O-trisaccharides, flavanone- and flavone-O-disaccharides, and, finally, flavone-C-glycosides. Mass spectral analysis of the early-eluting flavonoid fractions off the size exclusion column revealed a broad collection of minor-occurring flavone glycosides, which included, in part, glycosides of limocitrin, limocitrol, and chrysoeriol. Most hydroxycinnamates in the molasses were recovered by ion exchange chromatography, which also facilitated the recovery of fractions containing many other miscellaneous phenols. Total antioxidant levels and total phenolic contents were measured for the separate categories of phenols in the molasses. Inhibition of the superoxide anion reduction of nitroblue tetrazolium showed that a significant amount of the total antioxidant activity in orange peel molasses was attributable to minor-occurring flavones. The miscellaneous phenolic-containing fractions, in which a large portion of the total phenolic content in molasses occurred, also constituted a major portion of the total antioxidants in ultrafiltered molasses.

Keywords: Acid, Adsorption, Antioxidants, By-Products, Citrus Byproducts, Citrus Peel, Flavone Glycosides, Flavonoids, Hydroxycinnamates, Inflammation, Ischemia-Reperfusion Injury, Orange Peel, Peel, Polymethoxylated Flavones, Purified Flavonoid Fraction, Radicals, Release

? Cryer, S.A. (2004), Determining kinetic and nonequilibrium sorption behavior for chlopyrifos using a hybrid batch/column experiment. *Journal of Agricultural and Food Chemistry*, **53** (10), 4103-4109.

Full Text: [2004\J Agr Foo Che53, 4103.pdf](2004/J%20Agr%20Foo%20Che53,%204103.pdf)

Abstract: Pesticide mobility in soil is strongly coupled to the chemical’s sorption characteristics. A modified soil column batch experiment was conducted to measure the transient nature of chlorpyrifos sorption and desorption from Cecil soil. This experimental system minimizes many shortcomings associated with obtaining sorption parameters by fitting soil column data to an advective-dispersive transport equation. Several chlorpyrifos formulations were investigated to determine how formulations affect soil sorption, and if this effect is adequately described using transient sorption/desorption algorithms. Both a second-order sorption with first-order desorption kinetic model and the two-site kinetic/equilibrium model were found to yield reasonable comparisons to experimental observations. In general, the formulation temporarily decreases the sorptivity of chlorpyrifos and alters the time for equilibrium to be achieved. Care must be exercised when extrapolating sorption data for a pure molecule in a laboratory setting to formulated materials used in field applications when environmental fate predictions are sought.

Keywords: Chlorpyrifos, Sorption, Kinetics, Nonequilibrium, Organic-Compounds, Aquifer Materials, Column Techniques, Porous-Media, Soil, Equilibrium; Adsorption, Transport, Sediments, Picloram

? Shechter, M., Xing, B.S., Kopinke, F.D. and Chefetz, B. (2006), Competitive sorption-desorption behavior of triazine herbicides with plant cuticular fractions. *Journal of Agricultural and Food Chemistry*, **54** (20), 7761-7768.

Full Text: [2006\J Agr Foo Che53, 7761.pdf](2006/J%20Agr%20Foo%20Che53,%207761.pdf)

Abstract: Sorption interactions of plant cuticular matter with organic compounds are not yet fully understood. The objective of this study was to examine the competitive sorption-desorption interactions of the triazine herbicides (atrazine and ametryn) with cuticular fractions isolated from tomato fruits and leaves of Agave americana. The C-13 NMR data suggest a rubber-like nature for the cutin. This biopolymer exhibited reversible and noncompetitive sorption. Enhanced desorption of atrazine was recorded in the bi-solute system with bulk and dewaxed A. americana cuticles. C-13 NMR analyses of these samples suggested that the sorbed competitor ametryn facilitated a physical phase transition of rigid paraffinic sorption domain to mobile and flexible domain during sorption process. We suggest that the different sorption-desorption behavior obtained for the two cuticles is related to the higher content of waxes (14% vs 2.6%) and lower content of cutin (46% vs 75%) in the A. americana versus tomato fruit cuticle.

Keywords: Plant Cuticle, Cutin, Cutan, Atrazine, NMR, Sorption, Desorption, Glass Transition Temperature, Paraffinic Carbon, Natural Organic-Matter, Distributed Reactivity Model, Phenanthrene Sorption, Soils, Cuticles, Sediments, Atrazine, Contaminants, Components, Origin

? Siao, F.Y., Lu, J.F., Wang, J.S., Inbaraj, B.S. and Chen, B.H. (2009), *In vitro* binding of heavy metals by an edible biopolymer poly(γ-glutamic acid). *Journal of Agricultural and Food Chemistry*, **57** (2), 777-784.

Full Text: [2009\J Agr Foo Che57, 777.pdf](2009/J%20Agr%20Foo%20Che57,%20777.pdf)

Abstract: An edible biopolymer poly(gamma-glutamic acid) (gamma-PGA) was evaluated for possible use as an chelating/binding agent in the treatment of metal intoxication in humans. In vitro binding of the toxic heavy metals lead and cadmium as affected by pH, contact time, metal concentration, gamma-PGA dose, and essential metals was carried out in a batch mode. A maximum binding occurred in the pH range 5-7, corresponding to the gastrointestinal pH values except for the stomach. Binding isotherms at pH 5.5 were well described by the heterogeneous models (Freundlich and Toth), while the lead isotherm at pH 2.5 showed a S-type curve, which was fitted as multiple curves with the Langmuir model and a shifted-squared Langmuir model. However, no adsorption occurred for cadmium at pH 2.5. The maximum binding capacities of lead and cadmium at pH 5.5 were 213.58 and 41.85 mg/g, respectively. A curvilinear biphasic Scatchard plot signified a multisite interaction of metals. Binding was extremely rapid with 70-100% of total adsorption being attained in 2 min. Kinetics at low and high metal concentrations obeyed pseudo-first-order and pseudo-second-order models, respectively. The gamma-PGA dose-activity relationship revealed a low dose of gamma-PGA to be more efficient in binding a large amount of metals. Incorporation of Cu, Zn, Fe, Mg, Ca, and K showed only a minor influence on lead binding but significantly reduced the binding of cadmium.

Keywords: Adsorption, Poly(Gamma-Glutamic Acid), Biodegradable Polymer, Heavy Metals, Isotherms, Kinetics, Metal Selectivity, Wheat Bran, Capacity, Fiber, Ph, Adsorption, Calcium, Polymer, Agents, Natto

? Dong, Z.B., Liang, Y.R., Fan, F.Y., Ye, J.H., Zheng, X.Q. and Lu, J.L. (2011), Adsorption behavior of the catechins and caffeine onto polyvinylpolypyrrolidone. *Journal of Agricultural and Food Chemistry*, **59** (8), 4238-4247.

Full Text: [2011\J Agr Foo Che59, 4238.pdf](2011/J%20Agr%20Foo%20Che59,%204238.pdf)

Abstract: Adsorbent is one of the most important factors for separation efficiency in fixed-bed purification techniques. The adsorption behavior of catechins and caffeine onto polyvinylpolypyrrolidone (PVPP) was investigated by static adsorption tests. The results showed that catechins rather than caffeine were preferred to adsorb onto PVPP since the adsorption selectivity coefficient of total catechins vs caffeine was around 22.5, and that adsorption of catechins could be described by the pseudo-second-order model. Adsorption amount of caffeine onto PVPP in green tea extracts solution was much higher than that in purified caffeine solution although the initial concentration of caffeine was similar in the two solutions, indicating the caffeine might be attached with catechins which were adsorbed by PVPP instead of being adsorbed by PVPP directly. The results also showed that the adsorption capacity of catechins and caffeine decreased with an increase in temperature, and that Freundlich and Langmuir models were both suitable for describing the isothermal adsorption of catechins, but not suitable for caffeine. The predicted maximum monolayer adsorption capacity of total catechins by PVPP was 671.77 mg g-1 at 20ºC, which was significantly higher than that by other reported adsorbents. The thermodynamics analyses indicated that the adsorption of catechins onto PVPP was a spontaneous and exothermic physisorption process, revealing lower temperature was favorable for the adsorption of catechins. Elution tests showed that the desorption rates of catechins and caffeine were higher than 91% and 99% after two elution stages; in detail, almost all of the caffeine could be washed down at the water eluting stage, while catechins could be recovered at the dimethyl sulfoxide/ethanol solution eluting stage. Thus, the PVPP could be used as an excellent alternative adsorbent candidate for separating catechins from crude tea extracts, although some investigations, such as exploring the new eluants with low boiling point and high desorption efficiency, should be conducted furthermore.

Keywords: Adsorption, Adsorption Kinetics, Biosorption, Catechins, Cream Formation, Decaffeination, Decaffeination, Desorption, Equilibrium, Freundlich, Freundlich and Langmuir Models, Green Tea, Isothermal Adsorption, Langmuir, Lignocellulose, Polyphenol, Precipitation, Protein, PVPP, Separation, Sorption, Thermodynamics

# Title: Journal of the Agricultural Chemical Society of Japan

Full Journal Title: Journal of the Agricultural Chemical Society of Japan

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Sakaguchi, T., Horikoshi, T. and Nakajima, A. (1979), Studies on the accumulation of heavy-metal elements in biological systems. 7. Adsorption of heavy metal ions by chitin phosphate and chitosan phosphate. *Journal of the Agricultural Chemical Society of Japan*, **53** (5), 149-156.

# Title: Journal of Agro-Environment Science

Full Journal Title: Journal of Agro-Environment Science

ISO Abbreviated Title:

JCR Abbreviated Title:

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Language:

Publisher:

Publisher Address:

Subject Categories:

? Li, C.F., Liu, Y.G., Zeng, G.M., Xu, W.H., Tang, C.F. and Li, X. (2005), A Effect of pH on cadmium adsorption behavior in red soils. *Journal of Agro-Environment Science*, **24** (1), 84-88.

Full Text: [2005\J Agr-Env Sci24, 84.pdf](2005/J%20Agr-Env%20Sci24,%2084.pdf)

# Title: Journal of the Air Pollution Control Association

Full Journal Title: Journal of the Air Pollution Control Association

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Jahnke, J.A. (1982), Continuous emission monitoring: Design, operation and experience; Selected papers from an APCA specialty meeting: Conference introduction. *Journal of the Air Pollution Control Association*, **32** (7), 701.

Taylor, H.S. (1982), Extractive continuous emission monitoring at San Juan generating station. *Journal of the Air Pollution Control Association*, **32** (7), 702-705.

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van Ee, J.J. (1982), Mobile air quality monitoring systems: Present problems and future needs. *Journal of the Air Pollution Control Association*, **32** (7), 716-719.

# Title: Journal of the Air and Waste Management Association

Full Journal Title: [Journal of the Air & Waste Management Association](http://www.awma.org/journal/back-issues.asp)

ISO Abbreviated Title: J. Air Waste Manage. Assoc.

JCR Abbreviated Title: J Air Waste Manage

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Journal Country/Territory: United States

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Subject Categories:

Engineering, Environmental: Impact Factor 1.007, 6/36 (2000)

Environmental Sciences: Impact Factor 1.284, 34/126 (1999); Impact Factor 1.007, 55/127 (2000)

Meteorology & Atmospheric Sciences: Impact Factor 1.007, 24/40 (2000)

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Full Text: J Air Was Man Ass40, 42

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Full Text: J Air Was Man Ass40, 887

? Liem, A.J. and Wilson, M.A. (1991), A quantitative method for evaluating incinerator test burn results. *Journal of the Air and Waste Management Association*, **41** (1), 47-55.

Full Text: J Air Was Man Ass41, 47

Abstract: A quantitative method has been developed to assess compliance with a standard which is expressed by y(r) < y(c) as the condition for meeting compliance, where y(r) is the measured value and y(c) is the compliance level. The problem is not trival in cases where the variability of y(n), or more precisely, the accuracy and precision of the method used for measuring y(n), cannot be readily obtained.

The method requires the implementation of a surrogate spiking program to obtain indirectly the variability of the data. The Bayesian approach is then used to compute the a posteriori odds or probability of compliance being met on the basis of the data gathered. In the computation, assumptions of log-normality, constant variance, chi-square distribution of the variance, and constant density for the a priori probability are made. “Nondetectable” results are included in the analysis by assigning them the values of the detection limits.

The method is applied to a series of incinerator test burns where a surrogate spiking program was implemented. The results are satisfactory in that they are consistent with what is intuitively expected.

The requirements for the application of the method, its adoption as a regulatory tool, and its use in planning a test burn are discussed. The latter use will reduce the occurrences of inconclusive results.

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Full Text: J Air Was Man Ass41, 429

Abstract: The computer model Industrial Source Complex Short Term (ISCST) was used to study the stack emissions from a refuse incinerator proposed for the island of Bermuda. The model predicts that the highest ground level pollutant concentrations will occur near Prospect, 800 m to 1000 m due south of the stack. We installed a portable laboratory and instruments at Prospect to begin making air quality baseline measurements. By comparing the model’s estimates of the incinerator contribution to the background levels measured at the site we predict that stack emissions will not cause an increase in TSP or SO2. The incinerator will be a significant source of HCI to Bermuda air with ambient levels approaching air quality guidelines.

? Shields, J. (1991), Ambient air arsenic levels along the Texas-Mexico border. *Journal of the Air and Waste Management Association*, **41** (6), 827-831.

Full Text: J Air Was Man Ass41, 827

Abstract: The Texas-Mexico border region is one of the most rapidly developing areas in the state. Unprecedented economic and demographic growth is placing stress on a system already overburdened with air, water, waste, and public health problems. This paper reports the results of an initial survey of the past and present ambient air levels of arsenic along the Texas side of the border. Ambient air arsenic levels have increased over time, exhibit seasonal variations, and are higher in specific areas when compared to the rest of the state. Five of the 20 areas in Texas having the highest 24-hour levels of arsenic are found along the border. In areas where emissions have been significantly reduced at the source, arsenic levels remained high in the environment for over two years. This provides a potential continuum for human exposure. The results of this study emphasize the need for bl-national development and implementation of air quality control programs along the Texas-Mexico border.

? (1991), Osha releases results of hazardous-waste incinerator safety study. *Journal of the Air and Waste Management Association*, **41** (7), 908-909.

Full Text: J Air Was Man Ass41, 908

? Morse, H.N. (1991), On permitting a medical waste incinerator. *Journal of the Air and Waste Management Association*, **41** (8), 1145.

Full Text: J Air Was Man Ass41, 1145

? Thurnau, R.C. and Fournier, D. (1992), The behavior of arsenic in a rotary kiln incinerator. *Journal of the Air and Waste Management Association*, **42** (2), 179-184.

Full Text: J Air Was Man Ass42, 179

Abstract: A research test program which focused on the partitioning of environmentally sensitive metals that resulted from controlled incineration of multi-contaminated soils (organics and metals) was carried out at the U.S. Environmental Protection Agency’s (EPA) incineration Research Facility (IRF). A synthetic matrix and an actual Superfund soil were the systems from which the partitioning of arsenic was measured.

Incineration variables of kiln exit temperature, afterburner exit temperature, chlorine content and initial arsenic concentration were tested. The amount of arsenic partitioned to the ash was found to be dependent on kiln temperature, but independent of afterburner exit temperature and feed chlorine content. A distinct difference in arsenic volatility was observed between the different soil matrices, and the TCLP values for arsenic in the kiln ash of the Superfund soil was affected by the combustion conditions.

? Ho, M.D., Perdek, J.M., Stumbar, J.P. and Sawyer, R.H. (1992), Field demonstration of the linde oxygen combustion system on the EPA mobile incinerator. *Journal of the Air and Waste Management Association*, **42** (4), 493-499.

Full Text: J Air Was Man Ass42, 493

Abstract: This paper summarizes the various system performance tests and the long-term operating experience of the LINDE(R) Oxygen Combustion System installed on the U.S. Environmental Protection Agency’s Mobile Incineration System (MIS) when it was in operation at the Denney Farm site in southwestern Missouri. The LINDE OCS was installed on the MIS as part of a major modification program in 1987. The modified system was first demonstrated for three months in 1987 when various system performance tests were conducted. Test burns of the modified MIS showed destruction and removal efficiencies (DRE) surpassing both Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) standards. The system resumed operation in February 1988 to continue the incineration of dioxin-contaminated materials from sites in southwestern Missouri. After implementation of the modifications, over ten million pounds of dioxin-contaminated material including soil, lagoon sludge, plastics, trash, protective clothing, wood, etc., were processed. MIS operations at Denney Farm ceased in April 1989.

Keywords: Transient Puffs, Simulator, Wastes

? Rao, G. and Saxena, S.C. (1993), Prediction of flue-gas composition of an incinerator based on a nonequilibrium-reaction approach. *Journal of the Air and Waste Management Association*, **43** (5), 745-752.

Full Text: J Air Was Man Ass43, 745

Abstract: A nonequilibrium-reaction model is developed to predict the flue gas composition of an incinerator for solid waste combustion and gasification. The model may also be effectively utilized to predict the composition of exit gas from the primary chamber of an incinerator where invariably substoichiometric combustion conditions exist. The model assumes that the drying and pyrolysis of waste occurs in sequence followed by combustion of devolatilized gas and residue separately. The model is applied to the combustion of pine wood, and the flue gas compositions are computed as a function of operating parameters such as temperature (1100 to 1500 K), initial moisture content (0 to 40 percent), and percentage excess air (up to 100 percent). The model is extended to include substoichiometric combustion (to simulate the gasification process without steam injection) to compare its predictions with the available experimental data. The general agreement of theory and experiment is good.

? Carpi, A., Weinstein, L.H. and Ditz, D.W. (1994), Bioaccumulation of mercury by sphagnum moss near a municipal solid-waste incinerator. *Journal of the Air and Waste Management Association*, **44** (5), 669-672.

Full Text: J Air Was Man Ass44, 669

Abstract: Sphagnum moss (Sphagnum spp.) and Italian ryegrass (Lolium multiflorum Lam.) were used as biological monitors of atmospheric mercury around a municipal solid waste incinerator in rural New Jersey. Moss and grass samples were exposed according to standardized techniques at sixteen sites within 5 km of the incinerator. One remote site was monitored to establish background field accumulation. Duplicate and control monitors were used for quality assurance. In all cases, mercury concentrations in moss exceeded those in grass. Mercury accumulation by moss exhibited a spatial pattern consistent with a local source of pollution, considering wind and precipitation. Total mercury in moss exposed at sites within 1.7 km of the incinerator averaged 206 ppb while samples exposed at greater distances from the facility averaged 126 ppb.

Keywords: Metals

? Buchholz, B.A. and Landsberger, S. (1995), Leaching dynamics studies of municipal solid-waste incinerator ash. *Journal of the Air and Waste Management Association*, **45** (8), 579-590.

Full Text: J Air Was Man Ass45, 579

Abstract: An assessment of the short-and long-term hazards from municipal solid waste incinerator (MSWI) ash is made through the elemental analysis of 40 to 50 elements in the ash and leachates produced by several leaching procedures. The ash was analyzed using neutron activation analysis (NAA) and x-ray fluorescence (XRF). The leachates were analyzed using NAA and inductively-coupled plasma atomic emission spectroscopy (lCP). The leaching dynamics of an ash monofill were modelled with a series of extractions using simulated acid rain. An initial spike of the metals Ag, Ba, Be, Cr, Cu, Mo, Pb, Sr, and Zn in the leachates appears to be the greatest hazard posed by MSWI ash monofills. The elements As, Cd, Cu, Hg, Pb, S, and Zn were identified as potential long term hazards utilizing a sequential extraction procedure which approximates the total amount of the elements available over the lifetime of the monofill.

The pH of the resulting leachate is the single greatest factor governing the concentration of metals in solution, more important than the concentration of the element in the ash. These results are applied to an assessment of the suitability of the Toxicity Characteristic Leaching Procedure (TCLP) in measuring leaching potential of an MSWI ash monofill.

Keywords: Fly-Ash, Trace-Elements, Heavy-Metals, Leachability, Speciation, UK, Disposal, Batch

? Carroll, G.J., Thurnau, R.C. and Fournier, D.J. (1995), Mercury emissions from a hazardous-waste incinerator equipped with a state-of-the-art wet scrubber. *Journal of the Air and Waste Management Association*, **45** (9), 730-736.

Full Text: J Air Was Man Ass45, 730

Abstract: Over a six-week period, eleven tests were performed at the U.S. EPA incineration Research Facility (IRF) in Jefferson, Arkansas to evaluate the fate of trace metals fed to a rotary kiln incinerator equipped with a Calvert Flux-Forcer/Condensation Scrubber pilot plant as the primary air pollution control system (APCS). Test variables were kiln temperature, ranging from 538°C to 927°C; waste feed chlorine content, ranging from O% to 3.4%; and scrubber pressure drop, ranging from 8.2 kPa to 16.9 kPa. Mercury was among the six hazardous constituent trace metals fed to the IRF’s pilot-scale rotary kiln incineration system as part of a synthetic waste feed. This paper focuses on the test results solely with respect to mercury.

As expected, mercury behaved as a very volatile metal throughout the tests; it was not detected in any kiln ash samples. Scrubber collection efficiency for mercury ranged from 67% to > 99%, averaging 87%; this was somewhat lower than expected and may be attributable to low scrubber loadings.

The ability to collect and analyze representative scrubber water samples appears to have been affected by the waste feed chlorine content; detection of mercury at higher concentrations during high waste-chlorine-content tests is thought to be largely the result of the formation of mercuric chloride, a more water-soluble species, during those tests. As a result, no firm conclusions may be drawn regarding the true impact of waste feed chlorine content on mercury partitioning to the scrubber water. As expected, no significant relationship was observed between kiln exit-gas temperature and mercury partitioning, nor was there a significant relationship with scrubber pressure drop.

? Jakway, A.L., Sterling, A.M., Cundy, V.A., Cook, C.A. and Montestruc, A.N. (1995), In-situ velocity-measurements from an industrial rotary kiln incinerator. *Journal of the Air and Waste Management Association*, **45** (11), 877-885.

Full Text: J Air Was Man Ass45, 877.pdf

Abstract: For the first time, velocities were measured inside a field-scale rotary kiln incinerator. Combustion gas velocities and temperatures were measured at multiple points across a quadrant of the kiln near its exit using a bidirectional pressure probe and suction pyrometer. To accommodate the new bidirectional probe and gain access to the upper portion of the kiln, a lighter and stiffer positioning boom was designed. The kiln was directly fired using natural gas in a steady state mode. Results indicate strong vertical stratification of both velocity and temperature, with the highest values corresponding to the top of the kiln. Access restraints prevented the lower region of the kiln from being mapped. Horizontal variations in both temperature and velocity were insignificant. Operating conditions were varied by adjusting the amount of ambient air added to the front of the kiln. Increasing the flow of ambient air into the front of the kiln reduced the measured temperatures a’s expected, but did not have as significant an effect on measured velocities. The quality of the results is examined by performing mass balances across the incinerator and by comparison to an existing numerical model. Both methods indicate that the experimental results are reasonable.

Keywords: Loaded Toluene Sorbent, In-Depth, Evolution Rates, Exit, Bed, Packs

? Thurnau, R.C. and Manning, J.A. (1996), Low temperature desorption applications of a direct-fired rotary kiln incinerator. *Journal of the Air and Waste Management Association*, **46** (1), 12-19.

Full Text: [1996\J Air Was Man Ass46, 12.pdf](1996/J%20Air%20Was%20Man%20Ass46,%2012.pdf)

Abstract: High temperature incineration has been associated with the emission of some undesirable pollutants, namely dioxin and toxic metals. Because temperature appears to be a primary force in the generation of these pollutants, the EPA Office of Research and Development conducted a set of low temperature desorption experiments on a conventional pilot-scale rotary kiln incinerator to determine its treatment effectiveness for a synthetic waste stream.

The objective of the low temperature treatment test program was to research the global effects of five parameters believed to be of primary importance to the effectiveness of organic decontamination and toxic metal partitioning. The parameters studied were soil moisture/volatile content, treatment temperature, treatment time, solid bed depth, and degree of solid agitation. A series of twelve tests was performed under different operating conditions to determine:

the relationship between kiln exit gas temperature and soil treatment temperature;

that treatment temperature was a critical parameter for remediation;

that treatment time after achieving equilibrium temperature was important;

that moisture affected the treatment effectiveness;

that feed rate affected decontamination performance; and

that agitation did not affect performance.

? Lemieux, P.M., Ryan, J.V., Bass, C. and Barat, R. (1996), Emissions of trace products of incomplete combustion from a pilot-scale incinerator secondary combustion chamber. *Journal of the Air and Waste Management Association*, **46** (4), 309-316.

Full Text: [1996\J Air Was Man Ass46, 309.pdf](1996/J%20Air%20Was%20Man%20Ass46,%20309.pdf)

Abstract: Experiments were performed on a 73 kW rotary kiln incinerator simulator equipped with a 73 kW secondary combustion chamber (SCC) to examine emissions of products of incomplete combustion (PICs) resulting from incineration of carbon tetrachloride (CCl4) and dichloromethane (CH2Cl2). Species were measured using an on-line gas chromatograph (GC) system capable of measuring concentrations of eight species of volatile organic compounds (VOCs)in a near-real-time fashion. Samples were taken at several points within the SCC, to generate species profiles with respect to system residence time. For the experiments, the afterburner on the SCC was operated at conditions ranging from fuel-rich to fuel-lean, while the kiln was operated at a constant set of conditions. Results indicate that combustion of CH2Cl2 produces higher levels of measured PICs than combustion of CCl4, particularly 1,2 dichlorobenzene, and to a lesser extent, monochlorobenzene. Benzene emissions were predominantly affected by the afterburner air/fuel ratio regardless of whether or not a surrogate waste was being fed.

Keywords: Rotary Kiln Incineration, Transient Puffs, Liquid Wastes, In-Depth, Exit, Simulator, Sorbent

? Wei, Y.L. (1996), Thermal immobilization of lead contaminants in soils treated in a fixed-and fluidized-bed incinerator at moderate temperatures. *Journal of the Air and Waste Management Association*, **46** (5), 422-429.

Full Text: [1996\J Air Was Man Ass46, 422.pdf](1996/J%20Air%20Was%20Man%20Ass46,%20422.pdf)

Abstract: Artificially lead-contaminated soils with different lead contents (200, 450, 600, and 900 ppm) were thermally immobilized in both fixed-bed and fluidized-bed modes at moderate treating temperatures (less than 500°C) for various retention times. Cement powder and brick powder were added to the artificially contaminated soils to enhance lead immobilization. Results indicate that increasing treating temperature and time increases the extent of lead immobilization, as determined by the U.S. Environmental Protection Agency’s (U.S. EPA) Toxicity Characteristics Leachability Procedure (TCLP). The percentage of lead leached from the soil/cement mixtures was in the range of less than 0.251%, compared with the range between 13.6% and 40.7% for the corresponding soil/brick mixtures. As the amount of brick dust added to the Pb-doped soil was increased, the specific Yb immobilization effectiveness increased from 0.0675 to 0.149 mg Pb/g brick (for the 20-and 50-gram brick addition, respectively). An increase in air flow rate from 2 to 40 L/min caused a slight decrease in the Pb leaching percentage from 14.96% to 11.59%. Both the Freundlich and Langmuir isotherms give a satisfactory fit (r = 0.945 similar to 0.998) for the data derived from a TCLP test of the thermally-treated soil samples (105°C and 500°C) that contained lead contaminants. Sorption of lead contaminants in soil and sorbent matrices was the primary type of chemisorption. The kinetic results indicated that the Pb-doped soil system was too complicated to be described by a simple calculation.

Keywords: Hydrous Ferric-Oxide, Adsorption, Sorbents, Sorption, Removal, Cadmium, Copper, Zinc, pH

? Chichester, D.L. and Landsberger, S. (1996), Determination of the leaching dynamics of metals from municipal solid waste incinerator fly ash using a column test. *Journal of the Air and Waste Management Association*, **46** (7), 643-649.

Full Text: [1996\J Air Was Man Ass46, 643.pdf](1996/J%20Air%20Was%20Man%20Ass46,%20643.pdf)

Abstract: The objective of this work was to study the dynamic leaching behavior of thirty-three elements in municipal solid waste incinerator fly ash using a column test employing double deionized water. Nearly all of the elements initially present in the leachate were found to leach quickly and then decrease to near constant concentrations after five pore volumes of water passed through the column. of the eight elements subject to toxicity characteristic leaching procedure (TCLP) investigations, all except lead were found in concentrations below regulatory limits. After three pore volumes of water passed through the column, leachate lead concentrations were found to have diminished to TCLP permissible levels. Concerning Resource Conservation and Recovery Act (RCRA) Title D regulations pertaining to permissible landfill leachate production, lead concentrations were still found at levels above allowable limits after as many as 40 pore volumes of leachate production.

Giese-Bogdan, S. and Levine, S.P. (1996), International diffusion of open path FTIR technology and air monitoring methods: Taiwan (Republic of China). *Journal of the Air and Waste Management Association*, **46** (8), 761-764.

Full Text: [1996\J Air Was Man Ass46, 761.pdf](1996/J%20Air%20Was%20Man%20Ass46,%20761.pdf)

Abstract: International cooperation and diffusion of environmental technologies is a central goal of the U.S. EPA Environmental Technology Initiative and is of great interest to many countries. One objective is to exchange knowledge and skills concerning new monitoring technologies. In this case, the technology was open path Fourier Transform Infrared Spectrometry (op-FTIR).

Taiwan is a high-technology, newly industrialized country. Because of air pollution problems, it is interested in obtaining skills, knowledge and instrumentation for monitoring air pollutants. In April 1994, the Industrial Technology Research Institute, Center for Industrial Safety and Health Technology (ITRI/CISH) in Hsinchu, Taiwan, requested intensive training in op-FTIR. Training was held between September 30, 1994 and October 29, 1994.

During the stay, the instructor provided intensive training on op-FTIR theory as well as an introduction to available instrumentation and software. The training concluded with a field demonstration of the instrumentation in a manufacturing facility. This report gives an overview of the training methods, tructure and materials in the op-FTIR training course. It will also address various problems encountered while teaching this course. In addition, the potential use for this technology in industry as well as by the Taiwanese government will be explained.

Notes: highly cited

? Schwartz, J., Dockery, D.W. and Neas, L.M. (1996), Is daily mortality associated specifically with fine particles? *Journal of the Air and Waste Management Association*, **46** (10), 927-939.

Full Text: [1996\J Air Was Man Ass46, 927.pdf](1996/J%20Air%20Was%20Man%20Ass46,%20927.pdf)

Abstract: Recent epidemiologic studies have consistently reported increased daily mortality associated with exposures to particulate air pollution. Currently, particulate mass is measured as particles smaller than 10 mu m (PM(10)). Fine (PM(2.5)) and coarse (PM(10) - PM(2.5)) mass and sulfate particle concentrations were measured in six eastern U.S. cities for eight years, and aerosol acidity concentrations were measured for approximately one year. Daily mortality for these metropolitan areas was combined with particulate air pollution and weather measurements. City-specific associations with each measure of particle pollution were estimated by Poisson regression, adjusting for time trends and weather by nonparametric methods. Combined effect estimates were calculated as the inverse variance weighted mean of the city-specific estimates. PM(10), PM(2.5), and SO4 = were each significantly associated with increased daily mortality, while no associations were found with coarse mass nor with aerosol acidity (H+) concentrations. The strongest association was found with PM(2.5) - A 10 mu g/m(3) increase in two-day mean PM(2.5) was associated with a 1.5% (95% CI 1.1% to 1.9%) increase in total daily mortality. Somewhat larger increases were found for deaths caused by chronic obstructive pulmonary disease (+3.3%) and by ischemic heart disease (+2.1%). These data suggest that increased daily mortality is specifically associated with particle mass constituents found in the aerodynamic diameter size range under 2.5 mu m, that is, with combustion-related particles.

Keywords: Particulate Air-Pollution, Pulmonary Immune Cells, Tumor-Necrosis-Factor, Acid Aerosols, Ultrafine Particles, Polymorphonuclear Neutrophils, Personal Exposures, Passive Smoking, Heart-Disease, Lung Injury

Nelli, C.H. and Rochelle, G.T. (1998), Simultaneous sulfur dioxide and nitrogen dioxide removal by calcium hydroxide and calcium silicate solids. *Journal of the Air and Waste Management Association*, **48** (9), 819-828.

Full Text: [J\J Air Was Man Ass48, 819.pdf](J/J%20Air%20Was%20Man%20Ass48,%20819.pdf)

Abstract: At conditions typical of a bag filter exposed to a coal-fired flue gas that has been adiabatically cooled with water, calcium hydroxide and calcium silicate solids were exposed to a dilute, humidified gas stream of nitrogen dioxide (NO2) and sulfur dioxide (SO2) in a packed-bed reactor. A prior study found that NO2 reacted readily with surface water of alkaline and non-alkaline solids to produce nitrate, nitrite, and nitric oxide (NO). With SO2 present in the gas stream, NO2 also reacted with S(IV), a product of SO, removal, on the exterior of an alkaline solid. The oxidation of S(IV) to S(VI) by oxygen reduced the availability of S(IV) and lowered removal of NO2. Subsequent acidification of the sorbent by the removal of NO2 and SO2 facilitated the production of NO. However, the conversion of nitrous acid to sulfur-nitrogen compounds reduced NO production and enhanced SO2 removal. A reactor model based on empirical and semi-empirical rate expressions predicted rates of SO2 removal, NO2 removal, and NO production by calcium silicate solids. Rate expressions from the reactor model were inserted into a second program, which predicted the removal of SO2 and NOx by a continuous process, such as the collection of alkaline solids in a baghouse. The continuous process model, depending upon inlet conditions, predicted 30-40% removal for NOx and 50-90% removal for SO2. These results are relevant to dry scrubbing technology for combined SO2 and NOx removal that first oxidizes NO to NO2 by the addition of methanol into the flue duct.

Keywords: Fly-Ash, Oxidation

Haussard, M., Gaballah, I., de Donato, P., Barrès, O. and Mourey, A. (2002), Use of treated bark for the removal of lipids from water. *Journal of the Air & Waste Management Association*, **52** (1), 76-83.

Full Text: [J\J Air Was Man Ass52, 76.pdf](J/J%20Air%20Was%20Man%20Ass52,%2076.pdf)

Abstract: Raw, biologically treated bark and bark impregnated with transition metal ions were used to retain the lipids from synthetic emulsions. Several experimental parameters affecting the lipid removal efficiency (RE) were studied (initial concentration of lipids, temperature, time, pH, carboxylic acid chain length, etc.). Saturated bark was characterized using Fourier transform infrared (FTIR) spectroscopy and light microscopy, and the treated bark wetting index was determined. Results show that lipid removal can exceed 95% of the initial concentration at a pH lower than 7. The uptake of lipids by these sorbents varied from 0.2 to 2.5 g, g of dry bark. Trials for regenerating the sorbent saturated by lipids allowed the recovery of similar to95% of lipids. The calorific value of the saturated bark: was similar to79% that of domestic fuel and can be considered as an energy source, thus avoiding its waste disposal. These results may upgrade the treatment of wastewater generated by several industrial sectors, such as the food industry, surface treatment, and so on.

Keywords: Acid, Bark, Lipids, Metal, Metal Ions, Removal, Treated Bark, Waste

? Lin, H.Y., Yuan, C.S., Wu, C.H. and Hung, C.H. (2006), The adsorptive capacity of vapor-phase mercury chloride onto powdered activated carbon derived from waste tires. *Journal of the Air & Waste Management Association*, **56** (11), 1558-1566.

Full Text: [2006\J Air Was Man Ass56, 1558.pdf](2006/J%20Air%20Was%20Man%20Ass56,%201558.pdf)

Abstract: Injection of powdered activated carbon (PAC) upstream of particulate removal devices (such as electrostatic precipitator and baghouses) has been used effectively to remove hazardous air pollutants, particularly mercury-containing pollutants, emitted from combustors and incinerators. Compared with commercial PACs (CPACs), an alternative PAC derived from waste tires (WPAC) was prepared for this study. The equilibrium adsorptive capacity of mercury chloride (HgCl2) vapor onto the WPAC was further evaluated with a self-designed bench-scale adsorption column system. The adsorption temperatures investigated in the adsorption column were controlled at 25 and 150 degrees C. The superficial velocity and residence time of the flow were 0.01 m/sec and 4 sec, respectively. The adsorption column tests were run under nitrogen gas flow. Experimental results showed that WPAC with higher Brunauer-Emmett-Teller (BET) surface area could adsorb more HgCl2 at room temperature. The equilibrium adsorptive capacity of HgCl2 for WPAC measured in this study was 1.49×10-1 mg HgCl2/g PAC at 25°C with an initial HgCl2 concentration of 25 mu g/m3. With the increase of adsorption temperature <= 150°C, the equilibrium adsorptive capacity of HgCl2 for WPAC was decreased to 1.34×10-1 mg HgCl2/g PAC. Furthermore, WPAC with. higher sulfur contents could adsorb even more HgCl2 because of the reactions between sulfur and Hg2+ at 150 degrees C. It was demonstrated that the mechanisms for adsorbing HgCl, onto WPAC were physical adsorption and chemisorption at 25 and 150 degrees C, respectively. Experimental results also indicated that the apparent overall driving force model appeared to have the good correlation with correlation coefficients (r) > 0.998 for HgCl2, adsorption at 25 and 150°C. Moreover, the equilibrium adsorptive capacity of HgCl2 for virgin WPAC was similar to that for CPAC at 25°C, whereas it was slightly higher for sulfurized WPAC than for CPAC at 150 degrees C.

Keywords: Activated Carbon, Adsorption, Capacity, Carbon, Char, Chemisorption, Chemistry, Emissions, Equilibrium, Fired Power-Plants, Flue-Gas, Incineration Industry, Injection, Kinetics, Mechanisms, Mercury, Nitrogen, Removal, Sorbents, Surface Area, Temperature

# Title: Journal of Aircraft

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: Impact Factor

? Kostoff, R.N., Karpouzian, G. and Malpohl, G. (2005), Text mining the global abrupt-wing-stall literature. *Journal of Aircraft*, **42** (3), 661-664.

Full Text: [2005\J Air42, 661.pdf](2005/J%20Air42,%20661.pdf)

Abstract: Text mining was used to derive technical intelligence from an abrupt-wing-stall database derived from the Science Citation Index database. Both concept and document clustering were used to provide the structural taxonomy of the global abrupt-wing-stall literature and the estimated relative levels of effort in the major subcategories. Bibliometric analysis of the abrupt-wing-stall literature generated author/journal/institution publication and citation data.

Keywords: Bibliometrics, Citation, Database Tomography, Discovery, Document Clustering, Information, Publication, Science, Science Citation Index, Technical Intelligence, Trends

# Title: Journal of Allergy and Clinical Immunology

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? Novey, H.S., Habib, M. and Wells, I.D. (2000), Asthma and IgE antibodies induced by chromium and nickel salts. *Journal of Allergy and Clinical Immunology*, **72** (4), 407-412.

Full Text: [2000\J All Cli Imm72, 407.pdf](2000/J%20All%20Cli%20Imm72,%20407.pdf)

Abstract: Metal plating with chromium and nickel has secured an occupational relation with asthma for which an allergic basis has been postulated but not confirmed. A worker who developed de novo asthma after plating with nickel and chromium but not other metals was subjected to inhalational challenge and immunoserologic tests to evaluate this association. He developed acute asthma to chromium sulfate and a biphasic asthma-like response to nickel sulfate. Radioimmunoassays incorporating the challenge materials revealed specific IgE antibodies to the provocative agents but not to another metal, gold, which he could tolerate. The findings support the postulates that bronchial reactivity can be speci$cally induced by fumes of metallic salts, even in a previously nonallergic individual, and that an IgE type I immunopathogenic mechanism is involved. (J ALLERGY CLIN IMMUNOL 72:407-412, 1983.)

Siebers, R. (2000), The accuracy of references of three allergy journals. *Journal of Allergy and Clinical Immunology*, **105** (4), 837-838.

Full Text: [J\J All Cli Imm105, 837.pdf](J/J%20All%20Cli%20Imm105,%20837.pdf)

Keywords: References, Accuracy, Medline

Ziment, I. and Tashkin, D.P. (2000), Alternative medicine for allergy and asthma. *Journal of Allergy and Clinical Immunology*, **106** (4), 603-614.

Full Text: [J\J All Cli Imm106, 603.pdf](J/J%20All%20Cli%20Imm106,%20603.pdf)

Abstract: ‘Orthodox medical approaches to asthma and allergic respiratory diseases are provided in guidelines developed by professional societies and national or state organizations that represent organized medicine. Alternative therapies may include such orthodox medical therapies as obsolescent formerly used agents, unusual but accepted agents, and agents that are in favor for orthodox therapy in other countries. However, the current growth of complementary and alternative medicine is based on the use of nonorthodox remedies that are becoming increasingly popular with patients and that should be familiar to physicians. Asthma and allergies are frequently treated with such remedies by patients, either as part of self-therapy or on the advice of a complementary and alternative medicine practitioner, The most popular alternative medical treatments are herbs (Western and Asiatic), acupuncture, various types of body manipulation, psychologic therapies, homeopathy, and unusual allergy therapies. There is little evidence in favor of most of these unorthodox treatments, although they are very often reported on favorably by patients, The published evidence that might support some alternative medical practices is reviewed so as to help physicians select alternatives that could appropriately be integrated into orthodox practice.

Keywords: Asthma, Alternative Medicine, Herbal Therapy, Homeopathic Remedies, Acupuncture, Marijuana, Psychologic Therapies, Exercise-Induced Asthma, Bronchial-Asthma, Controlled Trial, Simulated Acupuncture, Herbal Medicine, Homeopathy, Marijuana, Real, Delta-9-Tetrahydrocannabinol, Management

Weiss, K.B. and Sullivan, S.D. (2001), The health economics of asthma and rhinitis. I. Assessing the economic impact. *Journal of Allergy and Clinical Immunology*, **107** (1), 3-8.

Full Text: [J\J All Cli Imm107, 3.pdf](J/J%20All%20Cli%20Imm107,%203.pdf)

Abstract: As new health care strategies compete with existing ones for limited resources, the health care system and its providers are beginning to turn to health economic analyses to help inform choices in the delivery of care. This 2-part review examines the current health economic literature fur asthma and rhinitis. This first installment of the review focuses on studies that characterize the economic burden of asthma and rhinitis and examines how resources are allocated to the care of persons with asthma and rhinitis, In 1998, asthma in the United States accounted for an estimated 12.7 billion dollars annually, Similarly, in 1994, allergic rhinitis was estimated to cost 1.2 billion dollars. Most of the costs for these conditions are attributed to direct medical expenditures, with medications emerging as the single largest cost component. Indirect costs also represent an important social effect. While cost-of-illness studies help to characterize the economic burden, comparative health economic: studies evaluate the value of new and existing strategies for clinical care. The second part of this review will explore how comparative studies have contributed to understanding how to best diagnose and treat asthma and allergic rhinitis.

Keywords: Cost of Illness, Health Economic Evaluation, Cost-Effectiveness, Cost-Benefit, Indirect Costs, United-States, Allergic Rhinitis, Childhood Asthma, Children, Severity, Burden

# Title: Journal of Alloys and Compounds

Full Journal Title: [Journal of Alloys and Compounds](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=09258388)

ISO Abbreviated Title: J. Alloy. Compd.

JCR Abbreviated Title: J Alloy Compd

ISSN: 0925-8388

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Journal Country/Territory: Switzerland

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Publisher: Elsevier Science SA

Publisher Address: Po Box 564, 1001 Lausanne, Switzerland

Subject Categories:

Chemistry, Physical: Impact Factor 0.953, / (2001)

Materials Science, Multidisciplinary: Impact Factor 0.953, / (2001)

Metallurgy & Metallurgical Engineering: Impact Factor 0.953, / (2001)

Notes: highly cited

? Bogdanović, B. and Schwickardi, M. (1997), Ti-doped alkali metal aluminium hydrides as potential novel reversible hydrogen storage materials. *Journal of Alloys and Compounds*, **253**, 1-9.

Full Text: [1997\J All Com271-253, 1.pdf](1997/J%20All%20Com271-253,%201.pdf)

Abstract: New reversible hydrogen storage systems are proposed, based on catalyzed reactions (Eqs. 4-6). The catalytic acceleration of the reactions in both directions is achieved by doping alkali metal aluminium hydrides with a few mol% of selected Ti compounds. The PCI diagrams of the Ti catalyzed systems show an absence of hysteresis and nearly horizontal pressure plateaus. The PCI of the NaAlH2 system reveals two temperature-dependent pressure plateaus, corresponding to the two-step reversible dissociation of NaAlH2. The PCI of the Na2AlH2 system shows only one pressure plateau; the latter can be lowered by partial substitution of Na by Li. Ln cyclic tests, reversible H2 capacities of 4.2-3.1 and 2.7-2.1 wt% H have been achieved.

Keywords: Alkali Metal Aluminium Hydrides, Pressure Composition Isotherms, Reversible Hydrogen Storage Materials, Titanium Catalysts

Nagasaki, S., Tanaka, S., Todoriki, M. and Suzuki, A. (1998), Surface sorption and surface diffusion of NpO2+ with poorly crystallized ferric oxide. *Journal of Alloys and Compounds*, **271-273**, 252-256.

Full Text: [J\J All Com271-273, 252.pdf](J/J%20All%20Com271-273,%20252.pdf)

Abstract: The sorption of NpO2+: onto synthetic poorly crystallized ferric oxide was studied by conducting batch experiments in the pH range from 4 to 8 as well as adsorption isotherm studies and constant boundary condition studies. The sorption process was characterized by two steps. The first step was a rapid reaction between the bulk solution and the external surfaces of the poorly crystallized ferric oxide. In this step, NpO2+: was sorbed on the external sites of the poorly crystallized ferric oxide by formation of an inner-sphere complex. The second step was a slow and rate-limiting reaction wherein the NpO2+: diffused through small pores in the poorly crystallized ferric oxide. By taking account of these two steps and the mass balance of NpO2+ in the poorly crystallized ferric oxide, we applied the diffusion model to our experimental results, and evaluated the surface diffusion coefficient of NpO2+: at 2.0×10-13 cm2 s-1. (C) 1998 Elsevier Science S.A.

Keywords: NpO2+, Poorly Crystallized Ferric Oxide, Sorption, Surface Diffusion, Kinetics, Adsorption, Desorption, Ferrihydrite, Hydrolysis, Chemistry, Arsenate, Cadmium

? Salam, M.A., Mokhtar, M., Basahel, S.N., Al-Thabaiti, S.A. and Obaid, A.Y. (2010), Removal of chlorophenol from aqueous solutions by multi-walled carbon nanotubes: Kinetic and thermodynamic studies. *Journal of Alloys and Compounds*, **500** (1), 87-92.

Full Text: [2010\J All Com500, 87.pdf](2010/J%20All%20Com500,%2087.pdf)

Abstract: Kinetics and thermodynamic studies were conducted for the adsorption of 2,3-dichlorophenol, as an example of persistence organic pollutants, on pristine multi-walled carbon nanotubes (MWCNTs) in aqueous solution. The adsorption of 2,3-dichlorophenol was found to be dependent on mass of MWCNTs, concentration, solution pH, and adsorption temperature. MWCNTs were found to be an excellent adsorbent for the removal of 2,3-dichlorophenol from aqueous solutions in a very short period of time. A comparison of the kinetic models and the overall adsorption capacity was best described by the pseudo second-order kinetic model. The kinetics of the adsorption showed that the adsorption is mainly due to the diffusion of 2,3-dichlorophenol from the aqueous phase to the solid phase. The adsorption of 2,3-dichlorophenol on pristine MWCNTs at different temperatures was studied. The thermodynamic parameters showed that the adsorption process is product favored, and becomes more so at lower temperature, since the adsorption is exothermic. The magnitude of the enthalpy suggests a weak type of bonding between the 2.3-dichlorophenol and the MWCNTs. The entropy values were negative, indicating that 2,3-dichlorophenol is more ordered on the aqueous phase than at the MWCNTs surface. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption, Aqueous Solution, Biosorption, Chlorophenols, Chromatography, Diffusion, Granular Activated Carbon, Kinetic, Kinetic Models, Kinetics, Methylene-Blue, Multi-Walled Carbon Nanotubes, Organic Pollutants, Phenolic-Compounds, Removal, Solid-Phase Extraction, Surface, Thermodynamics, Water

# Title: Journal of Alternative and Complementary Medicine

Full Journal Title: [Journal of Alternative and Complementary Medicine](http://www.ingentaconnect.com/content/mal/acm)

ISO Abbreviated Title: J. Altern. Complement Med.

JCR Abbreviated Title: J Altern Complem Med

ISSN: 1075-5535

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Mary Ann Liebert Inc Publ

Publisher Address: 2 Madison Avenue, Larchmont, NY 10538

Subject Categories:

Integrative & Complementary Medicine: Impact Factor 1.233, 1/8 (2000)

? Wu, J.N. (1996), A short history of acupuncture. *Journal of Alternative and Complementary Medicine*, **2** (1), 19-21.

Full Text: [1996\J Alt Com Med2, 19.pdf](1996/J%20Alt%20Com%20Med2,%2019.pdf)

Fisher, P., van Haselen, R., Hardy, K., Berkovitz, S. and McCarney, R. (2004), Effectiveness gaps: A new concept for evaluating health service and research needs applied to complementary and alternative medicine. *Journal of Alternative and Complementary Medicine*, **10** (4), 627-632.

Full Text: [J\J Alt Com Med10, 627.pdf](J/J%20Alt%20Com%20Med10,%20627.pdf)

Abstract: Background: An effectiveness gap (EG) is an area of clinical practice in which available treatments are not fully effective. EGs have not been previously researched. Complementary and alternative medicine (CAM) interventions, by definition, are not generally available through normal health care channels. Therefore, if effective, they have the potential to increase achieved community effectiveness.

Aims: A pilot study to determine whether EGs exist, and if so to provide initial data on their nature, frequency, and causes. To obtain preliminary data on whether CAM may offer effective interventions in these clinical areas.

Design: Semistructured telephone interviews; literature search.

Setting: Twenty-two (22) general practitioners (GPs) in London, U.K.

Method: One hundred and fifty-two (152) doctors who had responded to an earlier survey on attitudes to CAM were approached. Respondents were asked to specify EGs and to give reasons why available treatment is unsatisfactory and to estimate the frequency and severity of clinical problems relating to EGs. Sampling was continued to redundancy. A bibliometric study examined the volume and type of published evidence on the effectiveness of CAM interventions in the identified clinical areas.

Results: There was good concordance among respondents on EGs encountered in general/family practice. Seventy-eight (78) clinical problems were cited. EGs are encountered quite frequently: 68 of 78 (85%) of EGs were encountered at least once per month. Musculoskeletal problems were cited by 20 of 22 (90%) of respondents as being affected by EGs. Depression, eczema, chronic pain, and irritable bowel syndrome were also frequently mentioned. Systematic reviews and meta-analyses conclude that there is evidence for the effectiveness of various CAM interventions in most of these areas.

Conclusions: EGs, mapped against evidence, have the potential to inform service development and research policy. Further study should be undertaken: it should incorporate improved sampling and data collection methodology. Specifically, where effective CAM interventions exist but are not being applied, EGs form part of the “avoidable burden of illness” identified by early work on evidence-based medicine. Practice guidelines should incorporate CAM interventions where there is evidence. The CAM research agenda should focus on areas affected by EGs.

Keywords: Rheumatoid-Arthritis, Fish-Oil, Perspective

? Sarris, J. and Kavanagh, D.J. (2009), Kava and St. John’s Wort: Current evidence for use in mood and anxiety disorders. *Journal of Alternative and Complementary Medicine*, **15** (8), 827-836.

Full Text: [2009\J Alt Com Med15, 827.pdf](2009/J%20Alt%20Com%20Med15,%20827.pdf)

Abstract: Background: Mood and anxiety disorders pose significant health burdens on the community. Kava and St. John’s wort (SJW) are the most commonly used herbal medicines in the treatment of anxiety and depressive disorders, respectively. Objectives: The objective of this study was to conduct a comprehensive review of kava and SJW, to review any evidence of efficacy, mode of action, pharmacokinetics, safety and use in major depressive disorder, bipolar disorder, seasonal affective disorder (SAD), generalized anxiety disorder, social phobia (SP), panic disorder (PD), obsessive-compulsive disorder (OCD), and post-traumatic stress disorder (PTSD). Methods: A systematic review was conducted using the electronic databases MEDLINE, CINAHL, and The Cochrane Library during late 2008. The search criteria involved mood and anxiety disorder search terms in combination with kava, Piper methysticum, kavalactones, St. John’s wort, Hypericum perforatum, hypericin, and hyperforin. Additional search criteria for safety, pharmacodynamics, and pharmacokinetics were employed. A subsequent forward search was conducted of the papers using Web of Science cited reference search. Results: Current evidence supports the use of SJW in treating mild-moderate depression, and for kava in treatment of generalized anxiety. In respect to the other disorders, only weak preliminary evidence exists for use of SJW in SAD. Currently there is no published human trial on use of kava in affective disorders, or in OCD, PTSD, PD, or SP. These disorders constitute potential applications that warrant exploration. Conclusions: Current evidence for herbal medicines in the treatment of depression and anxiety only supports the use of Hypericum perforatum for depression, and Piper methysticum for generalized anxiety.

Keywords: Anxiety, Bipolar Disorder, Cochrane, Databases, Depression, Depression And Anxiety, Disorder, Double-Blind, Drug-Interactions, Efficacy, Generalized Anxiety Disorder, Healthy Male-Volunteers, Human, Hypericum Extract Ws-5570, Kava, Kavalactones, Liver-Function Tests, Major Depressive Disorder, Medline, Methods, Mood, Ocd, Once-Daily Dosage, Panic Disorder, Papers, Piper Methysticum, Piper-Methysticum, Posttraumatic Stress, Posttraumatic Stress Disorder, Ptsd, Randomized Controlled-Trial, Review, Sad, Safety, Science, Social, Stress, Systematic, Systematic Review, To-Moderate Depression, Treating Depression, Treatment, Web of Science

? Asher, G.N., Jonas, D.E., Coeytaux, R.R., Reilly, A.C., Loh, Y.L., Motsinger-Reif, A.A. and Winham, S.J. (2010), Auriculotherapy for pain management: A systematic review and meta-analysis of randomized controlled trials. *Journal of Alternative and Complementary Medicine*, **16** (10), 1097-1108.

Full Text: [2010\J Alt Com Med16, 1097.pdf](2010/J%20Alt%20Com%20Med16,%201097.pdf)

Abstract: Objectives: Side-effects of standard pain medications can limit their use. Therefore, nonpharmacologic pain relief techniques such as auriculotherapy may play an important role in pain management. Our aim was to conduct a systematic review and meta-analysis of studies evaluating auriculotherapy for pain management. Design: MEDLINE,(R) ISI Web of Science, CINAHL, AMED, and Cochrane Library were searched through December 2008. Randomized trials comparing auriculotherapy to sham, placebo, or standard-of-care control were included that measured outcomes of pain or medication use and were published in English. Two (2) reviewers independently assessed trial eligibility, quality, and abstracted data to a standardized form. Standardized mean differences (SMD) were calculated for studies using a pain score or analgesic requirement as a primary outcome. Results: Seventeen (17) studies met inclusion criteria (8 perioperative, 4 acute, and 5 chronic pain). Auriculotherapy was superior to controls for studies evaluating pain intensity (SMD, 1.56 [95% confidence interval (CI): 0.85, 2.26]; 8 studies). For perioperative pain, auriculotherapy reduced analgesic use (SMD, 0.54 [95% CI: 0.30, 0.77]; 5 studies). For acute pain and chronic pain, auriculotherapy reduced pain intensity (SMD for acute pain, 1.35 [95% CI: 0.08, 2.64], 2 studies; SMD for chronic pain, 1.84 [95% CI: 0.60, 3.07], 5 studies). Removal of poor quality studies did not alter the conclusions. Significant heterogeneity existed among studies of acute and chronic pain, but not perioperative pain. Conclusions: Auriculotherapy may be effective for the treatment of a variety of types of pain, especially postoperative pain. However, a more accurate estimate of the effect will require further large, well-designed trials.

Keywords: Cancer Pain, Clinical-Trials, Cochrane, Control, Ear-Acupuncture, Hip-Arthroplasty, ISI, Knee, Low-Back-Pain, Management, Manual Auricular Acupuncture, Medication, Meta-Analysis, Osteoarthritis, Outcome, Outcomes, Pain, Postoperative Pain, Primary, Review, Science, Significant, Stimulation, Systematic, Systematic Review, Treatment, Web of Science

? Sarris, J., Lake, J. and Hoenders, R. (2011), Bipolar disorder and complementary medicine: Current evidence, safety issues, and clinical considerations. *Journal of Alternative and Complementary Medicine*, **17** (10), 881-890.

Full Text: [2011\J Alt Com Med17, 881.pdf](2011/J%20Alt%20Com%20Med17,%20881.pdf)

Abstract: Background: Bipolar disorder (BD) is a debilitating syndrome that is often undiagnosed and undertreated. Population surveys show that persons with BD often self-medicate with complementary and alternative medicine (CAM) or integrative therapies in spite of limited research evidence supporting their use. To date, no review has focused specifically on nonconventional treatments of BD. Objectives: The study objectives were to present a review of nonconventional (complementary and integrative) interventions examined in clinical trials on BD, and to offer provisional guidelines for the judicious integrative use of CAM in the management of BD. Methods: PubMed, CINAHL,(R) Web of Science, and Cochrane Library databases were searched for human clinical trials in English during mid-2010 using Bipolar Disorder and CAM therapy and CAM medicine search terms. Effect sizes (Cohen’s d) were also calculated where data were available. Results: Several positive high-quality studies on nutrients in combination with conventional mood stabilizers and antipsychotic medications in BD depression were identified, while branched-chain amino acids and magnesium were effective (small studies) in attenuating mania in BD. In the treatment of bipolar depression, evidence was mixed regarding omega-3, while isolated studies provide provisional support for a multinutrient formula, n-acetylcysteine, and l-tryptophan. In one study, acupuncture was found to have favorable but nonsignificant effects on mania and depression outcomes. Conclusions: Current evidence supports the integrative treatment of BD using combinations of mood stabilizers and select nutrients. Other CAM or integrative modalities used to treat BD have not been adequately explored to date; however, some early findings are promising. Select CAM and integrative interventions add to established conventional treatment of BD and may be considered when formulating a treatment plan. It is hoped that the safety issues and clinical considerations addressed in this article may encourage the practice of safety-conscious and evidence-based integrative management of BD.

Keywords: Alternative Medicine, Bipolar Disorder, Cam, Clinical Trials, Cochrane, Databases, Debilitating, Depression, Disorder, Double-Blind, English, Guidelines, Human, I Disorder, Interventions, Magnesium, Major Depressive Disorder, Management, Medicine, Methods, Mood, Open-Label Trial, Outcomes, Placebo-Controlled Trial, Practice, Psychiatric-Disorders, Pubmed, Randomized Controlled-Trial, Rating-Scale, Research, Review, Safety, Science, St-Johns-Wort, Therapy, Treatment, Web of Science

# Title: Journal of Alzheimer’s Disease

Full Journal Title: [Journal of Alzheimer’s Disease](http://iospress.metapress.com/content/105656/?p=16bac34b55e24783ad893c7566b8206d&pi=0)

ISO Abbreviated Title:

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ISSN: 1387-2877

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sorensen, A.A. (2009), Alzheimer’s disease research: Scientific productivity and impact of the top 100 investigators in the field. *Journal of Alzheimer’s Disease*, **16** (3), 451-465.

Full Text: [2009\J Alz Dis16, 451.pdf](2009/J%20Alz%20Dis16,%20451.pdf)

Abstract: The online availability of scientific-literature databases and natural-language-processing (NLP) algorithms has enabled large-scale bibliometric studies within the field of scientometrics. Using NLP techniques and Thomson ISI reports, an initial analysis of the role of Alzheimer’s disease (AD) within the neurosciences as well as a summary of the various research foci within the AD scientific community are presented. Citation analyses and productivity filters are applied to post-1984, AD-specific subsets of the PubMed and Thomson ISI Web-of-Science literature bases to algorithmically identify a pool of the top AD researchers. From the initial pool of AD investigators, top-100 rankings are compiled to assess productivity and impact. One of the impact and productivity metrics employed is an AD-specific H-index. Within the AD-specific H-index ranking, there are many cases of multiple AD investigators with similar or identical H-indices. In order to facilitate differentiation among investigators with equal or near-equal H indices, two derivatives of the H-index are proposed: the Second-Tier H-index and the Scientific Following H-index. Winners of two prestigious AD-research awards are highlighted, membership to the Institute of Medicine of the US National Academy of Sciences is acknowledged, and an analysis of highly-productive, high-impact, AD-research collaborations is presented.

Keywords: AD, Algorithms, Alzheimer’S Disease, Amyloid-Beta, Amyloid-Beta Protein Precursor, Analyses, Analysis, Availability, Bibliometric, Bibliometric Studies, Cases, Citation, Citation Analysis, Collaborations, Community, Databases, Derivatives, Disease, Field, h Index, h-Index, h-Index, Highly-Cited, History of Science, Impact, Indices, Institute of Medicine, ISI, ISI Web of Science, Literature, Metrics, Neurodegenerative Diseases, Oxidative Stress, Productivity, Pubmed, Ranking, Rankings, Research, Role, Scientific Following H, Scientific Literature, Scientometrics, Second-Tier h-Index, Summary, Tau, Techniques, US, Web of Science

? Costa, J., Lunet, N., Santos, C., Santos, J. and Vaz-Carneiro, A. (2010), Caffeine exposure and the risk of parkinson’s disease: A systematic review and meta-analysis of observational studiess. *Journal of Alzheimer’s Disease*, **20**, S221-S238.

Full Text: 2010\J Alz Dis20, S221.pdf

Abstract: Several studies conducted worldwide report an inverse association between caffeine/coffee consumption and the risk of developing Parkinson’s disease (PD). However, heterogeneity and conflicting results between studies preclude a correct estimation of the strength of this association. We conducted a systematic review and meta-analysis of published epidemiological studies to better estimate the effect of caffeine exposure on the incidence of PD. Data sources searched included MEDLINE, LILACS, Scopus, Web of Science and reference lists, up to September 2009. Cohort, case-control and cross-sectional studies were included. Three independent reviewers selected the studies and extracted the data on to standardized forms. Twenty-six studies were included: 7 cohort, 2 nested case-control, 16 case-control, and 1 cross-sectional study. Quantitative data synthesis of the most precise estimates from each study was accomplished through random effects meta-analysis. Heterogeneity was quantified using the I(2) statistic. The summary RR for the association between caffeine intake and PD was 0.75 [95% Confidence Interval (95% CI): 0.68-0.82], with low to moderate heterogeneity (I(2) = 28.8%). Publication bias for case-control/cross-sectional studies may exist (Egger’s test, p = 0.053). When considering only the cohort studies, the RR was 0.80 (95% CI: 0.71-90; I(2) = 8.1%). The negative association was weaker when only women were considered (RR = 0.86, 95% CI: 0.73-1.02; I(2) = 12.9%). A linear relation was observed between levels of exposure to caffeine and the RR estimates: RR of 0.76 (95% CI: 0.72-0.80; I(2) = 35.1%) per 300 mg increase in caffeine intake. This study confirm an inverse association between caffeine intake and the risk of PD, which can hardly by explained by bias or uncontrolled confounding.

Keywords: Alcohol-Consumption, Association, Bias, Caffeine, Cigarette-Smoking, Coffee Consumption, Cohort Studies, Confounding, Disease, Epidemiology, Food Groups, Meta-Analysis, Nested Case-Control, Parkinson’S Disease, Personality, Prevalence, Progression, Relative Risk, Review, Risk, Risk Assessment, Science, Scopus, Systematic, Systematic Review, Tea Consumption, Web of Science, Women

? Santos, C., Costa, J., Santos, J., Vaz-Carneiro, A. and Lunet, N. (2010), Caffeine intake and dementia: Systematic review and meta-analysis. *Journal of Alzheimer’s Disease*, **20**, S187-S204.

Full Text: 2010\J Alz Dis20, S187.pdf

Abstract: A recent meta-analysis of 4 studies published up to January 2004 suggests a negative association between coffee consumption and Alzheimer’s disease, despite important heterogeneity in methods and results. Several epidemiological studies on this issue have been published since then, warranting an update of the insights on this topic. We conducted a systematic review and meta-analysis of published studies quantifying the relation between caffeine intake and cognitive decline or dementia. Data sources searched included MEDLINE, LILACS, Scopus, Web of Science and reference lists, up to September 2009. Cohort and case-control studies were included. Three independent reviewers selected the studies and extracted the data on to standardized forms. Nine cohort and two case-control studies were included. Quantitative data synthesis of the most precise estimates from each study was accomplished through random effects meta-analysis. Heterogeneity was quantified using the I(2) statistic. The outcomes of the studies considered for meta-analysis were Alzheimer’s disease in four studies, dementia or cognitive impairment in two studies, and cognitive decline in three studies. The summary relative risk (RR) for the association between caffeine intake and different measures of cognitive impairment/decline was 0.84 [95% Confidence Interval (95% CI): 0.72-0.99; I(2) = 42.6%]. When considering only the cohort studies, the summary RR was 0.93 (95% CI: 0.83-1.04, I(2) = 0.0%), and 0.77 (95% CI: 0.63-0.95, I(2) = 34.7%), if the most influential study was excluded. This systematic review and meta-analysis found a trend towards a protective effect of caffeine, but the large methodological heterogeneity across a still limited number of epidemiological studies precludes robust and definite statements on this topic.

Keywords: Adults, Alzheimer’S Disease, Alzheimers-Disease, Bias, Caffeine, Case-Control Studies, Cigarette-Smoking, Coffee Consumption, Cognitive Performance, Cohort Studies, Decline, Dementia, Disease, Drinking, Meta-Analysis, Outcomes, Parkinsons-Disease, Relative Risk, Review, Risk, Risk-Factors, Science, Scopus, Systematic, Systematic Review, Trend, Web of Science

# Title: Journal of Ambulatory Care Management

Full Journal Title: [Journal of Ambulatory Care Management](http://web.ebscohost.com/ehost/detail?vid=1&hid=6&sid=729a347f-190f-4747-b16e-98d741d59294%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d); [Journal of Ambulatory Care Management](http://ovidsp.uk.ovid.com/sp-2.3/ovidweb.cgi?QS2=434f4e1a73d37e8c164f0b3f1c1ffb36bb0790ad265a0a4bb833bc7822c534600b3dfee571c74b4fe6d4c2f2dabb0dd8d7a304781632c9e5ea3d3597079dc02ef9e163768b310c362a3785cdda6afe390e4fafe58d105fc1354cf4af248e692730ce80498bd0ec1)

ISO Abbreviated Title:

JCR Abbreviated Title: J Ambul Care Manage

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Nilsson, J.L. and Melander, A. (2006), Increased introduction, advertising, and sales of preventive drugs during 1986-2002 in Sweden. *Journal of Ambulatory Care Management*, **29** (3), 238-249.

Full Text: [2006\J Amb Car Man29, 238.pdf](2006/J%20Amb%20Car%20Man29,%20238.pdf)

Abstract: The objective of this study was to survey how introduction of new drugs and promotional activities influence drug sales in Sweden. All drugs on the Swedish market were categorized as curative, symptom-alleviating, substitutive, or preventive. The number of new drugs introduced, drug sales in volume and value, and the number of drug advertisements appearing in the major Swedish medical journal during 1986-2002 were determined for each of the 4 drug categories. Between 1986 and 1998, the relative shares of the 4 drug categories were relatively constant. From 1998 to 2002, the share of new preventive drugs increased from 24% to 30%, their share of advertisements increased from 20% to 35%, and their sales value increased from 25% to 30%. During the same period, the shares of other drugs decreased correspondingly. Pharmaceutical companies have shifted their attention to the introduction, advertising, and sales of preventive drugs in an attempt to exploit preventive medicine. This might lead to waste of resources when expensive preventive drugs are used by numerous patients over many years, as the benefit of preventive drugs for the individual patient cannot be judged easily.

Keywords: Advertising, Drug, Drugs, Journal, Lead, Market, Medical, Medicine, Patients, Survey, Sweden, Value, Volume, Waste

# Title: Journal of the American Academy of Child and Adolescent Psychiatry

Full Journal Title: Journal of the American Academy of Child and Adolescent Psychiatry

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sawyer, M.G., Giesen, F. and Walter, G. (2008), Child psychiatry curricula in undergraduate medical education. *Journal of the American Academy of Child and Adolescent Psychiatry*, **47** (2), 139-147.

Abstract: Objective: To review the literature describing the content and time allocated to undergraduate medical education curricula in child and adolescent psychiatry and make recommendations about child and adolescent psychiatry teaching goals and curricula content. Method: A literature search from 1970 to February 2007 using the key words undergraduate, curriculum, teaching, education, psychiatry, child, adolescent, and medical school, was conducted using PUBMED, PsycINFO, and Web of Science. Results: There is limited agreement about curricula content for undergraduate child and adolescent psychiatry teaching programs in medical schools, with a wide range of objectives identified by different programs. On average, the time allowed for teaching child and adolescent psychiatry is small. There is also great variation in the time allocated by different medical schools. In many countries, the number of child and adolescent psychiatrists with academic appointments is limited, and child and adolescent psychiatry programs are developed and taught by a small number of teaching staff at each medical school. Conclusions: Medical schools should reconsider the relatively low priority given to teaching child and adolescent psychiatry to medical students. The child and adolescent psychiatry profession must identify clear learning goals for a longitudinal developmentally appropriate model of child and adolescent psychiatry education commencing at an undergraduate level in medical schools and continuing through residency and fellowships. There is a need to promote national and international standards for teaching in this area and to encourage stronger collaborations between teaching staff across different medical schools.

Keywords: Adolescent, Adolescent-Psychiatry, Child, Disorders, Education, Family Medicine, General-Practice, Learning, Literature, Medical, Medical School, Mental-Health, Model, Primary-Care, Psychiatry, Pubmed, Residency, Review, Schools, Science, Service Use, Standards, Students, Teaching, Teaching Child, Undergraduate, Undergraduate Medical Education, Videotapes, Web of Science

# Title: Journal of the American Academy of Dermatology

Full Journal Title: [Journal of the American Academy of Dermatology](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6928&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=32bb92e976c827526572888a942023ed)

ISO Abbreviated Title: J. Am. Acad. Dermatol.

JCR Abbreviated Title: J Am Acad Dermatol

ISSN: 0190-9622

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Mosby, Inc

Publisher Address: 11830 Westline Industrial Dr, St Louis, MO 63146-3318

Subject Categories:

Dermatology & Venereal Diseases: Impact Factor 2.341, / (2001)

George, P.M. and Robbins, K. (1994), Reference accuracy in the dermatological literature. *Journal of the American Academy of Dermatology*, **31** (1), 61-64.

Full Text: [J\J Ame Aca Der31, 61.pdf](J/J%20Ame%20Aca%20Der31,%2061.pdf)

Abstract: Background: The reference list is an important part of a scientific article. To be useful it must be accurate.

Objective: The purpose of this study was to evaluate the accuracy of references in the dermatologic literature.

Methods: We randomly selected 240 references (60 per journal) from the Archives of Dermatology, the British Journal of Dermatology, this JOURNAL, and the Journal of Investigative Dermatology and checked them against the original articles.

Results: The overall rate of citation error (the information identifying the source) was 41%, and the quotation error (inconsistency between the statement referenced and the original source) was 35%. Only 36% of references were free of error.

Conclusion: This study shows that the rate of citation and quotation errors is unacceptably high in the dermatologic literature, which significantly diminishes the value of the reference list.

Keywords: Journals, Quotations

Boyd, A.S., Hook, M. and King, Jr., L.E. (1996), An evaluation of the accuracy of residency applicants’ curricula vitae: Are the claims of publications erroneous? *Journal of the American Academy of Dermatology*, **35** (4), 606-608.

Full Text: [J\J Ame Aca Der35, 606.pdf](J/J%20Ame%20Aca%20Der35,%20606.pdf)

Abstract: Competition for residency positions in dermatology is intense. Training programs in other disciplines have described significant misrepresentation among their applicants in claims of research and publication. An evaluation was made of the curricula vitae for the 138 applicants with completed applications for our 1994 residency match. Cited articles were placed in four categories: “published,” “in print/in press,” “submitted for publication,” and “in preparation/in progress.” We found significantly less misrepresentation than has been described in other specialty training programs. Simplification of the way in which applicants verify their bibliography may reduce erroneous citations and remove implications of willful misrepresentation of academic achievements.

? Lien, H.C., Tsai, T.F., Lee, Y.Y. and Hsiao, C.H. (1999), Merkel cell carcinoma and chronic arsenicism. *Journal of the American Academy of Dermatology*, **41** (4), 641-643.

Full Text: [1999\J Ame Aca Der41, 641.pdf](1999/J%20Ame%20Aca%20Der41,%20641.pdf)

Abstract: Arsenic is a well-documented human carcinogen. Bowen’s disease, squamous cell carcinoma, and basal cell carcinoma are the most common skin cancers found in patients exposed to arsenic over the long term. Merkel cell carcinoma has been documented in Taiwanese patients who resided in an endemic area of black foot disease, another condition found in patients with chronic arsenicism. We collected all cases of Merkel eel carcinoma diagnosed at two medical centers in Taiwan (N = 11) to find a possible association between chronic arsenicism and Merkel cell carcinoma. In our study 6 of the 11 patients were residents of the endemic areas for chronic arsenicism.

Keywords: Drinking-Water, Skin-Cancer

? Boonchai, W., Green, A., Ng, J., Dicker, A. and Chenevix-Trench, G. (2000), Basal cell carcinoma in chronic arsenicism occurring in Queensland, Australia, after ingestion of an asthma medication. *Journal of the American Academy of Dermatology*, **43** (4), 664-669.

Full Text: [J\J Ame Aca Der43, 664.pdf](J/J%20Ame%20Aca%20Der43,%20664.pdf)

Abstract: Background: Ingestion of trivalent inorganic arsenic has long been recognized as a cause of basal cell carcinomas (BCCs) anti has been reported most often in Taiwan and Singapore.

Objective: Our purpose was to study the clinical and histologic characteristics of BCCs occurring in Australian Caucasians as a consequence of chronic arsenicism due to ingestion of an arsenic-containing medication.

Methods: Self-referred persons with a history of ingestion of Bell’s Asthma Medication were interviewed, and skin examinations were performed. Local age-and sex-matched patients with BCCs were used to compare the distribution and histologic subtypes of BCCs in arsenic-exposed and sporadic cases.

Results: Thirty-six persons (21 male, 15 female; mean age, 57 years) participated, all of whom had been exposed to the asthma medication early in life (mean age, 13 years) for a mean duration of 5 years. Each person had at least one cutaneous sign of chronic arsenicism, either self-reported or on examination, and all except one had a history of either BCC or squamous cell carcinoma of the skin, with self-reports of 20 to 2000 skin lesions removed per person. The mean age at first presentation with a BCC Nas 33 years, but neither latency nor number of skin lesions appeared to be related to duration of exposure to arsenic. BCCs in persons exposed to arsenic occurred more often on sun-protected sites compared with BCCs in age-and sex-matched sporadic cases (P < .001), but the distribution and histologic subtypes between these two groups were similar.

Conclusion: We have described BCCs in arsenic-exposed Australians and shown that they occur predominantly in sun-protected locations. Although the reported number of skin lesions is very high, the latency and number do not appear to be related to the duration of arsenic exposure. The histologic types of the BCCs occurring in arsenic-exposed persons are not different from sporadic BCCs.

Keywords: Skin-Cancer, Drinking-Water, Liver, Lung, Carcinogenesis, Association, Population, Toxicity, Bladder, Kidney

Komericki, P., Aberer, W., Arbab, E., Kovacevic, Z. and Kranke, B. (2001), Pigmented purpuric contact dermatitis from Disperse Blue 106 and 124 dyes. *Journal of the American Academy of Dermatology*, **45** (3), 456-458.

Full Text: [J\J Ame Aca Der45, 456.pdf](J/J%20Ame%20Aca%20Der45,%20456.pdf)

Abstract: The diagnosis of purpura pigmentosa progressiva In a female patient had to be changed to purpuric contact dermatitis after patch testing with textile dyes. A modified patch test performed in the area in which most of her skin lesions were located revealed a petechial reaction to the azo dye Disperse Blue 124/106. For evaluation of purpura pigmentosa progressiva we suggest a patch test with potential allergens, and, especially for textile dyes, a patch test at the lesion site may be helpful.

Keywords: Clothing Dermatitis, Patch Test

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Full Text: [2007\J Ame Aca Der57, 527.pdf](2007/J%20Ame%20Aca%20Der57,%20527.pdf)

Keywords: Self-Plagiarism

? Armstrong, A.W., Idriss, S.Z., Kimball, A.B. and Bernhard, J.D. (2008), Fate of manuscripts declined by the *Journal of the American Academy of Dermatology*. *Journal of the American Academy of Dermatology*, **58** (4), 632-635.

Full Text: [2008\J Ame Aca Der58, 632.pdf](2008/J%20Ame%20Aca%20Der58,%20632.pdf)

Abstract: Background: Submissions to the journal of the American Academy of Dermatology (JAAD) undergo a rigorous peer-review process. However, little is known regarding the fate of manuscripts declined by the JAAD. Objective. We sought to: (1) determine the proportion of manuscripts declined by the JAAD that are subsequently published elsewhere. (2) identify the journals in which they were published; and (3) study whether the authors of declined manuscripts adopted in their final publications the changes suggested by the JAAD reviewers. Methods: We reviewed the outcomes of the 489 submissions declined by the JAAD during two 4-month periods: from March 1, 2004, to June 30, 2004, and from March 1, 2005, to June 30, 2005. Results: Of the 981 manuscripts submitted to JAAD during the two 4-month periods studied, 489 manuscripts (50%) were declined. Among the declined manuscripts, 201 (41%) had been subsequently published in other medical journals as of March 1, 2007. Among the 55 journals that published manuscripts declined by JAAD, 23 (42%) were nondermatology journals. The median impact factor for these 55 journals was 1.638, Compared with the JAAD’s impact factor of 2.402. Among the declined manuscripts, Case Reports comprised the largest proportion (n = 149, 31%), followed by Original Research Reports (n = 90, 18%). Overall, 46 (51%) rejected Original Research Reports were Subsequently published, compared with 145 (36%) rejected submissions in other categories that were later published (P <.01). Among the 101 subsequently published manuscripts for which full texts were available, 82% of the authors incorporated at least one change suggested by the JAAD reviewers. The manuscripts that adopted JAAD-reviewer suggestions were published in journals with higher impact factors than those that did not incorporate any JAAD-reviewer suggestions (P =.0305). Limitations: It is possible that the average lag time of 28 months in this study is not sufficient for some rejected manuscripts to reach subsequent publication. Conclusions: Approximately half of the manu scripts rejected by the JAAD were subsequently published in other journals within 28 months, among which, roughly 40% went to nondermatology journals. The median impact factor of the journals that published JAAD-rejectect manuscripts was lower than that of the JAAD. Rejected Original Research Reports have a significantly higher probability of being subsequently published than other category submissions. This may be a result of relative quality of Original Research Reports versus submissions for other sections of the journal (eg, Case Reports). Manuscripts that adopted JAAD-reviewer suggestions were subsequently published in journals with higher impact factors than those that did not incorporate JAAD-reviewer suggestions. This indicates that peer-reviewer comments can be useful and important for improving the quality of scientific publications.

Keywords: American, Authors, Change, Changes, Comments, Dermatology, Factors, Fate, Impact, Impact Factor, Impact Factors, Journal, Journals, Medical, Medical Journals, Outcomes, P, Peer Review, Peer-Review, Process, Publication, Publications, Quality, Quality of, Scientific Publications, Time

# Title: Journal of the American Academy of Nurse Practitioners

Full Journal Title: Journal of the American Academy of Nurse Practitioners

ISO Abbreviated Title:

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ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

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Full Text: [2009\J Ame Aca Nur Pra21, 371.pdf](2009/J%20Ame%20Aca%20Nur%20Pra21,%20371.pdf)

Abstract: Purpose To present information about cardiac syndrome X (CSX) including its (a) definition, (b) etiology and pathology, (c) epidemiology, (d) symptomatology, (e) diagnosis, (f) treatment, and (g) prognosis. Clinical recommendations will also be presented. Data sources Articles used in this review were found by searching CINAHL, MEDLINE, the Cochrane Library, Web of Science (ISI), Academic Search Premier, and Health Source: Nursing/Academic Edition. Conclusions The causes of CSX remain unknown; however, CSX is easy to diagnose and can be treated. Medication therapy and risk factor modification can greatly improve the quality of life by decreasing pain occurrence and lessening pain intensity. Implications for practice Too often, providers reassure patients of a healthy heart because of normal coronary arteries despite persistent chest pain and ST segment changes on the electrocardiogram. Chest pain, one of the primary signs and symptoms of CSX, can be reduced through common medications and interventions if the diagnosis of CSX is initiated.

Keywords: Angina, Angina, Articles, Cardiac Syndrome X, Cochrane, Debilitating, Diagnosis, Dysfunction, Epidemiology, Etiology, Health, Information, Interventions, ISI, Management, Microcirculation, Modification, Normal, Pain, Pathology, Practice, Primary, Prognosis, Quality of Life, Review, Risk, Science, Symptoms, Therapy, Treatment, Web of Science, Women, Women

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Full Text: [2010\J Ame Aca Nur Pra22, 217.pdf](2010/J%20Ame%20Aca%20Nur%20Pra22,%20217.pdf)

Abstract: Data sources: PUBMED, SportDiscus, Ovid MEDLINE, Psychinfo, Web of Science, LexisNexis, and EBM reviews. Conclusions: T2DM is a condition in which physical activity has been documented to improve patient outcomes, yet research has noted that healthcare professionals inadequately address this issue, resulting in physical activity being an underutilized therapy. Implications for practice: An exercise prescription consists of mode (type), frequency, intensity, duration, and progression. Determining the appropriate mode depends upon patient preference and safety issues regarding the state of T2DM or other conditions. Frequency, intensity, and duration are specific to the type of activity and should be tailored to the patient’s abilities to safely perform the activity. Finally, the health professional addresses periodic progression in order to maintain the exercise stimulus needed to promote continued health improvements and prevent “plateauing.” In this article, on the basis of the current scientific research, we propose recommendations that enable healthcare professionals to advocate for their patients with T2DM by offering safe and effective treatment options.

Keywords: Activities of Daily Living (Adl), Ambulatory Activity, Cardiovascular-Disease, Consensus Statement, Diabetes, Diabetes Type 2, Diet, Disease Prevention, Elderly, Exercise, Fracture Risk, Frequency, Healthcare Professionals, Insulin-Resistance, Life-Style Intervention, Medline, Obesity, Older-Adults, Outcomes, Patient Outcomes, Physical Activity, Physical-Activity, Practice, Professional, Pubmed, Randomized Controlled-Trial, Research, Risk-Factors, Safety, Science, Scientific Research, Tai Chi, Tai-Chi-Chuan, Therapy, Treatment, Type 2, Type 2 Diabetes, Web of Science, Yoga

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Full Text: [2010\J Ame Aca Nur Pra22, 250.pdf](2010/J%20Ame%20Aca%20Nur%20Pra22,%20250.pdf)

Abstract: Data sources: A comprehensive review of literature was conducted with articles selected from CINAHL, PUBMED, Ovid, MEDLINE, evidence-based medicine, evidence-based nursing, and the Web of Science from 1990 to the present. Key words such as ICD, randomized controlled trials, case studies, advanced directives, end-of-life, living will, health care proxy, and durable power of attorney were used to identify specific studies. Conclusions: Advanced directives are becoming an essential part of care for the ICD population. The recommendations in the literature suggest that clinicians should initiate end-of-life discussions with their patients when they are healthy. The patients’ preferences should be discussed often in patient care in case they would like changes made to their advance directive as their condition changes. Implications for practice: Implementation of advanced directives in patients’ medical care will need to be encouraged in the event of illness. Advanced practice nurses can provide clear explanations of patients’ treatment choices in outpatient and inpatient settings.

Keywords: Advanced Practice Nurse (Apn), Cardiovascular Disease, Care, Case Studies, Controlled-Trial, Defibrillation, End-of-Life, Evidence-Based Medicine, Experience, Health Care, Implementation, Literature, Literature Review, Medical, Medicine, Nurses, Nurses Knowledge, Nursing, Practice, Practice Nurses, Randomized Controlled Trials, Review, Science, Therapy, Treatment, Treatment Preferences, Web of Science

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Full Text: [2010\J Ame Aca Nur Pra22, 496.pdf](2010/J%20Ame%20Aca%20Nur%20Pra22,%20496.pdf)

Abstract: Purpose: To examine the quality of cardiac imaging done by multislice computed tomography (MSCT) and its ability to correctly identify significantly occluded segments of coronary arteries compared with quantitative coronary angiography. Data sources: Databases searched were CINAHL, MEDLINE, EBSCO, Academic Search Premier, and Web of Science and Health Source: Nursing/Academic edition. Keywords used were “Computed Tomography,” “Coronar\* Angiogra\*,” and “Coronary Artery Disease.” Studies from peer-reviewed journals published from 2002 to 2008 that compared quantitative coronary angiography to MSCT were evaluated. Additional sources were identified from review of reference lists from articles found in the electronic search. Conclusions: MSCT was best employed to screen for the absence of disease in patients who were in sinus rhythm, who had no previous bypass grafts or stents placed, had a low risk of calcifications, and who were not obese. Both 40- and 64-slice technology demonstrated the highest accuracy in screening for the absence of disease on a vessel-based analysis. Implications for Practice: Those who have multiple risk factors and are asymptomatic should still be screened via catheterization. More studies are needed to determine the effectiveness of newer 64-slice technology as a tool to positively identify CAD.

Keywords: Accuracy, Analysis, Cardiovascular Disease, Cardiovascular Risk, Catheterization, Ct, Databases, Disease, Effectiveness, Health, Image Quality, Imaging, Journals, Literature, Literature Review, Medline, Ms Temporal Resolution, Noninvasive Detection, Patient Population, Practice, Prevention, Quantitative, Review, Rhythm, Risk, Risk Factors, Science, Screening, Spiral Computed-Tomography, Stenosis, Technology, Web of Science

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Full Text: [2010\J Ame Aca Nur Pra22, 640.pdf](2010/J%20Ame%20Aca%20Nur%20Pra22,%20640.pdf)

Abstract: Purpose: The purpose of this article is to educate nurse practitioners about the pathophysiology surrounding the development of portal hypertension and the effective use of nonselective ss-blockers to prevent primary bleeding and decrease the mortality risk. Data sources: The articles included were retrieved via ISI Web of Science using the years 2004-2009 and key words cirrhosis, portal hypertension, esophageal varices, and beta-blockers. This information included scholarly books, journal reviews, retrospective chart reviews, and prospective randomized studies. Conclusions: Cirrhosis is the leading cause of portal hypertension in Europe and North America. Esophageal varices are a result of the portosystemic collaterals the body develops to decompress the portal system. Hemorrhage from esophageal varices is a major cause of morbidity and mortality. Prevention of a primary bleed is the goal of therapy and is accomplished with nonselective ss-blockers. Implications for practice: Very few patients with portal hypertension and esophageal varices are on ss-blockers. Use of nonselective ss-blockers has been found to lower portal pressure and decreases the risk of bleeding from esophageal varices and therefore decreases mortality. Patients unable to use ss-blockers can undergo endoscopic variceal ligation as an alternate method to reduce risk of bleeding.

Keywords: Ascites, Beta-Blocker, Cirrhosis, Development, Europe, Gastroenterology, Hemorrhage, Hepatology, Hypertension, Information, ISI, Journal, Ligation, Management, Morbidity, Mortality, Patient Education, Portal-Hypertension, Practice, Pressure, Primary, Primary Prophylaxis, Propranolol, Risk, Science, Therapy, Web of Science

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Full Text: [2011\J Ame Aca Nur Pra23, 493.pdf](2011/J%20Ame%20Aca%20Nur%20Pra23,%20493.pdf)

Abstract: Purpose: Hypertension is a highly prevalent risk factor for cardiovascular disease, and its early identification and management results in reductions in morbidity and mortality. Our objectives were to: (1) determine the extent to which the emergency department (ED) has been used to screen patients for undiagnosed hypertension; (2) estimate the incidence of undiagnosed hypertension in the ED population; (3) identify and describe the programs for ED hypertension screening; and (4) determine the feasibility of ED-based hypertension screening programs and the requirements for further study. Data sources: An online search of databases (i.e., OVID Search, CINAHL, Scopus, Web of Science), unpublished sources (i.e., ProQuest Dissertation & Theses and Papers First), and grey literature (i.e., OpenSIGLE and the New York Academy of Grey Literature) was conducted. A manual search of the reference lists of relevant studies was also completed. Conclusion: Hypertension screening in the ED is feasible. Individuals with elevated blood pressure (BP) in the ED should be referred for follow-up. Further study is needed to develop an ED screening tool that is predictive of persistently elevated BP in undiagnosed individuals. Implications for practice: Nurse practitioners in the ED should identify patients with elevated BP, provide hypertension education, and ensure appropriate intervention and referral.

Keywords: Blood, Blood Pressure, Cardiovascular, Cardiovascular Disease, Databases, Disease, ED Patients, Education, Effectiveness, Elevated Blood-Pressure, Emergency, Emergency Department, Emergency Department (ED), Epidemiology, Feasibility, Follow-Up, Health Promotion, Health-Promotion, Hypertension, Incidence, Intervention, Literature, Management, Morbidity, Mortality, Nurse-Practitioners, Patients, Physicians, Practice, Pressure, Preventive Care, Primary-Care Outcomes, Review, Risk, Risk Factor, Science, Scopus, Screening, Systematic, Systematic Review, Web of Science

# Title: Journal of the ACM

Full Journal Title: Journal of the ACM

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

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Full Text: [1960-80\J ACM18, 173.pdf](1960-80/J%20ACM18,%20173.pdf)

# Title: Journal of the American Ceramic Society

Full Journal Title: [Journal of the American Ceramic Society](http://www.ceramicjournal.org/pi/past_issues.html); [Journal of the American Ceramic Society](http://web.ebscohost.com/ehost/detail?vid=1&hid=12&sid=5a41e3ea-d585-475e-8291-0ece1357ddec%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=a9h&jid=6VP); [Journal of the American Ceramic Society](http://vnweb.hwwilsonweb.com/hww/Journals/getIssues.jhtml?sid=HWW:OMNIS&id=02109); [Journal of the American Ceramic Society](http://www3.interscience.wiley.com/journal/117955114/home)

ISO Abbreviated Title: J. Am. Ceram. Soc.

JCR Abbreviated Title: J Am Ceram Soc

ISSN: 0002-7820

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Amer Ceramic Soc

Publisher Address: 735 Ceramic Place, PO Box 6136, Westerville, OH 43086-6136

Subject Categories:

Materials Science, Ceramics: Impact Factor 1.748, / (2001)

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Full Text: [2001\J Ame Cer Soc84, 806.pdf](2001/J%20Ame%20Cer%20Soc84,%20806.pdf)

Abstract: The effect of particle size on the zeta potential and theology of nanoparticulate SiO2 dispersions stabilized with the polymer polyethylenimine (PEI) was investigated experimentally, The particle size and molecular weight of the polymer had only a small influence on the amount of PEI needed and the achieved zeta potential of the suspensions. The polymer concentration range within which a stable dispersion could be produced was very narrow for the smallest particle size. Higher-molecular-weight PEI was more suitable to stabilize small particle dispersions. Under optimum conditions, Newtonian flow behavior was achieved for dispersions of 20 nm particles with a solids content as high as 25 vol%.

Keywords: Tetragonal Zirconia, Poly(Acrylic Acid), Suspensions, Nitride, Adsorption, Behavior

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Full Text: [2008\J Ame Cer Soc84, 246.pdf](2008/J%20Ame%20Cer%20Soc84,%20246.pdf)

Abstract: Porous gamma-alumina with a bimodal pore size distribution has been developed by adding nanosized polystyrene beads to boehmite sol as templating units. The primary pore diameter is in the range of 4-6 nm and the secondary pore diameter is ca. 50 nm with minor pore shrinkage. The unsupported gamma-alumina with different porous structures are characterized using thermogravimetric analysis, Fourier transform infrared spectra, X-ray diffraction, N-2 adsorption/desorption, and transmission electron microscopy. gamma-alumina with a bimodal porous structure shows reduced transport resistance compared with gamma-alumina with a unimodal porous structure in the dye adsorption test. Although the thickness of gamma-alumina thin layer increases when more secondary pores are generated, a gamma-alumina membrane with a bimodal pore size distribution shows diminution of transport resistance in the water permeability study also.

Keywords: Porous Ceramic Membranes, Silica, Ultrafiltration, Performance, Adsorption, Support, Oxide

# Title: Journal of the American Chemical Society

(J. Amer. Chem. Soc.; JACS; JACSA; JACSAT; J. Am. Chem. S.)

Full Journal Title: [Journal of the American Chemical Society](http://pubs3.acs.org/acs/journals/toc.page?incoden=jacsat)

ISO Abbreviated Title: J. Am. Chem. Soc.

JCR Abbreviated Title: J Am Chem Soc

ISSN: 0002-7863

Issues/Year: 52

Journal Country/Territory: United States

Language: English

Publisher: Amer Chemical Soc

Publisher Address: 1155 16th St, NW, Washington, DC 20036

Subject Categories:

Chemistry: Impact Factor

Notes: KKinetic

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Full Text: [-1959\J Ame Che Soc19, 930.pdf](-1959/J%20Ame%20Che%20Soc19,%20930.pdf)

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Full Text: [-1959\J Ame Che Soc25, 742.pdf](-1959/J%20Ame%20Che%20Soc25,%20742.pdf)

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Full Text: [-1959\J Ame Che Soc26, 383.pdf](-1959/J%20Ame%20Che%20Soc26,%20383.pdf)

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Full Text: [J Ame Che Soc30, 1307.pdf](J%20Ame%20Che%20Soc30,%201307.pdf)

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Full Text: [J\J Ame Che Soc34, 1742.pdf](J/J%20Ame%20Che%20Soc34,%201742.pdf)

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Full Text: [J\J Ame Che Soc34, 860.pdf](J/J%20Ame%20Che%20Soc34,%20860.pdf)

Notes: highly cited

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Full Text: [J\J Ame Che Soc34, 1310.pdf](J/J%20Ame%20Che%20Soc34,%201310.pdf)

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Full Text: [J\J Ame Che Soc35, 105.pdf](J/J%20Ame%20Che%20Soc35,%20105.pdf)

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Full Text: [-1959\J Ame Che Soc35, 927.pdf](-1959/J%20Ame%20Che%20Soc35,%20927.pdf)

Abstract: The use of a Hale-Pirani vacuum manometer has led to the observation of various phenomena difficult of explanation. This manometer consists of Pt-wire, 1.1 mil in diam., mounted on glass supports and sealed in a thin-walled glass bulb, a constant current of about 0.00925 amp., taken from a special storage battery being sent through the wire which is thus heated to about 125 degrees. At low pressures the equilibrium temperature of the wire, and therefore its resistance, is a function of the gas pressure. The manometer is calibrated by taking the resistance of the wire at various pressures--as low as 0.00002 mm. of mercury--which are measured by a sensitive, accurate McLeod manometer. The calibration curve thus gives resistance of the wire in terms of the pressure and is a straight line below 0.0005 mm. The zero-pressure resistance is found by extrapolation. In measuring the pressures in incandescent lamps it was found that, after a lamp had been burning for about 50 hours, the zero-pressure resistance was often exceeded, a negative pressure being thus indicated. In view of the theory propounded by Langmuir concerning the presence in incandescent lamps of the active modification of hydrogen formed by the decomposition of traces of water-vapour by the filament [see Abstracts Nos, 1913A00523, 1913A00891], it seemed possible that the atomic hydrogen would recombine at the Ft filament and thus furnish heat to produce the abnormal action in the manometer. Interposition between the lamp and manometer of either a glass U-tube immersed in liquid air or a plug of glass wool prevented the appearance of the negative pressure, presumably owing to the, adsorption of the active hydrogen. That the abnormally high resistance of the Pt is not, however, due to the heat developed by the recombination of hydrogen atoms is shown by the persistence of these negative pressures for 50 hours after the current is cut off from the lamp, and it seems probable that the absorption of the active hydrogen by the Pt causes the increased resistance of the latter. When air is let inio the apparatus the specific resistance of the Pt falls to its original value, owing evidently to oxidation of the atomic hydrogen.

Keywords: Absorption, Adsorption, Equilibrium, Langmuir, Modification, Oxidation, Temperature, Theory

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Full Text: [-1959\J Ame Che Soc36, 646.pdf](-1959/J%20Ame%20Che%20Soc36,%20646.pdf)

Abstract: Salt solutions of sulphates, chlorides, nitrates, and acetates were placed in osmotic cells constructed of porcelain of the same degree of porosity. Whilst some of the solutions gave positive osmose, others gave negative osmose, i.e. the direction of flow was from the concentrated to the more dilute solution. The flow of the solution as a whole through the membrane, in the experiments with nitrates and chlorides, was toward the more dilute solution, when the anion had a greater migration velocity than the kathion;the rate of flow increased with the difference between the migration velocities of anion and kathion. The appearance of negative osmose is dependent on the pore diameter of the membrane. Negative osmose of MgCl/sub 2/ predominates only when the pore diameters are somewhat less than 0.4 mu. Negative osmose appears to depend on electrical polarisation of the capillaries brought about through ionic adsorption by the membrane.

Keywords: Adsorption, Solution

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Full Text: [J\J Ame Che Soc36, 1708.pdf](J/J%20Ame%20Che%20Soc36,%201708.pdf)

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Abstract: Previous calculations of the degree of dissociation of hydrogen from the results of experiments on the heat losses from tungsten wires in hydrogen [see Abs. 1912A01474, 1914A01932] are in disagreement with Bjerrum’s determinations of the specific heat of hydrogen by the explosion method. The weak point in the calculation is a somewhat arbitrary assumption regarding the diffusion coefficient of atomic hydrogen through ordinary hydrogen. That the abnormal thermal conductivity of hydrogen at high temperatures is due to dissociation is indicated by the observation that, when the gas at low pressures comes into contact with metallic wires at temperatures above 1300°K. part of the hydrogen is converted into an active modification which remains adsorbed on glass surfaces for a long time. This active hydrogen reacts at room temperature with oxygen and many reducible substances and dissolves in metals such as Pt;it appears to be in the atomic condition. More accurate measurements have now been made of the thermal losses from a tungsten wire at temperatures ranging from 800° to 3500°K. and at pressures of hydrogen (or nitrogen) from 0.01 mm. to atmospheric pressure. At temperatures below that of dissociation the loss of heat diminishes steadily as the pressure is lowered. Convection currents play an important part only when the pressure exceeds 200 mm., the decrease in the heat loss at lower pressures being due to the temperatures discontinuity. The theory of this effect is developed for the case of small wires at very high temperatures, the calculated results being in good agreement with the experimental ones. The normal thermal conductivity is separated from the abnormal effect due to dissociation and the amounts of heat carried from the wire by the dissociation are calculated for various temperatures and pressures. The following theory of the observed phenomena is proposed. The dissociation of the hydrogen does not occur in the space round the wire, and is not due to the impact of the gas molecules against its surface, but takes place only among the hydrogen molecules which have been absorbed [? dissolved] by the metal of the wire. Within the metal the reaction is so rapid that equilibrium may be always assumed, but the equilibrium constant may differ widely from that in the gaseous phase. It is assumed that there is no “adsorption film” on the surface of the wire through which the hydrogen has to diffuse, but that the absorption takes place by the collision of the molecules (or atoms) with the surface. It is supposed that a certain fraction alpha /sub 2/ of all the impinging hydrogen molecules is absorbed, the fraction 1- alpha /sub 2/ being reflected, and that the fraction alpha /sub 1/ of all the impinging hydrogen atoms is absorbed. In general, the partial pressures of atomic hydrogen in the gas immediately surrounding the wire will not be that corresponding with the equilibrium at the temperature of the wire;the difference may be regarded as a “drop in concentration” at the surface of the wire strictly analogous to Smoluchowski’s “temperature drop” in the case of heat conduction and to Kundt and Warburg’s “slip” in the case of experiments on the viscosity of gases. From this theory it is possible, by thermodynamic reasoning, to deduce the relation- K = (W//b q/)/sup 2/ (P/D+1/ alpha /sup 1/)/sup 2//P-(W//b q/)(P/D+1/ alpha /sub 2/), where K is the dissociation constant in the gas phase, W the heat carried from the wire by dissociation, /b q/ the heat of reaction, and D is the diffusion coefficient. With suitable values of K, /b q/, D, alpha /sub 1/ and alpha /sub 2/, the calculated and experimental values of W agree well at all temperatures and pressures. The coefficients alpha /sub 1/ and alpha /sub 2/ are found to be constant and equal to 1 and 0.68 respectively.

Keywords: Absorption, Diffusion, Equilibrium, Metal, Metals, Modification, Temperature, Theory

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Abstract: In the Light of the following assumptions, the results given in Abstract 1916A00831 can be explained. (1) Abnormal osmosis - that is, from the concentrated to the dilute solution - is due primarily to an electrical effect, and is analogous to electric osmosis. (2) This osmosis is caused by the passage of a charged liquid layer along the capillary tubes of the membrane, the passage of this layer being brought about by the driving force of a p.d. which acts as though it were set up between the two faces of the membrane. (3) The charge on the membrane - and hence the charge ‘on the liquid layer - may be modified or the sign may reversed by selective adsorption of the ions of electrolytes;another tons than H and OH’ may materially affect the charge on the membrane (4) The p.d., which seems to act between the two faces of the membrane, is primarily due to contact electrification, the magnitude of which is dependent upon a difference of migration velocities of the ions in the membrane.This p.d. may, however, be altered by other factors, such as adsorption. (5) Osmosis is related to diffusion, since the diffusion of the ions seem to determine to a large extent the polarisation of the membrane. (9) The extent of osmosis may be affected by the relative volumes off water and salt solution on the two faces of the membrane, inasmuch as this factor may affect the diffusion of the salt through the membrane. The membrane, when immersed in water or any electrolyte in which there is little tendency for preferential adsorption of ions, bears a negative charge and the adjacent water layer a corresponding positive charge. Kathions are much more adsorbed than anions,the negative ions, with the possible exception of OH’ and a few polyvalent anions, having .’little effect on the charge of the membrane. The alterations of the charge on the walls of the capillary tubes of the membrane by an adsorbed ion will be greater the higher the concentration of the electrolyte. The potential between the two faces of the membrane will be in the direction required by Nernst’s theory, and will be greater the greater the concentration of the electrolyte, unless some effect such as adsorption interferes. If the movable water layer and the solution end of the membrane are charged with electricity of opposite sign the osmosis will be positive;if charged with the same sign the osmosis will tend to be negative.

Keywords: Adsorption, Diffusion, Preferential Adsorption, Selective Adsorption, Solution, Theory, Water

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Abstract: In a recent communication’ we published some low temFerature physical adsorption isotherms for various gases on a pure iron synthetic ammonia catalyst and pointed out that they appeared to afford a means for calculating the surface area of the catalyst. Similar isotherms have now been determined for a total of six iron synthetic ammonia catalysts. The present paper gives the detailed experimental results that have been obtsiiied and includes in addition a discussion of the various factors involved in interpreting the isotherms in terms of relative and absolute catalyst surface areas.

Keywords: Adsorption, Adsorption Isotherms, Isotherms, Surface Area

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Full Text: [1960-80\J Ame Che Soc85, 3533.pdf](1960-80/J%20Ame%20Che%20Soc85,%203533.pdf)

Abstract: A number of Lewis acids of diverse types are classified as (a) or (b) following the criterion of Ahrland, Chtt, and Davies. Class (a) acids prefer to bind to “hard” or nonpolarizable bases. Since class (a) acids are themselves “hard” and since class (b) acids are “soft” a simple, useful rule is proposed: hard acids bind strongly to hard bases and soft acids bind strongly to soft bases. The explanations for such behavior include: (1) various degrees of ionic and covalent u-binding; (2) a-bonding; (3) electron correlation phenomena; (4) solvation effects.

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Abstract: The possibility of producing oleophobic monolayers containing more than one component (mixed monolayers) is investigated. It is shown that homogeneous mixed monolayers containing components which are very different in their properties and molecular shape may be easily formed on various solid polar substrates by adsorption from organic solutions. Irreversible adsorption may also be achieved through covalent bonding of active silane molecules to the surface of the substrate. Details regarding the structure and the formation of mixed monolayers are revealed by means of spectroscopic methods using surfaceactive dyes as monolayer components. By studying the time dependence of formation it is shown that interactions involving both the molecules in the adsorbed state and those in solution lead to large fluctuations in the composition of mixed monolayers containing only reversibly adsorbed components, while irreversible adsorption tends to stabilize certain final compositions which are monotonically approached. It is concluded that adsorption on well-defined solid surfaces might be developed into a suitable method for producing monomolecular films with a controllable molecular organization.

Keywords: Adsorption, Structure

Notes: highly cited

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Full Text: [1991\J Ame Che Soc113, 7152.pdf](1991/J%20Ame%20Che%20Soc113,%207152.pdf)

Abstract: Long-chain alkanethiols, HS(CH2)nCH3, adsorb from solution onto the surfaces of gold, silver, and copper and form monolayers. Reflection infrared spectroscopy indicates that monolayers on silver and on copper (when carefully prepared) have the chains in well-defined molecular orientations and in crystalline-like phase states, as has been observed on gold. Monolayers on silver are structurally related to those formed by adsorption on gold, but different in details of orientation. The monolayers formed on copper are structurally more complex and show a pronounced sensitivity to the details of the sample preparation. Quantitative analysis of the IR data using numerical simulations based on an average single chain model suggests that the alkyl chains in monolayers on silver are all-trans zig-zag and canted by approximately 12-degrees from the normal to the surface. The analysis also suggests a twist of the plane containing the carbon backbone of approximately 45-degrees from the plane defined by the tilt and surface normal vectors. For comparison, the monolayers that form on adsorption of alkanethiols on gold surfaces, as judged by their vibrational spectra, are also trans zig-zag extended but, when interpreted in the context of the same single chain model, have a cant angle of approximately 27-degrees and a twist of the plane of the carbon backbone of approximately 53-degrees. The monolayers formed on copper (when they are obtained in high quality) exhibit infrared spectra effectively indistinguishable from those on silver and thus appear to have the same structure. Films on copper are also commonly obtained that are structurally ill-defined and appear to contain significant densities of gauche conformations. These spectroscopically based interpretations are compatible with inferences from wetting and XPS measurements. The structure of the substrate-sulfur interface appears to control molecular orientations of the alkyl groups in these films. An improved structural model, incorporating a two-chain unit cell and allowing for the temperature-dependent population of gauche conformations, is presented and applied to the specific case of the structures formed on gold.

Keywords: Adsorption, Alkyl Thiol Monolayers, Bond Activation, Carbon, Comparison, Complex, Copper, Cu, Gold, Gold Surfaces, Groups, IR, Measurements, Model, Normal-Alkanoic Acids, Organized Molecular Assemblies, Organosulfur Compounds, Oxidized Aluminum Surface, Phase-Behavior, Population, Preparation, Quantitative Analysis, Raman-Scattering, Solid Liquid Interface, Spectroscopy, XPS

Notes: FFreundlich

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Ryoo, R., Cho, S.J., Pak, C.H., Kim, J.G., Ihm, S.K. and Lee, J.Y. (1992), Application of the xenon-adsorption method for the study of metal cluster formation and growth on y-zeolite. *Journal of the American Chemical Society*, **114** (1), 76-82.

Full Text: [J\J Ame Che Soc114, 76.pdf](J/J%20Ame%20Che%20Soc114,%2076.pdf)

Abstract: Supported metal clusters of Pt, Ir, Ru, Rh, and Pd have been prepared in the supercage of Y zeolite by activating their ion-exchanged ammine complexes. Xenon adsorption isotherms obtained from these samples at temperatures ranging from 296 to 340 K and pressures up to 500 Torr, as well as the chemical shift data from the Xe-129 NMR study of the adsorbed xenon gas, indicate that the xenon adsorption can occur quite strongly, becoming saturated above ca. 50 Torr, on the metal cluster surface whereas the adsorption is so weak on the support that the adsorbed quantity increases linearly with pressure according to Henry’s law. Upon chemisorption of hydrogen or oxygen, the metal clusters lose the ability to adsorb the xenon so strongly, resulting in a decrease in the xenon adsorption quantity. Such a xenon-adsorption decrease due to the chemisorption of another gas can determine the amount of xenon that can be saturated on all the metal clusters present in the sample. This quantity is sensitive to the size and the number of the supported clusters. It can then be used to probe the formation and the size variation of the clusters which are very difficult to study by other methods due to their very small size, e.g. about 1 nm. An application of such a simple technique for the study of Pt cluster formation on NaY zeolite indicates that the size of the Pt cluster formed in the supercage does not change significantly as the metal content is changed from 2 to 10%. This xenon-adsorption method has also been very useful for the study of the formation and growth of the Ru cluster on Na Y zeolite. The result indicates that very small Ru clusters are formed in the supercage by treating a precursor, which is prepared by heating Na Y zeolite in an aqueous ammonia solution of RuCl3, in vacuum at temperatures above 623 K. The clusters grow gradually at higher temperatures both in H2 and under vacuum. The data also agree that an exposure of the supported Ru clusters in O2 at temperatures above 423 K causes excessive migration of the Ru species, resulting in large agglomeration. Another example, which can further promise wide applicability of the xenon adsorption method, is a study of the formation of Pd clusters in the supercage of various ion-exchanged Y and X zeolites. The result indicates that Ca2+, Y3+, and perhaps other multivalent cations residing in the supercage are necessary to obtain ca. 1-nm clusters whereas univalent cations give larger clusters.

Keywords: Nuclear Magnetic-Resonance, XE-129 NMR-Spectroscopy, Redox Behavior, Nay Zeolite, Platinum, Ruthenium, Dispersion, Particles, Cations, Ions

Notes: highly cited (> 1000)

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Full Text: [1992\J Ame Che Soc114, 10834.pdf](1992/J%20Ame%20Che%20Soc114,%2010834.pdf)

Abstract: The synthesis, characterization, and proposed mechanism of formation of a new family of silicate/aluminosilicate mesoporous molecular sieves designated as M41S is described. MCM-41, one member of this family, exhibits a hexagonal arrangement of uniform mesopores whose dimensions may be engineered in the range of approximately 15 angstrom to greater than 100 angstrom. Other members of this family, including a material exhibiting cubic symmetry, have been synthesized. The larger pore M41S materials typically have surface areas above 700 m2/g and hydrocarbon sorption capacities of 0.7 cc/g and greater. A templating mechanism (liquid crystal templating-LCT) in which surfactant liquid crystal structures serve as organic templates is proposed for the formation of these materials. In support of this templating mechanism, it was demonstrated that the structure and pore dimensions of MCM-41 materials are intimately linked to the properties of the surfactant, including surfactant chain length and solution chemistry. The presence of variable pore size MCM-41, cubic material, and other phases indicates that M41S is an extensive family of materials.

Keywords: Characterization, Chemistry, Cross-Polarization, Extensive, MCM-41, Mechanism, Mesoporous, Molecular Sieves, Nuclear Magnetic-Resonance, Organic, Si-29 Chemical-Shifts, Silanol Groups, Silica-Gel, Sites, Sorption, Spin-Lattice Relaxation, Support, Surface, Surfactant, Zeolites, ZSM-5

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Full Text: [J\J Ame Che Soc115, 7789.pdf](J/J%20Ame%20Che%20Soc115,%207789.pdf)

Abstract: The C60 and C70 fullerenes can be adsorbed from toluene solution onto the surfaces of etched, single-crystal n-CdS and n-CdSe [n-CdS(e)] semiconductors. These fullerene adsorbates act as Lewis acids toward the CdS(e) surface, causing quenching of the solids’ band-edge photoluminescence (PL) intensity relative to the intensity in a reference ambient of pure toluene. For C60 adsorbed onto CdSe, the quenching of PL intensity is well fit by a dead-layer model that permits estimation of the adduct-induced expansion in depletion width as being as large as approximately 300 angstrom. The degree of quenching is somewhat larger for C70 at a wavelength where the two fullerenes can be directly compared. PL quenching by both fullerenes is concentration dependent and can be fit to the Langmuir adsorption isotherm model to yield large equilibrium binding constants in the range of 105 to 106 M-1; the fullerenes can be detected by this PL method at submicromolar concentrations. Use of the polar Cd-rich (0001) and Se-rich (0001BAR) faces of a n-CdSe sample reveals similar binding constants for C60 and C70 on the two faces but larger expansions of the dead-layer thickness from adsorption of either fullerene on the Cd-rich face.

Keywords: Scanning Tunneling Microscopy, Beta-Diketonate Complexes, Photoelectrochemical Cells, Electrochemical Properties, Aniline Derivatives, C60, Clusters, Crystals, Adsorption, Interface

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Full Text: J Ame Che Soc115, 10083.pdf

Abstract: “Gemini surfactant” is a name assigned to a family of synthetic amphiphiles possessing, in sequence, a long hydrocarbon chain, an ionic group, a spacer, a second ionic group, and another hydrocarbon tail. Intramolecular chain/chain association was inhibited through the use of rigid spacers, thereby averting self-assembly into conventional micellar structures. Aggregation of the geminis was investigated by (a) surface tension, (b) film-balance methods, (c) dynamic light scattering, (d) H-1 and Na-23 NMR, and (e) spectral changes in an adsorbed dye. Among the more striking properties of geminis, one should cite the following: (a) a higher critical micelle concentration (according to surface tension and NMR) for geminis with two long chains of 16-20 carbons than that for shorter-chain analogs; (b) the lift-off areas in monomolecular films that are several times those of phospholipids, indicating that the geminis lie absolutely horizontally at the air/water interface; and (c) the formation of only small micelles, despite the potential to grow, polymer-like, into extended strands. It is argued that geminis, especially the longer-chain members, engage in self-coiling or submicellar aggregation when first exposed to water. Self-assembly into micelles and adsorption at the air/water interface then take place over hours or days at 23°C but much more rapidly at 50°C. Spectral data provide strong evidence for submicellar structures.

Keywords: Micelle Formation; Chain; Amphiphiles

Moore, D.E., Lisensky, G.C. and Ellis, A.B. (1994), pHotoluminescent properties of cadmium selenide coated with a photoactive cobalt coordination complex: A dioxygen-driven transducer. *Journal of the American Chemical Society*, **116** (21), 9487-9491.

Full Text: [J\J Ame Che Soc116, 9487.pdf](J/J%20Ame%20Che%20Soc116,%209487.pdf)

Abstract: In Methylene chloride solution; in the absence of dioxygen, addition of N, N’-ethylenebis(3-methoxysalicylideneiminato)cobalt(II), Co(3-MeO-salen), enhances the band gap photoluminescence (PL) intensity of etched, single-crystal n-CdSe relative to its intensity in Methylene chloride alone, suggesting that the complex acts as a Lewis base toward the solid. Use of a dead-layer model permits an estimate of the maximum adduct-induced reduction in depletion width of similar to 130 Angstrom. The PL enhancement is concentration dependent, saturating at similar to 40 µM, and can be well fit by the simple Langmuir adsorption isotherm model in this concentration regime, yielding an equilibrium constant K of similar to 104-105 M-1. At higher concentration, between similar to 50 and 100 µM, there is an irreversible, concentration-independent (to similar to 1000 µM) inversion of the PL response to a net quenching, which is consistent with multilayer film formation. A thin layer of Co(3-MeO-salen) adsorbed onto CdSe from Methylene chloride solution acts as a transducer: Exposure of the coated semiconductor to gaseous dioxygen quenches the band gap PL intensity relative to its intensity in a nitrogen atmosphere, while negligible PL intensity changes are induced by dioxygen in the absence of the film. The dioxygen-induced PL quenching is pressure-dependent; a good fit to the Langmuir model yields an equilibrium constant K of similar to 10 to 20 atm-µ. The film is observed to be photoactive: Excitation at wavelengths shorter than similar to 600 nm, which are absorbed by the oxygenated complex, induces the loss of dioxygen from the film, giving fractional quenching of PL intensity that increases with decreasing incident intensity. Implications for on-line sensor design using this transduction strategy are discussed.

Keywords: Surface

Notes: highly cited

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Full Text: [1995\J Ame Che Soc117, 4788.pdf](1995/J%20Ame%20Che%20Soc117,%204788.pdf)

Abstract: Fluorescence and absorption spectroscopy, isothermal titration calorimetry, and viscosity measurements have been used to characterize the interaction of Δ- and Λ-[Ru(Phen)2DPPZ]2+ with calf thymus DNA. The method of continuous variations revealed two distinct binding stoichiometries for both Δ- and Λ-DPPZ, corresponding to 0.7 and 3 mol of base pair/mol of ligand. Binding isotherms were obtained for the two enantiomers, both of which show strong binding to DNA, with K = 3.2×106 M-1 bp and 1.7×106 M-1 bp for the Δ and Λ isomers, respectively, at 25°C in solutions containing 50 mM NaCl. Titration calorimetry gave ΔH values of +0.3 kcal mol-1 for Δ-DPPZ and +2.9 kcal mol-1 for Λ-DPPZ for their interaction with DNA. These small positive enthalpies, which were confirmed using thermal difference spectroscopy, indicated that the binding of these compounds to DNA is entropically driven. An enthalpy of +2.5 kcal mol-1 was obtained for the binding of the parent compound, tris(phenanthroline)-Ru(II), to DNA. Titration of all three compounds into buffer gave a nonnegligible heat of dilution. The salt dependence of the binding constant was examined for both isomers. The slope SK = (delta logK/delta log[Na+]) was found to be 1.9 and 2.1 for the Δ and Λ isomers, respectively. By using polyelectrolyte theory to interpret the observed salt dependence of the equilibrium constant, it can be shown that there is a significant nonelectrostatic contribution to the binding constant. Relative viscosity experiments showed that both Δ- and Λ-DPPZ increase the length of rod-like DNA, in a manner consistent with binding by classical intercalation. Fluorescence energy transfer experiments provided additional evidence for the intercalation of Δ- and Λ-[Ru(Phen)2DPPZ]2+ into DNA.

Keywords: Complexes, Enthalpy, Equilibrium, Helical DNA, Interaction, Intercalation, Isotherms, Light Switch, Nucleic-Acids, Photophysics, Specificity, Stereoselectivity, Tris(Phenanthroline)Ruthenium(II)

Moore, D.E., Meeker, K. and Ellis, A.B. (1996), Detection of chiral analytes through adduct formation with chiral films coated onto emissive cadmium selenide substrates. *Journal of the American Chemical Society*, **118** (51), 12997-13001.

Full Text: [J\J Ame Che Soc118, 12997.pdf](J/J%20Ame%20Che%20Soc118,%2012997.pdf)

Abstract: A film of [N, N’-bis(3.5-di-tert-butylsalicylidene)-1, 2-cyclohexanediamine] manganese(III) chloride, 1, adsorbed onto an n-type CdSe single-crystal substrate acts as a stereoselective transducer for chiral analytes, coupling the complexation chemistry of the film to the band gap photoluminescence (PL) intensity of the underlying semiconductor. Exposure of the uncoated semiconductor to phenylpropylene oxide (PPO) and styrene oxide (StO) vapor results in a small PL enhancement relative to a vacuum reference level that is the same within experimental error for the four PPO and for the two StO stereoisomers. Zn contrast, exposure of the coated semiconductor to PPO and StO vapor substantially enhances the CdSe PL intensity relative to its intensity under vacuum conditions, and the optical response is stereoselective, with the PL enhancements and equilibrium adsorption constants dependent on the chirality of both the adsorbate and film, Use of a S, S-1 film on CdSe gives larger PL enhancements and equilibrium binding constants (estimated using the Langmuir adsorption isotherm model) for S, S, -PPO, R, S-PPO, and R-StO than for the enantiomer of each of these epoxides. When the R, R-1 film is employed on CdSe, the expected enantiomeric relationship is observed, with R, R-PPO, S, R-PPO, and S-StO yielding larger PL enhancements and equilibrium binding constants. Binding constants for the preferred film-analyte interactions are in the range of 103 to 104 atm-1. The PL enhancements can be fit to a dead-layer model, except at short wavelengths where evidence for photodissociation of the epoxide from the film is obtained, and maximum reductions in depletion width caused by epoxide-film adduct formation are estimated to range from similar to 200 to 800 Angstrom. The PL response can in principle serve as the basis for an on-line chemical sensor for chiral analytes.

Keywords: pHotoluminescent Properties, Epoxidation, Surface

Ariga, K., Lvov, Y. and Kunitake, T. (1997), Assembling alternate dye-polyion molecular films by electrostatic layer-by-layer adsorption. *Journal of the American Chemical Society*, **119** (9), 2224-2231.

Full Text: [J\J Ame Che Soc119, 2224.pdf](J/J%20Ame%20Che%20Soc119,%202224.pdf)

Abstract: Electrostatic alternate adsorption was successfully employed for low-molecular-weight dyes, leading to a large variety of dye-polyion layer-by-layer assemblies. The assembling process of individual dye-polyion layers of Congo Red (CR) poly (diallyldimethylammonium chloride) (PDDA) was investigated by using a quartz crystal microbalance (QCM). The in-situ QCM measurement revealed that the dye adsorption occurred at a rate similar to that of conventional polyion adsorption. Successful assembly of the CR layer was confirmed also by increasing intensities in the UV adsorption. The molecular aggregation within the dye layer was inferred from the observed absorption shift in the case of CR-PDDA. Apparently, stable film formation is promoted by dye aggregation in the adsorbed layer, although the extent of film growth was independent of conceivable aggregation in the solution. Successive frequency decreases due to film growth were observed for other representative dyes under optimized conditions. Comparison of the film thickness estimated from QCM frequency shift with the molecular dimension of individual dyes suggests the formation of well-packed monomolecular dye layers that is affected by size, number of charge, and spatial orientation of dye molecules. The alternate layer-by-layer assembly is now extended from linear polyions to other macroions (proteins and inorganic plates) and charged small molecules. Advantages and disadvantages of the alternate assembly were discussed relative to those of the Langmuir-Blodgett technique.

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Full Text: [1998\J Ame Che Soc120, 8571.pdf](1998/J%20Ame%20Che%20Soc120,%208571.pdf)

Keywords: Binding, Cavities, Isotherms, Network, Sorption

Lorenz, J.K., Ellis, A.B. (1998), Surfactant-semiconductor interfaces: Perturbation of the photoluminescence of bulk cadmium selenide by adsorption of tri-n-octylphosphine oxide as a probe of solution aggregation with relevance to nanocrystal stabilization. *Journal of the American Chemical Society*, **120** (42), 10970-10975.

Full Text: [J\J Ame Che Soc120, 10970.pdf](J/J%20Ame%20Che%20Soc120,%2010970.pdf)

Abstract: The band edge photoluminescence (PL) of bulk single-crystal n-CdSe is perturbed by adsorption of tri-n-octylphosphine oxide (TOPO) from toluene solution onto the crystal’s 0001,000 (1) over bar, and 11 (2) over bar 0 faces. These are three of the crystal faces observed in studies of CdSe nanocrystals, which are commonly capped with TOPO surfactant molecules to control their properties. At low concentration, where monomeric TOPO dominates the toluene solution composition, reversible PL enhancements are observed, indicating that the adsorbate is acting as a labile Lewis base toward the surface. However, above similar to 10 mM concentration, there is an abrupt reversal in the PL signature, such that net quenching of PL is observed relative to the PL intensity in the toluene reference ambient. The PL changes at concentrations above 10 mM are not reversible with toluene rinsing, and are associated with a strongly bound species of Lewis acidic character that requires exposure to a strong base such as pyridine for desorption. XPS data are consistent with PL measurements in identifying experimental conditions associated with strong and weak binding of TOPO to CdSe. The PL changes can be fit to a dead-layer model in both the low and high concentration regimes, permitting an estimate for TOPO-induced contractions and expansions of the dead-layer thickness of about 100-300 Angstrom, for the 0001 face, which generally yielded the largest PL changes. Equilibrium binding constants were estimated from the Langmuir adsorption isotherm model as being similar to 104 M-1 and at least 102 M-1 in the low and high concentration regimes, respectively. The concentration at which the PL signature reversal occurs corresponds to incipient aggregate formation in solution based on both P-31 NMR and IR spectral changes. MacroModel calculations indicate that TOPO dimer formation is energetically favorable and that a surface adduct formed from the dimer could be stabilized by multiple surface interactions.

Keywords: Cdse Nanocrystallites, Dimerization Constant, Self-Association, Monomer Shift, Quantum Dots, Dimer Shift, P-31 NMR, Diffraction, Clusters, Example

Crispin, X., Lazzaroni, R., Geskin, V., Baute, N., Dubois, P., Jérôme, R. and Brédas, J.L. (1999), Controlling the electrografting of polymers onto transition metalsurfaces through solvent vs monomer adsorption. *Journal of the American Chemical Society*, **121** (1), 176-187.

Full Text: [J\J Ame Che Soc121, 176.pdf](J/J%20Ame%20Che%20Soc121,%20176.pdf)

Abstract: Electropolymerization of methacrylic monomers opens the possibility of chemically grafting a wide range of polymers onto transition metalsurfaces. In this work, the electropolymerization of polyacrylonitrile and polyethyl acrylate is studied in different solvents; we experimentally confirm that the choice of solvent is a critical parameter for obtaining electrografted polymers. A density-functional theory-based study modeling the interaction of solvent (acetonitrile, dimethylformamide, and pyridine) or monomer (acrylonitrile and ethyl acrylate) molecules with the Ni (100) metalsurface provides the means to classify the organic molecules with respect to their ability to interact with the surface. The surface binding-energy difference between monomer and solvent is introduced in a Frumkin-type isotherm. This allows us to rationalize the experimental observations in terms of a competitive adsorption at the metalsurface between the monomer and the solvent. The first step in the electrografting mechanism thus appears to be the chemisorption of the monomer at the electrode surface before cathodic polarization is applied; the chemisorbed monomer is therefore the first species reduced, giving rise to an adsorbed reactive intermediate, which is thus able to start the polymerization of a grafted chain.

Notes: highly cited

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Full Text: [2000\J Ame Che Soc122, 1391.pdf](2000/J%20Ame%20Che%20Soc122,%201391.pdf)

Abstract: Gas sorption isotherm measurements performed on the evacuated derivatives of four porous metalorganic frameworks (MOF-n), Zn(BDC).(DMF)(H2O) (DMF = N,N’-dimethylformamide, BDC = 1,4-benzenedicarboxylate) (MOF-2), Zn-3(BDC)(3). 6CH(3)OH (MOF-3), Zn-2(BTC)NO3.(C2H5OH)(5)H2O (BTC = 1,3,5-benzenetricarboxylate) (MOF-4), and Zn4O(BDC)(3).(DMF)(8)C6H5Cl (MOF-5), reveal type I isotherms for n = 2, 3, and 5, which is evidence of microporous and accessible channels having high structural integrity and organization. Although gas sorption into MOF-4 was not observed, careful examination of its ethanol sorption isotherms at 22 and 32 degrees C point to the presence of coordinatively unsaturated zinc centers within its pores, which upon ethanol sorption undergo coordination transitions from 3- to 4-, 4- to 5-, and 5- to B-coordination. MOF-n materials were produced by building the extended analogues of molecular metal carboxylate clusters-a strategy that has allowed the realization of the most porous and thermally stable framework yet reported: the evacuated form of MOF-5 is especially stable in air at 300 degrees C and has a free pore volume representing 55-60% of its crystal as determined by gas sorption and single-crystal diffraction studies.

Keywords: Cavities, Chemistry, Complex, Crystal-Structures, Ethanol, Gas Sorption, Isotherms, Pore Volume, Sorption, Zinc

Ivanisevic, A., Reynolds, M.F., Burstyn, J.N. and Ellis, A.B. (2000), pHotoluminescent properties of cadmium selenide in contact with solutions and films of metalloporphyrins: Nitric oxide sensing and evidence for the aversion of an analyte to a buried semiconductor-film interface. *Journal of the American Chemical Society*, **122** (15), 3731-3738.

Full Text: [J\J Ame Che Soc122, 3731.pdf](J/J%20Ame%20Che%20Soc122,%203731.pdf)

Abstract: The band-edge photoluminescence (PL) intensity of etched n-CdSe single crystals is quenched reversibly by adsorption of the trivalent metalloporphyrins, MTPPCl (TPP = tetraphenylporphyrin; M = Mn, Fe, Co) in nitrogen-saturated Methylene chloride solution. The PL responses are concentration dependent and can be fit to the Langmuir adsorption isotherm model to yield binding constants of similar to 103-103 M-1. The MTPPCl compounds react irreversibly with NO in solution to form nitrosyl adducts, and these compounds reversibly enhance the CdSe PL intensity when adsorbed onto the semiconductor surface, also with binding constants of similar to 103-104 M-1. Films of MTPPCl were prepared on CdSe substrates by solvent evaporation. These coatings serve as transducers for NO detection: while the bare CdSe surface shows no response to NO gas relative to N-2, the coated surfaces reversibly enhance the PL intensity (CoTPPCl) or quench it (MnTPPCl and FeTPPCl), with binding constants on the order of similar to 1 atm-1. In contrast to the PL results, which are particularly sensitive to the semiconductor-film interface, electronic and IR spectral changes of the bulk film induced by NO binding were irreversible. The UV-vis and IR spectra could be spectroscopically mimicked by preformed nitrosyl adduct films that were prepared by solvent evaporation of MTPPCl (M = Co, Fe) and MTPP (M = Co) solutions that had been exposed to NO. These films, however, lack transduction capability, as the PL intensity is the same in NO and N2 ambients. For the films prepared from FeTPPCl and CoTPPCl, the saturation of IR and UV-vis spectral changes occurs at NO pressures at least 10-fold lower than observed for PL changes. These results indicate that NO has a strong aversion to binding at the semiconductor-film interface as opposed to the bulk film environment. Steric and electronic contributions to these observed effects are discussed.

Keywords: Sulfide Nanoparticles, Cobalt Porphyrins, Electron-Transfer, Adduct Formation, Building-Blocks, Copper(II) Ions, Stereochemistry, Derivatives, Adsorption, Complexes

Notes: highly cited

? Qiu, X.H., Wang, C., Zeng, Q.D., Xu, B., Yin, S.X., Wang, H.N., Xu, S.D. and Bai, C.L. (2000), Alkane-assisted adsorption and assembly of phthalocyanines and porphyrins. *Journal of the American Chemical Society*, **122** (23), 5550-5556.

Full Text: [2000\J Ame Che Soc122, 5550.pdf](2000/J%20Ame%20Che%20Soc122,%205550.pdf)

Abstract: In this paper it is demonstrated that the stabilizing effect of linear alkanes can be utilized to achieve very high stability in the adsorption and assembly of planar organic molecules on inert surfaces under ambient conditions, by direct deposition from solutions. Using peripherally alkylated phthalocyanines and porphyrins as the examples, optimal resolutions can be achieved with complex molecular systems. Submolecular features of the molecular cores and the interdigitated alkyl parts are clearly visible. Distinctly different packing symmetries were also observed and could be attributed to the intermolecular and adsorbate-substrate interactions. Appreciable contrast variations were also recorded with changing bias voltages. This approach could be adapted to the studies of other molecules to observe submolecular features and could be helpful in obtaining two-dimensional assemblies of monodispersed molecules, especially planar molecules.

Keywords: Scanning-Tunneling-Microscopy, Image-Contrast, Copper-Phthalocyanine, Metal-Free, Molecular Adsorbates, Discotic Mesophases, Liquid-Crystals, Stm Images, Graphite, MoS2

Buchwald, P. and Bodor, N. (2000), Simple model for nonassociative organic liquids and water. *Journal of the American Chemical Society*, **122** (43), 10671-10679.

Full Text: [J\J Ame Che Soc122, 10671.pdf](J/J%20Ame%20Che%20Soc122,%2010671.pdf)

Abstract: A simple model that has been derived from molecular-level considerations (J. Phys. Chem. B 1998, 102, 5715) is revisited and extended. It is shown that it gives a unified and adequate description of a variety of properties related to intermolecular interactions, including boiling point, enthalpy of vaporization, vapor pressure, surface tension, and a number of partition and solubility data for organic liquids that do not contain associative or strongly polar substituents. All corresponding equations were derived from the same free energy expression that forms the basis of the model. For the organic liquids considered here that include haloalkanes, aromatics, haloaromatics, eaters, and ketones, molecular size as the sole descriptor (characterized here by molecular volume) can account for 80-90% of the variance. Furthermore, water, which is a highly abnormal liquid, seems to be integrable within the model by a simple modification of the interaction-related constant. This modification is consistent with the modified hydration-shell hydrogen-bond model of Muller, with data on partition and solubility in water, and with the large surface tension value of water. Within this approach, the controversy related to different macroscopic/microscopic free energies of interactions per surface area that was raised by Tanford and has recently resurfaced in the work of Honig, Sharp, and co-workers is also avoided.

Keywords: Transfer Free-Energies, Solvation Free-Energies, Flory-Huggins Theory, Hydrogen-Bond Model, Size-Based Model, Molecular-Size, Partition-Coefficients, Hydrophobic Hydration, Surface-Area, Octanol

Notes: highly cited

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Full Text: [2001\J Ame Che Soc123, 1613.pdf](2001/J%20Ame%20Che%20Soc123,%201613.pdf)

Abstract: A new series of panchromatic ruthenium(II) sensitizers derived from carboxylated terpyridyl complexes of tris-thiocyanato Ru(II) have been developed. Black dye containing different degrees of protonation {(C2H5)3NH}[Ru(H3tcterpy)(NCS)3] 1, {(C4H9)4N}2[Ru(H2tcterpy)(NCS)3] 2, {(C4H9)4N}3[RU(Htcterpy)(NCS)3] 3, and {(C4H9)4N}4[Ru(tcterpy)(NCS)3] 4 (tcterpy = 4,4’,4” -tricarboxy-2,2’:6’,2” -terpyridine) have been synthesized and fully characterized by UV-vis, emission, IR, Raman, NMR, cyclic voltammetry, and X-ray diffraction studies. The crystal structure of complex 2 confirms the presence of a Ru(II)N6 central core derived from the terpyridine ligand and three N-bonded thiocyanates. Intermolecular H-bonding between carboxylates on neighboring terpyridines gives rise to 2-D H-bonded arrays. The absorption and emission maxima of the black dye show a bathochromic shift with decreasing pH and exhibit pH-dependent excited-state lifetimes. The red-shift of the emission maxima is due to better pi -acceptor properties of the acid form that lowers the energy of the CT excited state. The low-energy metal-to-ligand charge-transfer absorption band showed marked solvatochromism due to the presence of thiocyanate ligands. The Ru(II)/(III) oxidation potential of the black dye and the ligand-based reduction potential shifted cathodically with decreasing number of protons and showed more reversible character. The adsorption of complex 3 from methoxyacetonitrile solution onto transparent TiO2 films was interpreted by a Langmuir isotherm yielding an adsorption equilibrium constant, K-ads, of (1.0±0.3)×105 M-1. The amount of dye adsorbed at monolayer saturation was (n(alpha) = 6.9±0.3)×10-8 mol/mg of TiO2, which is around 30% less than that of the cis-di(thiocyanato)bis(2,2’-bipyridyl-4,4’-dicarboxylate)-ruthenium(II) complex. The black dye, when anchored to nanocrystalline; TiO2. films achieves very efficient sensitization over the whole visible range extending into the near-IR region up to 920 nm, yielding over 80% incident photon to-current efficiencies (IPCE). solar cells containing the black dye were subjected to analysis by a photovoltaic calibration laboratory (NREL, U.S.A.) to determine their solar-to-electric conversion efficiency under standard AM 1.5 sunlight. A short circuit photocurrent density obtained was 20.5 mA/cm2, and the open circuit voltage was 0.72 V corresponding to an overall conversion efficiency of 10.4%.

Keywords: (2,2’-Bipyridyl-4,4’-Dicarboxylic Acid)Ruthenium(II) Complexes, Interfacial Electron-Transfer, Polypyridyl Complexes, Energy-Conversion, Excited-States, Ruthenium(II) Complexes, Recombination Kinetics, Charge Recombination, Injection Dynamics, Crystal-Structures

Notes: highly cited

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Full Text: [2004\J Ame Che Soc126, 5300.pdf](2004/J%20Ame%20Che%20Soc126,%205300.pdf)

Abstract: Experimental and molecular modeling studies are conducted to investigate the underlying mechanisms for the high solubility Of CO2 in imidazolium-based ionic liquids. CO2 absorption isotherms at 10, 25, and 50°C are reported for six different ionic liquids formed by pairing three different anions with two cations that differ only in the nature of the “acidic” site at the 2-position on the imidazolium ring. Molecular dynamics simulations of these two cations paired with hexafluorophosphate in the pure state and mixed with CO2 are also described. Both the experimental and the simulation results indicate that the anion has the greatest impact on the solubility Of CO2. Experimentally, it is found that the bis(trifluoromethylsulfonyl)imide anion has the greatest affinity for CO2, While there is little difference in CO2 solubility between ionic liquids having the tetrafluoroborate or hexafluorophosphate anion. The simulations show strong organization Of CO2 about hexafluorophosphate anions, but only small differences in CO2 structure about the different cations. This is consistent with the experimental finding that, for a given anion, there are only small differences in CO2 solubility for the two cations. Computed and measured densities, partial molar volumes, and thermal expansion coefficients are also reported.

Keywords: 1-N-Butyl-3-Methylimidazolium Hexafluorophosphate, CO2, Equilibria, Isotherms, Mixtures, Molecular-Dynamics, Potentials, Simulations, Solubilities, Supercritical Carbon-Dioxide, Temperature, Water

Notes: highly cited

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Full Text: [2006\J Ame Che Soc128, 34.pdf](2006/J%20Ame%20Che%20Soc128,%2034.pdf)

Keywords Plus: Ion-Exchange Properties, Coordination, Molecules, Design, TPT=2,4,6-Tri(4-Pyridyl)-1,3,5-Triazine, Chemistry, Networks, Symmetry, Sorption

Notes: highly cited

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Full Text: [2006\J Ame Che Soc128, 1304.pdf](2006/J%20Ame%20Che%20Soc128,%201304.pdf)

Abstract: The dihydrogen adsorption isotherms of eight metal-organic frameworks (MOFs), measured at 77 K up to a pressure of 1 atm, have been examined for correlations with their structural features. All materials display approximately Type I isotherms with no hysteresis, and saturation was not reached for any of the materials under these conditions. Among the six isoreticular MOFs (IRMOFs) studied, the catenated materials exhibit the largest capacities on a molar basis, up to 9.8 H2 per formula unit. The addition of functional groups (-Br, -NH2, -C2H4-) to the phenylene links of IRMOF-1 (MOF-5), or their replacement with thieno[3,2-b]thiophene moieties in IRMOF-20, altered the adsorption behavior by a minor amount despite large variations in the pore volumes of the resulting materials. In contrast, replacement of the metal oxide units with those containing coordinatively unsaturated metal sites resulted in greater H2 uptake. The enhanced affinities of these materials, MOF-74 and HKUST-1, were further demonstrated by calculation of the isosteric heats of adsorption, which were larger across much of the range of coverage examined, compared to those of representative IRMOFs. The results suggest that under low-loading conditions, the H2 adsorption behavior of MOFs can be improved by imparting larger charge gradients on the metal oxide units and adjusting the link metrics to constrict the pore dimensions; however, a large pore volume is still a prerequisite feature.

Keywords: Activated Carbons, Adsorption, Adsorption Isotherms, Coordination Polymers, Coverage, Design, Gas Sorption Properties, H2, H2 Binding, Isotherms, Molecular-Hydrogen, Pore Volume, Porous Materials, Secondary Building Units, Sites, Storage

Notes: highly cited

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Full Text: [2006\J Ame Che Soc128, 3494.pdf](2006/J%20Ame%20Che%20Soc128,%203494.pdf)

Keywords: Hydrogen-Storage, Adsorption, Crystals, Units

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Full Text: [2008\J Ame Che Soc130, 10247.pdf](2008/J%20Ame%20Che%20Soc130,%2010247.pdf)

Abstract: The heat of adsorption and sticking probability of cyclohexene on Pt(111) were measured as a function of coverage using single-crystal adsorption calorimetry in the temperature range from 100 to 300 K. At 100 K, cyclohexene adsorbs as intact di-sigma bonded cyclohexene on Pt(111), and the heat of adsorption is well described by a second-order polynomial (1130 - 47 theta - 1250 theta(2)) kJ/mol, yielding a standard enthalpy of formation of di-sigma bonded cyclohexene on Pt(111) at low coverages of -135 kJ/mol and a C-Pt sigma bond strength of 205 kJ/mol. At 281 K, cyclohexene dehydrogenates upon adsorption, forming adsorbed 2-cyclohexenyl (c-C6H9,a) and adsorbed hydrogen, and the heat of adsorption is well described by another second-order polynomial (174 - 700 theta + 761 theta(2)) kJ/mol. This yields a standard enthalpy of formation of adsorbed 2-cyclohexenyl on Pt(111) at a low coverage of -143 kJ/mol. At coverages below 0.10 ML, the sticking probability of cyclohexene on Pt(111) is close to unity (> 0.95), independent of temperature.

Keywords: Adsorption, Benzene, Bismuth-Covered Pt(111), Coverage, Dehydrogenation, Enthalpy, Function, Heat, Heat of Adsorption, Hreels, Hydrocarbons, Hydrogen, Low Temperature, Microcalorimetry, Molecular-Beam, Platinum, Second Order, Second-Order, Single-Crystal Surfaces, Standard, Strength, Temperature

# Title: Journal of the American College of Cardiology

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? Goldberg, S.J., Lebowitz, M.D., Graver, E.J. and Hicks, S. (1990), An association of human congenital cardiac-malformations and drinking-water contaminants. *Journal of the American College of Cardiology*, **16** (1), 155-164.

Full Text: 1990\J Ame Col Car16, 155.pdf

Kloner, R.A., Leor, J., Poole, W.K. and Perritt, R. (1997), Population-based analysis of the effect of the Northridge earthquake on cardiac death in Los Angeles County, California. *Journal of the American College of Cardiology*, **30** (5), 1174-1180.

Full Text: [J\J Ame Col Car30, 1174.pdf](J/J%20Ame%20Col%20Car30,%201174.pdf)

Abstract: Objectives. We sought to determine whether a natural disaster affected total cardiovascular mortality and coronary mortality in an entire population. Background. The effect of the January 17, 1994 Northridge Earthquake (NEQ) on all deaths and causes of deaths within the entire population of Eus Angeles County is unknown. The purposes of our study were to analyze all deaths in this entire population before, during and after the NEQ and to determine whether the NEQ temporally and spatially altered death due to cardiovascular disease. Methods. We analyzed all death certificate data (n = 19, 617) from Los Angeles County during January of 1992, 1993 (control periods) and 1994, using International Classification of Diseases, 9th Revision codes for ischemic beast disease (IHD) and atherosclerotic cardiovascular disease (ASCVD), as well as other causes of death. Results. There was an average of 73 deaths per day due to IHD and ASCVD during January 1 to 16, 1994; this increased to 125 on the day of the NEQ, and then decreased to 57 deaths per day from January 18 to 31 (p < 0.00001, before NEQ vs, day of NEQ; after NEQ vs, day of NEQ; and before NEQ vs. after NEQ). The NEQ was associated with an increase in deaths due to myocardial infarction and trauma but not cardiomyopathy, hypertensive heart disease, valvular heart disease, cerebrovascular disease or noncardiovascular causes. Based on plots of daily deaths due to IHD and ASCVD, the decrease in deaths during the 14 days after the NEQ (-144) overcompensated for the increase on the day of the NEQ (+55). Geographic analysis revealed a redistribution of deaths due to IHD and ASCVD toward the epicenter on the day of the NEQ. Conclusions. When an entire population simultaneously experiences a major environmental stress, there is an increase in death doe to coronary artery disease (but not other cardiac causes), followed by a decrease that overcompensates for the excess of death. The overcompensation may represent a residual population that is more resistant to stress or a possible preconditioning effect of the stress, or both. This study supports the concept that cardiovascular events within an entire population can be triggered by a shared stress.

Johnson, P.D., Dawson, B.V. and Goldberg, S.J. (1998), Cardiac teratogenicity of trichloroethylene metabolites. *Journal of the American College of Cardiology*, **32** (2), 540-545.

Full Text: [J\J Ame Col Car32, 540.pdf](J/J%20Ame%20Col%20Car32,%20540.pdf)

Abstract: OBJECTIVES: The hypothesis of this study was that metabolites of trichloroethylene (TCE), dichloroethylene (DCE) and related compounds were responsible for fetal cardiac teratogenic effects seen when TCE or DCE is consumed by pregnant rats during organogenesis. Identification of teratogenic metabolites would allow more accurate assessment of environmental contaminants and public health risks from contaminated water or possibly municipal water supplies which, when chlorinated, may produce these potentially dangerous chemicals.

BACKGROUND: Human epidemiologic studies and previous teratogenic studies using chick embryos and fetal rats have shown an increased incidence of congenital cardiac lesions in animals exposed to TCE and DCE.

METHODS: Metabolites and compounds studied in drinking water exposure included: trichloroacetic acid (TCAA), monochloroacetic acid (MCAA), trichloroethanol (TCEth), carboxy methylcystine (CMC), trichloroacetaldehyde (TCAld), dichloroacetaldehyde (DCAld), and dichlorovinyl cystine (DCVC). Compounds were administered to pregnant rats during fetal heart development. RESULTS: Fetuses of rats receiving 2, 730 ppm TCAA in drinking water were the only group that demonstrated a significant increase in cardiac defects (10.53%) compared with controls (2.15%) on a per fetus basis (p = 0.0001, Fischer’s exact test), and a per litter basis (p = 0.0004, Wilcoxon and p = 0.0015, exact permutation tests). Trichloroacetic acid also demonstrated an increased number of implantation and resorption sites (p < 0.05) over controls. Other maternal and fetal variables showed no statistically significant differences between treated and untreated groups.

CONCLUSIONS: of the metabolites tested, only TCAA appeared to be a specific cardiac teratogen in the fetus when imbibed by the maternal rat.

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Full Text: 2002\J Ame Col Car39, 58A.pdf

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Full Text: [2009\J Ame Col Car53, 936.pdf](2009/J%20Ame%20Col%20Car53,%20936.pdf)

Abstract: Objectives This review aimed to evaluate the association between anger and hostility and coronary heart disease (CHD) in prospective cohort studies using quantitative methods. Background The harmful effect of anger and hostility on CHD has been widely asserted, but previous reviews have been inconclusive. Methods We searched general bibliographic databases: MEDLINE, PsycINFO, Web of Science, and PUBMED up to November 2008. Two reviewers independently extracted data on study characteristics, quality, and estimates of associations. Results There were 25 studies (21 articles) investigating CHD outcomes in initially healthy populations and 19 studies (18 articles) of samples with existing CHD. Anger and hostility were associated with increased CHD events in the healthy population studies (combined hazard ratio [HR]: 1.19; 95% confidence interval [CI]: 1.05 to 1.35, p = 0.008) and with poor prognosis in the CHD population studies (HR: 1.24; 95% CI: 1.08 to 1.42, p = 0.002). There were indications of publication bias in these reports, although the fail-safe numbers were 2,020 and 750 for healthy and disease population studies, respectively. Intriguingly, the harmful effect of anger and hostility on CHD events in the healthy populations was greater in men than women. In studies of participants with CHD at baseline that controlled fully for basal disease status and treatment, the association of anger and hostility with poor prognosis persisted. Conclusions The current review suggests that anger and hostility are associated with CHD outcomes both in healthy and CHD populations. Besides conventional physical and pharmacological interventions, this supports the use of psychological management focusing on anger and hostility in the prevention and treatment of CHD. (J Am Coll Cardiol 2009; 53: 936-46) (C) 2009 by the American College of Cardiology Foundation.

Keywords: A Behavior Pattern, Acute Myocardial-Infarction, Aggression, Bias, Bibliographic, Bibliographic Databases, C-Reactive Protein, Cardiology, Cardiovascular-Disease, Carotid Atherosclerosis, CHD-Prone Personality, Cohort Studies, Coronary Heart Disease, Databases, Disease, Follow-Up, Hostility, Interventions, Management, Medline, Meta-Analysis, Methods, Outcomes, Postmenopausal Women, Prevention, Prognosis, Prospective Study, Psychological, Psychosocial Risk-Factors, Publication, Publication Bias, Pubmed, Quantitative, Ratio, Review, Science, Total Mortality, Trait-Anger, Treatment, Web of Science, Women

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Full Text: [2009\J Ame Col Car54, 2087.pdf](2009/J%20Ame%20Col%20Car54,%202087.pdf)

Abstract: Objectives We undertook a meta-analysis to determine whether changes in wave reflection substantiate the consensus explanation of why blood pressure (BP) changes with aging. Background Consensus documents attribute the aging changes in BP to wave reflection moving progressively from diastole into systole. However, the extensive quantitative data on this phenomenon have never been systematically reviewed. Individual studies have been small, and limited to a narrow age range. Methods Using PUBMED, Cochrane, and Web of Science databases, we identified 64 studies (including 13,770 subjects, age range 4 to 91 years) reporting the timing of wave reflection, defined as the time from the onset (foot) of the pressure waveform to the shoulder point (anachrotic notch). Results In subjects of all ages, reflection times were well within systole. There was a small tendency for younger subjects to have later reflection, but this was only 0.7 ms per year, whereas the weighted mean reflection time was 136 ms (99% confidence interval: 130 to 141 ms) and the mean duration of systole was 328 ms (99% confidence interval: 310 to 347 ms). At this rate of change with age, arrival of wave reflection would only be construed to be in diastole at an extrapolated age of -221 years. Conclusions These findings challenge the current consensus view that a shift in timing of wave reflection significantly contributes to the changes in the BP waveform with aging. We should re-evaluate the mechanisms of BP elevation in aging. (J Am Coll Cardiol 2009; 54: 2087-92) (C) 2009 by the American College of Cardiology Foundation.

Keywords: Advancing Age, Aging, Aortic Stiffness, Arterial Stiffness, Arteries, Blood, Blood Pressure, Cardiology, Cochrane, Databases, Disease, Hemodynamics, Input Impedance, Meta-Analysis, Methods, Outcomes, Pressure, Pubmed, Quantitative, Science, Trial, Wave Reflection, Wave Reflection, Web of Science, Women

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Full Text: 2011\J Ame Col Car57, 794.pdf

Abstract: The need for consistent and current data describing the true incidence of sudden cardiac arrest (SCA) and/or sudden cardiac death (SCD) was highlighted during the most recent Sudden Cardiac Arrest Thought Leadership Alliance’s (SCATLA) Think Tank meeting of national experts with broad representation of key stakeholders, including thought leaders and representatives from the American College of Cardiology, American Heart Association, and the Heart Rhythm Society. As such, to evaluate the true magnitude of this public health problem, we performed a systematic literature search in MEDLINE using the MeSH headings, “death, sudden” OR the terms “sudden cardiac death” OR “sudden cardiac arrest” OR “cardiac arrest” OR “cardiac death” OR “sudden death” OR “arrhythmic death.” Study selection criteria included peer-reviewed publications of primary data used to estimate SCD incidence in the U. S. We used Web of Science’s Cited Reference Search to evaluate the impact of each primary estimate on the medical literature by determining the number of times each “primary source” has been cited. The estimated U. S. annual incidence of SCD varied widely from 180,000 to >450,000 among 6 included studies. These different estimates were in part due to different data sources (with data age ranging from 1980 to 2007), definitions of SCD, case ascertainment criteria, methods of estimation/extrapolation, and sources of case ascertainment. The true incidence of SCA and/or SCD in the U. S. remains unclear, with a wide range in the available estimates that are badly dated. As reliable estimates of SCD incidence are important for improving risk stratification and prevention, future efforts are clearly needed to establish uniform definitions of SCA and SCD and then to prospectively and precisely capture cases of SCA and SCD in the overall U.S. population. (J Am Coll Cardiol 2011; 57: 794-801) (C) 2011 by the American College of Cardiology Foundation.

Keywords: Antiarrhythmic-Drug Therapy, Arrest, Cardiac Arrest, Cardiology, Certificate Diagnosis, Coronary-Heart-Disease, Definitions, Epidemiology, High-Risk, Impact, Implantable Cardioverter-Defibrillator, Incidence, Leaders, Leadership, Literature, Medical, Medline, Myocardial-Infarction, Peer-Reviewed Publications, Prevention, Primary, Public Health, Publications, Review, Risk, Sudden Cardiac Arrest, Sudden Cardiac Death, Survival, Systematic, Systematic Review, Temporal Trends

? Kastorini, C.M., Milionis, H.J., Esposito, K., Giugliano, D., Goudevenos, J.A. and Panagiotakos, D.B. (2011), The effect of mediterranean diet on metabolic syndrome and its components: A meta-analysis of 50 studies and 534,906 individuals. *Journal of the American College of Cardiology*, **57** (11), 1299-1313.

Full Text: 2011\J Ame Col Car57, 1299.pdf

Abstract: Objectives The aim of this study was to meta-analyze epidemiological studies and clinical trials that have assessed the effect of a Mediterranean diet on metabolic syndrome (MS) as well as its components. Background The Mediterranean diet has long been associated with low cardiovascular disease risk in adult population. Methods The authors conducted a systematic review and random effects meta-analysis of epidemiological studies and randomized controlled trials, including English-language publications in PUBMED, EMBASE, Web of Science, and the Cochrane Central Register of Controlled Trials until April 30, 2010; 50 original research studies (35 clinical trials, 2 prospective and 13 cross-sectional), with 534,906 participants, were included in the analysis. Results The combined effect of prospective studies and clinical trials showed that adherence to the Mediterranean diet was associated with reduced risk of MS (log hazard ratio: -0.69, 95% confidence interval [CI]: -1.24 to -1.16). Additionally, results from clinical studies (mean difference, 95% CI) revealed the protective role of the Mediterranean diet on components of MS, like waist circumference (-0.42 cm, 95% CI: -0.82 to -0.02), high-density lipoprotein cholesterol (1.17 mg/dl, 95% CI: 0.38 to 1.96), triglycerides (-6.14 mg/dl, 95% CI: -10.35 to -1.93), systolic (-2.35 mm Hg, 95% CI: -3.51 to -1.18) and diastolic blood pressure (-1.58 mm Hg, 95% CI: -2.02 to -1.13), and glucose (-3.89 mg/dl, 95% CI: -5.84 to -1.95), whereas results from epidemiological studies also confirmed those of clinical trials. Conclusions These results are of considerable public health importance, because this dietary pattern can be easily adopted by all population groups and various cultures and cost-effectively serve for primary and secondary prevention of the MS and its individual components. (J Am Coll Cardiol 2011; 57: 1299-313) (C) 2011 by the American College of Cardiology Foundation.

Keywords: Adherence, Adult, Analysis, Authors, Blood, Blood Pressure, Cardiology, Cardiovascular, Cardiovascular Disease, Cardiovascular-Disease Risk, Clinical Trials, Cochrane, Diet, Disease, Disease Risk, Endothelial Function, High-Carbohydrate, High-Monounsaturated Fat, Ischemic-Heart-Disease, Lipids, Lipoprotein, Low-Fat Diet, Mediterranean Diet, Meta-Analysis, Metabolic Syndrome (MS), Methods, Myocardial-Infarction, Pressure, Prevention, Primary, Prospective Studies, Public Health, Publications, Pubmed, Randomized Controlled Trial, Randomized Controlled Trials, Ratio, Research, Review, Risk, Science, Secondary Prevention, Systematic, Systematic Review, Type-2 Diabetes-Mellitus, Waist Circumference, Web of Science, Weight-Loss

? Coutinho, T., Goel, K., De Sa, D.C., Kragelund, C., Kanaya, A.M., Zeller, M., Park, J.S., Kober, L., Torp-Pedersen, C., Cottin, Y., Lorgis, L., Lee, S.H., Kim, Y.J., Thomas, R., Roger, V.L., Somers, V.K. and Lopez-Jimenez, F. (2011), Central obesity and survival in subjects with coronary artery disease: A systematic review of the literature and collaborative analysis with individual subject data. *Journal of the American College of Cardiology*, **57** (19), 1877-1886.

Full Text: 2011\J Ame Col Car57, 1877.pdf

Abstract: Objectives The aim of this study was to examine the association of central (waist circumference [WC] and waist-hip ratio [WHR]) and total obesity (body mass index [BMI]) measures with mortality in coronary artery disease (CAD) patients. Background The question of which measure of obesity better predicts survival in patients with CAD is controversial. Methods We searched OVID/MEDLINE, EMBASE, CENTRAL, and Web of Science from 1980 to 2008 and asked experts in the field for unpublished data meeting inclusion criteria, in which all subjects had: 1) CAD at baseline; 2) measures of WC or WHR; 3) mortality data; and 4) a minimum follow-up of 6 months. Results From 2,188 studies found, 6 met inclusion criteria. We obtained individual subject data from 4, adding unpublished data from a cardiac rehabilitation cohort. A variable called “central obesity” was created on the basis of tertiles of WHR or WC. Cox-proportional hazards were adjusted for age, sex, and confounders. The final sample consisted of 15,923 subjects. There were 5,696 deaths after a median follow-up of 2.3 (interquartile range 0.5 to 7.4) years. Central obesity was associated with mortality (hazard ratio [HR]: 1.70, 95% confidence interval [CI]: 1.58 to 1.83), whereas BMI was inversely associated with mortality (HR: 0.64, 95% CI: 0.59 to 0.69). Central obesity was also associated with higher mortality in the subset of subjects with normal BMI (HR: 1.70, 95% CI: 1.52 to 1.89) and BMI >= 30 kg/m(2) (HR: 1.93, 95% CI: 1.61 to 2.32). Conclusions In subjects with CAD, including those with normal and high BMI, central obesity but not BMI is directly associated with mortality. (J Am Coll Cardiol 2011;57:1877-86) (C) 2011 by the American College of Cardiology Foundation.

Keywords: Abdominal Obesity, Acute Myocardial-Infarction, BMI, Body Mass Index, Body-Mass Index, Cardiac Rehabilitation, Cardiology, Cardiovascular-Disease, Central Obesity, Coronary Artery Disease, Disease, Embase, Follow-Up, Heart-Disease, Impact, Methods, Mortality, Mortality, Normal, Obesity, Ratio, Rehabilitation, Review, Science, Survival, Systematic, Systematic Review, To-Hip Ratio, Waist Circumference, Waist Circumference, Waist-Hip Ratio, Web of Science, Weight-Loss

# Title: Journal of the American College of Nutrition

Full Journal Title: Journal of the American College of Nutrition

ISO Abbreviated Title: J. Am. Coll. Nutr.

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Publisher: Amer Coll Nutrition

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Subject Categories:

Nutrition & Dietetics: Impact Factor 1.564, 18/51 (2000)

? Dutradeoliveira, J.E., Ferreira, J.B., Vasconcellos, V.P. and Marchini, J.S. (1994), Drinking-water as an iron carrier to control anemia in preschool-children in a day-care-center. *Journal of the American College of Nutrition*, **13** (2), 198-202.

Abstract: Objective: Several foods have been used as iron (Fe) carriers to fight widespread global Fe deficiency and anemia. This paper describes the longitudinal effect of Fe-fortified drinking water given to a group of Brazilian preschool children.

Design: The experimental design included 31 preschool children who attended a day-care institution. Hemoglobin and serum ferritin were the blood parameters used to check the Fe status. Fe++ sulfate (20 mg Fe/L) was added daily to their drinking water container and measurements were obtained before the addition, 4 and 8 months later.

Results: The number of Fe-deficient children decreased drastically after they started drinking the Fe-enriched water. Mean hemoglobin values increased from 10.6 to 13.7 g/dL and serum ferritin from 13.7 to 25.6 µg/L. There were no problems related to the salt addition or to the children drinking the Fe-enriched water.

Conclusion: Fe-enriched drinking water was shown to be a practical alternative to supply Fe to children attending a day-care institution.

Keywords: Children, Iron Fortification, Iron Anemia, Anemia Control, Water, Drinking Water, Bioavailability, Fortification, Absorption, Zinc

? Rivlin, R.S. (1994), Magnesium-deficiency and alcohol intake-mechanisms, clinical-significance and possible relation to cancer development-(a review). *Journal of the American College of Nutrition*, **13** (5), 416-423.

Abstract: A comprehensive and critical review of the evidence relating magnesium (Mg) deficiency to alcohol consumption reveals several important types of interactions. First, alcohol acts acutely as a Mg diuretic, causing a prompt, vigorous increase in the urinary excretion of this metal along with that of certain other electrolytes. Second, with chronic intake of alcohol. and development of alcoholism, the body stores of Mg become depleted. During the late stages of alcoholism, the urinary excretion of Mg may become diminished as a physiological response to reduced intake and reduction of body stores. A number of aspects of the clinical syndrome of alcoholism contribute to and intensify the already existing reduction in body Mg stores. Third, a number of manifestations of alcoholism are believed due to effects of Mg deficiency, and some therapeutic benefit has been suggested from treatment of alcoholic patients with Mg. Finally, relatively little attention has been paid to the possible value of Mg administration as a preventive measure to forestall or minimize the deleterious effects of chronic use of alcohol or to prevent the development of cancer than can occur in this setting.

Keywords: Nutritional-Status, Calcium, Hypomagnesemia, Metabolism, Cells, Magnesium, Alcohol, Cancer

# Title: Journal of the American College of Surgeons

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JCR Abbreviated Title:

ISSN: 1072-7515

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Maker, V. and Layke, J. (2004), Gastrointestinal injury secondary to extracorporeal shock wave lithotripsy: A review of the literature since its inception. *Journal of the American College of Surgeons*, **198** (1), 128-135.

Full Text: [J\J Ame Col Sur198, 128.pdf](J/J%20Ame%20Col%20Sur198,%20128.pdf)

Keywords: Small-Bowel Perforation, Colonic Injury, Kidney-Stones, Position, Experience, Cavitation, Damage, Prone, Tract, ESWL

? Nuttall, M.C., van der Meulen, J.H., Browne, J.P., Emberton, M., Coomer, M., Mundy, A.R. and Morris, P.J. (2005), An analysis of the research fellowship scheme of the Royal College of Surgeons of England. *Journal of the American College of Surgeons*, **200** (2), 186-190.

Full Text: [2005\J Ame Col Sur200, 186.pdf](2005/J%20Ame%20Col%20Sur200,%20186.pdf)

Abstract: BACKGROUND: The Research Fellowship Scheme of the Royal College of Surgeons of England commenced in 1993 with the aim of exposing selected surgical trainees to research techniques and methodology, with the hope of having an impact on surgical research and increasing the cadre of young surgeons who might decide to pursue an academic career in surgery. Over pound11 million (approximately $20 million) has been invested in 264 fellowships. The College wished to evaluate the impact of the Scheme on the careers of research fellows, surgical research, and patient care. As the 10th anniversary of the Scheme approached. STUDY DESIGN: Two-hundred and sixty research fellows whose current addresses were available were sent a questionnaire. Two-hundred and thirty-eight (91.5%) responded. RESULTS: Three-quarters of the research fellows conducted laboratory-based research, with most of the remainder conducting patient-based clinical research. One-third of the fellows who have reached consultant status have an academic component to their post. The total number of publications based on fellowship projects was 53 1, with a median impact factor of 3.5. Almost all fellows had been awarded a higher degree or were working toward this. Half of the fellows received subsequent funding for research, mostly awarded by national or international funding bodies. CONCLUSIONS: The Research Fellowship Scheme of the Royal College of Surgeons of England has successfully supported many trainee surgeons in the initial phase of their research career. It has helped surgical research by increasing the pool of surgeons willing to embark on an academic career. Indirectly, patient care has benefited by promoting an evidence-based culture among young surgeons. Such schemes are relevant to surgical training programs elsewhere if more young surgeons are to be attracted into academic surgery. (C) 2005 by the American College of Surgeons.

Keywords: Academic, American, Analysis, Background, Bodies, Care, Careers, Clinical, Clinical Research, Culture, Design, England, Evidence Based, Evidence-Based, Fellowship, Funding, Hope, Impact, Impact Factor, International, Methodology, National, Number of Publications, Patient Care, Publications, Questionnaire, Research, Status, Surgery, Techniques, Training, Young

? Kuo, P.C., Schroeder, R.A., Shah, A., Shah, J., Jacobs, D. and Pietrobon, R. (2008), “Ghost” publications among applicants to a general surgery residency program. *Journal of the American College of Surgeons*, **207** (4), 485-489.

Abstract: OBJECTIVE: To determine the incidence of potentially fraudulent (or “ghost”) publications in applications to a general surgery residency program. METHODS: Electronic Residency Application Services applications Submitted in 2005 to the general surgery residency program were reviewed in an IRB-approved study. No identifiers were collected. Publications were checked against MEDLINE, PUBMED, ISI Web of Science, and Google. Non-verifiable publications were then submitted to the medical librarian for verification. Ghost publications were defined as journals, books, or meetings that cannot be verified; verified journals without the listed publication; or verified publications without an applicant author. Data analyses were performed using univariate and multivariate regression analysis for nonparametric data. A p value < 0.05 was considered significant. RESULTS: Four hundred ninety-three applications were received. Thirty-one percent (150 of 493) of applicants listed a total of 596 publications, including 30 abstracts, 359 journal articles, and 207 chapters. Thirty-three percent (196 of 596) of the publications could not be verified: 7 abstracts, 177 journal articles, and 12 chapters. The distribution of ghost publications was skewed toward the journals subgroup (p < 0.001). Positive predictors of ghost publications were age and foreign medical school. The sole negative predictor was enrollment in a top-10 US research medical school. CONCLUSION: A disturbingly substantial fraction of publications listed on Electronic Residency Application Services applications cannot be verified. This might indicate a need for greater mentorship and oversight for medical school applicants. It is unknown whether this behavior predicts lack of integrity in other professional settings. (J Am Coll Surg 2008;207:485-489. (C) 2008 by the American College of Surgeons).

Keywords: Analysis, Author, Faculty Applicants, Fellowships, Incidence, ISI, Journal, Journals, Medical, Medical School, Misrepresentation, Nonparametric, Professional, Publication, Publications, Pubmed, Research, Research Citations, Residency, Science, Surgery, US, Web of Science

? Wijeyekoon, S.P., Gurusamy, K., El-Gendy, K. and Chan, C.L. (2010), Prevention of parastomal herniation with biologic/composite prosthetic mesh: A systematic review and meta-analysis of randomized controlled trials. *Journal of the American College of Surgeons*, **211** (5), 637-645.

Full Text: [2010\J Ame Col Sur211, 637.pdf](2010/J%20Ame%20Col%20Sur211,%20637.pdf)

Abstract: BACKGROUND: Parastomal herniation is a frequent complication of stoma formation and can be difficult to repair satisfactorily, making it a recognized cause of significant morbidity. A systematic review with meta-analysis of randomized clinical trials was performed to determine the benefits and risks of mesh reinforcement versus conventional stoma formation in preventing parastomal herniation. STUDY DESIGN: Trials were identified from The Cochrane Library trials register, Medline, Embase, Science Citation Index Expanded, and reference lists. The primary outcome was the incidence of parastomal herniation. The secondary outcomes were the incidence of parastomal herniation requiring surgical repair, postoperative morbidity, and mortality. Meta-analysis was performed using a random-effects model. The risk ratio (RR) was estimated with 95% confidence intervals (CI) based on an intention-to-treat analysis. RESULTS: Three trials with 129 patients were included. Composite or biologic mesh was used in either the preperitoneal or sublay position. Mesh reinforcement was associated with a reduction in parastomal herniation versus conventional stoma formation (RR 0.23, 95%CI 0.06 to 0.81; p = 0.02), and a reduction in the percentage of parastomal hernias requiring surgical treatment (RR 0.13, 95%CI 0.02 to 1.02; p = 0.05). There was no difference between groups in stoma-related morbidity (2 of 58, 3.4% in the mesh group versus 2 of 57, 3.5% in the conventional group; p = 0.97), nor was there any mortality related to the placement of mesh. CONCLUSIONS: Composite or biologic mesh reinforcement of stomas in the preperitoneal/sublay position is associated with a reduced incidence of parastomal herniation with no excess morbidity. Mesh reinforcement also demonstrates a trend toward a decreased incidence of parastomal herniation requiring surgical repair. (J Am Coll Surg 2010;211:637-645. (C) 2010 by the American College of Surgeons).

Keywords: Analysis, Citation, Clinical-Trials, Closure, Colostomy, Complications, Composite, Confidence Intervals, Design, Medline, Meta-Analysis, Model, Mortality, Placement, Polypropylene Mesh, Primary Operation, Reduction, Repair, Science, Science Citation Index, Science Citation Index Expanded, Stoma, Surgery, Systematic Review, Treatment, Trend

? Fitzgerald, T.L., Brinkley, J. and Zervos, E.E. (2011), Pushing the envelope beyond a centimeter in rectal cancer: Oncologic implications of close, but negative margins. *Journal of the American College of Surgeons*, **213** (5), 589-595.

Full Text: [2011\J Ame Col Sur213, 589.pdf](2011/J%20Ame%20Col%20Sur213,%20589.pdf)

Abstract: BACKGROUND: The treatment of rectal cancer has improved significantly over the last century. Advances in surgical and adjuvant therapy coupled with a better understanding of the natural history have allowed for acceptance of progressively diminished margins for distal neoplasms. In order to better define oncologically safe distal margins, we performed a meta-analysis of the existing world’s literature. STUDY DESIGN: Studies were identified on Medline and ISI Web of Science using key words rectal cancer and margin. Studies were excluded if specific margins and local recurrence rates could not be extracted. All analyses were performed using Comprehensive Meta-Analysis Software (Biostat). RESULTS: Twenty-one studies reported outcomes in relationship to distal margins. Seventeen studies, 4,885 patients, reported outcomes with margins of less than 1 cm. Analysis of all studies indicated a nonsignificant trend favoring greater margins. However, in order to understand distal margins in the context of current care standards, additional analyses were performed. Thirteen studies reported application of total mesorectal excision and/or radiation. There was no significant difference in local recurrence rates for margins less than1 cm. In the 4 studies that reported neither total mesorectal excision nor radiation, a margin greater than1 cm was favored. Increased recurrence rates and decreased survival were associated with positive final margins. CONCLUSIONS: When total mesorectal excision is combined with radiotherapy, excellent local control can be expected with sphincter preservation for distal rectal cancers when margins are less than 1 cm, as long as final pathologic margins are negative. (J Am Coll Surg 2011; 213: 589-595. (C) 2011 by the American College of Surgeons).

Keywords: 1 CM, Adjuvant Therapy, Anastomotic Recurrence, Cancer, Carcinoma, Care, Control, Curative Surgery, Design, Distal Clearance Margin, History, Intersphincteric Resection, ISI, ISI Web of Science, Literature, Local Recurrence, Medline, Meta Analysis, Meta-Analysis, Natural, Neoplasms, Outcomes, Patients, Preoperative Radiotherapy, Radiotherapy, Rectal Cancer, Recurrence, Science, Sphincter-Saving Resection, Standards, Surgical, Survival, Therapy, Total Mesorectal Excision, Treatment, Trend, Web of Science

# Title: Journal of the American College of Toxicology

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ISSN: 0730-0913

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Culp, S.J. and Beland, F.A. (1996), Malachite green: A toxicological review. *Journal of the American College of Toxicology*, **15** (3), 219-238.

Abstract: Malachite green, an N-methylated diaminotriphenylmethane dye, is used primarily as a therapeutic agent in aquaculture. In solution, the dye exists as a mixture of the cation (chromatic malachite green) and its carbinol base, with the ratio depending on the pH of the solution; the dye also can undergo chemical and metabolic reduction to a leuco derivative. Analysis of fish tissue after exposure to malachite green indicates the presence of both chromatic and leuco forms, with the latter having a much longer tissue half-life. Malachite green intercalates with DNA, with a preference for A:T-rich regions, and the leuco derivative bears a structural resemblance to carcinogenic aromatic amines that can form covalent DNA adducts. Malachite green is mutagenic in Salmonella typhimurium TA98 in the presence of an exogenous metabolizing system. In mammalian cells, it shows marked cytotoxicity and the ability to induce cell transformation and lipid peroxidation. Results from carcinogenicity bioassays with malachite green have been equivocal; however, it appears to act as a tumor promoter, perhaps because of its ability to induce the formation of reactive oxygen species. These characteristics, plus its close structural similarity to carcinogenic triphenylmethane dyes (e.g., gentian violet) suggest that additional data are required to determine if human exposure to malachite green results in adverse health effects.

Keywords: Malachite Green, Leuco-Malachite Green, Triphenylmethane Dyes, Gentian Violet, Carcinogenicity, Mutagenicity, Hamster Embryo Cells, Gentian-Violet, Rainbow-Trout, Triphenylmethane Dyes, DNA, Aquaculture, Toxicity, Azo, Rat

# Title: Journal of the American Dental Association

Full Journal Title: [Journal of the American Dental Association](http://jada.ada.org/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lagravere, M.O. and Flores-Mir, C. (2005), The treatment effects of invisalign orthodontic aligners: A systematic review. *Journal of the American Dental Association*, **136** (12), 1724-1729.

Full Text: 2005\J Ame Den Ass136, 1724.pdf

Abstract: Background. The authors conducted a systematic review of the literature to determine the treatment effects of the Invasalign orthodontic system (Align Technology, Santa Clara, Calif). Types of studies reviewed. The authors reviewedclinical trials that assessed Invisalign’s treatment effects in nongrowing patients. They did not consider trials involving surgical or other simultaneous fixed or removable orthodontic treatment interventions. Results. The authors searched electronic databases (PUBMED, MEDLINE, MEDLINE In-Process & Other Non-Indexed Citations Evidence Based Medicine Reviews, EMBASE Excerpta medica, Thomsen’s ISI web of science and LILACS)with the help of a senior health sciences librarian. They used “Invisalign” as the sole search term, and 22 documents appeared in the combined search. Thereafter, they used”clinical trials” “humans” and “Invisalign treatment effects” as abstract selection criteria. Only two published articles met these inlclusion criteria, though after reading the actual articles, the authors determined that they did not adequately evaluate Invisalign treatment effects. Both articles identified methodological issues. Clinical Implications. The inadequately designed studies the authors found represented only a lower level of evidence (level II). Therefore, the authors found that no strong conclusions could be made regarding the treatment effects of Invisalign appliances. Future prospective randomized clinical trials are required to support, with sound scientific evidence, the claims about Invisalign’s treatment effects. Clinicians will have to rely on theirInvisalign clinical experience, the opiniomns of experts and the limited published evidence when using Invisalign appliances.

Keywords: Appliances, Authors, Citations, Clinical Trials, Databases, Embase, Health Sciences, Interventions, Invisalign, ISI, Literature, Medline, Orthodontics, Pubmed, Randomized Clinical Trials, Review, Science, Sciences, Surgical, Systematic, Systematic Review, Treatment, Treatment Interventions, Treatment Outcomes, Web of Science

? Glick, M. (2007), You are what you cite - The role of references in scientific publishing. *Journal of the American Dental Association*, **138** (1), 12-14.

Full Text: [2007\J Ame Den Ass138, 12.pdf](2007/J%20Ame%20Den%20Ass138,%2012.pdf)

Keywords: References, Self-Citation

? Witt, M. and Flores-Mir, C. (2011), Laypeople’s preferences regarding frontal dentofacial esthetics Tooth-related factors. *Journal of the American Dental Association*, **142** (6), 635-645.

Full Text: 2011\J Ame Den Ass142, 635.pdf

Abstract: Background. Researchers have conducted extensive studies regarding dentoalveolar factors that affect anterior dental esthetics; however, there is no consensus regarding laypeople’s perspectives on these factors. Methods. The authors conducted a systematic search of electronic databases (MEDLINE, PUBMED, EMBASE, Cochrane Library and Web of Science) until May 2010. They identified and selected articles in which investigators explored anterior dental esthetics from a layperson’s perspective, and they assigned methodological scores to the studies. Results. Seventeen articles met the inclusion criteria. The authors determined laypeople’s preferences for tooth shape, tooth size and proportion, and incisor position. Conclusions. The results of this literature review show that laypeople did not discriminate between square, square-round (basically square with rounded mesioincisal and distoincisal angles) and round incisors or between canine shapes when displayed in photographs of female models. They preferred square-round incisors to square incisors and flat canines (when paired with round incisors) in photographs of male models. Most laypeople appeared to prefer unworn dentitions, small teeth in photographs of female models and large teeth in photographs of male models, width-to-length ratios in central incisors between 75 and 85 percent, and tooth-to-tooth proportions between the lateral and central incisors between 50 and 74 percent. Laypeople discerned a 10 degrees angulation of one or both central incisors as being less attractive. Significant discrepancies in perceptions existed for incisal edges. Most laypeople preferred an overbite of 2.0 millimeters, with some leeway (around 2 mm). The authors noted that laypeople had a preference for no diastemas. Clinical Implications. Laypeople have varying degrees of sensitivity to certain esthetic issues. Thus, clinicians can expect their patients to be more attentive to some dental esthetic factors than to others.

Keywords: Angulation, Appearance Following Changes, Arc, Authors, Buccal Corridors, Cochrane, Databases, Dental Attractiveness, Dentofacial Esthetics, Impact, Laypeople, Laypersons, Literature, Literature Review, Medline, Methods, Perception, Perceptions, Pubmed, Researchers, Review, Science, Significant, Smile, Smile Aesthetics, Systematic, Tooth, Web of Science

? Cleveland, J.L., Junger, M.L., Saraiya, M., Markowitz, L.E., Dunne, E.F. and Epstein, J.B. (2011), The connection between human papillomavirus and oropharyngeal squamous cell carcinomas in the United States Implications for dentistry. *Journal of the American Dental Association*, **142** (8), 915-924.

Full Text: 2011\J Ame Den Ass142, 915.pdf

Abstract: Background. Results from studies conducted in the past several years suggest that some oropharyngeal cancers, those of the base of the tongue and the tonsils, are associated with high-risk types of human papillomavirus (HPV). In this article, the authors summarize the available evidence regarding the epidemiology of HPV-associated oropharyngeal cancers in the United States, the available HPV vaccines and the implications of these for dentistry. They also examine the differences in HPV prevalence between cancers of the oral cavity and those of the oropharynx. Types of Studies Reviewed. The authors searched PUBMED, Web of Science, The Cochrane Library and the National Guideline Clearinghouse to identify English-language systematic reviews and meta-analyses focused on HPV-associated oropharyngeal squamous cell cancers published from January 2005 through May 2011. Results. Molecular and epidemiologic evidence suggest a strong etiologic association of HPV with oropharyngeal cancers. The incidence of oropharyngeal cancers in the United States has increased between 1973 and 2007, whereas that of cancers at other head and neck sites has decreased steadily. Compared with HPV-negative cancers, HPV-positive oropharyngeal cancers are associated with certain sexual behaviors, occur more often among white men and people who do not use tobacco or alcohol, and may occur in a population younger by about four years (median ages, 52-56 years). Despite often having a later stage of diagnosis, people with HPV-positive oropharyngeal cancers have a lower risk of dying or recurrence than do those with HPV-negative cancers. The effectiveness of the HPV vaccine in preventing oropharyngeal cancers is unknown. Clinical Implications. Dental health care personnel (DHCP) should be knowledgeable about the role of HPV in carcinogenesis, the association of HPV with oropharyngeal cancers and HPV vaccines, and they should be prompt in referring patients with suggestive symptoms for evaluation. DHCP can play an important role in increasing patients’ knowledge about HPV and oropharyngeal cancers.

Keywords: Alcohol, Authors, Carcinogenesis, Cochrane, Dentistry, Diagnosis, Effectiveness, Epidemiology, Evaluation, Head, Health Care, Hpv, Human, Human Papillomavirus, Incidence, Infection, Knowledge, Natural-History, Neck-Cancer, Oral Human-Papillomavirus, Oropharyngeal Cancer, Prevalence, Pubmed, Recurrence, Risk, Risk Factors, Risk-Factors, Science, Sexual-Behaviors, Symptoms, Systematic, Systematic Reviews, Tobacco, Tonsillar Carcinoma, Vaccine, Vaccines, Web of Science

? Witt, M. and Flores-Mir, C. (2011), Laypeople’s preferences regarding frontal dentofacial esthetics Periodontal factors. *Journal of the American Dental Association*, **142** (8), 925-937.

Full Text: 2011\J Ame Den Ass142, 925.pdf

Abstract: Background. The authors conducted a review to evaluate the magnitude of esthetic impairment that the general public is able to discern with regard to periodontal factors. Methods. The authors conducted a systematic computerized search of electronic databases (MEDLINE, PUBMED, EMBASE, Cochrane Library and Web of Science) until May 2010. They scrutinized the abstracts of the retrieved articles and identified, selected and assigned methodological scores to those that investigated periodontal factors affecting anterior dental esthetics from a layperson’s perspective. Results. Thirty-two articles met the inclusion criteria. The authors determined laypeople’s preferences and sensitivities with regard to midline deviation, gingival display and architecture, smile arc and buccal corridors. Conclusions. The results of the literature review show that most laypeople could detect dental midline deviations of less than 3.0 millimeters, but when made aware of midlines, they preferred those that are coincident with each other and with the facial midline. There appears to be an esthetic range from 4.0 mm of incisal coverage to 3.6 mm of gingival display that the general public tolerates, with a preference for the lip at or near the gingival margins of the maxillary central incisors. They preferred consonant smile arcs in both sexes but tolerated flat smile arcs in men more than they did in women. Laypeople preferred minimal buccal corridor. Clinical Implications. Laypeople have varying degrees of sensitivity to certain dental esthetic issues. Thus, clinicians can expect their patients to be more attentive to some dental esthetic factors than they are to others.

Keywords: Arc, Authors, Buccal Corridor Space, Buccal Corridors, Cochrane, Coverage, Databases, Dental Attractiveness Ratings, Dentofacial Esthetics, Extraction, General Public, Gingival Architecture, Gingival Display, Laypeople, Laypersons, Literature, Literature Review, Medline, Methods, Midline Deviation, Orthodontic Treatment, Perception, Posed Smile, Professionals, Pubmed, Review, Science, Smile, Smile Aesthetics, Smile Arc, Smile Esthetics, Systematic, Web of Science, Women

# Title: Journal of the American Dietetic Association

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? Harland, B.F. and Hardenwilliams, B.A. (1994), In vanadium of human nutritional importance yet. *Journal of the American Dietetic Association*, **94** (8), 891-894.

Full Text: [1994\J Ame Die Ass94, 891.pdf](1994/J%20Ame%20Die%20Ass94,%20891.pdf)

Abstract: The trace element vanadium has been studied by the nutrition community for four decades, yet has not achieved essential status for human beings. It is found in compounds at valences of 2, 3, 4, or 5, with the tetravalent and pentavalent forms being the most common. In human beings, pharmacologic amounts of vanadium (ie, 10 to 100 times normal intake) affect cholesterol and triglyceride metabolism, influence the shape of erythrocytes, and stimulate glucose oxidation and glycogen synthesis in the liver. Vanadium’s primary mode of action is as a cofactor that enhances or inhibits enzymes. Recent evidence suggests that vanadium may be essential for higher animals. After their mothers had been fed carefully formulated vanadium-deficient diets, second-generation goat kids suffered skeletal damage and died within 3 days of parturition. Although ubiquitous in air, soil, water, and the food supply, vanadium is generally found in nanogram or microgram quantities, which makes it difficult to measure. Estimates for the American intake of vanadium (based on a food intake of 500 g dry weight) are 10 to 60 µg/day. Vanadium levels in diets from five regions of the United States range from 30.9±1.5 in the Southeast to 50.5±1.5 µg/kg dry weight in the West. Although vanadium is thought to be essential for goats, new data may soon support its essentiality in human beings.

# Title: Journal of the American Geriatrics Society

Full Journal Title: [Journal of the American Geriatrics Society](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=jgs)

ISO Abbreviated Title: J. Am. Geriatr. Soc.

JCR Abbreviated Title: J Am Geriatr Soc

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Publisher: Lippincott Williams & Wilkins

Publisher Address: 530 Walnut St, pHiladelphia, PA 19106-3621

Subject Categories:

Geriatrics & Gerontology: Impact Factor 3.136, 2/22 (2000)

? Kario, K. and Ohashi, T. (1997), Increased coronary heart disease mortality after the Hanshin-Awaji earthquake among the older community on Awaji Island. *Journal of the American Geriatrics Society*, **45** (5), 610-613.

Full Text: 1997\J Ame Ger Soc45, 610.pdf

Abstract: OBJECTIVES: To investigate the characteristics of earthquake (EQ)-induced coronary heart disease (CHD) deaths.

SETTING AND PARTICIPANTS: On January 17, 1995, the south part of Hyogo Prefecture in Japan was struck by a major EQ (Hanshin-Awaji EQ) measuring 7.2 on the Richter scale. We investigated the characteristics of EQ-induced CHD deaths (myocardial infarction and sudden death) in the Tsuna region, which is a community with a large older population (31% of the total of 64,000 residents are 60 years of age or older) and includes the epicenter and one of the most heavily damaged areas.

MEASUREMENTS: EQ-related CHD mortality on the basis of direct access to records of physicians who were able to continue services for the EQ victims without interruption by this disaster situation.

RESULTS: Coronary heart disease deaths increased for a few months after the EQ, and the total number from January 17 to April 30, 1995, was 45, which was significantly (1.5 times) higher than the 31 deaths during the same period of the previous year (1994). The CHD deaths after the EQ all occurred in individuals more than 60 years of age and had a positive correlation with EQ-induced damages. Concerning the onset time, CHD deaths occurred 1.8 times more often (P <.05) in the nighttime (11 PM to 5 AM) and 1.4 times as often during the morning (5 AM to 11 AM), whereas their occurrence did not vary during a 12-hour period from 11 AM to 11 PM.

CONCLUSION: Deaths of older individuals from CHD persisted for a few months after the EQ and were especially prominent during the nighttime and morning. Reduction of stress and related coronary risk factors in this period may suppress CHD deaths after a major EQ.

Patel, S.A. and Zenilman, M.E. (2001), Outcomes in older people undergoing operative intervention for colorectal cancer. *Journal of the American Geriatrics Society*, **49** (11), 1561-156.

Full Text: [2001\J Ame Ger Soc49, 1561.pdf](2001/J%20Ame%20Ger%20Soc49,%201561.pdf)

Abstract: PURPOSE: To compare the outcomes of primary surgery for colorectal cancer in an older patient population consisting of the young old (65-74), older old (75-84), and oldest old (greater than or equal to 85) with those in younger patient groups. BACKGROUND: Colorectal cancer continues to be a significant cause of cancer-related deaths in the United States, particularly in older people. Age remains the most significant risk factor for colorectal cancer.(1) Studies have shown that over 60% of patients requiring surgical intervention for this disease are age 70 and older.(2) Furthermore, for every 7 years over the age of 50, the risk of developing colorectal cancer nearly doubles.’ The prevalence of colorectal cancer in older people is likely to increase further as the size of the geriatric population increases. Surgical therapy is the cornerstone for treatment of colorectal cancer. Attempts at more conservative and less definitive treatment are associated with at least a twofold increase in death rate.(4) Given the propensity of older people to develop colorectal cancer and the current status of surgery as the standard for treatment, the clinician is faced with the dilemma of how aggressive to be in treating this population of patients while being respectful of their coexisting comorbidities, life expectancy, and quality of life issues. Several studies have shown that age as an isolated factor has minimal or no effect on mortality after colorectal surgery for cancer.(5-9) This systematic review analyzed postoperative mortality, morbidity, length of hospital stay, overall survival, and cancer-specific survival as measures of outcome in older patients with colorectal cancer compared with younger (< 65 years) patients. DATA SOURCES: The following electronic databases were searched from when they were started to July 1998: Medline, Embase, CancerLit, Cochrane Controlled Trials Register, Cinahl, Healthstar, Science Citation Index, Edina Biosis, National Health Service Economic Evaluation Database, Index to scientific and technical proceedings, and Pascal. Manual searches were performed of conference abstracts from annual meetings of the Association of Surgeons of Great Britain and Ireland, European Congress of Surgery, American Society of Colon and Rectal Surgeons, 1996-1998, and the First European Conference on the Economics of Cancer, 1997. The National research register, Medical Research Council trials directory, current research in Britain, United Kingdom Coordinating Committee on Cancer Research trials register, center watch clinical trials listing, physician data query, Nation Institutes of Health inventory of clinical trials and studies, trial amnesty on Cochrane library, system for information on grey literature in Europe, index of UK theses, Department of Health and Social Services (DHSS) data CD, and the International Network of Agencies for Health Technology Assessment (INAHTA) database were also searched for relevant citations and continuing or recently completed studies. Cancer registries in the United Kingdom in which prospective audits were believed to have taken place were also contacted. STUDY SELECTION CRITERIA: Prospective, longitudinal studies of adults undergoing primary treatment for Duke’s stage A-D colon or rectal cancer were eligible. Population-based studies (including all patients with colorectal cancer) and consecutive and nonconsecutive surgical series were included. Only those studies published after January 1, 1988, and with more than 100 participants were included; studies in which patients without symptoms were identified by screening and that focused on prognostic markers or blood transfusion in relation to outcome of surgery and randomized controlled trials of follow-up methods were excluded. DATA EXTRACTION: Data were collected from 28 independent studies, which included 34,194 patients. These studies allowed for the data to be broken down by age. Three of the studies documented the progress of all patients with colorectal cancer within a geographical area, five documented data on all patients presenting to the hospital irrespective of whether they underwent surgery, and the remaining studies were prospective series of surgical cases (14 of which included consecutive patients undergoing surgery for colorectal cancer, six of which included only patients undergoing curative resection). Of the 28 studies, 22 included both colon cancer and rectal cancer patients, five included only rectal cancer patients, and one included only colon cancer patients. Data were extracted by one reviewer from published papers and verified by a second reviewer. The following data were recorded: demographic characteristics of patients, site and stage of the tumors, preoperative comorbidities, surgical interventions, and outcomes (including postoperative morbidity, mortality, recurrence, survival, quality of life, and cost effectiveness). Rate ratios were calculated for each of the older patient subgroups with respect to those patients less than age 65 for mortality and survival data. Postoperative complications and prognostic factors, such as stage of disease and type of surgery (elective vs emergent) in different age groups, were compared by calculating an overall rate per group by summing the number of events and the denominators from each individual study. The rates of postoperative complications were then assessed for trends in incidence using the chi-squared test, as were the distribution of prognostic factors. MAIN RESULTS: The study represented 34,194 patients, of which 34% were < 65, 32% were 65 to 74, 27% were 75 to 84, and 8% were greater than or equal to 85. The postoperative mortality rate ratios were 1.8, 3.2, and 6.2 in the 65 to 74, 75 to 84, and greater than or equal to 85 age groups, respectively, when compared with the < 65 age group. The frequencies of various postoperative complications are shown in Table 1. There was a significant trend toward increased rates of pneumonia/respiratory failure, cardiovascular complications, cerebrovascular accidents, and thromboembolism in older people, whereas rates of anastomotic leak were not significantly different. Table 2 shows the median 2-year and 5-year overall survival rates for each of the age groups. In those undergoing surgery with curative intent, the median survival rate ratios at 2 years were 0.92, 0.82, and 0.65 for the 65 to 74, 75 to 84, and greater than or equal to 85 age groups, respectively, compared with those <65. However, this trend was not as clear as the trend in overall survival secondary to the greater variability between studies. Data from consecutive patients presenting with colorectal cancer regardless of whether they underwent surgery suggested a decline in cancer-specific survival with age. However, cancer-specific survival in those undergoing curative surgery yielded rate ratios close to I at both 2 years and 5 years in all three older age groups. Median values for cancer-specific survival at 2-year and 5-year follow-up for those undergoing curative resection are shown in Table 3. A linear relation with respect to age and stage of disease at presentation (P = .0014) was evident in those who were staged, with older patients presenting with more advanced disease. In addition, the frequency of unstaged cancers increased with age, with 3.9% in those <greater than>65, 6.1% in those 65 to 74, 9.0% in those 75 to 84, and 17.3% in those greater than or equal to 85. Five studies reported data on prevalence of comorbidities. Several of the comorbidities were more prevalent in the older age groups, but these comorbidities were assessed differently in the various studies, and therefore pooled estimates were not obtainable. There was a statistically significant (P < .0001) trend toward increasing rates of emergent versus elective surgery with advancing age (Table 4). There was also a significant trend toward decreasing rates of curative operations with advancing age (P < .0001). The percentage of patients undergoing curative surgery were as follows: 76% in the <65 age group (n = 10,772), 75% in the 65 to 74 age group (n = 9,710), 73% in the 75 to 84 age group (n = 7,805), and 67% in the 85 age group (n = 1,932). Data from studies reporting on the number of patients not undergoing surgery for colorectal cancer demonstrate that older people are less likely to undergo surgery. The rates of no operation were 4%, 6%, 11%, and 21% in the <less than>65, 65 to 74, 75 to 84, and = 85 age groups, respectively. CONCLUSION: This systematic review concludes that the relationship between outcomes with colorectal cancer surgery and age of patients is complex and confounded by variables including stage at presentation, tumor site, preexisting comorbidities, and type of treatment administered. Furthermore, selected older patients can achieve cancer-specific survival rivaling that in young patients, as demonstrated by a relative cancer-specific survival of nearly 1 for all older groups undergoing curative surgery. As such, surgery should not be withheld from the older patient based on age alone.

Keywords: Ad, Age, Cancer, Cd, Characteristics, Citation, Citations, Clinical Trials, Colon Surgery, Colorectal Cancer, Complex, Cost Effectiveness, Criteria, Database, Databases, Determinants, Economics, Effectiveness, Europe, Evaluation, Extraction, Fecal Occult Blood, Groups, International, Intervention, Lavage, Literature, Longitudinal, Median, Medline, Methods, Mortality, Nation, National Health Service, Older People, Oldest Old, Outcomes, Prevalence, Primary, Randomized Controlled Trials, Research, Resection, Review, Risk, Risk-Factors, Science, Science Citation Index, Screening, Selection, Sigmoidoscopy, Surgery, Survival, System, Systematic Review, Technology, Therapy, Treatment, Trends, UK, United Kingdom, United States, Variability

? Navarro, A. and Lynd, F.E. (2005), Where does research occur in geriatrics and gerontology? *Journal of the American Geriatrics Society*, **53** (6), 1058-1063.

Full Text: [2005\J Ame Ger Soc53, 1058.pdf](2005/J%20Ame%20Ger%20Soc53,%201058.pdf)

Abstract: The International Plan of Action on Aging 2002 emphasized the need to promote and develop research on aging, especially in underdeveloped countries. This article aims at describing the current situation with regard to the international scientific production in the field of geriatrics and gerontology. All articles published in journals included in the categories “Geriatrics and Gerontology” of the Science Citation Index or “Gerontology” of the Social Science Citation Index in 2002 were analyzed. There is unquestionable predomination by the United States, which participates in 53.8% of the articles analyzed, followed by the United Kingdom (9.66%) and Canada (6.66%). The production of the 15 European Union countries together is 31.2%. When adjustments are made for economic or population factors, other countries show their importance: Israel and Sweden, for example. Authors from richer countries participate in more than 95% of the articles, whereas those in less-developed countries tend to publish less, and when they do so, it is through collaboration with more-developed countries. In general, only 10.5% of the articles are written in collaboration with institutions from different countries. One of the keys to stimulating research in less wealthy countries would seem to be precisely through collaboration. This would aid the transfer of knowledge and experience, allowing researchers in these countries to obtain autonomy to perform their own studies independently and to provide them with the ability to gain access for their publications at the international level.

Keywords: Bibliometrics, Collaboration, European Union, Geriatrics, Gerontology, International Cooperation, Journals, Publications, Research, Science Citation Index, Scientific Production, Social Science Citation Index, United Kingdom

? Kalyani, R.R., Stein, B., Valiyil, R., Manno, R., Maynard, J.W. and Crews, D.C. (2010), Vitamin D treatment for the prevention of falls in older adults: Systematic review and meta-analysis. *Journal of the American Geriatrics Society*, **58** (7), 1299-1310.

Full Text: 2010\J Ame Ger Soc58, 1299.pdf

Abstract: OBJECTIVES: To systematically review and quantitatively synthesize the effect of vitamin D therapy on fall prevention in older adults. DESIGN: Systematic review and meta-analysis. SETTING: MEDLINE, CINAHL, Web of Science, EMBASE, Cochrane Library, LILACS, bibliographies of selected articles, and previous systematic reviews through February 2009 were searched for eligible studies. PARTICIPANTS: Older adults (aged >= 60) who participated in randomized controlled trials that both investigated the effectiveness of vitamin D therapy in the prevention of falls and used an explicit fall definition. MEASUREMENTS: Two authors independently extracted data, including study characteristics, quality assessment, and outcomes. The I(2) statistic was used to assess heterogeneity in a random-effects model. RESULTS: of 1,679 potentially relevant articles, 10 met inclusion criteria. In pooled analysis, vitamin D therapy (200-1,000 IU) resulted in 14% (relative risk (RR) = 0.86, 95% confidence interval (CI) = 0.79-0.93; I(2) = 7%) fewer falls than calcium or placebo (number needed to treat = 15). The following subgroups had significantly fewer falls: community-dwelling (aged <80), adjunctive calcium supplementation, no history of fractures or falls, duration longer than 6 months, cholecalciferol, and dose of 800 IU or greater. Meta-regression demonstrated no linear association between vitamin D dose or duration and treatment effect. Post hoc analysis including seven additional studies (17 total) without explicit fall definitions yielded smaller benefit (RR = 0.92, 95% CI = 0.87-0.98) and more heterogeneity (I(2) = 36%) but found significant intergroup differences favoring adjunctive calcium over none (P = .001). CONCLUSION: Vitamin D treatment effectively reduces the risk of falls in older adults. Future studies should investigate whether particular populations or treatment regimens may have greater benefit. J Am Geriatr Soc 58: 1299-1310, 2010.

Keywords: Adults, Aged, Analysis, Assessment, Authors, Bone Loss, Calcium, Calcium Supplementation, Cholecalciferol Vitamin-D-3, Cochrane, Community, Definitions, Design, Effectiveness, Elderly, Elderly-People, Embase, Falls, Fractures, History, Medline, Meta-Analysis, Model, Nursing-Home, Older Adults, Outcomes, Pooled Analysis, Prevention, Randomized Controlled Trials, Randomized Controlled-Trial, Relative Risk, Review, Risk, Science, Systematic, Systematic Review, Systematic Reviews, Therapy, Treatment, Vitamin D, Web of Science, Women

# Title: Journal of the American Leather Chemists Association

Full Journal Title: [Journal of the American Leather Chemists Association](http://www.leatherchemists.org/home.asp)

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JCR Abbreviated Title: J Am Leather Chem Assoc

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Subject Categories:

Chemistry, Applied: Impact Factor 0.722, / (2003)

Materials Science, Textiles: Impact Factor 0.722, / (2003)

? Evans, N.A., Milligan, B. and Montgomery, K.C. (1987), Collagen cross-linking - New binding-sites for mineral tannage. *Journal of the American Leather Chemists Association*, **82** (4), 86-95.

? Shi, B., Li, G.Y., He, Y.J., Lu, Z.B. and Gao, X.H. (2002), Ultrasonic removal of organic pollutants in tannery wastewater. *Journal of the American Leather Chemists Association*, **97** (3), 98-101.

Abstract: The effect of ultrasonic treatment on flocculating settling of tannery effluent, the reduction of COD in particular, was studied. The influence of the irradiation method, the duration of ultrasound and offer, and the prescription of coagulants on the efficiency of minimizing organic chemicals in wastewater were investigated. The results show that: (1) when waste water is treated only by ultrasound for 60 seconds, the removal rate of COD is 40.6%; (2) when total concentration of coagulants is increased to 100 mg/l, the greatest reduction of COD is achieved; (3) when wastewater is first treated with ultrasound for 60 seconds and then flocculated by coagulants, the reduction of COD is 10 - 37% higher than the controls without ultrasound. Thus, treatment of tannery wastewater with flocculating-settling technology can be effectively improved by ultrasound.

Keywords: Aqueous-Solution, Leather

Liao, X.P., Du, X., Tang, W. and Shi, B. (2004), Equilibrium and kinetics of vegetable tanning process. *Journal of the American Leather Chemists Association*, **99** (5), 191-196.

Full Text: [J\J Ame Lea Che Ass99, 191.pdf](J/J%20Ame%20Lea%20Che%20Ass99,%20191.pdf)

Abstract: Vegetable tanning is an adsorption process of tannins onto hide collagen. Its equilibrium and kinetics were investigated in detail by using hide powder, cattle hide and sheepskin. The experiments indicated that the Freundlich model could be used to describe the adsorption equilibrium of tannins onto hide powder, and a pseudo-second-order rate model could be used to describe adsorption kinetics with an error of less than 6%. The adsorption capacities calculated by the adsorption rate model were close to that of actual measurements. The adsorption heat, within 8-50 kJ/mol, confirmed that the adsorption mechanism of tannins onto hide powder is hydrogen bond adsorption. Further studies indicated that the Freundlich model and pseudo-second-order rate model can also be used to describe the practical vegetable tanning process. The equilibrium adsorption capacities of tannins onto cattle hide and sheepskin calculated by the pseudo-second-order rate model were consistent with the actual measurements with an errors of less than 5%. It can be concluded that pseudo-second-order rate model can be used to predict the adsorption capacity of tannins in the vegetable tanning process.

Keywords: Plant Polyphenols, Tannage, Temperature, Adsorption, Mechanism, Leather

? Aravindhan, R., Fathima, N.N., Rao, J.R. and Nair, B.U. (2006), Utilization of calcium alginate beads as adsorbent for removal of dyes from tannery wastewaters. *Journal of the American Leather Chemists Association*, **101** (6), 223-230.

Full Text: [2006\J Ame Lea Che Ass99, 223.pdf](2006/J%20Ame%20Lea%20Che%20Ass99,%20223.pdf)

Abstract: The presence of color due to dyes in the effluents from leather industry is a major concern in today’s eco-sensitive world. In this present study, the removal of three most commonly used dyes in leather industry, viz. acid, direct and metal complex dye, by adsorption onto calcium alginate beads has been studied in dynamic-batch mode. The effect of initial dye concentration, alginate quantity, size of the beads, pH and temperature on dye removal was studied for batch conditions. Experiments with commercial tannery dye effluents have also been carried out and the results indicate the potential of calcium alginate beads as effective adsorbents for removal of dyes from commercial tannery effluent. Desorption studies were carried out, which indicate the reuse potential of the alginate beads. The measured adsorption kinetics was well described by a pseudo-second order kinetic model.

Keywords: Textile Effluents, Aqueous-Solutions, Reactive Dyes, Color Removal, Biosorption, Adsorption, Decolorization, Sorption, Biomass

? Jiao, L.M., Liao, X.P. and Shi, B. (2009), Adsorptive removal of As(V) from aqueous solution by Zr(IV)-loaded skin shavings. *Journal of the American Leather Chemists Association*, **104** (9), 308-315.

Full Text: J Ame Lea Che Ass104, 308.pdf

Abstract: Wet-white shavings are one of the main solid wastes produced in the leather industry. In this paper, Zirconium (IV)-loaded adsorbent (ZrLA) was prepared by using wet-white shavings as the supporting matrix. The fundamental adsorption behaviors of this new adsorbent for arsenic [As(V)] were investigated. It was found that the adsorption capacity of ZrLA for As(V) in aqueous solution was 60.90 mg.g-1, when the initial concentration of As(V) was 75.0 mg.L-1 at pH 4.0 and the dosage of ZrLA was 1.0 g.L-1. The initial pH of As(V) solution significantly affected adsorption capacity of ZrLA to As(V) and the optimal pH for adsorption was in the range of 3.0-6.0. The adsorption isotherms of As(V) could be well fitted by the Langmuir equation, and the maximum adsorption capacities calculated by the Langmuir equation were close to those determined by experiments. The adsorption kinetics of As(V) on ZrLA could be satisfactorily described by the pseudo-second-order rate model. The adsorption capacity was increased with the increase of the zirconium content in ZrLA, and the highest adsorption capacity was obtained when zirconium content of ZrLA was 90-110 mg.g-1.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacities, Adsorption Capacity, Adsorption Isotherms, Adsorption Kinetics, Aqueous Solution, Arsenic, Arsenic Removal, As(V), Capacity, Chelating Resin, Collagen, Concentration, Equilibrium, Experiments, Groundwater, Health, Ions, Isotherms, Kinetics, Langmuir, Langmuir Equation, Matrix, Model, Ph, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Removal, Solution, Waste, Water

? Tang, K.Y., Zheng, X.J., Yang, M., Liu, J., Shelly, D.C. and Casadonte, D.J. (2009), Influence of retanning on the adsorption capacity of water on cattlehide collagen fibers. *Journal of the American Leather Chemists Association*, **104** (11), 367-374.

Abstract: There are plenty of hydrophilic groups in the collagen fibers in leathers. Because the affinity between these hydrophilic groups and water molecules varies with environmental changes in temperature and relative humidity, leathers will adsorb or de-adsorb water in the environment if the environmental factors change. The strength, permeability, and thermal stability of leathers may be greatly affected by the water within them. Retanning is a key operation in leather making. The main purpose of retanning is to get leathers with some special performances. The water content in leathers is around 20wt%, an amount that cannot be neglected. However, no reports are found on the interactions between collagen and water, particularly the influence of retanning on the interaction between water and collagen fibers. The state that water molecules exist in collagen fibers, the mechanism for collagen fibers to adsorb water, the de-adsorption kinetics for water molecules to escape from collagen fibers, and the influence of retanning on the adsorption of water on collagen fibers should be made clear to improve the leathermaking technology by controlling the structure and behaviors of leathers. In the present paper, after being chrome tanned, collagen fibers were retanned with chrome, glutaraldehyde, TGR retanning agent (proprietary acrylic based), and wattle extract, respectively, to get different retanned samples. The water adsorption isotherms of the samples were obtained by the use of the gravimetric method, by which the influence of retanning on the equilibrium water adsorption capacity and the influencing mechanism were discussed. On the base of adsorption characterization and equilibrium adsorption capacity for the samples to adsorb water, different mathematics models were used to describe the adsorption process and the adsorption mechanism. Six models were chosen to fit the experimental data, and it was found that the Bradley model is the best to describe the adsorption.

Keywords: Adsorption, Adsorption Capacity, Adsorption Isotherms, Adsorption Mechanism, Behavior, Capacity, Changes, Characterization, Collagen, Data, Environment, Environmental, Equilibrium, Experimental, Fibers, Foods, Glutaraldehyde, Interaction, Isotherms, Kinetics, Leather, Mechanism, Model, Models, NOV, Operation, Permeability, Purpose, Sorption Isotherms, Stability, State, Strength, Structure, Technology, Temperature, Thermal Stability, Water, Water Adsorption, Water Adsorption Capacity

# Title: Journal of the American Medical Directors Association

Full Journal Title: [Journal of the American Medical Directors Association](http://www.sciencedirect.com/science/journal/15258610)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Osterweil, D. and Bail, M.D. (2006), Who needs another journal? *Journal of the American Medical Directors Association*, **7** (9), 601-603.

Full Text: [2006\J Ame Med Dir Ass7, 601.pdf](2006/J%20Ame%20Med%20Dir%20Ass7,%20601.pdf)

Keywords: Journal, Needs

? Morley, J.E. (2007), The future history of long term care. *Journal of the American Medical Directors Association*, **8** (9), 553-556.

Full Text: [2007\J Ame Med Dir Ass8, 553.pdf](2007/J%20Ame%20Med%20Dir%20Ass8,%20553.pdf)

Keywords: Care, History, Long Term, Long-Term, Term

? van der Maarel-Wierink, C., Vanobbergen, J.N.O., Bronkhorst, E.M., Schols, J.M.G.A. and de Baat, C. (2011), Risk factors for aspiration pneumonia in frail older people: A systematic literature review. *Journal of the American Medical Directors Association*, **12** (5), 344-354.

Full Text: 2011\J Ame Med Dir Ass12, 344.pdf

Abstract: Objective: To systematically review the risks for aspiration pneumonia in frail older people and the contribution of bad oral health among the risk factors. Design: Systematic literature review. Setting: PUBMED (MEDLINE), Web of Science, Cochrane Library, EMBASE, and CINAHL were searched for eligible studies, published in English in the period January 2000 to April 2009. Participants: Frail older people. Measurements: Only publications with regard to hospitalized, institutionalized, or frail home-dwelling people of 60 years and older were eligible. Two authors independently assessed the publications for their methodological quality. Unadjusted and adjusted odds ratios and their corresponding 95% confidence intervals for respective risk factors related to aspiration pneumonia were extracted. The results were evaluated according to the levels of evidence of the Oxford Centre for Evidence-based Medicine. Results: A total of 21 publications fulfilled the quality criteria. Evidence level 2a (systematic review with homogeneity of cohort studies) was found for a positive relationship between aspiration pneumonia and age, male gender, lung diseases, dysphagia, and diabetes mellitus; 2b (individual cohort study) for severe dementia, angiotensin l-converting enzyme deletion/deletion genotype, and bad oral health; 3a (systematic review with homogeneity of case-control studies) for malnutrition; 3b (individual case-control study) for Parkinson’s disease and the use of antipsychotic drugs, proton pump inhibitors, and angiotensin-converting enzyme inhibitors. The contribution of bad oral health among the risk factors seems limited. Conclusion: Thirteen significant risk factors were identified: Age, male gender, lung diseases, dysphagia, diabetes mellitus, severe dementia, angiotensin l-converting enzyme deletion/deletion genotype, bad oral health, malnutrition, Parkinson’s disease, and the use of antipsychotic drugs, proton pump inhibitors, and angiotensin-converting enzyme inhibitors. The contribution of bad oral health seems limited. (J Am Med Dir Assoc 2011; 12: 344-354).

Keywords: Acute Stroke, Aspiration Pneumonia, Authors, Care, Case-Control, Case-Control Studies, Case-Control Study, Cochrane, Cohort Studies, Cohort Study, Community-Acquired Pneumonia, Confidence Intervals, Contribution, Converting-Enzyme Gene, Dementia, Diabetes, Diabetes Mellitus, Disease, Drugs, Elderly-Patients, Embase, Factors, Frailty, Gender, Literature, Literature Review, Nosocomial Pneumonia, Nursing-Home, Obstructive Pulmonary-Disease, Older People, Oropharyngeal Dysphagia, Parkinson’s Disease, Pneumonia, Population, Publications, Pubmed, Review, Risk, Risk Factor, Risk Factors, Science, Systematic, Systematic Literature Review, Systematic Review, Web of Science

# Title: Journal of the American Medical Informatics Association

Full Journal Title: [Journal of the American Medical Informatics Association](http://www.jamia.org/)

ISO Abbreviated Title: J. Am. Med. Inform. Assoc.

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Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Dunn, K., Chisnell, C., Szak, S. and Sittig, D.F. (1994), A quantitative method for measuring library user journal needs: A pilot-study using CD plus medline usage statistics. *Journal of the American Medical Informatics Association*, 108-112 Suppl.

Abstract: Objective: To develop a quantitatible method for measuring library user journal needs based on an analysis of bibliographic search results. Design: Retrospective bibliometric comparison of citation selections generated by users in the library. Measures: Number of times each journal was identified by library users during multiple bibliographic search sessions. Results: Library users identified 4907 journal titles. The top 200 journal titles accounted for 55% of the library user journal needs. Of the 1380 unique titles identified, 652 were selected once. Conclusion: Our pilot study demonstrated that analysis of bibliographic search results can be used to identify library user journal needs. Such a method could also be used to estimate user requirements for online, full-text scientific journals.

Keywords: Citation Analysis, Therapy

? Morris, T.A. and McCain, K.W. (1998), The structure of medical informatics journal literature. *Journal of the American Medical Informatics Association*, **5** (5), 448-466.

Full Text: [1998\J Ame Med Inf Ass5, 448.pdf](1998/J%20Ame%20Med%20Inf%20Ass5,%20448.pdf)

Abstract Objective: Medical informatics is an emergent interdisciplinary field described as drawing upon and contributing to both the health sciences and information sciences. The authors elucidate the disciplinary nature and internal structure of the field.

Design: To better understand the field’s disciplinary nature, the authors examine the intercitation relationships of its journal literature. To determine its internal structure, they examined its journal cocitation patterns.

Measurements: The authors used data from the Science Citation Index (SCI) and Social Science Citation Index (SSCI) to perform intercitation studies among productive journal titles, and software routines from *SPSS* to perform multivariate data analyses on cocitation data for proposed core journals.

Results: Intercitation network analysis suggests that a core literature exists, one mark of a separate discipline. Multivariate analyses of cocitation data suggest that major focus areas within the field include biomedical engineering, biomedical computing, decision support, and education. The interpretable dimensions of multidimensional scaling maps differed for the SCI and SSCI data sets. Strong links to information science literature were not found.

Conclusion: The authors saw indications of a core literature and of several major research fronts. The field appears to be viewed differently by authors writing in journals indexed by SCI from those writing in journals indexed by SSCI, with more emphasis placed on computers and engineering versus decision making by the former and more emphasis on theory versus application (clinical practice) by the latter.

? Fallis, D. and Frické, M. (2002), Indicators of accuracy of consumer health information on the internet: A study of indicators relating to information for managing fever in children in the home. *Journal of the American Medical Informatics Association*, **9** (1), 73-79.

Full Text: [2002\J Ame Med Inf Ass9, 73.pdf](2002/J%20Ame%20Med%20Inf%20Ass9,%2073.pdf)

Abstract: Objectives: To identify indicators of accuracy for consumer health information on the Internet. The results will help lay people distinguish accurate from inaccurate health information on the Internet.

Design: Several popular search engines (Yahoo, AltaVista, and Google) were used to find Web pages on the treatment of fever in children. The accuracy and completeness of these Web pages was determined by comparing their content with that of an instrument developed from authoritative sources on treating fever in children. The presence on these Web pages of a number of proposed indicators of accuracy, taken from published guidelines for evaluating the quality of health information on the Internet, was noted.

Main Outcome Measures: Correlation between the accuracy of Web pages on treating fever in children and the presence of proposed indicators of accuracy on these pages. Likelihood ratios for the presence (and absence) of these proposed indicators.

Results: One hundred Web pages were identified and characterized as “more accurate” or “less accurate.” Three indicators correlated with accuracy: displaying the HONcode logo, having an organization domain, and displaying a copyright. Many proposed indicators taken from published guidelines did not correlate with accuracy (e.g., the author being identified and the author having medical credentials) or inaccuracy (e.g., lack of currency and advertising).

Conclusions: This method provides a systematic way of identifying indicators that are correlated with the accuracy (or inaccuracy) of health information on the Internet. Three such indicators have been identified in this study. Identifying such indicators and informing the providers and consumers of health information about them would be valuable for public health care.

? Aronsky, D., Ransom, J. and Robinson, K. (2005), Accuracy of references in five biomedical informatics journals. *Journal of the American Medical Informatics Association*, **12** (2), 225-228.

Full Text: [2005\J Ame Med Inf Ass12, 225.pdf](2005/J%20Ame%20Med%20Inf%20Ass12,%20225.pdf)

Abstract: Objective: To determine the rate and type of errors in biomedical informatics journal article references. Methods: References in articles from the first 2004 issues of five biomedical informatics journals, Journal of the American Medical Informatics Association Journal of Biomedical Informatics, International Journal of Medical Informatics, Methods of Information in Medicine, and artificial Intelligence in Medicine were compared with MEDLINE for journal, authors, title, year, volume, and page number accuracy. If discrepancies were identified, the reference was compared with the original publication. Two reviewers independently evaluated each reference. Results: The five journal issues contained 37 articles. Among the 656 eligible references, 225 (34.3%) included at least one error. Among the 225 references, 311 errors were identified. One or more errors were found in the bibliography of 31 (84%) of the 37 articles. The reference error rates by journal ranged from 22.1% to 40.7%. Most errors (39.0%) occurred in the author element, followed by the journal (31.2%), title (17.7%), page (7.4%), year (3.5%), and volume (1.3%) information. Conclusion: The study identified a considerable error rate in the references of five biomedical informatics journals. Authors are responsible for the accuracy of references and should more carefully check them, possibly using informatics-based assistance.

Keywords: Accuracy, Accuracy Of References, Anesthesia, Authors Check, Bibliography, Biomedical, Citations, Error, Error Rate, Errors, First, Informatics, Information, Journal, Journal Article, Journals, Medical Journals, MEDLINE, Publication, Rates, Reference, References, Surgery, Volume

? Aronsky, D.A., Ransom, J. and Robinson, K. (2005), Accuracy of references in five biomedical informatics journals (vol 12, pg 225, 2005). *Journal of the American Medical Informatics Association*, **12** (5), 587.

Full Text: [2005\J Ame Med Inf Ass12, 587.pdf](2005/J%20Ame%20Med%20Inf%20Ass12,%20587.pdf)

Keywords: Biomedical, Informatics, Journals, References

? Or, C.K.L. and Karsh, B.T. (2009), A systematic review of patient acceptance of consumer health information technology. *Journal of the American Medical Informatics Association*, **16** (4), 550-560.

Full Text: 2009\J Ame Med Inf Ass16, 550.pdf

Abstract: A systematic literature review was performed to identify variables promoting consumer health information technology (CHIT) acceptance among patients. The electronic bibliographic databases Web of Science, Business Source Elite, CINAHL, Communication and Mass Media Complete, MEDLINE, PsycArticles, and PsycInfo were searched. A cited reference search of articles meeting the inclusion criteria was also conducted to reduce misses. Fifty-two articles met the selection criteria. Among them, 94 different variables were tested for associations with acceptance. Most of those tested (71%) were patient factors, including sociodemographic characteristics, health- and treatment-related variables, and prior experience or exposure to computer/health technology. Only ten variables were related to human-technology interaction; 16 were organizational factors; and one was related to the environment. In total, 62 (66%) were found to predict acceptance in at least one study. Existing literature focused largely on patient-related factors. No studies examined the impact of social and task factors on acceptance, and few tested the effects of organizational or environmental factors on acceptance. Future research guided by technology acceptance theories should fill those gaps to improve our understanding of patient CHIT acceptance, which in turn could lead to better CHIT design and implementation.

Keywords: Acceptance, Bibliographic, Bibliographic Databases, Communication, Computer-Based Education, Consumer, Databases, Environment, Environmental, Exposure, Health, Heart-Failure, Impact, Information, Information Technology, Internet Use, Lead, Literature, Literature Review, Media, Medical Information, Medline, Obtain Cancer Information, Perceived Usefulness, Quality-of-Life, Research, Review, Science, Self-Efficacy, Social, Sociodemographic Characteristics, Support System, Systematic, Systematic Literature Review, Systematic Review, Theories, User Acceptance, Web of Science

# Title: Journal of the American Medical Association

Full Journal Title: Journal of the American Medical Association

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ISSN: 0002-9955

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Vaughan, V.C. (1904), Some toxicogenic germs found in drinking water. *Journal of the American Medical Association*, **42**, 935-941.

Full Text: -1959\J Ame Med Ass42, 935.pdf

? Spiller, W.G. and Martin, E. (1912), The treatment of persistent pain of organic origin in the lower part of the body by division of the anterolateral column of the spinal cord. *Journal of the American Medical Association*, **58** (20), 1489-1490.

Full Text: -1959\J Ame Med Ass58, 1489.pdf

? Hoover, C.F. (1918), Moisture in the air spaces of the lungs and oxygen therapy. *Journal of the American Medical Association*, **71**, 880-884.

Full Text: -1959\J Ame Med Ass71, 880.pdf

? Simmons, G.H. and Fishbein, M. (1925), The art and practice of medical writing I. An acceptable paper. *Journal of the American Medical Association*, **84** (20), 892-893.

Full Text: -1959\J Ame Med Ass84, 892.pdf

Keywords: Medical, Practice, Writing

# Title: JAMA-Journal of the American Medical Association

Full Journal Title: [JAMA-Journal of the American Medical Association](http://jama.ama-assn.org/)

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Medicine, General & Internal: Impact Factor 15.402, 2/105 (2000); Impact Factor 17.569, 2/112 (2001); Impact Factor 15.586, 2/107 (2002); Impact Factor 21.455 2/102 (2003); Impact Factor 22.483 2/103 (2004)

Cales, R.H. and Trunkey, D.D. (1985), Preventable trauma deaths: A review of trauma care systems development. *JAMA-Journal of the American Medical Association*, **254** (8), 1059-1063.

Full Text: [J\JAMA254, 1059.pdf](J/JAMA254,%201059.pdf)

Notes: highly cited

Garfield, E. (1987), 100 citation classics from the *Journal of the American Medical Association*. *JAMA-Journal of the American Medical Association*, **257** (1), 52-59.

Full Text: [J\JAMA257, 52.pdf](J/JAMA257,%2052.pdf)

Abstract: The 100 most-cited JAMA articles were identified using the 1955 through 1983 Science Citation Index of the Institute for Scientific Information. The most-cited article received 705 citations, while the least-cited article received 158. The oldest was published in 1910 and the most recent in 1976. These articles describe important medical advances in areas such as asbestos exposure, smoking, and oral contraceptives. Most of the 285 JAMA authors are Americans and include Baruch S. Blumberg and Edward A. Doisy, both Nobel laureates. Thirteen of the articles were included in JAMA’s original landmark series; the editorial committee used a combination of peer review and citation frequency to select 51 articles.

Orsay, E.M., Turnbull, T.L., Dunne, M., Barrett, J.A., Langenberg, P. and Orsay, C.P. (1988), Prospective study of the effect of safety belts on morbidity and health care costs in motor-vehicle accidents. *JAMA-Journal of the American Medical Association*, **260** (24), 3598-3603.

Full Text: [J\JAMA260, 3598.pdf](J/JAMA260,%203598.pdf)

Evans, J.T., Nadjari, H.I. and Burchell, S.A. (1990), Quotational and reference accuracy in surgical journals: A continuing peer-review problem. *JAMA-Journal of the American Medical Association*, **263** (10), 1353-1354.

Full Text: [J\JAMA263, 1353.pdf](J/JAMA263,%201353.pdf)

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Full Text: [1990\JAMA263, 1424.pdf](1990/JAMA263,%201424.pdf)

(1990), A permanent US-Mexico border environmental health commission. Council on Scientific Affairs. *JAMA-Journal of the American Medical Association*, **263** (24), 3319-3321.

Full Text: [1990\JAMA263, 3319.pdf](1990/JAMA263,%203319.pdf)

Abstract: Public health officials, physicians, and politicians have long been aware of the squalid environmental conditions existing along the US-Mexico border. Some attempts have been made to improve the environmental pollution and causes of human disease, beginning as early as the 1930s with the IBWC, established in 1889. More recent agreements and legislation have called for US and Mexico cooperation by way of each nation’s corresponding environmental agency (ie, the EPA and Mexico’s SEDUE) and their agencies of foreign affairs (ie, the IBWC). Nevertheless, environmental monitoring and disease incidence data continue to point out that public and environmental health along the border--the result of uncontrolled air and water pollution and lack of disease vector control--is rapidly deteriorating and seriously affecting the health and future economic vitality on both sides of the border. Many prominent public health professionals and environmental organizations are concerned that the present working relationship between the United States and Mexico is not functioning well and cannot adequately cope with existing environmental conditions; for one thing, the efforts of the EPA and SEDUE are reviewed no more frequently than once a year by a staff quartered in Washington and Mexico City. Some projects to improve these conditions have been undertaken by the EPA and SEDUE and the IBWC; at present, the prospects for success do not appear promising. Consequently, these individuals and organizations have urged creation of a US-Mexico border environmental health commission. Congress did see fit last year to give responsibility for the environment to the IBWC in the form of Public Law 100-465. This law, however, does not address the full severity of environmental and public health deradation along the border; it does not address the pollution of the New River, Agua Prieta, the San Pedro River, or the Pacific Ocean, neither does it offer remedial control of hazardous waste sites, rabies, and other disease vectors. Moreover, the IBWC is only a deliberative body, not an implementing one.

? Riesenberg, D. and Lundberg, G.D. (1990), The order of authorship – Who’s on first. *JAMA-Journal of the American Medical Association*, **264** (14), 1857.

Full Text: [1990\JAMA264, 1857.pdf](1990/JAMA264,%201857.pdf)

? Hulley, S.B. (1991), The order of authorship. *JAMA-Journal of the American Medical Association*, **265** (7), 865.

Full Text: [1991\JAMA265, 865.pdf](1991/JAMA265,%20865.pdf)

? Fahmy, R.N. and Fahmy, J.L. (1991), The order of authorship. *JAMA-Journal of the American Medical Association*, **265** (7), 865.

Full Text: [1991\JAMA265, 865.pdf](1991/JAMA265,%20865.pdf)

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Full Text: [1991\JAMA265, 865.pdf](1991/JAMA265,%20865.pdf)

? Marwick, C. (1992), NIH scientists retract published report. *JAMA-Journal of the American Medical Association*, **268** (7), 848-849.

Full Text: [1992\JAMA268, 848.pdf](1992/JAMA268,%20848.pdf)

Harrell, B., Woernle, C.H., Osorio, A., Tolentino, N., Lehnherr, M., Howe, H., Choquette, K., Currier, R., Coe, E., Rabin, R., Gerwel, B., Stone, R., Barnett, M., Gordon, J.E., Willis, T., Perrotta, D.M. and Hanrahan, L. (1992), Elevated blood lead levels in adults: United States, second quarter, 1992 (reprinted from MMWR, Vol 41, pg 715-716, 1992). *JAMA-Journal of the American Medical Association*, **268** (16), 2152.

Full Text: [J\JAMA268, 2152.pdf](J/JAMA268,%202152.pdf)

Notes: highly cited

? Guyatt, G. (1992), Evidence-based medicine - A new approach to teaching the practice of medicine. *JAMA-Journal of the American Medical Association*, **268** (17), 2420-2425.

Full Text: [1992\JAMA268, 2420.pdf](1992/JAMA268,%202420.pdf)

Keywords: Access, Care, Controlled Trial, Critical-Appraisal, Curriculum, Guidelines

Crandall, S.J.S., Volk, R.J. and Loemker, V. (1993), Medical students’ attitudes toward providing care for the underserved: Are we training socially responsible physicians. *JAMA-Journal of the American Medical Association*, **269** (19), 2519-2523.

Full Text: [J\JAMA269, 2519.pdf](J/JAMA269,%202519.pdf)

Abstract: Objective. To investigate the association between attitudes toward caring for the medically indigent and years of medical training.

Design. Questionnaire comparing attitudes of first-year medical students (MS-Is) and fourth-year medical students (MS-IVs).

Setting. Southwest medical school. Participants.-A total of 83 (67%) male and 41 (33%) female MS-I and 65 (73%) male and 24 (27%) female MS-IV volunteers.

Main Outcome Measure. Self-report, attitudinal scale developed for this study that provided a measure of overall attitudes, perceived societal expectations, physician/student responsibility, personal efficacy, and provision of basic services and expensive procedures.

Results. Overall attitudes were significantly less favorable for MS-IVs (95% confidence interval [CI], 99.6 to 106.2) than MS-Is (95% CI, 109.5 to 114.3, P<.0001). Except for basic services (P = .46), MS-IVs had worse attitudes on all attitudes subscales. Male MS-IVs reported significantly less favorable attitudes than male MS-Is in the areas of general attitudes (P = .03) and physician/student responsibility (P = .01). Female medical students showed no significant differences across classes (P>.05). Except for physician/student responsibility, female medical students’ attitudes were more favorable than those of males, regardless of class.

Conclusions. The MS-IVs are less favorably inclined toward caring for the medically indigent than MS-Is, though these differences are apparent only for males. Further research is needed to explore why females appear to be more resistant to attitude changes, and what educational interventions are necessary to better train physicians to respond to national health careIssues.

Shapiro, D.W., Wenger, N.S. and Shapiro, M.F. (1994), The contributions of authors to multiauthored biomedical-research papers. *JAMA-Journal of the American Medical Association*, **271** (6), 438-442.

Full Text: [J\JAMA271, 438.pdf](J/JAMA271,%20438.pdf)

Abstract: Objective.-To determine the contributions of each author to multiauthored biomedical research papers.

Design.-Mailed, self-administered survey.

Participants.-A total of 184 first authors from a consecutive sample of 200 papers with four or more authors published in 10 leading biomedical journals.

Main Outcome Measures.-First authors’ ratings of which authors had made substantial contributions to the following: initial conception of the study, design of the study, provision of needed resources, collection of data, analysis and interpretation of data, and writing the first draft of the paper or revising drafts for important intellectual content.

Results.-The contributions of nonfirst authors varied greatly within and among papers. Even second and last authors-though they generally contributed more than other nonfirst authors-were markedly inconsistent in the extent and pattern of their contributions. Time spent on the research differed among authors by orders of magnitude. An appreciable number of authors made few or no substantial contributions to the research.

Conclusions.-The nature and extent of contributions of nonfirst authors to biomedical research reported in multiauthored papers cannot reliably be discerned (or discounted) by authorship or order of authors. The two core purposes of scientific authorship-to confer credit and denote responsibility for research-are not adequately being met by these authorship practices.

Keywords: Integrity, Publish, Fraud

Rennie, D. and Flanagin, A. (1994), Authorship! Authorship! Guests, ghosts, grafters, and the two-sided coin. *JAMA-Journal of the American Medical Association*, **271** (6), 469-471.

Full Text: [J\JAMA271, 469.pdf](J/JAMA271,%20469.pdf)

Keywords: Acknowledgments

? Yamada, T., Ahnen, D., Alpers, D.H., Greenberg, H.B., Gray, L., Joscelyn, K.B., Kauffman, G., Podolsky, D.K., Ray, W.A., Schaberg, D., Silverstein, F.E., Sivak, M.V., Williams, A.L.B. and Yolken, R. (1994), *Helicobacter pylori* in peptic ulcer disease. *JAMA-Journal of the American Medical Association*, **272** (1), 65-69.

Full Text: [1994\JAMA272, 65.pdf](1994/JAMA272,%2065.pdf)

Abstract: The National Institutes of Health Consensus Development Conference on Helicobacter pylori in Peptic Ulcer Disease brought together specialists in gastroenterology, surgery, infectious diseases, epidemiology, and pathology, as well as the public to address the following questions: (1) What is the causal relationship of H pylori to upper gastrointestinal disease? (2) How does one diagnose and eradicate H pylori infection? (3) Does eradication of H pylori infection benefit the patient with peptic ulcer disease? (4) What is the relationship between H pylori infection and gastric malignancy? (5) Which H pylori-infected patients should be treated? (6) What are the most important questions that must be addressed by future research in H pylori infections? Following 1 1/2 days of presentations by experts and discussion by the audience, a consensus panel weighed the evidence and prepared their consensus statement. Among their findings, the consensus panel concluded that (1) ulcer patients with H pylori infection require treatment with antimicrobial agents in addition to antisecretory drugs whether on first presentation with the illness or on recurrence; (2) the value of treating of nonulcerative dyspepsia patients with H pylori infection remains to be determined; and (3) the interesting relationship between H pylori infection and gastric cancers, requires further exploration.

Keywords: Helicobacter Pylori, Research, Treatment

Gilbert, J.R., Williams, E.S. and Lundberg, G.D. (1994), Is there gender bias in JAMAS peer-review process? *JAMA-Journal of the American Medical Association*, **272** (2), 139-142.

Full Text: [J\JAMA272, 139.pdf](J/JAMA272,%20139.pdf)

Abstract: Objective.-To assess whether manuscripts received by JAMA in 1991 possessed differing peer review and manuscript processing characteristics, or had a variable chance of acceptance, associated with the gender of the participants in the peer review process.

Design.-Retrospective cohort study of 1851 research articles.

Setting.-JAMA editorial office.

Participants.-Eight male and five female JAMA editors, 2452 male and 930 female reviewers, and 1698 male and 462 female authors.

Main Outcome Measure.-Statistically significant gender bias.

Results.-Female editors were assigned manuscripts from female corresponding authors more often than were male editors (P<.001). Female editors used more reviewers per manuscript if sent for other review. Male reviewers assisted male editors more often than female editors, and male reviewers took longer to return manuscripts than did their female counterparts (median, 25 vs 22 days). Content reviewer recommendations were independent of corresponding author and review gender, while male statistical reviewers recommended the highest and lowest categories more frequently than did female statistical reviewers (P<.001). Manuscripts handled by female editors were rejected summarily at higher rates (P<.001). Articles submitted to JAMA in 1991 were not accepted at significantly different rates based on the gender of the corresponding author or the assigned editor (P>.4).

Conclusions.-Gender differences exist in editor and reviewer characteristics at JAMA with no apparent effect on the final outcome of the peer review process or acceptance for publication.

Keywords: Publication Bias, Sex

Laband, D.N. and Piette, M.J. (1994), A citation analysis of the impact of blinded peer-review. *JAMA-Journal of the American Medical Association*, **272** (2), 147-149.

Full Text: [J\JAMA272, 147.pdf](J/JAMA272,%20147.pdf)

Abstract: Objective.-To determine whether articles published in journals using blinded peer review receive significantly more or fewer citations than those published in journals using nonblinded peer review.

Design.-Drawing from a sample of 1051 full articles published in 28 economics journals during 1984, we used nonlinear regression and ordered probit techniques to estimate the impact of blinded peer review on citations of these articles in 1985 through 1989.

Outcomes.-Citations of articles.

Results.-Articles published in journals using blinded peer review were cited significantly more than articles published in journals using nonblinded peer review, controlling for a variety of author, article, and journal attributes.

Conclusions.-Nonblinded peer review apparently suffers from type I error to a greater extent than blinded peer review. That is, journals using nonblinded peer review publish a larger fraction of papers that should not have been published than do journals using blinded peer review. When reviewers know the identity of the author(s) of an article, they are able to (and evidently do) substitute particularistic criteria for universalistic criteria in their evaluative process.

Whitely, W.P., Rennie, D. and Hafner, A.W. (1994), The scientific community’s response to evidence of fraudulent publication: The Slutsky, Robert case. *JAMA-Journal of the American Medical Association*, **272** (2), 170-173.

Full Text: [J\JAMA272, 170.pdf](J/JAMA272,%20170.pdf)

Abstract: Objective.-To determine whether scientists can detect fraudulent results in published research articles and to identify corrective measures that are most effective in purging fraudulent results from the literature.

Design.-Retrospective case-control study comparing articles by an author known to have published fraudulent articles, Robert A, Slutsky, MD, to a set of control articles. The number of non-self-citations received by each article during each calendar year (1979 through 1990) was counted. The citation numbers were transformed into scores. Each Slutsky article was assigned a score between 1 and 3 based on the number of citations received by the Slutsky article and each of its assigned control articles. Average citation numbers and scores were tracked for each year during the 11-year study period.

Results.-Before Slutsky’s work was publicly questioned (1975 to 1985), scientists cited his articles as frequently as they cited control articles. After Slutsky’s work was questioned and reports were published in the news media (1985), scientists cited his articles less frequently than they cited control articles. Citations decreased further after the University of California-San Diego published a review of the validity of Slutsky’s work in 1987. Citations did not decrease after the appearance of retractions in print or in MEDLINE.

Conclusion.-Scientists do not, and probably cannot, identify published articles that are fraudulent. However, when alerted to the presence of fraudulent results in the literature, the scientific community responds by reducing the number of citations of the tainted articles. In the Slutsky case, general news articles and the three reviews published by the University of California-San Diego were most effective and retractions were least effective in purging fraudulent results from the literature.

Brody, D.J., Pirkle, J.L., Kramer, R.A., Flegal, K.M., Matte, T.D., Gunter, E.W. and Paschal, D.C. (1994), Blood lead levels in the US population: Phase 1 of the Third National-Health AND Nutrition Examination Survey (NHANES-III, 1988 to 1991). *JAMA-Journal of the American Medical Association*, **272** (4), 277-283.

Full Text: [J\JAMA272, 277.pdf](J/JAMA272,%20277.pdf)

Abstract: Objective. To determine mean blood lead levels and their sociodemographic correlates in the US population.

Design. Nationally representative cross-sectional health examination survey that included measurements of venous blood lead.

Participants. A total of 13 201 persons aged 1 year and older examined during phase 1 of the third National Health and Nutrition Examination Survey (1988 to 1991).

Results. The overall mean blood lead level for the US population was 0.14 µmol/L (2.8 µg/dL). Blood lead levels were consistently higher for younger children than for older children, for older adults than for younger adults, for males than for females, for blacks than for whites, and for central-city residents than for non-central-city residents. Other correlates of higher blood lead levels included low income, low educational attainment, and residence in the Northeast region of the United States, National estimates for children 1 to 5 years of age indicate that 8.9%, or approximately 1.7 million children, have blood lead levels 0.48 µmol/L (10 µg/dL) or greater. These levels are high enough to be of health concern under 1991 Centers for Disease Control and Prevention guidelines.

Conclusions. The low overall mean blood lead levels demonstrate a major public health success in primary prevention efforts. However, exposure to lead at levels that may adversely affect the health of children remains a problem especially for those who are minority, urban, and from low-income families. Strategies to identify the most vulnerable risk groups are necessary to further reduce lead exposure in the United States.

Pirkle, J.L., Brody, D.J., Gunter, E.W., Kramer, R.A., Paschal, D.C., Flegal, K.M. and Matte, T.D. (1994), The decline in blood lead levels in the United States: The National Health and Nutrition Examination Surveys (NHANES). *JAMA-Journal of the American Medical Association*, **272** (4), 284-291.

Full Text: [J\JAMA272, 284.pdf](J/JAMA272,%20284.pdf)

Abstract: Objective. To describe trends in blood lead levels for the US population and selected population subgroups during the time period between 1976 and 1991.

Design. Two nationally representative cross-sectional surveys and one cross-sectional survey representing Mexican Americans in the southwestern United States.

Setting/Participants.-Participants in two national surveys that included blood lead measurements: the second National Health and Nutrition Examination Survey, 1976 to 1980 (n = 9832), and phase 1 of the third National Health and Nutrition Examination Survey, 1988 to 1991 (n = 12119). Also, Mexican Americans participating in the Hispanic Health and Nutrition Examination Survey, 1982 to 1984 (n = 5682).

Results. The mean blood lead level of persons aged 1 to 74 years dropped 78%, from 0.62 to 0.14 µmol/L (12.8 to 2.8 µg/dL). Mean blood lead levels of children aged 1 to 5 years declined 77% (0.66 to 0.15 µmol/L [13.7 to 3.2 µg/dL]) for non-Hispanic white children and 72% (0.97 to 0.27 µmol/L [20.2 to 5.6 µg/dL]) for non-Hispanic black children. The prevalence of blood lead levels 0.48 µmol/L (10 µg/dL) or greater for children aged 1 to 5 years declined from 85.0% to 5.5% for non-Hispanic white children and from 97.7% to 20.6% for non-Hispanic black children. Similar declines were found in population subgroups defined by age, sex, race/ethnicity, income level, and urban status. Mexican Americans also showed similar declines in blood lead levels of a slightly smaller magnitude over a shorter time.

Conclusions. The results demonstrate a substantial decline in blood lead levels of the entire US population and within selected subgroups of the population. The major cause of the observed decline in blood lead levels is most likely the removal of 99.8% of lead from gasoline and the removal of lead from soldered cans. Although these data indicate major progress in reducing lead exposure, they also show that the same sociodemographic factors continue to be associated with higher blood lead levels, including younger age, male sex, non-Hispanic black race/ethnicity, and low income level. Future efforts to remove other lead sources (eg, paint, dust, and soil) are needed but will be more difficult than removing lead from gasoline and soldered cans.

(1994), Hyponatremic seizures among infants fed with commercial bottled drinking water: Wisconsin, 1993 (reprinted from MMWR, vol 43, pg 641-643, 1994). *JAMA-Journal of the American Medical Association*, **272** (13), 996-997.

Full Text: [J\JAMA272, 996.pdf](J/JAMA272,%20996.pdf)

Keywords: Intoxication

? Glantz, S.A. and Parmley, W.W. (1995), Passive smoking and heart disease: Mechanisms and risk. *JAMA-Journal of the American Medical Association*, **273** (13), 1047-1053.

Full Text: [J\JAMA273, 1047.pdf](J/JAMA273,%201047.pdf)

Abstract: Objective.-Recent clinical, laboratory, and epidemiological evidence that passive smoking causes heart disease was reviewed, with particular emphasis on understanding the underlying physiological and biochemical mechanisms.

Data Sources.-Publications in the peer-reviewed literature were located via MEDLINE, citation in other relevant articles, and appropriate reports by scientific agencies, Greatest emphasis was given to work published since 1990.

Conclusions.-Passive smoking reduces the blood’s ability to deliver oxygen to the heart and compromises the myocardium’s ability to use oxygen to create adenosine triphosphate. These effects are manifest as reduced exercise capability in people breathing secondhand smoke, Secondhand smoke increases platelet activity, accelerates atherosclerotic lesions, and increases tissue damage following ischemia or myocardial infarction. The effects of secondhand tobacco smoke on the cardiovascular system are not caused by a single component of the smoke, but rather are caused by the effects of many elements, including carbon monoxide, nicotine, polycyclic aromatic hydrocarbons, and other, not fully specified elements in the smoke. Nonsmokers exposed to secondhand smoke in everyday life exhibit an increased risk of both fatal and nonfatal cardiac events.

Keywords: Coronary-Artery Disease, Cigarette-Smoke, Carbon-Monoxide, Cardiovascular-Disease, Myocardial-Infarction, Exercise Performance, Platelet Sensitivity, Tobacco-Smoke, Lung-Cancer, Endothelium

Wallach, R.C. (1995), What component of prenatal care is responsible for improved outcome? *JAMA-Journal of the American Medical Association*, **274** (8), 611-612.

Full Text: [J\JAMA274, 611.pdf](J/JAMA274,%20611.pdf)

Assendelft, W.J.J., Koes, B.W., Knipschild, P.G. and Bouter, L.M. (1995), The relationship between methodological quality and conclusions in reviews of spinal manipulation. *JAMA-Journal of the American Medical Association*, **274** (24), 1942-1948.

Full Text: [J\JAMA274, 1942.pdf](J/JAMA274,%201942.pdf)

Abstract: Objective.-To study the relationship between the methodological quality and other characteristics of reviews of spinal manipulation for low back pain on the one hand and the reviewers’ conclusions on the effectiveness of manipulation on the other hand.

Data Sources.-Reviews identified by MEDLINE search, citation tracking, library search, and correspondence with experts.

Study Selection.-English- or Dutch-language reviews published up to 1993 dealing with spinal manipulation for low back pain that include at least two randomized clinical trials (RCTs).

Data Extraction.-Methodological quality was assessed using a standardized criteria list applied independently by two assessors (range, 0% to 100%). Other extracted characteristics were the comprehensiveness of the search, selective citation of studies, language, inclusion of non-RCTs, type of publication, reviewers’ professional backgrounds, and publication in a spinal manipulation journal or book. The reviewers’ conclusions were classified as negative, neutral, or positive.

Data Synthesis.-A total of 51 reviews were assessed, 17 of which were neutral and 34 positive. The methodological quality was low, with a median score of 23%. Nine of the 10 methodologically best reviews were positive. Other factors associated with a positive reviewers’ conclusion were review of spinal manipulation only, inclusion of a spinal manipulator in the review team, and a comprehensive literature search.

Conclusions.-The majority of the reviews concluded that spinal manipulation is an effective treatment for low back pain. Although, in particular, the reviews with a relatively high methodological quality had a positive conclusion, strong conclusions were precluded by the overall low quality of the reviews. More empirical research on the review methods applied to other therapies in other professional fields is needed to further explore our findings about the factors related to a positive reviewers’ conclusion.

Keywords: Low-Back-Pain, Randomized Clinical-Trials, Manual Therapy, Management, Articles, Efficacy, Metaanalysis, Mobilization, Science, State

Kahrilas, P.J. (1996), Gastroesophageal reflux disease. *JAMA-Journal of the American Medical Association*, **276** (12), 983-988.

Full Text: [J\JAMA276, 983.pdf](J/JAMA276,%20983.pdf)

Abstract: Objective.-To review the management of gastroesophageal reflux disease (GERD) in adults with esophageal complications (esophagitis, stricture, adenocarcinoma, or Barrett metaplasia) or extraesophageal complications (otolaryngological manifestations and asthma).

Data Sources.-Peer-reviewed publications located via MEDLINE or cross-citation.

Study Selection.-Emphasis was placed on new developments in diagnosis and therapeutics. Thus, fewer than 10% of identified citations are discussed.

Data Extraction.-Controlled therapeutic trials were emphasized. The validity of pathophysiological observations and uncontrolled trials were critiqued by the author.

Data Synthesis.-Esophagitis is typically a chronic, recurring disorder treated with long-term antisecretory therapy, titrated to disease severity, Laparascopic antireflux surgery is an alternative strategy, but neither long-term efficacy data nor an appropriate controlled trial comparing it with proton pump inhibitor therapy exists. The main risk of esophagitis is adenocarcinoma arising from Barrett metaplasia, the incidence of which is increasing. Strong evidence suggests that both reflux-induced asthma and otolaryngological complications (subglottic stenosis, laryngitis, pharyngitis, or cancer) can occur without esophagitis. While the otolaryngological manifestations usually respond to antisecretory medications, reflux-induced asthma responds convincingly only to antireflux surgery.

Conclusions.-Although esophagitis and GERD symptoms predictably respond to antisecretory medicines, the risk of adenocarcinoma from Barrett metaplasia dictates that if heartburn is refractory to treatment, chronic (>5 years), or accompanied by dysphagia, odynophagia, or bleeding, it should be evaluated by endoscopy. Thereafter, patients with Barrett metaplasia require surveillance endoscopy to control the cancer risk. Reflux-induced asthma remains a vexing problem in the absence of either medical therapy of proven efficacy or a reliable mechanism of prospectively identifying affected patients.

Keywords: Barretts-Esophagus, Gastric-Acid, H2-Receptor Antagonists, Posterior Laryngitis, Term Treatment, Omeprazole, Therapy, Adenocarcinoma, Lansoprazole, Management

Notes: highly cited

Davidson, F., Smith, R., Squires, B.P., Lundberg, G., Glass, R., Horton, R., Van Der Weyden, M., Utiger, R., Robinson, R.G., Nylenna, M., Colaianni, L.A., Clever, L.H. and Woolf, P. (1997), Uniform requirements for manuscripts submitted to biomedical journals. *JAMA-Journal of the American Medical Association*, **277** (11), 927-934.

Full Text: [J\JAMA277, 927.pdf](J/JAMA277,%20927.pdf)

Rennie, D., Yank, V. and Emanuel, L. (1997), When authorship fails: A proposal to make contributors accountable. *JAMA-Journal of the American Medical Association*, **278** (7), 579-585.

Full Text: [J\JAMA278, 579.pdf](J/JAMA278,%20579.pdf)

Abstract: A published article is the primary means whereby new work is communicated, priority is established, and academic promotion is determined, Publication depends on trust and requires that authors be held to standards of honesty, completeness, and fairness in their reporting, and to accountability for their statements. The system of authorship, while appropriate for articles with only 1 author, has become inappropriate as the average number of authors of an article has increased; as the work of coauthors has become more specialized and relationships between them have become more complex; and as both credit and, even more, responsibility have become obscured and diluted. Credit and accountability cannot be assessed unless the contributions of those named as authors are disclosed to readers, so the system is flawed. We argue for a radical conceptual and systematic change, to reflect the realities of multiple author ship and to buttress accountability, We propose dropping the outmoded notion of author in favor of the more useful and realistic one of contributor. This requires disclosure to readers of the contributions made to the research and to the manuscript by the contributors, so that they can accept both credit and responsibility, In addition, certain named contributors take on the role of guarantor for the integrity of the entire work. The requirement that all participants be named as contributors will eliminate the artificial distinction between authors and acknowledgees and will enhance the integrity of publication.

Keywords: Publication, Ghosts

Kozyrskyj, A.L., Hildes-Ripstein, G.E., Longstaffe, S.E.A., Wincott, J.L., Sitar, D.S., Klassen, T.P. and Moffatt, M.E.K. (1998), Treatment of acute otitis media with a shortened course of antibiotics: A meta-analysis. *JAMA-Journal of the American Medical Association*, **279** (21), 1736-1742.

Full Text: [J\JAMA279, 1736.pdf](J/JAMA279,%201736.pdf)

Abstract: Objective.-To conduct a meta-analysis of randomized controlled trials of antibiotic treatment of acute otitis media in children to determine whether outcomes were comparable in children treated with antibiotics for less than 7 days or at least 7 days or more.

Data Sources.-MEDLINE (1966-1997), EMBASE (1974-1997), Current Contents, and Science Citation Index searches were conducted to identify randomized controlled trials of the treatment of acute otitis media in children with antibiotics of different durations,

Study Selection.-Studies were included if they met the following criteria: subjects aged 4 weeks to 18 years, clinical diagnosis of acute otitis media, no antimicrobial therapy at time of diagnosis, and randomization to less than 7 days of antibiotic treatment vs 7 days or more of antibiotic treatment,

Data Extraction.-Trial methodological quality was assessed independently by 7 reviewers; outcomes were extracted as the number of treatment failures, relapses, or reinfections.

Data Synthesis.-Included trials were grouped by antibiotic used in the short course: (1) 15 short-acting oral antibiotic trials (penicillin V potassium, amoxicillin [-clavulanate], cefaclor, cefixime, cefuroxime, cefpodoxime proxetil, cefprozil), (2)4 intramuscular ceftriaxone sodium trials, and (3) 1 1 oral azithromycin trials. The summary odds ratio for treatment outcomes at 8 to 19 days in children treated with short-acting antibiotics for 5 days vs 8 to 10 days was 1.52 (95% confidence interval [CI], 1.17-1.98) but by 20 to 30 days outcomes between treatment groups were comparable (odds ratio, 1.22; 95% CI, 0.98 to 1.54). The risk difference (2.3%; 95% CI, -0.2% to 4.9%) at 20 to 30 days suggests that 44 children would need to be treated with the long course of short-acting antibiotics to avoid 1 treatment failure. This similarity in later outcomes was observed for up to 3 months following therapy (odds ratio, 1.16; 95% CI, 0.90-1.50), Comparable outcomes were shown between treatment with ceftriaxone or azithromycin, and at least 7 days of other antibiotics,

Conclusion. This meta-analysis suggests that 5 days of short-acting antibiotic use is effective treatment for uncomplicated acute otitis media in children.

Keywords: Placebo-Controlled Trial, Pediatric-Patients, Clinical-Trials, Co-Amoxiclav, Antimicrobial Treatment, Penicillin Treatment, Amoxicillin Therapy, General-Practice, Children, Azithromycin

Drenth, J.P.H. (1998), Multiple authorship: The contribution of senior authors. *JAMA-Journal of the American Medical Association*, **280** (3), 219-221.

Full Text: [J\JAMA280, 219.pdf](J/JAMA280,%20219.pdf)

Abstract: Context.-The number of authors per article has increased markedly in recent years. Little is known about the hierarchical order of authorship and its change over time.

Objective.-To assess the change in number and profile of authors of original articles published over a 20-year period in BMJ. It was hypothesized that the number of authors increased over this 20-year period and that it was the senior scientists who benefited most.

Design.-Comparative descriptive analysis of the number and academic rank of authors who published original articles in BMJ volumes 270 (1975), 280 (1980), 290 (1985), 300 (1990), and 310 (1995).

Main Outcome Measures.-The specific academic rank, order, and number of authors for each original article. Eight categories of authorship were distinguished as follows: 1, professor; 2, department chairperson; 3, consultant; 4, senior registrar; 5, lecturer and/or registrar; 6, medical student; 7, house officer; and 8, miscellaneous.

Results.-The number of original articles published per year decreased from 262 (1975) to 125 (1995). The mean number (SD) of authors per article increased steadily from 3.21 (SD, 1.89) (1975) to 4.46 (SD, 2.04) (1995). Most authors belonged to category 3, and its proportion varied from 24.7% (1975) to 22.6% (1995), while category 1 grew from 13.2% to 20.3%. Category 5 authorship dropped from 24.3% (1975) to 15.8% (1995). With regard to first authorship, category 1 more than doubled from 8.0% (1975) to 16.8% (1995) compared with category 5 whose proportion decreased from 34.0% to 24.8%. Most last authors were from category 1, 20.4% (1975), growing to 29.0% (1995).

Conclusion.-Over the last 20 years the number of BMJ authors of original articles increased, mainly because of the rise of authorship among professors and department chairpersons.

Keywords: Medicine

? Flanagin, A., Carey, L.A., Fontanarosa, P.B., Phillips, S.G., Pace, B.P., Lundberg, G.D. and Rennie, D. (1998), Prevalence of articles with honorary authors and ghost authors in peer-reviewed medical journals. *JAMA-Journal of the American Medical Association*, **280** (3), 222-224.

Full Text: [1998\JAMA280, 222.pdf](1998/JAMA280,%20222.pdf)

Abstract: Context.-Authorship in biomedical publications establishes accountability, responsibility, and credit. Misappropriation of authorship undermines the integrity of the authorship system, but accurate data on its prevalence are limited.

Objectives.-To determine the prevalence of articles with honorary authors (named authors who have not met authorship criteria) and ghost authors (individuals not named as authors but who contributed substantially to the work) in peer-reviewed medical journals and to identify journal characteristics and article types associated with such authorship misappropriation.

Design.-Mailed, self-administered, confidential survey.

Participants.-A total of 809 corresponding authors (1179 surveyed, 69% response rate) of articles published in 1996 in 3 peer-reviewed, large-circulation general medical journals (Annals of Internal Medicine, JAMA, and The New England Journal of Medicine) and 3 peer-reviewed, smaller-circulation journals that publish supplements (American Journal of Cardiology, American Journal of Medicine, and American Journal of Obstetrics and Gynecology).

Main Outcome Measures.-Prevalence of articles with honorary authors and ghost authors, as reported by corresponding authors.

Results.-Of the 809 articles, 492 were original research reports, 240 were reviews and articles not reporting original data, and 77 were editorials. A total of 156 articles (19%) had evidence of honorary authors (range, 11%-25% among journals); 93 articles (11%) had evidence of ghost authors (range, 7%-16% among journals) and 13 articles (2%) had evidence of both. The prevalence of articles with honorary authors was greater among review articles than research articles (odds ratio [OR], 1.8; 95% confidence interval [CI], 1.2-2.6) but did not differ significantly between large-circulation and smaller-circulation journals (OR, 1.4; 95% CI, 0.96-2.03). Compared with similar-type articles in large-circulation journals, articles with ghost authors in smaller-circulation journals were more likely to be reviews (OR, 4.2; 95% CI, 1.5-13.5) and less likely to be research articles (OR, 0.49; 95% CI, 0.27-0.88).

Conclusion.-A substantial proportion of articles in peer-reviewed medical journals demonstrate evidence of honorary authors or ghost authors.

Black, N., van Rooyen, S., Godlee, F., Smith, R. and Evans, S. (1998), What makes a good reviewer and a good review for a general medical journal? *JAMA-Journal of the American Medical Association*, **280** (3), 231-233.

Full Text: [J\JAMA280, 231.pdf](J/JAMA280,%20231.pdf)

Abstract: Context.-Selecting peer reviewers who will provide high-quality reviews is a central task of editors of biomedical journals.

Objectives.-To determine the characteristics of reviewers for a general medical journal who produce high-quality reviews and to describe the characteristics of a good review, particularly in terms of the time spent reviewing and turnaround time.

Design, Setting, and Participants.-Surveys of reviewers of the 420 manuscripts submitted to BMJ between January and June 1997,

Main Outcome Measures.-Review quality was assessed independently by 2 editors and by the corresponding author using a newly developed 7-item review quality instrument.

Results.-Of the 420 manuscripts, 345 (82%) had 2 reviews completed, for a total of 690 reviews. Authors’ assessments of review quality were available for 507 reviews. The characteristics of reviewers had little association with the quality of the reviews they produced (explaining only 8% of the variation), regardless of whether editors or authors defined the quality of the review. In a logistic regression analysis, the only significant factor associated with higher-quality ratings by both editors and authors was reviewers trained in epidemiology or statistics. Younger age also was an independent predictor for editors’ quality assessments, while reviews performed by reviewers who were members of an editorial board were rated of poorer quality by authors. Review quality increased with time spent on a review, up to 3 hours but not beyond.

Conclusions.-The characteristics of reviewers we studied did not identify those who performed high-quality reviews. Reviewers might be advised that spending longer than 3 hours on a review on average did not appear to increase review quality as rated by editors and authors.

Keywords: Peer Reviewers, Quality

? Link, A.M. (1998), US and non-US submissions - An analysis of reviewer bias. *JAMA-Journal of the American Medical Association*, **280** (3), 246-247.

Full Text: [1998\JAMA280, 246.pdf](1998/JAMA280,%20246.pdf)

Abstract: Context.-Reviewers increasingly are asked to review manuscripts from outside their own country, but whether they are more likely to recommend acceptance of such manuscripts is not known. Objective.-To assess whether US reviewers or non-US reviewers evaluate manuscripts differently, depending on whether the manuscripts are submitted from outside the United States or from the United States. Design and Setting.-A retrospective analysis of all original submissions received by Gastroenterology in 1995 and 1996. Reviewers ranked manuscripts in 4 decision categories: accept, provisionally accept, reject with resubmission, or reject. Main Outcome Measure.-Ranking of papers based on nationality of authors and reviewers. Results.-The percentage of non-US manuscripts placed in each decision category by US (n=2355) and non-US reviewers (n=1297) was nearly identical (P=.31). However, US reviewers recommended acceptance of papers submitted by US authors more often than did non-US reviewers (P=.001). Non-US reviewers ranked US papers slightly more favorably than non-US papers (P=.09), while US reviewers ranked US papers much more favorably (P=.001). Conclusions.-Reviewers from the United States and outside the United States evaluate non-US papers similarly and evaluate papers submitted by US authors more favorably, with US reviewers having a significant preference for US papers.

Callaham, M.L., Wears, R.L., Weber, E.J., Barton, C. and Young, G. (1998), Positive-outcome bias and other limitations in the outcome of research abstracts submitted to a scientific meeting. *JAMA-Journal of the American Medical Association*, **280** (3), 254-257.

Full Text: [J\JAMA280, 254.pdf](J/JAMA280,%20254.pdf)

Weber, E.J., Callaham, M.L., Wears, R.L., Barton, C. and Young, G. (1998), Unpublished research from a medical specialty meeting: Why investigators fail to publish. *JAMA-Journal of the American Medical Association*, **280** (3), 257-259.

Full Text: [J\JAMA280, 257.pdf](J/JAMA280,%20257.pdf)

Abstract: Context.-It is not known whether peer review of research abstracts submitted to scientific meetings influences subsequent attempts at publication.

Objective.-To determine why research submitted to a scientific meeting is not subsequently published. We hypothesized that authors of abstracts rejected by a meeting are less likely to pursue publication than those whose abstracts are accepted, regardless of research quality.

Design and Participants.-Blinded review of abstracts submitted to a medical specialty meeting in 1991 and not published as full manuscripts within 5 years. In 1996, authors of 266 unpublished studies were asked to complete questionnaires.

Main Outcome Measures.-Submission of a full manuscript to a journal between 1991 and 1996; failure to submit a manuscript to a journal because the investigator believed it would not be accepted for publication.

Results.-A total of 223 (84%) of the unpublished investigators returned the questionnaire. Only 44 (20%) had submitted manuscripts to a journal. Manuscript submission was not associated with abstract quality (odds ratio [OR], 1.16; 95% confidence interval [CI], 0.80-1.64), positive results (OR, 0.75; 95% CI, 0.31-1.57), or other study characteristics. Having an abstract accepted for presentation at the meeting weakly predicted submission of a manuscript to a journal (OR, 1.88; 95% CI, 0.84-4.10), Authors of accepted abstracts were significantly less likely to believe a journal would not publish their manuscript than were authors of rejected abstracts (OR, 0.23; 95% CI, 0.0001-0.61).

Conclusions.-Study characteristics do not predict attempts to publish research submitted to a scientific meeting. Investigators whose research is rejected by a meeting are pessimistic about chances for publication and may make less effort to publish.

Keywords: Publication Bias, Abstracts, Trials, Fate

Joyce, J., Rabe-Hesketh, S. and Wessely, S. (1998), Reviewing the reviews: The example of chronic fatigue syndrome. *JAMA-Journal of the American Medical Association*, **280** (3), 264-266.

Full Text: [J\JAMA280, 264.pdf](J/JAMA280,%20264.pdf)

Abstract: Objective.-To test the hypothesis that the selection of literature in review articles is unsystematic and is influenced by the authors’ discipline and country of residence.

Data Sources.-Reviews in English published between 1980 and March 1996 in MEDLINE, EMBASE (BIDS), PSYCHLIT, and Current Contents were searched.

Study Selection.-Reviews of chronic fatigue syndrome (CFS) were selected. Articles explicitly concerned with a specialty aspect of CFS and unattributed, unreferenced, or insufficiently referenced articles were discarded.

Data Extraction.-Record of data sources in each review was noted as was the departmental specialty of the first author and his or her country of residence. The references cited in each index paper were tabulated by assigning them to 6 specialty categories, by article title, and by assigning them to 8 categories, by country of journal publication.

Data Synthesis.-Of 89 reviews, 3 (3.4%) reported on literature search and described search method. Authors from laboratory-based disciplines preferentially cited laboratory references, while psychiatry-based disciplines preferentially cited psychiatric literature (P =.01). A total of 71.6% of references cited by US authors were from US journals, while 54.9% of references cited by United Kingdom authors were published in United Kingdom journals (P =.001).

Conclusion.-Citation of the literature is influenced by review authors’ discipline and nationality.

Keywords: Publication, Trials, Bias

Garrow, J., Butterfield, M., Marshall, J. and Williamson, A. (1998), The reported training and experience of editors in chief of specialist clinical medical journals. *JAMA-Journal of the American Medical Association*, **280** (3), 286-287.

Full Text: [J\JAMA280, 286.pdf](J/JAMA280,%20286.pdf)

Abstract: Context.-The majority of the peer-reviewed clinical literature is edited by editors whose training in editorial matters may be limited or nonexistent. We suspect that editors are selected for their clinical or academic rather than editorial ability.

Objective.-To test the hypothesis that editors of medical specialist clinical journals were recruited from active clinicians rather than those with evident ability or training as editors.

Design, Setting, and Subjects.-Anonymous mail survey to editors of the 262 peer-reviewed clinical journals that had received at least 1000 citations in the 1994 Science Citation Index.

Main Outcome Measures.-Training and editorial practices of editors.

Results.-Replies were received from 191 editors (73%): in 1994 the journals they edited had 6060 (27300/1000 [maximum/minimum]) citations, 234 (740/31) source items, and an impact factor of 2.10 (18.3/0.2); nonresponders’ journals had similar characteristics. Of the responding editors, 181 (95%) were part-time, 132 (69%) treated patients, and 164 (86%) were recruited by one of the following methods: election by a scientific society (49 [30%]), nomination by the previous editor (41 [25%]), or response to an advertisement (29 [18%]). There was no strong association between method of recruitment or formal editorial training and the status of the journal. Only 9% of editors in the United States send at least half of the papers to reviewers outside their own country, compared with 41% of editors in the United Kingdom and 73% in other countries, and 69% do not feel bound to follow the advice they receive concerning acceptance of papers.

Conclusions.-Clinical journals are usually edited by practicing clinicians who are self-taught part-time editors, but willing to accept further training. They usually consult 2 reviewers, but exercise independent judgment on the acceptability of papers.

Wetzel, M.S., Eisenberg, D.M. and Kaptchuk, T.J. (1998), Courses involving complementary and alternative medicine at US medical schools. *JAMA-Journal of the American Medical Association*, **280** (9), 784-787.

Full Text: [J\JAMA280, 784.pdf](J/JAMA280,%20784.pdf)

Abstract: Context.-With the public’s increasing use of complementary and alternative medicine, medical schools must consider the challenge of educating physicians about these therapies.

Objectives.-To document the prevalence, scope, and diversity of medical school education in complementary and alternative therapy topics and to obtain information about the organizational and academic features of these courses.

Design.-Mail survey and follow-up letter and telephone survey conducted in 1997-1998.

Participants.-Academic or curriculum deans and faculty at each of the 125 US medical schools.

Main Outcome Measures.-Courses taught at US medical schools and administrative and educational characteristics of these courses.

Results.-Replies were received from 117 (94%) of the 125 US medical schools. Of schools that replied, 75 (64%) reported offering elective courses in complementary or alternative medicine or including these topics in required courses. Of the 123 courses reported, 84 (68%) were stand-alone electives, 38 (31%) were part of required courses, and one (1%) was part of an elective. Thirty-eight courses (31%) were offered by departments of family practice and 14 (11%) by departments of medicine or internal medicine. Educational formats included lectures, practitioner lecture and/or demonstration, and patient presentations. Common topics included chiropractic, acupuncture, homeopathy, herbal therapies, and mind-body techniques.

Conclusions.-There is tremendous heterogeneity and diversity in content, format, and requirements among courses in complementary and alternative medicine at US medical schools.

Keywords: Care

? van Haselen, R. and Fisher, P. (1998), Evidence influencing British health authorities’ decisions in purchasing complementary medicine. *JAMA-Journal of the American Medical Association*, **280** (18), 1564-1565.

Full Text: [1998\JAMA280, 1564.pdf](1998/JAMA280,%201564.pdf)

? Eisenberg, D.M., Davis, R.B., Ettner, S.L., Appel, S., Wilkey, S., van Rompay, M. and Kessler, R.C. (1998), Trends in alternative medicine use in the United States, 1990-1997 - Results of a follow-up national survey. *JAMA-Journal of the American Medical Association*, **280** (18), 1569-1575.

Full Text: [J\JAMA280, 1569.pdf](J/JAMA280,%201569.pdf)

Abstract: Context.-A prior national survey documented the high prevalence and costs of alternative medicine use in the United States in 1990.

Objective.-To document trends in alternative medicine use in the United States between 1990 and 1997,

Design.-Nationally representative random household telephone surveys using comparable key questions were conducted in 1991 and 1997 measuring utilization in 1990 and 1997, respectively.

Participants.-A total of 1539 adults in 1991 and 2055 in 1997.

Main Outcomes Measures.-Prevalence, estimated costs, and disclosure of alternative therapies to physicians.

Results.-Use of at least 1 of 16 alternative therapies during the previous year increased from 33.8% in 1990 to 42.1% in 1997 (P less than or equal to.001). The therapies increasing the most included herbal medicine, massage, megavitamins, self-help groups, folk remedies, energy healing, and homeopathy. The probability of users visiting an alternative medicine practitioner increased from 36.3% to 46.3% (P = .002), In both surveys alternative therapies were used most frequently for chronic conditions, including back problems, anxiety, depression, and headaches. There was no significant change in disclosure rates between the 2 survey years; 39.8% of alternative therapies were disclosed to physicians in 1990 vs 38.5% in 1997, The percentage of users paying entirely out-of-pocket for services provided by alternative medicine practitioners did not change significantly between 1990 (64.0%) and 1997 (58.3%) (P = .36). Extrapolations to the US population suggest a 47.3% increase in total visits to alternative medicine practitioners, from 427 million in 1990 to 629 million in 1997, thereby exceeding total visits to all US primary care physicians. An estimated 15 million adults in 1997 took prescription medications concurrently with herbal remedies and/or high-dose vitamins (18.4% of all prescription users). Estimated expenditures for alternative medicine professional services increased 45.2% between 1990 and 1997 and were conservatively estimated at $21.2 billion in 1997, with at least $12.2 billion paid out-of-pocket. This exceeds the 1997 out-of-pocket expenditures for all US hospitalizations. Total 1997 out-of-pocket expenditures relating to alternative therapies were conservatively estimated at $27.0 billion, which is comparable with the projected 1997 out-of-pocket expenditures for all US physician services.

Conclusions.-Alternative medicine use and expenditures increased substantially between 1990 and 1997, attributable primarily to an increase in the proportion of the population seeking alternative therapies, rather than increased visits per patient.

Keywords: Complementary Medicine, Adverse Reactions, Herbal Medicines, Prevalence, Therapies, Cost

? Shlay, J.C., Chaloner, K., Max, M.B., Flaws, B., Reichelderfer, P., Wentworth, D., Hillman, S., Brizz, B., Cohn, D.L. and Terry Beirn Community Programs Clinical Res AID (1998), Acupuncture and amitriptyline for pain due to HIV-related peripheral neuropathy - A randomized controlled trial. *JAMA-Journal of the American Medical Association*, **280** (18), 1590-1595.

Full Text: [1998\JAMA280, 1590.pdf](1998/JAMA280,%201590.pdf)

Abstract: Context.-Peripheral neuropathy is common in persons infected with the human immunodeficiency virus (HIV) but few data on symptomatic treatment are available.

Objective.-To evaluate the efficacy of a standardized acupuncture regimen (SAR) and amitriptyline hydrochloride for the relief of pain due to HIV-related peripheral neuropathy in HIV-infected patients.

Design.-Randomized, placebo-controlled, multicenter clinical trial. Each site enrolled patients into 1 of the following 3 options: (1) a modified double-blind 2 x 2 factorial design of SAR, amitriptyline, or the combination compared with placebo, (2) a modified double-blind design of an SAR vs control points, or (3) a double-blind design of amitriptyline vs placebo.

Setting.-Terry Beirn Community Programs for Clinical Research on AIDS (HIV primary care providers) in 10 US cities.

Patients.-Patients with HIV-associated, symptomatic, lower-extremity peripheral neuropathy. Of 250 patients enrolled, 239 were in the acupuncture comparison (125 in the factorial option and 114 in the SAR option vs control points option), and 136 patients were in the amitriptyline comparison (125 in the factorial option and 11 in amitriptyline option vs placebo option).

Interventions.-Standarized acupuncture regimen vs control points, amitriptyline (75 mg/d) vs placebo, or both for 14 weeks.

Main Outcome Measure.-Changes in mean pain scores at 6 and 14 weeks, using a pain scale ranging from 0.0 (no pain) to 1.75 (extremely intense), recorded daily.

Results.-Patients in all 4 groups showed reduction in mean pain scores at 6 and 14 weeks compared with baseline values. For both the acupuncture and amitriptyline comparisons, changes in pain score were not significantly different between the 2 groups. At 6 weeks, the estimated difference in pain reduction for patients in the SAR group compared with those in the control points group (a negative value indicates a greater reduction for the “active” treatment) was 0.01 (95% confidence interval [CI], -0.11 to 0.12; P=.88) and for patients in the amitriptyline group vs those in the placebo group was -0.07 (95% CI, -0.22 to 0.08; P = .38). At 14 weeks, the difference for those in the SAR group compared with those in the control points group was -0.08 (95% CI, -0.21 to 0.06; P = .26) and for amitriptyline compared with placebo was 0.00 (95% CI, -0.18 to 0.19; P = .99).

Conclusions.-In this study, neither acupuncture nor amitriptyline was more effective than placebo in relieving pain caused by HIV-related peripheral neuropathy.

Keywords: Diabetic Neuropathy, Desipramine, Fluoxetine, Rat

Notes: highly cited

? Rowbotham, M., Harden, N., Stacey, B., Bernstein, P., Magnus-Miller, L. and the Gabapentin Postherpetic Neuralgia Study Group (1998), Gabapentin for the treatment of postherpetic neuralgia - A randomized controlled trial. *JAMA-Journal of the American Medical Association*, **280** (21), 1837-1842.

Full Text: [1998\JAMA280, 1837.pdf](1998/JAMA280,%201837.pdf)

Abstract: Context.-Postherpetic neuralgia (PHN) is a syndrome of often intractable neuropathic pain following herpes tester (shingles) that eludes effective treatment in many patients.

Objective.-To determine the efficacy and safety of the anticonvulsant drug gabapentin in reducing PHN pain.

Design.-Multicenter, randomized, double-blind, placebo-controlled, parallel design, 8-week trial conducted from August 1996 through July 1997.

Setting.-Sixteen US outpatient clinical centers.

Participants.-A total of 229 subjects were randomized.

Intervention.-A 4-week titration period to a maximum dosage of 3600 mg/d of gabapentin or matching placebo. Treatment was maintained for another 4 weeks at the maximum tolerated dose. Concomitant tricyclic antidepressants and/or narcotics were continued if therapy was stabilized prior to study entry and remained constant throughout the study.

Main Outcome Measures.-The primary efficacy measure was change in the average daily pain score based on an Ii-point Likert scale (0, no pain; 10, worst possible pain) from baseline week to the final week of therapy, Secondary measures included average daily sleep scores, Short-Form McGill Pain Questionnaire (SF-MPQ), Subject Global Impression of Change and investigator-rated Clinical Global Impression of Change, Short Form-36 (SF-36) Quality of Life Questionnaire, and Profile of Mood States (POMS). Safety measures included the frequency and severity of adverse events.

Results.-One hundred thirteen patients received gabapentin, and 89 (78.8%) completed the study; 116 received placebo, and 95 (81.9%) completed the study. By intent-to-treat analysis, subjects receiving gabapentin had a statistically significant reduction in average daily pain score from 6.3 to 4.2 points compared with a change from 6.5 to 6.0 points in subjects randomized to receive placebo (P<.001). Secondary measures of pain as well as changes in pain and sleep interference showed improvement with gabapentin (P<.001), Many measures within the SF-36 and POMS also significantly favored gabapentin (P less than or equal to.01). Somnolence, dizziness, ataxia, peripheral edema, and infection were all more frequent in the gabapentin group, but withdrawals were comparable in the 2 groups (15 [13.3%] in the gabapentin group vs 11 [9.5%] in the placebo group).

Conclusions.-Gabapentin is effective in the treatment of pain and sleep interference associated with PHN. Mood and quality of life also improve with gabapentin therapy.

Keywords: Post-Herpetic Neuralgia, Neuropathic Pain, Amitriptyline, Management, Therapy

? London, R.F., Anderson, P.M., Gill, P.S. and Greenfield, S.H. (1999), Educating medical students for work in culturally diverse societies. *JAMA-Journal of the American Medical Association*, **282** (9), 875-880.

Full Text: [1999\JAMA282, 875.pdf](1999/JAMA282,%20875.pdf)

Abstract: Context Recent attention has focused on whether government health service institutions, particularly in the United Kingdom, reflect cultural sensitivity and competence and whether medical students receive proper guidance in this area.

Objective To systematically identify educational programs for medical students on cultural diversity, in particular, racial and ethnic diversity.

Data Sources The following databases were searched: MEDLINE (1963-August 1998); Bath international Data Service (BIDS) Institute for Scientific Information science and social science citation indexes (1981-August 1998); BIDS International Bibliography for the Social Sciences (1981-August 1998); and the Educational Resources Information Centre (1987-August 1998), In addition, the following online data sets were searched: Kings Fund; Centre for Ethnic Relations, University of Warwick; Health Education Authority; European Research Centre on Migration and Ethnic Relations, University of Utrecht; International Centre for Intercultural Studies, University of London; the Refugee Studies Programme, University of Oxford. Medical education and academic medicine journals (1994-1998) were searched manually and experts in medical education were contacted.

Study Selection Studies included in the analysis were articles published in English before August 1998 that described specific programs for medical students on racial and ethnic diversity. Of 1456 studies identified by the literature search, 17 met the criteria. Two of the authors performed the study selection independently.

Data Extraction The following data were extracted: publication year, program setting, student year, whether a program was required or optional, the teaching staff and involvement of minority racial and ethnic communities, program length, content and teaching methods, student assessment, and nature of program evaluation.

Data Synthesis Of the 17 selected programs, 13 were conducted in North America. Eleven programs were exclusively for students in years 1 or 2. Fewer than half (n = 7) the programs were part of core teaching. Only 1 required program reported that the students were assessed on the session in cultural diversity.

Conclusions Our study suggests that there is limited information available on an increasingly important subject in medical education. Further research is needed to identify effective components of educational programs on cultural diversity and valid methods of student assessment and program evaluation.

Keywords: Health, Program

(2000), From the Centers for Disease Control and Prevention. Achievements in public health, 1900-1999: Fluoridation of drinking water to prevent dental caries. *JAMA-Journal of the American Medical Association*, **283** (10), 1283-1286.

? Morrison, L.J., Verbeck, P.R., McDonald, A.C., Sawadsky, B.V. and Cook, D.J. (2000), Mortality and prehospital thrombolysis for acute myocardial infarction: A meta-analysis. *JAMA-Journal of the American Medical Association*, **283** (20), 2686-2692.

Full Text: [2000\JAMA283, 2686.pdf](2000/JAMA283,%202686.pdf)

Abstract: Context Early administration of thrombolysis for acute myocardial infarction (AMI) may improve survival if safely and appropriately delivered. No systematic reviews that have comprehensively examined this topic exist in the literature.

Objective To perform a meta-analysis of randomized controlled trials of prehospital vs in-hospital thrombolysis for AMI measuring in-hospital mortality.

Data Sources The Cochrane search strategy was used to search MEDLINE, EMBASE, and the Science Citation Index (1982-1999); Dissertation Abstracts (1987-1999); and Current Contents (1994-1999) for the terms thrombolysis, thrombolysis therapy, prehospital, and acute myocardial infarction. In addition, text and journal article bibliographies were hand searched, the National Institutes of Health Web site was reviewed, and primary authors and thrombolytic drug manufacturers were contacted for unpublished studies.

Study Selection Randomized controlled trials of prehospital vs in-hospital thrombolysis for AMI measuring all-cause hospital mortality were included. Two authors independently reviewed 175 citations by title, abstract, or complete article. After exclusion of 30 duplicate citations, 145 studies remained, of which 6 studies and 3 follow-up studies met the inclusion criteria.

Data Extraction Independent data abstraction by 2 reviewers blinded to the journal, title, and author was confirmed by consensus. Trial quality was independently assessed by 2 other coauthors, blinded to the author, title, journal, introduction, and discussion.

Data Synthesis The results of the 6 randomized trials (n=6434) were pooled and indicated significantly decreased all-cause hospital mortality among patients treated with prehospital thrombolysis compared with in-hospital thrombolysis (odds ratio, 0.83; 95% confidence interval, 0.70-0.98). Results were similar regardless of trial quality or training and experience of the provider. Estimated (SE) time to thrombolysis was 104 (7) minutes for the prehospital group and 162 (16) minutes for the in-hospital thrombolysis group (P = .007).

Conclusions Our meta-analysis suggests that prehospital thrombolysis for AMI significantly decreases the time to thrombolysis and all-cause hospital mortality.

Keywords: Tissue Plasminogen-Activator, Randomized Trials, Clinical-Trials, Therapy, Management, Survival, Electrocardiogram, Metaanalysis, Guidelines, Emergency

McFarlane, M., Bull, S.S. and Rietmeijer, C.A. (2000), The Internet as a newly emerging risk environment for sexually transmitted diseases. *JAMA-Journal of the American Medical Association*, **284** (4), 443-446.

Full Text: [J\JAMA284, 443.pdf](J/JAMA284,%20443.pdf)

Abstract: Context Transmission of sexually transmitted diseases (STDs) such as human immunodeficiency virus (HIV) infection is associated with unprotected sex among multiple anonymous sex partners. The role of the Internet in risk of STDs is not known.

Objective To compare risk of STD transmission for persons who seek sex partners on the Internet with risk for persons not seeking sex partners on the Internet.

Design Cross-sectional survey conducted September 1999 through April 2000,

Setting and Participants A total of 856 clients of the Denver Public Health HIV Counseling and Testing Site in Colorado.

Main Outcome Measures Self-report of logging on to the Internet with the intention of finding sex partners; having sex with partners who were originally contacted via the Internet; number of such partners and use of condoms with them; and time since last sexual contact with Internet partners, linked to HIV risk assessment and test records.

Results of the 856 clients, most were white (77.8%), men (69.2%), heterosexual (65.3%), and aged 20 to 50 years (84.1%), of those, 135 (15.8%) had sought sex partners on the Internet, and 88 (65.2%) of these reported having sex with a partner initially met via the Internet, of those with Internet partners, 34 (38.7%) had 4 or more such partners, with 62 (71.2%) of contacts occurring within 6 months prior to the client’s HIV test. Internet sex seekers were more likely to be men (P<.001) and homosexual (P<.001) than those not seeking sex via the Internet. Internet sex seekers reported more previous STDs (P=.02); more partners (P<.001); more anal sex (P<.001); and more sexual exposure to men (P<.001), men who have sex with men (P<.001), and partners known to be HIV positive (P<.001) than those not seeking sex via the Internet,

Conclusions Seeking sex partners via the Internet was a relatively common practice in this sample of persons seeking HIV testing and counseling (representative of neither Denver nor the overall US population). Clients who seek sex using the Internet appear to be at greater risk for STDs than clients who do not seek sex on the Internet.

Keywords: Determinants, Patterns

Cummings, K.J., Lee, S.M., West, E.S., Cid-Ruzafa, J., Fein, S.G., Aoki, Y., Sulkowski, M.S. and Goodman, S.N. (2001), Interferon and ribavirin vs interferon alone in the re-treatment of chronic hepatitis C previously nonresponsive to interferon: A meta-analysis of randomized trials. *JAMA-Journal of the American Medical Association*, **285** (2), 193-199.

Full Text: [J\JAMA285, 193.pdf](J/JAMA285,%20193.pdf)

Abstract: Context Hepatitis C is the leading cause of chronic liver disease in the United States. Several trials have found that interferon and ribavirin combination therapy is more efficacious than interferon monotherapy for previously untreated patients and those who relapsed after prior interferon monotherapy, but its effectiveness for nonresponders to prior interferon monotherapy is unclear.

Objective To assess the efficacy and safety of interferon and ribavirin vs interferon alone for treatment of patients with chronic hepatitis C who previously did not respond to interferon monotherapy.

Data Sources A systematic search was performed using MEDLINE and the Science Citation Index for publications from 1966 to December 1999. A manual reference search and a manual review of relevant specialty journals also were performed, and input from clinical hepatology experts was sought.

Study Selection included studies were randomized, controlled clinical trials comparing interferon and ribavirin with interferon alone and reporting virological and biochemical outcomes after a follow-up period. Of 50 identified studies, 12 trials (941 patients) were included in the analysis.

Data Extraction Two investigators reviewed trials independently for methods, inclusion and exclusion criteria, and outcomes. Disagreements were resolved by discussion. Abstracted data included study and patient characteristics and virological, biochemical, and histological outcomes. A quality evaluation questionnaire was used to score studies.

Data Synthesis The pooled virological response rate for combination therapy was 14% (95% confidence interval [CI], 11%-17%), with a risk difference favoring combination therapy of 7% (95% CI, 2%-13%). Use of interferon alfa-2a/2b and ribavirin, 1000 to 1200 mg/d, was associated with a pooled virological response rate of 18% and a risk difference of 16% (95% CI, 11%-21%). When interferon alfa-n/n3 and a lower dosage of ribavirin (600-800 mg/d) were used, the risk difference was 0% (95% CI, -7% to 7%). Combination therapy was associated with more adverse effects and an increased rate of discontinuation of treatment compared with interferon monotherapy.

Conclusions for chronic hepatitis C that is non responsive to prior interferon monotherapy, combination therapy is more effective than re-treatment with interferon alone. Response rates remain less than 20% even in the most responsive subgroups, demonstrating a need for better therapeutic options.

Keywords: Chronic Active Hepatitis, 10-Year Follow-Up, Plus Ribavirin, Combination Therapy, Multicenter Trial, Viral-Hepatitis, Virus Genotypes, United-States, Alpha Therapy, Resistant

Torgerson, D.J. and Bell-Syer, S.E.M. (2001), Hormone replacement therapy and prevention of nonvertebral fractures: A meta-analysis of randomized trials. *JAMA-Journal of the American Medical Association*, **285** (22), 2891-2897.

Full Text: [J\JAMA285, 2891.pdf](J/JAMA285,%202891.pdf)

Abstract: Context Hormone replacement therapy (HRT) is widely considered to reduce fractures, but this belief is based on observational data; evidence from randomized trials is lacking.

Objective To conduct a systematic review of all randomized trials of HRT that have reported or collected nonvertebral fracture data but that may not have focused on fracture prevention.

Data Sources The MEDLINE, EMBASE, Science Citation Index, and Cochrane Controlled Trials Register databases were searched from 1997 through 2000 and a search was conducted of all recent systematic reviews to identify older studies. Authors were contacted to establish whether fracture data had been collected but not reported. Researchers in the field and pharmaceutical companies also were contacted to try to identify unpublished studies.

Study Selection Trials were included in which participants had been randomized to at least 12 months of therapy and data on nonvertebral fractures at any other site and due to any cause were available. Of 70 initially identified studies, 22 were included in the analysis.

Data Extraction Both investigators extracted data independently and appraised trial quality according to the Jadad scale, which assesses the methods of randomization, concealment allocation, and reporting of withdrawals and dropouts. Disagreements were resolved by discussion.

Data Synthesis There was an overall 27% reduction in nonvertebral fractures in a pooled analysis (reduction favoring HRT in relative risk [RR], 0.73; 95% confidence interval [CI], 0.56-0.94; P=.02). This effect was greater among women randomized to HRT who had a mean age younger than 60 years (RR, 0.67; 95% CI, 0.46-0.98; P=.03), Among women with a mean age of 60 years or older, there was a reduced effect (RR, 0.88; 95% CI, 0.71-1.08; P=.22). For hip and wrist fractures alone, the effectiveness of HRT appeared more marked (RR, 0.60; 95% CI, 0.40-0.91; P=.02), particularly for women younger than 60 years (RR, 0.45; 95% CI, 0.26-0.79; P=.005).

Conclusions Our meta-analysis of randomized controlled trials of HRT noted a statistically significant reduction in nonvertebral fractures. However, this effect may be attenuated in older women.

Keywords: Healthy Postmenopausal Women, Estrogen Replacement, Hip Fracture, Bone Mass, Vertebral Fractures, Osteoporosis, Risk, Alendronate, Combination, Estradiol

Grol, R. (2001), Improving the quality of medical care: Building bridges among professional pride, payer profit, and patient satisfaction. *JAMA-Journal of the American Medical Association*, **286** (20), 2578-2585.

Full Text: [J\JAMA286, 2578.pdf](J/JAMA286,%202578.pdf)

Abstract: Physicians today are confronted with increasing demand to ensureand improve care of their patients. A variety of approachesclaim to provide solutions to the problems of health care delivery.These approaches represent different perspectives on optimalcare and the best method for improving care. By summarizingrecent reviews and debates in this field, this article criticallyreflects on the value of some of the approaches that have gainedpopularity during the last decades: evidence-based medicineand clinical practice guidelines, professional development, assessment and accountability, patient empowerment, and totalquality management. Evidence regarding the impact and feasibilityof the various approaches is mixed or simply lacking. In particular, the health care community lacks an understanding of which approachesare most appropriate for what types of improvement in what settingsand of the determinants of successful performance change. Giventhe complexity of improvement and change in patient care, itis not realistic to expect that one approach can solve all theproblems in health care delivery. None of the popular modelsfor improving clinical performance appear to be superior. Therefore, bridges must be built and models must be integrated to be trulyeffective.

Baden, L.R., Horowitz, G., Jacoby, H. and Eliopoulos, G.M. (2001), Quinolones and false-positive urine screening for opiates by immunoassay technology. *JAMA-Journal of the American Medical Association*, **286** (24), 3115-3119.

Full Text: [J\JAMA286, 3115.pdf](J/JAMA286,%203115.pdf)

Abstract: Context Millions of assays are performed each year to monitor for substance abuse in various settings. When common medications cross-react with frequently used testing assays, false-positive results can lead to invalid conclusions. Objective To evaluate cross-reactivity of quinolone antimicrobials in common opiate screening assays and to assess the in vivo implications of this phenomenon. Design, Setting, and Participants The reactivity of 13 quinolones (levofloxacin, ofloxacin, pefloxacin, enoxacin, moxifloxacin, gatifloxacin, trovafloxacin, sparfloxacin, lomefloxacin, ciprofloxacin, clinafloxacin, norfloxacin, and nalidixic acid) was tested in 5 commercial opiate screening assays from September 1998 to March 1999. In 6 healthy volunteers, we confirmed the cross- reactivity of levofloxacin or ofloxacin with these opiate screening assays. Main Outcome Measure Opiate assay activity (threshold for positive result, 300 ng/mL of morphine). Results Nine of the quinolones caused assay results above the threshold for a positive result in at least 1 of the assays. Four of the assay systems caused false-positive results for at least 1 quinolone. Eleven of the 13 compounds caused some opiate activity by at least 1 assay system. At least 1 compound caused opiate assay activity in all 5 assay systems. Levofloxacin, oflaxacin, and perfloxacin were most likely to lead to a false- positive opiate result. Positive results were obtained in urine from all 6 volunteers. Conclusion Greater attention to the cross-reactivity of quinolones with immunoassays for opiates is needed to minimize the potential for invalid test interpretation

Keywords: Antibacterial Activity/Codeine/Community-Acquired Pneumonia/Gatifloxacin/Healthy-Subjects/Levofloxacin/Morphine/Moxifloxacin/Ofloxacin/pHarmacokinetics/Poppy Seed/Pulmonary Tuberculosis/Quinolones

Furmanski, M. (2002), Citation of unethical research. *JAMA-Journal of the American Medical Association*, **287** (4), 452-453.

Full Text: [J\JAMA287, 452.pdf](J/JAMA287,%20452.pdf)

Dennis, D.T., Inglesby, T.V., O’Toole, T. and Henderson, D.A. (2002), Citation of unethical research - Reply. *JAMA-Journal of the American Medical Association*, **287** (4), 453.

Full Text: [J\JAMA287, 452.pdf](J/JAMA287,%20452.pdf)

Eysenbach, G., Powell, J., Kuss, O. and Sa, E.R. (2002), Empirical studies assessing the quality of health information for consumers on the World Wide Web: A systematic review. *JAMA-Journal of the American Medical Association*, **287** (20), 2691-2700.

Full Text: [J\JAMA287, 2691.pdf](J/JAMA287,%202691.pdf)

Abstract: Context The quality of consumer health information on the World Wide Web is an important issue for medicine, but to date no systematic and comprehensive synthesis or the methods and evidence has been performed.

Objectives To establish a methodological framework on how quality on the Web is evaluated in practice, to determine the heterogeneity of the results and conclusions, and to compare the methodological rigor of these studies, to determine to what extent the conclusions depend on the methodology used, and to suggest future directions for research.

Data Sources We searched MEDLINE and PREMEDLINE (1966 through September 2001), Science Citation Index (1997 through September 2001), Social Sciences Citation Index (1997 through September 2001), Arts and Humanities Citation Index (1997 through September 2001), LISA (1969 through July 2001), CINAHL (1982 through July 2001), PsychINFO (1988 through September 2001), EMBASE (1988 through June 2001), and SIGLE (1980 through June 2001). We also conducted hand searches, general Internet searches, and a personal bibliographic database search.

Study Selection We included published and unpublished empirical studies in any language in which investigators searched the Web systematically for specific health information, evaluated the quality of Web sites or pages, and reported quantitative results. We screened 7830 citations and retrieved 170 potentially eligible full articles. A total of 79 distinct studies met the inclusion criteria, evaluating 5941 health Web sites and 1329 Web pages, and reporting 408 evaluation results for 86 different quality criteria.

Data Extraction Two reviewers independently extracted study characteristics, medical domains, search strategies used, methods and criteria of quality assessment, results (percentage of sites or pages rated as inadequate pertaining to a quality criterion), and quality and rigor of study methods and reporting.

Data Synthesis Most frequently used quality criteria used include accuracy, completeness, readability, design, disclosures, and references provided. Fifty-five studies (70%) concluded that quality is a problem on the Web, 17 (22%) remained neutral, and 7 studies (9%) came to a positive conclusion. Positive studies scored significantly lower in search (P=.02) and evaluation (P=.04) methods.

Conclusions Due to differences in study methods and rigor, quality criteria, study population, and topic chosen, study results and conclusions on health-related Web sites vary widely. Operational definitions of quality criteria are needed.

Keywords: Medical Information, Patient Information, Internet Information, Surgical Departments, Surgery Information, Cancer Information, Readability Levels, Pediatric-Surgery, Anatomy Sites, Education

? Mowatt, G., Shirran, L., Grimshaw, J.J.M., Rennie, D., Flanagin, A., Yank, V., MacLennan, G., Gotzsche, P.C. and Bero, L.A. (2002), Prevalence of honorary and ghost authorship in Cochrane reviews. *JAMA-Journal of the American Medical Association*, **287** (21), 2769-2771.

Full Text: [2002\JAMA287, 2769.pdf](2002/JAMA287,%202769.pdf)

Abstract: Context To determine the prevalence of honorary and ghost authorship in Cochrane reviews, how authorship is assigned, and the ways in which authors and Cochrane editorial teams contribute. Methods Using a Web-based, self-administered survey, corresponding authors for 577 reviews published in issues 1 and 2 from 1999 of The Cochrane Library were invited to report on the prevalence of honorary and ghost authors, contributions by authors listed in the byline and members of Cochrane editorial teams, and identification of methods of assigning authorship. Responses were received for 362 reviews (63% response rate), which contained 913 authors. Results One hundred forty-one reviews (39%) had evidence of honorary authors, 32 (9%) had evidence of ghost authors (most commonly a member of the Cochrane editorial team), and 9 (2%) had evidence of both honorary and ghost authors. The editorial teams contributed in a wide variety of ways to 301 reviews (83%). Authorship was decided by the group of authors (31%) or lead author (25%) in most reviews. Authorship order was assigned according to contribution in most reviews (76%). The 3 functions contributed to most by those listed in the byline were assessing the quality of included studies (83%), interpreting data (82%), and abstracting data from included studies (77%). Conclusions A substantial proportion of reviews had evidence of honorary and ghost authorship. The Cochrane editorial teams contributed to most Cochrane reviews.

Keywords: Abstracting, Articles, Author, Authors, Authorship, Authorship Order, Cochrane, Contribution, Ghost Authorship, Honorary Authors, Lead, Methods, Prevalence, Quality, Survey

Dickersin, K., Scherer, R., Suci, E.S.T. and Gil-Montero, M. (2002), Problems with indexing and citation of articles with group authorship. *JAMA-Journal of the American Medical Association*, **287** (21), 2772-2774.

Full Text: [J\JAMA287, 2772.pdf](J/JAMA287,%202772.pdf)

Abstract: Context It is not known whether articles with group authorship (ie, with a research group name listed as the author) are difficult to identify or whether use of group authorship may lead to problems with citation.

Methods To examine ways in which reports of controlled trials with group authorship are indexed and citations counted in bibliographic databases, we conducted a cross-sectional study in January 2000. We identified 47 controlled trials funded by the National Eye Institute and 285 associated articles. Between January and August 2000, we searched PubMed and Science Citation Index (SCI) and recorded the citation practices for these articles. Our main outcome measures were ways in which trial reports were listed in PubMed and SCI and number of citations to each report by type of authorship.

Results Of the 285 published reports identified, 126 (44%) had group authorship, 109 (38%) had modified group authorship (listing individual names plus the name of the research group), and 50 (18%) had named authors only. In PubMed, no group authors were listed in the author field (per MEDLINE rules); in SCI, group-authored reports generally were incorrectly attributed (first name on investigator list [35.3%], first name on writing committee [25.5%], contact name [16.7%], anonymous [16.7%], and other [5.9%]). Using the SCI general search, we identified citations to 16.7% of group-authored reports, compared with citations to 96.9% of reports with modified group authorship and 93.9% of citations to reports with named authors only. Other systematic search methods found that more than 98% of group-authored reports actually had been cited and that group-authored reports were cited more than other reports.

Conclusions Indexing systems are not optimally adapted to group authorship. We recommend that indexing services change their practices to include group authors in the author field to help correct the problem.

Lee, K.P., Schotland, M., Bacchetti, P. and Bero, L.A. (2002), Association of journal quality indicators with methodological quality of clinical research articles. *JAMA-Journal of the American Medical Association*, **287** (21), 2805-2808.

Full Text: [J\JAMA287, 2805.pdf](J/JAMA287,%202805.pdf)

Abstract: Context The ability to identify scientific journals that publish high-quality research would help clinicians, scientists, and health-policy analysts to select the most up-to-date medical literature to review.

Methods To assess whether journal characteristics of (1) peer-review status, (2) citation rate, (3) impact factor, (4) circulation, (5) manuscript acceptance rate, (6) MEDLINE indexing, and (7) Brandon/Hill Library List indexing are predictors of methodological quality of research articles, we conducted a cross-sectional study of 243 original research articles involving human subjects published in general internal medical journals.

Results The mean (SD) quality score of the 243 articles was 1.37 (0.22). All journals reported a peer-review process and were indexed on MEDLINE. In models that controlled for article type (randomized controlled trial [RCT] or non-RCT), journal citation rate was the most statistically significant predictor (0.051 increase per doubling; 95% confidence interval [CI], 0.037-0.065; P<.001). In separate analyses by article type, acceptance rate was the strongest predictor for RCT quality (-0.113 per doubling; 95% Cl, -0.148 to -0.078; P<.001), while journal citation rate was the most predictive factor for non-RCT quality (0.051 per doubling; 95% Cl, 0.044-0.059; P<.001).

Conclusions High citation rates, impact factors, and circulation rates, and low manuscript acceptance rates and indexing on Brandon/Hill Library List appear to be predictive of higher methodological quality scores for journal articles.

Keywords: Randomized Controlled Trials, Impact Factor, Citation Analysis, Bias, Health, Drug, Publications, Medicine, Science, Scales

Wager, E. and Middleton, P. (2002), Effects of technical editing in biomedical journals: A systematic review. *JAMA-Journal of the American Medical Association*, **287** (21), 2821-2824.

Full Text: [J\JAMA287, 2821.pdf](J/JAMA287,%202821.pdf)

Abstract: Context Technical editing supposedly improves the accuracy and clarity of journal articles. We examined evidence of its effects on research reports in biomedical journals.

Methods Subset of a systematic review using Cochrane methods, searching MEDLINE, EMBASE, and other databases from earliest entries to February 2000 by using inclusive search terms; hand searching relevant journals. We selected comparative studies of the effects of editorial processes on original research articles between acceptance and publication in biomedical journals. Two reviewers assessed each study and performed independent data extraction.

Results The 11 studies on technical editing indicate that it improves the readability of articles slightly (as measured by Gunning Fog and Flesch reading ease scores), may improve other aspects of their quality, can increase the accuracy of references and quotations, and raises the quality of abstracts. Supplying authors with abstract preparation instructions had no discernible effect.

Conclusions Considering the time and resources devoted to technical editing, remarkably little is know about its effects or the effects of imposing different house styles. Studies performed at 3 journals employing relatively large numbers of professional technical editors suggest that their editorial processes are associated with increases in readability and quality of articles, but these findings may not be generalizable to other journals.

Keywords: Original Research Articles, Structured Abstracts, Manuscript Quality, Internal-Medicine, Accuracy, Readers, Annals, Trial

Callaham, M., Wears, R.L. and Weber, E. (2002), Journal prestige, publication bias, and other characteristics associated with citation of published studies in peer-reviewed journals. *JAMA-Journal of the American Medical Association*, **287** (21), 2847-2850.

Full Text: [J\JAMA287, 2847.pdf](J/JAMA287,%202847.pdf)

Abstract: Context Citation by other authors is important in the dissemination of published science, but factors predicting it are little studied.

Methods To identify characteristics of published research predicting citation in other journals, we searched the Science Citations Index database for a standardized 3.5 years for all citations of published articles originally submitted to a 1991 emergency medicine specialty meeting. Analysis was conducted by classification and regression trees, a nonparametric modeling technique of regression trees, to determine the impact of previously determined characteristics of the full articles on the outcome measures, We calculated the the number of times an article was cited each year and calculated the mean impact factor (citations per manuscript per year) in other citing journals.

Results Of the 493 submitted manuscripts, 204 published articles met entry criteria. The mean citations per year was 2.04 (95% confidence interval, 1.6-2.4; range, 0-20.9) in 440 different journals. Nineteen articles (9.3%)were never cited. The ability to predict the citations per year was weak (pseudo R-2 = 0.14.). The strongest predictor of citations per year was the impact factor of the original publishing journal. The presence of a control group, the subjective newsworthiness score, and sample size predicted citation frequency (24.3%, 26.0%, and 26.5% as strongly, respectively). The ability to predict mean impact factor of the citing journals was even weaker (pseudo R-2 = 0.09). The impact factor of the publishing journal was the strongest predictor, followed by the newsworthiness score (89.9% as strongly) and a subjective quality score (61.5%). Positive outcome bias was not evident for either outcome measure.

Conclusion In this cohort of published research, commonly used measures of study methodology and design did not predict the frequency of citations or the importance of citing journals. Positive outcome bias was not evident, The impact factor of the original publishing journal was more important than any other variable, suggesting that the journal in which a study is published may be as important as traditional measures of study quality in ensuring dissemination.

Keywords: Metaanalysis, Abstracts, Quality, Hazards, Trials

? Rossouw, J.E., Anderson, G.L., Prentice, R.L., LaCroix, A.Z., Kooperberg, C., Stefanick, M.L., Jackson, R.D., Beresford, S.A.A., Howard, B.V., Johnson, K.C., Kotchen, M. and Ockene, J. (2002), Risks and benefits of estrogen plus progestin in healthy postmenopausal women - Principal results from the Women’s Health Initiative randomized controlled trial. *JAMA-Journal of the American Medical Association*, **288** (3), 321-333.

Abstract: Context Despite decades of accumulated observational evidence, the balance of risks and benefits for hormone use in healthy postmenopausal women remains uncertain. Objective To assess the major health benefits and risks of the most commonly used combined hormone preparation in the United States. Design Estrogen plus progestin component of the Women’s Health Initiative, a randomized controlled primary prevention trial (planned duration, 8.5 years) in which 16608 postmenopausal women aged 50-79 years with an intact uterus at baseline were recruited by 40 US clinical centers in 1993-1998. Interventions Participants received conjugated equine estrogens, 0.625 mg/d, plus medroxylprogesterone acetate, 2.5 mg/d, in 1 tablet (n = 8506) or placebo (n = 8102). Main Outcomes Measures The primary outcome was coronary heart disease (CHD) (nonfatal myocardial infarction and CHD death), with invasive breast cancer as the primary adverse outcome. A global index summarizing the balance of risks and benefits included the 2 primary outcomes plus stroke, pulmonary embolism (PE), endometrial cancer, colorectal cancer, hip fracture, and death due to other causes. Results On May 31, 2002, after a mean of 5.2 years of follow-up, the data and safety monitoring board recommended stopping the trial of estrogen plus progestin vs placebo because the test statistic for invasive breast cancer exceeded the stopping boundary for this adverse effect and the global index statistic supported risks exceeding benefits. This report includes data on the major clinical outcomes through April 30, 2002. Estimated hazard ratios (HRs) (nominal 95% confidence intervals [Cis]) were as follows: CHD, 1.29 (1.02-1.63) with 286 cases; breast cancer, 1.26 (1.00-1.59) with 290 cases; stroke, 1.41 (1.07-1.85) with 212 cases; PE, 2.13 (1.39-3.25) with 101 cases; colorectal cancer, 0.63 (0.43-0.92) with 112 cases; endometrial cancer, 0.83 (0.47-1.47) with 47 cases; hip fracture, 0.66 (0.45-0.98) with 106 cases; and death due to other causes, 0.92 (0.74-1.14) with 331 cases, Corresponding HRs (nominal 95% Cis) for composite outcomes were 1.22 (1.09-1.36) for total cardiovascular disease (arterial and venous disease), 1,03 (0.90-1.17) for total cancer, 0.76 (0.69-0.85) for combined fractures, 0.98 (0.82-1.18) for total mortality, and 1.15 (1.03-1.28) for the global index. Absolute excess risks per 10000 person-years attributable to estrogen plus progestin were 7 more CHD events, 8 more strokes, 8 more PEs, and 8 more invasive breast cancers, while absolute risk reductions per 10000 1 person-years were 6 fewer colorectal cancers and 5 fewer hip fractures. The absolute excess risk of events included in the global index was 19 per 10000 person-years. Conclusions Overall health risks exceeded benefits from use of combined estrogen plus progestin for an average 5.2-year follow-up among healthy postmenopausal US women. All-cause mortality was not affected during the trial. The risk-benefit profile found in this trial is not consistent with the requirements for a viable intervention for primary prevention of chronic diseases, and the results indicate that this regimen should not be initiated or continued for primary prevention of CHD.

Keywords: Association, Breast-Cancer Risk, Cardiovascular-Disease, Coronary-Artery Atherosclerosis, Events, Fractures, Heart-Disease, Hormone Replacement Therapy, Metaanalysis, Secondary Prevention

Flanagin, A., Fontanarosa, P.B. and de Angelis, C.D. (2002), Authorship for research groups. *JAMA-Journal of the American Medical Association*, **288** (24), 3166-3168.

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Full Text: [J\JAMA289, 80.pdf](J/JAMA289,%2080.pdf)

Abstract: Context Although few patients with acute abdominal pain will prove to have cholecystitis, ruling in or ruling out acute cholecystitis consumes substantial diagnostic resources.

Objective To determine if aspects of the history and physical examination or basic laboratory testing clearly identify patients who require diagnostic imaging tests to rule in or rule out the diagnosis of acute cholecystitis.

Data Sources Electronic search of the Science Citation Index, Cochrane Library, and English-language articles from January 1966 through November 2000 indexed in MEDLINE. We also hand-searched Index Medicus for 1950-1965, and scanned references in identified articles and bibliographies of prominent textbooks of physical examination, surgery, and gastroenterology. To identify relevant articles appearing since the comprehensive search, we repeated the MEDLINE search in July 2002.

Study Selection Included studies evaluated the role of the history, physical examination, and/or laboratory tests in adults with abdominal pain or suspected acute cholecystitis. Studies had to report data from a control group found not to have acute cholecystitis. Acceptable definitions of cholecystitis included surgery, pathologic examination, hepatic iminodiacetic acid scan or right upper quadrant ultrasound, or clinical course consistent with acute cholecystitis and no evidence for an alternate diagnosis. Studies of acalculous cholecystitis were included. Seventeen of 195 identified studies met the inclusion criteria.

Data Extraction Two authors independently abstracted data from the 17-included studies. Disagreements were resolved by discussion and consensus with a third author.

Data Synthesis No clinical or laboratory finding had a sufficiently high positive likelihood ratio (LR) or low negative LR to rule in or rule out the diagnosis of acute cholecystitis. Possible exceptions were the Murphy sign (positive LR, 2.8; 95% CI, 0.8-8.6) and right upper quadrant tenderness (negative LR, 0.4; 95% CI, 0.2-1.1), though the 95% CIs for both included 1.0. Available data on diagnostic confirmation rates at laparotomy and test characteristics of relevant radiological investigations suggest that the diagnostic impression of acute cholecystitis has a positive LR of 25 to 30. Unfortunately, the available literature does not identify the specific combinations of clinical and laboratory findings that presumably account for this diagnostic success.

Conclusions No single clinical finding or laboratory test carries sufficient weight to establish or exclude cholecystitis without further testing (eg, right upper quadrant ultrasound). Combinations of certain symptoms, signs, and laboratory results likely have more useful LRs, and presumably inform the diagnostic impressions of experienced clinicians. Pending further research characterizing the pretest probabilities associated with different clinical presentations, the evaluation of patients with abdominal pain suggestive of cholecystitis will continue to rely heavily on the clinical gestalt and diagnostic imaging.

Keywords: Delayed Laparoscopic Cholecystectomy, Acute Acalculous Cholecystitis, Suspected Acute Cholecystitis, Pulmonary-Embolism, Abdominal-Pain, Clinical-Diagnosis, Emergency, Disease, Tests, Bias

Bekelman, J.E., Li, Y. and Gross, C.P. (2003), Scope and impact of financial conflicts of interest in biomedical research: A systematic review. *JAMA-Journal of the American Medical Association*, **289** (4), 454-465.

Full Text: [J\JAMA289, 454.pdf](J/JAMA289,%20454.pdf)

Abstract: Context Despite increasing awareness about the potential impact of financial conflicts of interest on biomedical research, no comprehensive synthesis of the body of evidence relating to financial conflicts of interest has been performed.

Objective To review original, quantitative studies on the extent, impact, and management of financial conflicts of interest in biomedical research.

Data Sources Studies were identified by searching MEDLINE (January 1980-October 2002), the Web of Science citation database, references of articles, letters, commentaries, editorials, and books and by contacting experts.

Study Selection All English-language studies containing original, quantitative data on financial relationships among industry, scientific investigators, and academic institutions were included. A total of 1664 citations were screened, 144 potentially eligible full articles were retrieved, and 37 studies met our inclusion criteria.

Data Extraction One investigator (J.E.B.) extracted data from each of the 37 studies. The main outcomes were the prevalence of specific types of industry relationships, the relation between industry sponsorship and study outcome or investigator behavior, and the process for disclosure, review, and management of financial conflicts of interest.

Data Synthesis Approximately one fourth of investigators have industry affiliations, and roughly two thirds of academic institutions hold equity in start-ups that sponsor research performed at the same institutions. Eight articles, which together evaluated 1140 original studies, assessed the relation between industry sponsorship and outcome in original research. Aggregating the results of these articles showed a statistically significant association between industry sponsorship and pro-industry conclusions (pooled Mantel-Haenszel odds ratio, 3.60; 95% confidence interval, 2.63-4.91). Industry sponsorship was also associated with restrictions on publication and data sharing, The approach to managing financial conflicts varied substantially across academic institutions and peer-reviewed journals.

Conclusions Financial relationships among industry, scientific investigators, and academic institutions are widespread. Conflicts of interest arising from these ties can influence biomedical research in important ways.

Keywords: Industry Research Relationships, Randomized Clinical-Trials, Of-Interest Policies, Medical Journals, Economic-Analyses, National Survey, Life Sciences, Quality, Faculty, Biotechnology

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Abstract: Discusses the outbreak of severe acute respiratory syndrome (SARS). Outbreak that is being investigated by the U.S. Center for Disease Control and the World Health Organization; Individuals in the U.S. who have been infected; Number of countries that have reported SARS; Travel advisories that remain in effect; Guidelines for infection-control; Development of laboratory diagnostic tests; Case histories of individuals diagnosed with SARS.

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Full Text: [J\JAMA289, 2801.pdf](J/JAMA289,%202801.pdf)

Abstract: Context Severe acute respiratory syndrome (SARS) is an emerging infectious disease that first manifested in humans in China in November 2002 and has subsequently spread worldwide.

Objectives To describe the clinical characteristics and short-term outcomes of SARS in the first large group of patients in North America; to describe how these patients were treated and the variables associated with poor outcome.

Design, Setting, and Patients Retrospective case series involving 144 adult patients admitted to 10 academic and community hospitals in the greater Toronto, Ontario, area between March 7 and April 10, 2003, with a diagnosis of suspected or probable SARS. Patients were included if they had fever, a known exposure to SARS, and respiratory symptoms or infiltrates observed on chest radiograph. Patients were excluded if an alternative diagnosis was determined.

Main Outcome Measures Location of exposure to SARS; features of the history, physical examination, and laboratory tests at admission to the hospital; and 21-day outcomes such as death or intensive care unit (ICU) admission with or without mechanical ventilation.

Results Of the 144 patients, 111 (77%) were exposed to SARS in the hospital setting. Features of the clinical examination most commonly found in these patients at admission were self-reported fever (99%), documented elevated temperature (85%), nonproductive cough (69%), myalgia (49%), and dyspnea (42%). Common laboratory features included elevated lactate dehydrogenase (87%), hypocalcemia (60%), and lymphopenia, (54%). Only 2% of patients had rhinorrhea. A total of 126 patients (88%) were treated with ribavirin, although its use was associated with significant toxicity, including hemolysis (in 76%) and decrease in hemoglobin of 2 g/dL (in 49%). Twenty-nine patients (20%) were admitted to the ICU with or without mechanical ventilation, and 8 patients died (21-day mortality, 6.5%; 95% confidence interval [CI], 1.9%-11.8%). Multivariable analysis showed that the presence of diabetes (relative risk [RR], 3.1; 95% CI, 1.4-7.2; P=.01) or other comorbid conditions (RR, 2.5; 95% CI, 1.1-5.8; P=.03) were independently associated with poor outcome (death, ICU admission, or mechanical ventilation).

Conclusions The majority of cases in the SARS outbreak in the greater Toronto area were related to hospital exposure. In the event that contact history becomes unreliable, several features of the clinical presentation will be useful in raising the suspicion of SARS. Although SARS is associated with significant morbidity and mortality, especially in patients with diabetes or other comorbid conditions, the vast majority (93.5%) of patients in our cohort survived.

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Full Text: [2004\JAMA292, 1602.pdf](2004/JAMA292,%201602.pdf)

Abstract: Content Although it is common practice to read tests with clinical information, whether this improves or decreases the accuracy of test reading is uncertain. Objective To determine whether diagnostic tests are more accurate when read with clinical information or without it. DataSources MEDLINE search (1966-December 2003) extended by search of reference lists and articles citing the articles retrieved (Web of Science, 1985-December 2003). Study Selection All articles comparing the accuracy of tests read twice by the same readers, once without and once with clinical information, but otherwise under identical conditions. Only articles that reported sensitivity and specificity or receiver operating characteristic (ROC) curves were included. Data Extraction Data were extracted by one author and reviewed independently by the other. When the data were difficult to interpret, differences were resolved by discussion. Data Synthesis Sixteen articles met the inclusion criteria. Eleven articles compared areas under ROC curves for tests read with and without clinical information, and 5 compared only sensitivity and specificity. Ten articles used actual clinical information; 6 used constructed clinical information that was plausible. Overall, clinical information improved test reading accuracy although the effect was smaller in the articles using actual clinical information when compared with those using constructed clinical information. There were no instances in which clinical information resulted in significant reduction in test reading accuracy. In some instances, improved test reading accuracy came from improved sensitivity without loss of specificity. Conclusions At least for the tests examined, the common practice of reading diagnostic tests with clinical information seems justified. Future studies should be designed to investigate the best way of providing clinical information. These studies should also give an estimate of the accuracy of clinical information used, display ROC curves with identified data points, and include a wider range of diagnostic tests.

Keywords: Accuracy, Author, Bias, Chest Radiograph, Computed-Tomography, ECG Interpretation, Extraction, History, Impact, Information, Interobserver Agreement, Knowledge, Lacunar Infarction, Lesions, Medline, Points, Practice, Review, Science, Sensitivity and Specificity, Systematic, Systematic Review, Web of Science

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Full Text: [2004\JAMA292, 2388.pdf](2004/JAMA292,%202388.pdf)

Abstract: Context The optimal management of fibromyalgia syndrome (FMS) is unclear and comprehensive evidence-based guidelines have not been reported. Objective To provide up-to-date evidence-based guidelines for the optimal treatment of FMS. Data Sources, Selection, and Extraction A search of all human trials (randomized controlled trials and meta-analyses of randomized controlled trials) of FMS was made using Cochrane Collaboration Reviews (1993-2004), MEDLINE (1966-2004), CINAHL (1982-2004), EMBASE (1988-2004), PUBMED (1966-2004), Healthstar (1975-2000), Current Contents (2000-2004), Web of Science (1980-2004), PsychInfo (1887-2004), and Science Citation Indexes (1996-2004). The literature review was performed by an interdisciplinary panel, composed of 13 experts in various pain management disciplines, selected by the American Pain Society (APS), and supplemented by selected literature reviews by APS staff members and the Utah Drug Information Service. A total of 505 articles were reviewed. Data Synthesis There are major limitations to the FMS literature, with many treatment trials compromised by short duration and lack of masking. There are no medical therapies that have been specifically approved by the US Food and Drug Administration for management of FMS. Nonetheless, current evidence suggests efficacy of low-dose tricyclic antidepressants, cardiovascular exercise, cognitive behavioral therapy, and patient education. A number of other commonly used FMS therapies, such as trigger point injections, have not been adequately evaluated. Conclusions Despite the chronicity and complexity of FMS, there are pharmacological and non pharmacological interventions available that have clinical benefit. Based on current evidence, a stepwise program emphasizing education, certain medications, exercise, cognitive therapy, or all 4 should be recommended.

Keywords: Administration, Aerobic Exercise, Antidepressants, Blind Crossover Trial, Cardiovascular, Chronic Widespread Pain, Citation, Cochrane, Cognitive-Behavioral Treatment, Collaboration, Controlled Clinical-Trial, Education, Efficacy, Embase, Emg-Biofeedback, Exercise, Extraction, Guidelines, Human, Hypothalamic-Pituitary, Interventions, Literature, Literature Review, Management, Medical, Medline, Pain, Patient Education, Pubmed, Randomized Controlled Trials, Randomized Controlled-Trial, Review, Science, Sources, Temporal Summation, Therapy, Treatment, US, Venlafaxine Treatment, Web of Science

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Keywords: History, Impact, Impact Factor, Journal, Journal Impact, Journal Impact Factor

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Full Text: [2006\JAMA295, 2270.pdf](2006/JAMA295,%202270.pdf)

Abstract: Context In surveys based on data available prior to 2000, clinical trials funded by for-profit organizations appeared more likely to report positive findings than those funded by not-for-profit organizations. Whether this situation has changed over the past 5 years or whether similar effects are present among jointly funded trials is unknown. Objective To determine in contemporary randomized cardiovascular trials the association between funding source and the likelihood of reporting positive findings. Design We reviewed 324 consecutive superiority trials of cardiovascular medicine published between January 1, 2000, and July 30, 2005, in JAMA, The Lancet, and the New England Journal of Medicine. Main Outcome Measure The proportion of trials favoring newer treatments over the standard of care was evaluated by funding source. Results Of the 324 superiority trials, 21 cited no funding source. Of the 104 trials funded solely by not-for-profit organizations, 51 (49%) reported evidence significantly favoring newer treatments over the standard of care, whereas 53 (51%) did not (P=. 80). By contrast, 92 (67.2%) of 137 trials funded solely by for-profit organizations favored newer treatments over standard of care (P <. 001). Among 62 jointly funded trials, 35 (56.5%), an intermediate proportion, favored newer treatments. For 205 randomized trials evaluating drugs, the proportions favoring newer treatments were 39.5%, not-for-profit; 54.4%, jointly funded; and 65.5%, for-profit trials (P for trend across groups =. 002). For the 39 randomized trials evaluating cardiovascular devices, the proportions favoring newer treatments were 50.0%, not-for-profit; 69.2%, jointly funded; and 82.4%, for-profit trials (P for trend across groups=. 07). Regardless of funding source, trials using surrogate end points, such as quantitative angiography, intravascular ultrasound, plasma biomarkers, and functional measures were more likely to report positive findings (67%) than trials using clinical end points (54.1%; P=. 02). Conclusions Recent cardiovascular trials funded by for-profit organizations are more likely to report positive findings than trials funded by not-for-profit organizations, as are trials using surrogate rather than clinical end points. Trials jointly funded by not-for-profit and for-profit organizations appear to report positive findings at a rate approximately midway between rates observed in trials supported solely by one or the other of these entities.

Keywords: Angiography, Association, Biomarkers, Cardiovascular, Care, Clinical, Clinical Trials, Data, Drugs, England, Evidence, Funding, Medicine, Outcomes, P, Plasma, Randomized, Rates, Reporting, Source, Standard, Standard of Care, Surrogate, Surveys, Trend, Ultrasound

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Full Text: [2006\JAMA295, 74.pdf](2006/JAMA295,%2074.pdf)

Abstract: Context Statins are cholesterol - lowering drugs that have been proven in randomized controlled trials to prevent cardiac events. Recent retrospective analyses have suggested that statins also prevent cancer. Objectives To investigate the effect of statin therapy on cancer incidence and cancer death and to analyze the effect of statins on specific cancers and the effect of statin lipophilicity or derivation. Data Sources A systematic literature search of MEDLINE, EMBASE, CINAHL, Web of Science, CANCERLIT, and the Cochrane Systematic Review Database through July 2005 was conducted using specific search terms. A review of cardiology and cancer abstracts and manual review of references was also performed. Study Selection Twenty-seven of the 8943 articles (n = 86 936 participants) initially identified met the inclusion criteria, reporting 26 randomized controlled trials of statins, with a mean duration of follow-up of at least 1 year, enrolling a minimum of 100 patients, and reporting data on either cancer incidence (n = 20 studies) or cancer death (n = 22 studies). Data Extraction All data were independently extracted by 3 investigators using a standardized data abstraction tool. Weighted averages were reported as odds ratios (ORs) with 95% confidence intervals (CIs) using a random-effects model (DerSimonian and Laird methods). Statistical heterogeneity scores were assessed with the Q statistic. Data Synthesis In meta-analyses including 6662 incident cancers and 2407 cancer deaths, statins did not reduce the incidence of cancer (OR, 1.02; 95% Cl, 0.97-1.07) or cancer deaths (OR, 1.01; 95% Cl, 0.93-1.09). No reductions were noted for any individual cancer type. This null effect on cancer incidence persisted when only hydrophilic, lipophilic, naturally derived, or synthetically derived statins were evaluated. Conclusions Statins have a neutral effect on cancer and cancer death risk in randomized controlled trials.. We found that no type of cancer was affected by statin use and no subtype of statin affected the risk of cancer.

Keywords: Artery-Disease, Average Cholesterol Concentrations, Cancer, Cardiac Outcomes, Cardiovascular-Disease, Cochrane, Confidence Intervals, Coronary-Heart-Disease, Embase, Extraction, Follow-Up, Hmg-Coa Reductase, Hypertensive Patients, Literature, Medline, Meta-Analysis, Model, Placebo-Controlled Trial, Randomized Controlled Trials, Randomized Controlled-Trial, Review, Risk, Science, Sources, Statins, Systematic, Systematic Review, Therapy, Web of Science

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Full Text: [2006\JAMA296, 974.pdf](2006/JAMA296,%20974.pdf)

Abstract: Context Pressure ulcers are common in a variety of patient settings and are associated with adverse health outcomes and high treatment costs. Objective To systematically review the evidence examining interventions to prevent pressure ulcers. Data Sources and Study Selection MEDLINE, EMBASE, and CINAHL (from inception through June 2006) and Cochrane databases (through issue 1, 2006) were searched to identify relevant randomized controlled trials (RCTs). UMI Proquest Digital Dissertations, ISI Web of Science, and Cambridge Scientific Abstracts were also searched. All searches used the terms pressure ulcer, pressure sore, decubitus, bedsore, prevention, prophylactic, reduction, randomized, and clinical trials. Bibliographies of identified articles were further reviewed. Data Synthesis Fifty-nine RCTs were selected. Interventions assessed in these studies were grouped into 3 categories, ie, those addressing impairments in mobility, nutrition, or skin health. Methodological quality for the RCTs was variable and generally suboptimal. Effective strategies that addressed impaired mobility included the use of support surfaces, mattress overlays on operating tables, and specialized foam and specialized sheepskin overlays. While repositioning is a mainstay in most pressure ulcer prevention protocols, there is insufficient evidence to recommend specific turning regimens for patients with impaired mobility. In patients with nutritional impairments, dietary supplements may be beneficial. The incremental benefit of specific topical agents over simple moisturizers for patients with impaired skin health is unclear. Conclusions Given current evidence, using support surfaces, repositioning the patient, optimizing nutritional status, and moisturizing sacral skin are appropriate strategies to prevent pressure ulcers. Although a number of RCTs have evaluated preventive strategies for pressure ulcers, many of them had important methodological limitations. There is a need for well-designed RCTs that follow standard criteria for reporting nonpharmacological interventions and that provide data on cost-effectiveness for these interventions.

Keywords: Bibliographies, Clinical Trials, Cochrane, Cost-Effectiveness, Costs, Databases, Dissertations, Elderly Patients, Embase, Health Outcomes, Hospitalized-Patients, Interventions, ISI, Medline, Nursing-Home Residents, Nutrition, Nutritional Supplementation, Outcomes, Pressure, Prevention, Quality Assessment, Randomized Controlled Trials, Relieving Devices, Review, Risk-Factors, Science, Sources, Support Surfaces, Systematic, Systematic Review, Treatment, Web of Science

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Full Text: [2007\JAMA297, 2381.pdf](2007/JAMA297,%202381.pdf)

Abstract: Context Rectal administration of artemisinin derivatives is a potentially lifesaving emergency treatment of severe malaria. Many different preparations are marketed in tropical countries, but their pharmacokinetic disposition and clinical efficacy may vary. Objective To review the pharmacokinetics, efficacy, and safety of rectally administered artesunate, artemisinin, dihydroartemisinin, and artemether. Data Sources We searched the MEDLINE, EMBASE, Cochrane Database of Clinical Reviews, Global Health, Web of Science, and CINAHL computerized databases up to December 2006, along with reviewing unpublished data from conference proceedings, pharmaceutical companies, and regulatory applications. Studies in languages other than English were translated. Study Selection Studies were included involving rectal administration of an artemisinin derivative to healthy volunteers or patients with measurement of plasma drug concentrations or rates of initial parasite clearance. Both single-arm and comparative trials were included. Data Extraction Forty-five studies were identified, of which 39 eligible studies were included in the review. Primary efficacy outcome measures included parasite density as a percentage of baseline at 12 and 24 hours following the first dose. Pharmacokinetic variables included maximum plasma concentration (C-max), time to C-max (T-max), and area under the plasma concentration-time curve. Weighted means were calculated from available data. Data Synthesis Thirty-two studies provided valid clinical efficacy data: 19 of artesunate, 10 of artemisinin, 2 of dihydroartemisinin, and 1 of artemether. All demonstrated prompt parasite clearance, with evidence of a dose-dependent effect for artesunate. Mortality rates in severe malaria (weighted means, 0%-13%) were consistent with those expected. Eight studies compared rectal artemisinin with conventional parenteral treatment (quinine, artemether, or artesunate) for severe malaria. Despite similar clinical outcomes, rectal artemisinin derivatives initiated parasite clearance more rapidly than parenteral treatment (percentage of baseline at 12 hours, <= 27% vs >= 56%, respectively). Eighteen pharmacokinetic studies were identified, including 13 of artesunate. There was marked interindividual variability in most pharmacokinetic variables, but artesunate achieved an earlier T-max and higher C-max and area under the plasma concentration - time curve than other artemisinin derivatives. Conclusions Available rectal preparations of artemisinin derivatives differ in their pharmacokinetic disposition. Most available evidence pertains to artesunate and artemisinin. Despite marked interindividual variability in bioavailability, rectal preparations appear to have acceptable therapeutic efficacy, including in severe illness.

Keywords: Acute Falciparum-Malaria, Artesunate Suppositories, Cochrane, Databases, Drug, Efficacy, Embase, Extraction, Health, Intramuscular Artemether, Intravenous Quinine, Measurement, Medline, Moderately Severe Malaria, Mortality, Outcome, Outcomes, Papua-New-Guinea, Pharmaceutical Companies, Plasma, Primary, Randomized Clinical-Trial, Review, Reviewing, Safety, Science, Sequential Treatments, Sources, Treatment, Uncomplicated Malaria, Variability, Vietnamese Patients, Web of Science

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Full Text: [2007\JAMA297, 2741.pdf](2007/JAMA297,%202741.pdf)

Abstract: Context Changes in the prevalence of chronic health conditions in childhood have considerable societal consequences for health care planning and for employment. To obtain valid and reliable estimates of the prevalence of chronic health conditions, a clear definition is needed. Objective To present an overview of all definitions and operationalizations that have been applied to measure the prevalence of chronic health conditions in childhood. Data Sources PUBMED and the Web of Science were searched for articles published up to December 2006. Also, references were searched by hand for related articles. Study Selection Non - English- and non - Dutch-language articles were excluded. of 7252 articles found, 64 articles that stated a conceptual definition and/or operationalization of chronic health conditions in children (aged 0-18 years) were included. Data Extraction Data on the (1) definition; (2) operationalization in terms of source of information, method of information retrieval, and study population; and (3) resulting prevalence rate were extracted by 2 independent reviewers. Data Synthesis A large range of definitions were in use, of which 4 were cited by many authors. Various operationalizations of the concepts that were measured were identified. Chronic health conditions in childhood prevalence estimates ranged from 0.22% to 44%, depending on these operationalizations. Conclusions The wide variability in reported prevalence rates of chronic health conditions in childhood can be explained by considerable diversity in the concepts and operationalizations used. International consensus about the conceptual definition of chronic health conditions in childhood is needed.

Keywords: Aged, Authors, Care Needs, Children, Chronic Disease, Chronic Illness, Complex Chronic Conditions, Definitions, Employment, Extraction, Health Care, Health Conditions, Identifying Children, Information, Information Retrieval, Information-Retrieval, Israeli Children, Limiting Chronic Conditions, Measurement, National Sample, Overview, Prevalence, Pubmed, Review, School-Aged Children, Science, Sources, Systematic, Systematic Review, Variability, Washington-State, Web of Science

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Full Text: [2008\JAMA299, 1937.pdf](2008/JAMA299,%201937.pdf)

Abstract: Context More than a quarter of the human population is likely infected with soil-transmitted helminths (Ascaris lumbricoides, hookworm, and Trichuris trichiura) in highly endemic areas. Preventive chemotherapy is the mainstay of control, but only 4 drugs are available: Albendazole, mebendazole, levamisole, and pyrantel pamoate. Objective To assess the efficacy of single- dose oral albendazole, mebendazole, levamisole, and pyrantel pamoate against A lumbricoides, hookworm, and T trichiura infections. Data Sources A systematic search of PUBMED, ISI Web of Science, ScienceDirect, the World Health Organization library database, and the Cochrane Central Register of Controlled Trials (1960 to August 2007). Study Selection From 168 studies, 20 randomized controlled trials were included. Data Extraction and Data Synthesis Information on study year and country, sample size, age of study population, mean infection intensity before treatment, diagnostic method used, time between evaluations before and after treatment, cure rate (the percentage of individuals who became helminth egg negative following treatment with an anthelminthic drug), egg reduction rate, adverse events, and trial quality was extracted. Relative risk, including a 95% confidence interval (CI), was used to measure the effect of the drugs on the risk of infection prevalence with a random- effects model. Results Single- dose oral albendazole, mebendazole, and pyrantel pamoate for infection withAlumbricoides resulted in cure rates of 88%(95% CI, 79%- 93%; 557 patients), 95% (95% CI, 91%- 97%; 309 patients), and 88%(95% CI, 79%- 93%; 131 patients), respectively. Cure rates for infection with T trichiura following treatment with single- dose oral albendazole and mebendazole were 28% (95% CI, 13%- 39%; 735 patients) and 36% (95% CI, 16%- 51%; 685 patients), respectively. The efficacy of single- dose oral albendazole, mebendazole, and pyrantel pamoate against hookworm infections was 72% (95% CI, 59%- 81%; 742 patients), 15%(95% CI, 1%- 27%; 853 patients), and 31%(95% CI, 19%- 42%; 152 patients), respectively. Nopooled relative risks could be calculated for pyrantel pamoate against T trichiura and levamisole for any of the parasites investigated. Conclusions Single- dose oral albendazole, mebendazole, and pyrantel pamoate show high cure rates against A lumbricoides. For hookworm infection, albendazole was more efficacious than mebendazole and pyrantel pamoate. Treatment of T trichiura with single oral doses of current anthelminthics is unsatisfactory. New anthelminthics are urgently needed.

Keywords: Albendazole, Anthelmintic Efficacy, Chemotherapy, Clinical-Trials, Cochrane, Control, Drug, Efficacy, Extraction, Health, Human, Human Hookworm Infections, Infection, ISI, Mebendazole, Meta-Analysis, Model, Neglected Tropical Diseases, Nematode Infections, Prevalence, Pubmed, Randomized Controlled Trials, Randomized Controlled-Trials, Review, Risk, Schistosomiasis, Science, Sources, Southern Region, Systematic, Systematic Review, Treatment, Web of Science

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Full Text: [2008\JAMA300, 1181.pdf](2008/JAMA300,%201181.pdf)

Abstract: Context The increasing use of Internet- based learning in health professions education may be informed by a timely, comprehensive synthesis of evidence of effectiveness. Objectives To summarize the effect of Internet- based instruction for health professions learners compared with no intervention and with non- Internet interventions. Data Sources Systematic search of MEDLINE, Scopus, CINAHL, EMBASE, ERIC, TimeLit, Web of Science, Dissertation Abstracts, and the University of Toronto Research and Development Resource Base from 1990 through 2007. Study Selection Studies in any language quantifying the association of Internet-based instruction and educational outcomes for practicing and student physicians, nurses, pharmacists, dentists, and other health care professionals compared with a no-intervention or non- Internet control group or a preintervention assessment. Data Extraction Two reviewers independently evaluated study quality and abstracted information including characteristics of learners, learning setting, and intervention (including level of interactivity, practice exercises, online discussion, and duration). Data Synthesis There were 201 eligible studies. Heterogeneity in results across studies was large (I-2 >= 79%) in all analyses. Effect sizes were pooled using a random effects model. The pooled effect size in comparison to no intervention favored Internet- based interventions and was 1.00 (95% confidence interval [ CI], 0.90- 1.10; P < .001; n= 126 studies) for knowledge outcomes, 0.85 (95% CI, 0.49- 1.20; P <.001; n= 16) for skills, and 0.82 (95% CI, 0.63- 1.02; P <.001; n= 32) for learner behaviors and patient effects. Compared with non- Internet formats, the pooled effect sizes (positive numbers favoring Internet) were 0.10 (95% CI, - 0.12 to 0.32; P=. 37; n= 43) for satisfaction, 0.12 (95% CI, 0.003 to 0.24; P=. 045; n= 63) for knowledge, 0.09 (95% CI, - 0.26 to 0.44; P=. 61; n= 12) for skills, and 0.51 (95% CI, - 0.24 to 1.25; P=. 18; n= 6) for behaviors or patient effects. No important treatment- subgroup interactions were identified. Conclusions Internet- based learning is associated with large positive effects compared with no intervention. In contrast, effects compared with non- Internet instructional methods are heterogeneous and generally small, suggesting effectiveness similar to traditional methods. Future research should directly compare different Internet- based interventions.

Keywords: Assessment, Computer-Assisted-Instruction, Continuing Medical-Education, Control, Dentists, Designs, Education, Effectiveness, Embase, Extraction, Health Care, Impact, Information, Internet, Intervention, Interventions, Knowledge, Learning, Medline, Meta-Analysis, Model, Nurses, Nursing-Education, Outcomes, Pharmacists, Physicians, Practice, Quality, Reasons, Research, Science, Scopus, Sources, Students, Systematic, Traditional, Treatment, University, Web, Web of Science

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Full Text: [2008\JAMA300, 1674.pdf](2008/JAMA300,%201674.pdf)

Abstract: Context Randomized controlled trials and meta- analyses have demonstrated that male circumcision reduces men’s risk of contracting human immunodeficiency virus (HIV) infection during heterosexual intercourse. Less is known about whether male circumcision provides protection against HIV infection among men who have sex with men (MSM). Objectives To quantitatively summarize the strength of the association between male circumcision and HIV infection and other sexually transmitted infections (STIs) across observational studies of MSM. Data Sources Comprehensive search of databases, including MEDLINE, EMBASE, ERIC, Sociofile, PsycINFO, Web of Science, and Google Scholar, and correspondence with researchers, to find published articles, conference proceedings, and unpublished reports through February 2008. Study Selection of 18 studies that quantitatively examined the association between male circumcision and HIV/ STI among MSM, 15 (83%) met the selection criteria for the meta- analysis. Data Extraction Independent abstraction was conducted by pairs of reviewers using a standardized abstraction form. Study quality was assessed using the Newcastle-ottawa Scale. Data Synthesis A total of 53 567 MSM participants (52% circumcised) were included in the meta- analysis. The odds of being HIV- positive were nonsignificantly lower among MSM who were circumcised than uncircumcised (odds ratio, 0.86; 95% confidence interval, 0.65- 1.13; number of independent effect sizes [k]= 15). Higher study quality was associated with a reduced odds of HIV infection among circumcised MSM (beta, - 0.415; P=. 01). Among MSM who primarily engaged in insertive anal sex, the association between male circumcision and HIV was protective but not statistically significant (odds ratio, 0.71; 95% confidence interval, 0.23- 2.22; k= 4). Male circumcision had a protective association with HIV in studies of MSM conducted before the introduction of highly active antiretroviral therapy (odds ratio, 0.47; 95% confidence interval, 0.32- 0.69; k= 3). Neither the association between male circumcision and other STIs (odds ratio, 1.02; 95% confidence interval, 0.83- 1.26; k= 8), nor its relationship with study quality was statistically significant (beta, 0.265; P=. 47). Conclusions Pooled analyses of available observational studies of MSM revealed insufficient evidence that male circumcision protects against HIV infection or other STIs. However, the comparable protective effect of male circumcision in MSM studies conducted before the era of highly active antiretroviral therapy, as in the recent male circumcision trials of heterosexual African men, supports further investigation of male circumcision for HIV prevention among MSM.

Keywords: Active Antiretroviral Therapy, Anal Warts, Analysis, Antiretroviral, Antiretroviral Therapy, Availability, Behavior, Correspondence, Databases, Embase, Extraction, Google Scholar, Hiv, Homosexual-Men, Human, Infection, Medline, Meta-Analysis, Observational Studies, Prevention, Randomized Controlled Trials, Ratio, Reduction, Researchers, Risk, Scale, Science, Sources, Sub-Saharan Africa, Therapy, Trial, United-States, Web of Science

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Full Text: [2008\JAMA300, 2277.pdf](2008/JAMA300,%202277.pdf)

Abstract: Context Venous thromboembolism is one of the leading causes of morbidity and mortality in patients with cancer. Concerns have arisen regarding the risk of venous thromboembolism with the novel antiangiogenic agent bevacizumab, a recombinant humanized monoclonal antibody to vascular endothelial growth factor that is widely used in cancer treatment. Currently, the role of bevacizumab in venous thromboembolism is controversial. Objective To assess the overall risk of venous thromboembolism associated with the use of bevacizumab, a systematic review and meta- analysis of published randomized controlled trials was performed. Data Sources The databases of PUBMED and Web of Science were searched for articles published in the English language from January 1966 until January 2008 and abstracts presented at American Society of Clinical Oncology conferences held between January 2000 and January 2008 were searched to identify relevant clinical trials. Study Selection and Data Extraction Eligible studies included prospective randomized controlled trials in which standard antineoplastic therapy was used with and without bevacizumab and data on venous thromboembolism were available. Summary incidence rates, relative risks (RRs), and 95% confidence intervals (CIs) were calculated using random- effects or fixed- effects models based on the heterogeneity of included studies. Data Synthesis A total of 7956 patients with a variety of advanced solid tumors from 15 randomized controlled trials were identified and included for analysis. Among those patients receiving bevacizumab, the summary incidences of all- grade and high-grade venous thromboembolism were 11.9% (95% CI, 6.8%- 19.9%) and 6.3% (95% CI, 4.8%- 8.3%), respectively. Patients treated with bevacizumab had a significantly increased risk of venous thromboembolism with an RR of 1.33 (95% CI, 1.13- 1.56; P <. 001) compared with controls. The risk was significantly increased for both all-grade and high- grade venous thromboembolism. In addition, the risk was similarly increased for bevacizumab at 2.5 mg/ kg per week (low dose; RR, 1.31 [95% CI, 1.08-1.60]; P=. 007) and 5 mg/ kg per week (high dose; RR, 1.31 [95% CI, 1.02- 1.68]; P=. 04). Conclusion The use of bevacizumab was significantly associated with an increased risk of developing venous thromboembolism in cancer patients receiving this drug.

Keywords: Analysis, Angiogenesis, Bevacizumab, Breast-Cancer, Cancer, Cell Lung-Cancer, Chemotherapy, Clinical Trials, Combination, Confidence Intervals, Databases, Drug, Endothelial Growth-Factor, Extraction, Fluorouracil, Leucovorin, Meta Analysis, Meta-Analysis, Metastatic Colorectal-Cancer, Morbidity, Mortality, Oncology, Phase-Ii Trial, Pubmed, Randomized Controlled Trials, Randomized-Trial, Review, Risk, Science, Sources, Systematic, Systematic Review, Therapy, Treatment, Vascular Endothelial Growth Factor, Web of Science

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Full Text: [2008\JAMA300, 2407.pdf](2008/JAMA300,%202407.pdf)

Abstract: Context Recent studies of inhaled corticosteroid (ICS) therapy for managing stable chronic obstructive pulmonary disease (COPD) have yielded conflicting results regarding survival and risk of adverse events. Objective To systematically review and quantitatively synthesize the effects of ICS therapy on mortality and adverse events in patients with stable COPD. Data Sources Search of MEDLINE, CENTRAL, EMBASE, CINAHL, Web of Science, and PsychInfo through February 9, 2008. Study Selection Eligible studies were double- blind, randomized controlled trials comparing ICS therapy for 6 or more months with nonsteroid inhaled therapy in patients with COPD. Data Extraction Two authors independently abstracted data including study characteristics, all- cause mortality, pneumonia, and bone fractures. The (2) statistic was used to assess heterogeneity. Study- level data were pooled using a random- effects model (when I-2 >= 50%) or a fixed- effects model (when I-2 < 50%). For the primary outcome of all- cause mortality at 1 year, our meta- analysis was powered to detect a 1.0% absolute difference in mortality, assuming a 2- sided alpha of .05 and power of 0.80. Results Eleven eligible randomized controlled trials (14 426 participants) were included. In trials with mortality data, no difference was observed in 1- year all- cause mortality (128 deaths among 4636 patients in the treatment group and 148 deaths among 4597 patients in the control group; relative risk [ RR], 0.86; 95% confidence interval [ CI], 0.68- 1.09; P=. 20; I-2= 0%). In the trials with data on pneumonia, ICS therapy was associated with a significantly higher incidence of pneumonia (777 cases among 5405 patients in the treatment group and 561 cases among 5371 patients in the control group; RR, 1.34; 95% CI, 1.03- 1.75; P=. 03; I-2= 72%). Subgroup analyses indicated an increased risk of pneumonia in the following subgroups: highest ICS dose (RR, 1.46; 95% CI, 1.10- 1.92; P=. 008; I-2 = 78%), shorter duration of ICS use (RR, 2.12; 95% CI, 1.47-3.05; P <. 001; I-2= 0%), lowest baseline forced expiratory volume in the first second of expiration (RR, 1.90; 95% CI, 1.26- 2.85; P=. 002; I-2= 0%), and combined ICS and bronchodilator therapy (RR, 1.57; 95% CI, 1.35- 1.82; P <. 001; I-2= 24%). Conclusions Among patients with COPD, ICS therapy does not affect 1- year all-cause mortality. ICS therapy is associated with a higher risk of pneumonia. Future studies should determine whether specific subsets of patients with COPD benefit from ICS therapy.

Keywords: Analysis, Authors, Bone, Budesonide, Chronic Obstructive Pulmonary Disease, Community-Acquired Pneumonia, Control, Copd, Corticosteroid, Disease, Embase, Extraction, Fluticasone Propionate, Inflammation, Lung-Function, Medline, Meta Analysis, Meta-Analysis, Model, Mortality, Outcome, Primary, Randomized Controlled Trials, Relative Risk, Review, Risk, Salmeterol, Salmeterol, Fluticasone Propionate, Science, Sources, Survival, Systematic, Systematic Review, Therapy, Treatment, Trial, Web of Science

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Full Text: [2008\JAMA300, 2765.pdf](2008/JAMA300,%202765.pdf)

Abstract: Context Colorectal cancer is the third most common form of cancer and the fourth most frequent cause of cancer deaths worldwide. The association between cigarette smoking and colorectal cancer has been inconsistent among studies. Objective To clarify the association of cigarette smoking and colorectal cancer, we performed a comprehensive literature search and a meta- analysis of observational studies considering both incidence and mortality. Data Sources We performed a literature search using PUBMED, ISI Web of Science (Science Citation Index Expanded), and EMBASE to May 2008, with no restrictions. We also reviewed references from all retrieved articles. Study Selection All articles that were independent and contained the minimum information necessary to estimate the colorectal cancer risk associated with cigarette smoking and a corresponding measure of uncertainty. Data Extraction Articles were reviewed and data were extracted and crosschecked independently by 3 investigators, and any disagreement was resolved by consensus among all 3. Results One hundred six observational studies were included in the analysis of incidence. Twenty- six studies provided adjusted risk estimates for ever smokers vs never smokers, leading to a pooled relative risk of 1.18 (95% confidence interval [CI], 1.11-1.25). Smoking was associated with an absolute risk increase of 10.8 cases per 100 000 person- years (95% CI, 7.9- 13.6). We found a statistically significant dose-relationship with an increasing number of pack- years and cigarettes per day. However, the association was statistically significant only after 30 years of smoking. Seventeen cohort studies were included in the analysis of mortality. The pooled risk estimate for ever vs never smokers was 1.25 (95% CI, 1.14- 1.37). Smoking was associated with an absolute risk increase of 6.0 deaths per 100 000 person- years (95% CI, 4.2-7.6). For both incidence and mortality, the association was stronger for cancer of the rectum than of the colon. Conclusion Cigarette smoking is significantly associated with colorectal cancer incidence and mortality.

Keywords: 26-Year Follow-Up, Alcohol-Consumption, Analysis, Articles, Cancer, Cigarette-Smoking, Citation, Cohort Studies, Colon-Cancer, Colorectal Cancer, Embase, Extraction, Information, ISI, Japanese Men, Life-Style, Literature, Male British Doctors, Meta Analysis, Meta-Analysis, Mortality, Observational Studies, Pubmed, Rectal-Cancer, Relative Risk, Risk, Risk-Factors, Science, Science Citation Index, Singapore-Chinese Health, Smoking, Sources, Web of Science

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Full Text: [2008\JAMA300, 2886.pdf](2008/JAMA300,%202886.pdf)

Abstract: Context Low birth weight is implicated as a risk factor for type 2 diabetes. However, the strength, consistency, independence, and shape of the association have not been systematically examined. Objective To conduct a quantitative systematic review examining published evidence on the association of birth weight and type 2 diabetes in adults. Data Sources and Study Selection Relevant studies published by June 2008 were identified through literature searches using EMBASE (from 1980), MEDLINE (from 1950), and Web of Science (from 1980), with a combination of text words and Medical Subject Headings. Studies with either quantitative or qualitative estimates of the association between birth weight and type 2 diabetes were included. Data Extraction Estimates of association (odds ratio [ OR] per kilogram of increase in birth weight) were obtained from authors or from published reports in models that allowed the effects of adjustment (for body mass index and socioeconomic status) and the effects of exclusion (for macrosomia and maternal diabetes) to be examined. Estimates were pooled using random- effects models, allowing for the possibility that true associations differed between populations. Data Synthesis of 327 reports identified, 31 were found to be relevant. Data were obtained from 30 of these reports (31 populations; 6090 diabetes cases; 152 084 individuals). Inverse birth weight - type 2 diabetes associations were observed in 23 populations (9 of which were statistically significant) and positive associations were found in 8 (2 of which were statistically significant). Appreciable heterogeneity between populations (l(2)= 66%; 95% confidence interval [ CI], 51%- 77%) was largely explained by positive associations in 2 native North American populations with high prevalences of maternal diabetes and in 1 other population of young adults. In the remaining 28 populations, the pooled OR of type 2 diabetes, adjusted for age and sex, was 0.75 (95% CI, 0.70- 0.81) per kilogram. The shape of the birth weight - type 2 diabetes association was strongly graded, particularly at birth weights of 3 kg or less. Adjustment for current body mass index slightly strengthened the association (OR, 0.76 [ 95% CI, 0.70-0.82] before adjustment and 0.70 [ 95% CI, 0.65- 0.76] after adjustment). Adjustment for socioeconomic status did not materially affect the association (OR, 0.77 [ 95% CI, 0.70- 0.84] before adjustment and 0.78 [ 95% CI, 0.72- 0.84] after adjustment). There was no strong evidence of publication or small study bias. Conclusion In most populations studied, birth weight was inversely related to type 2 diabetes risk.

Keywords: Adult Chronic Disease, Adults, Authors, Bias, Body Mass Index, Body-Mass Index, British Womens Heart, Cardiovascular Risk, Diabetes, Embase, Extraction, Fetal-Growth, Impaired Glucose-Tolerance, Insulin-Resistance, Later Life, Literature, Maternal Smoking, Medline, Metabolic Syndrome, Publication, Quantitative, Ratio, Review, Risk, Science, Socioeconomic Status, Sources, Systematic, Systematic Review, Type 2, Type 2 Diabetes, Web of Science, Young Adults

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Full Text: [2009\JAMA301, 1909.pdf](2009/JAMA301,%201909.pdf)

Abstract: Context Randomized trials have shown that aspirin decreases the risk of cardiovascular events in patients with symptomatic coronary and cerebrovascular disease. Despite guideline recommendations for secondary prevention in peripheral artery disease (PAD), the effect of aspirin in this population is not well established. Objective To investigate the effect of aspirin on cardiovascular event rates in patients with PAD. Data Sources and Study Selection MEDLINE, the Cochrane Central Register of Controlled Trials, EMBASE, Science Citation Index (1966 to December 2008), and unpublished studies from the supplemental index of the Antithrombotic Trialists’ Collaboration. Eligible studies were prospective, randomized controlled trials of aspirin therapy, with or without dipyridamole that reported cardiovascular event rates. Eighteen trials involving 5269 individuals were identified. Data Extraction Studies were reviewed to determine the number of participants, mean follow-up, and the primary end point of cardiovascular events (nonfatal myocardial infarction [MI], nonfatal stroke, and cardiovascular death). Data on the secondary end points of all-cause mortality, major bleeding, and the individual components of the primary outcome measure were also abstracted. For the primary end point, the analysis had 88% power to detect a 25% reduction and 70% power to detect a 20% reduction in cardiovascular events in the aspirin group compared with the control group. Data Synthesis Among 5269 participants, cardiovascular events were experienced by 251 (8.9%) of 2823 patients taking aspirin (alone or with dipyridamole) and by 269 (11.0%) of 2446 in the control group (pooled relative risk [RR], 0.88; 95% confidence interval [CI], 0.76-1.04). Aspirin therapy was associated with a reduction in the secondary outcome of nonfatal stroke (52 of 2823 vs 76 of 2446; RR, 0.66; 95% CI, 0.47-0.94) but was not associated with significant reductions in all-cause or cardiovascular mortality, MI, or major bleeding. In the subset of 3019 participants taking aspirin alone vs control, aspirin was associated with a nonsignificant reduction in cardiovascular events (125 of 1516 vs 144 of 1503; RR, 0.75; 95% CI, 0.48-1.18), a significant reduction in nonfatal stroke (32 of 1516 vs 51 of 1503; RR, 0.64; 95% CI, 0.42-0.99), but no statistically significant reductions in all-cause or cardiovascular mortality, MI, or major bleeding. Conclusions In patients with PAD, treatment with aspirin alone or with dipyridamole resulted in a statistically nonsignificant decrease in the primary end point of cardiovascular events and a significant reduction in nonfatal stroke. Results for the primary end point may reflect limited statistical power. Additional randomized controlled trials of aspirin therapy are needed to establish the net benefit and bleeding risks in PAD. JAMA. 2009;301(18):1909-1919 www.jama.com.

Keywords: Antiplatelet Therapy, Citation, Double-Blind Trial, Inflammatory Markers, Low-Dose Aspirin, Lower-Extremity, Medline, Meta-Analysis, Mortality, Myocardial-Infarction, Occlusive Disease, Placebo-Controlled Trial, Platelet Inhibition, Science, Vascular-Surgery

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Full Text: [2009\JAMA302, 179.pdf](2009/JAMA302,%20179.pdf)

Abstract: Context The association of obesity with development of type 2 diabetes may be partly mediated by altered secretion of adipokines by adipose tissue. Greater adiposity down-regulates secretion of adiponectin, an adipokine with anti-inflammatory and insulin-sensitizing properties. The strength and consistency of the relation between plasma adiponectin and risk of type 2 diabetes is unclear. Objective To systematically review prospective studies of the association of plasma adiponectin levels and risk of type 2 diabetes. Data Sources A systematic search of the MEDLINE, EMBASE, and Science Citation Index Expanded databases using adiponectin and diabetes and various synonyms and reference lists of retrieved articles up to April 10, 2009. Study Selection We included prospective studies with plasma adiponectin levels as the exposure and incidence of type 2 diabetes as the outcome variable. Data Extraction Two reviewers independently extracted data and assessed study quality. Generalized least-squares trend estimation was used to assess dose-response relationships. Pooled relative risks and 95% confidence intervals were calculated using random-effects models to incorporate between-study variation. Results Thirteen prospective studies with a total of 14 598 participants and 2623 incident cases of type 2 diabetes were included in the meta-analysis. Higher adiponectin levels were monotonically associated with a lower risk of type 2 diabetes. The relative risk of type 2 diabetes was 0.72 (95% confidence interval, 0.67-0.78) per 1-log mu g/mL increment in adiponectin levels. This inverse association was consistently observed in whites, East Asians, Asian Indians, African Americans, and Native Americans and did not differ by adiponectin assay, method of diabetes ascertainment, duration of follow-up, or proportion of women. The estimated absolute risk difference (cases per 1000 person-years) per 1-log mu g/mL increment in adiponectin levels was 3.9 for elderly Americans and 30.8 for Americans with impaired glucose tolerance. Conclusion Higher adiponectin levels are associated with a lower risk of type 2 diabetes across diverse populations, consistent with a dose-response relationship. JAMA. 2009;302(2):179-188 www.jama.com.

Keywords: Citation, Concentrations Predict, Dose-Response Data, Follow-Up, Insulin-Resistance, Medline, Meta-Analysis, Metabolic Syndrome, Molecular-Weight Adiponectin, Older Men, Plasma Adiponectin, Progression, Quality, Review, Science, Trend Estimation

? de Almeida, J.R., Al Khabori, M., Guyatt, G.H., Witterick, I.J., Lin, V.Y.W., Nedzelski, J.M. and Chen, J.M. (2009), Combined corticosteroid and antiviral treatment for bell palsy: A systematic review and meta-analysis. *JAMA-Journal of the American Medical Association*, **302** (9), 985-993.

Full Text: [2009\JAMA302, 985.pdf](2009/JAMA302,%20985.pdf)

Abstract: Context New evidence has emerged regarding the use of corticosteroids and antiviral agents in Bell palsy. Objective To estimate the association of corticosteroids and antiviral agents with the risk of unsatisfactory facial recovery in patients with Bell palsy. Data Sources The search included MEDLINE, EMBASE, CENTRAL, PsychInfo, CINAHL, Web of Science, PAPERSFIRST, PROCEEDINGSFIRST, and PROQUEST to identify studies up to March 1, 2009. Study Selection and Data Extraction Eligible studies were randomized controlled trials comparing treatment with either corticosteroids or antiviral agents with a control and measuring at least 1 of the following outcomes: unsatisfactory facial recovery (>= 4 months), unsatisfactory short-term recovery (6 weeks to < 4 months), synkinesis and autonomic dysfunction, or adverse effects. Two reviewers extracted data on study characteristics, methods, and outcomes. Disagreement was resolved by consensus. Results Eighteen trials involving 2786 patients were eligible. Regression analysis identified a synergistic effect when corticosteroids and antiviral agents were administered in combination compared with alone (odds ratio for interaction term, 0.54 [95% confidence interval {CI}, 0.35-0.83]; P=.004). Meta-analysis using a random-effects model showed corticosteroids alone were associated with a reduced risk of unsatisfactory recovery (relative risk [RR], 0.69 [95% CI, 0.55-0.87]; P=.001) (number needed to treat to benefit 1 person, 11 [95% CI, 8-25]), a reduced risk of synkinesis and autonomic dysfunction (RR, 0.48 [95% CI, 0.36-0.65]; P < .001) (number needed to treat to benefit 1 person, 7 [95% CI, 6-10]), and no increase in adverse effects. Antiviral agents alone were not associated with a reduced risk of unsatisfactory recovery (RR, 1.14[95% CI, 0.80-1.62]; P=.48). When combined with antiviral agents, corticosteroids were associated with greater benefit (RR, 0.48 [95% CI, 0.29-0.79]; P=.004) than antiviral agents alone. When combined with corticosteroids, antiviral agents were associated with greater risk reduction of borderline significance compared with corticosteroids alone (RR, 0.75 [95% CI, 0.56-1.00]; P=.05). Conclusions In Bell palsy, corticosteroids are associated with a reduced risk of unsatisfactory recovery. Antiviral agents, when administered with corticosteroids, may be associated with additional benefit. JAMA .2009;302(9):985-993 www.jama.com.

Keywords: Acyclovir, Adverse Effects, Analysis, Control, Double-Blind, Embase, Extraction, Facial-Nerve Paralysis, Grading System, Herpes-Simplex-Virus, Medline, Meta Analysis, Meta-Analysis, Model, Outcomes, Polymerase-Chain-Reaction, Prednisolone, Ramsay-Hunt-Syndrome, Randomized Controlled Trials, Ratio, Relative Risk, Review, Risk, Risk Reduction, Science, Sine Herpete, Sources, Systematic, Systematic Review, Treatment, Varicella-Zoster-Virus, Web of Science

? Kulkarni, A.V., Aziz, B., Shams, I. and Busse, J.W. (2009), Comparisons of citations in Web of Science, Scopus, and Google Scholar for articles published in general medical journals. *JAMA-Journal of the American Medical Association*, **302** (10), 1092-1096.

Full Text: [2009\JAMA302, 1092.pdf](2009/JAMA302,%201092.pdf)

Abstract: Context Until recently, Web of Science was the only database available to track citation counts for published articles. Other databases are now available, but their relative performance has not been established. Objective To compare the citation count profiles of articles published in general medical journals among the citation databases of Web of Science, Scopus, and Google Scholar. Design Cohort study of 328 articles published in JAMA, Lancet, or the New England Journal of Medicine between October 1, 1999, and March 31, 2000. Total citation counts for each article up to June 2008 were retrieved from Web of Science, Scopus, and Google Scholar. Article characteristics were analyzed in linear regression models to determine interaction with the databases. Main Outcome Measures Number of citations received by an article since publication and article characteristics associated with citation in databases. Results Google Scholar and Scopus retrieved more citations per article with a median of 160 (interquartile range [IQR], 83 to 324) and 149 (IQR, 78 to 289), respectively, than Web of Science (median, 122; IQR, 66 to 241) (P<.001 for both comparisons). Compared with Web of Science, Scopus retrieved more citations from non-English-language sources (median, 10.2% vs 4.1%) and reviews (30.8% vs 18.2%), and fewer citations from articles (57.2% vs 70.5%), editorials (2.1% vs 5.9%), and letters (0.8% vs 2.6%) (all P<.001). On a log(10)-transformed scale, fewer citations were found in Google Scholar to articles with declared industry funding (nonstandardized regression coefficient, -0.09; 95% confidence interval [CI], -0.15 to -0.03), reporting a study of a drug or medical device (-0.05; 95% CI, -0.11 to 0.01), or with group authorship (-0.29; 95% CI, -0.35 to -0.23). In multivariable analysis, group authorship was the only characteristic that differed among the databases; Google Scholar had significantly fewer citations to group-authored articles (-0.30; 95% CI, -0.36 to -0.23) compared with Web of Science. Conclusion Web of Science, Scopus, and Google Scholar produced quantitatively and qualitatively different citation counts for articles published in 3 general medical journals. JAMA. 2009;302(10):1092-1096 www.jama.com.

Keywords: Analysis, Articles, Authorship, Citation, Citation Counts, Citations, Databases, Drug, England, Funding, Google Scholar, Impact, Industry, Journal, Journals, Medical, Medical Journals, Of-Science, Publication, Science, Scopus, Web of Science

? Kogan, J.R., Holmboe, E.S. and Hauer, K.E. (2009), Tools for direct observation and assessment of clinical skills of medical trainees: A systematic review. *JAMA-Journal of the American Medical Association*, **302** (12), 1316-1326.

Full Text: [2009\JAMA302, 1316.pdf](2009/JAMA302,%201316.pdf)

Abstract: Context Direct observation of medical trainees with actual patients is important for performance-based clinical skills assessment. Multiple tools for direct observation are available, but their characteristics and outcomes have not been compared systematically. Objectives To identify observation tools used to assess medical trainees’ clinical skills with actual patients and to summarize the evidence of their validity and outcomes. Data Sources Electronic literature search of PUBMED, ERIC, CINAHL, and Web of Science for English-language articles published between 1965 and March 2009 and review of references from article bibliographies. Study Selection Included studies described a tool designed for direct observation of medical trainees’ clinical skills with actual patients by educational supervisors. Tools used only in simulated settings or assessing surgical/procedural skills were excluded. of 10 672 citations, 199 articles were reviewed and 85 met inclusion criteria. Data Extraction Two authors independently abstracted studies using a modified Best Evidence Medical Education coding form to inform judgment of key psychometric characteristics. Differences were reconciled by consensus. Results A total of 55 tools were identified. Twenty-one tools were studied with students and 32 with residents or fellows. Two were used across the educational continuum. Most (n = 32) were developed for formative assessment. Rater training was described for 26 tools. Only 11 tools had validity evidence based on internal structure and relationship to other variables. Trainee or observer attitudes about the tool were the most commonly measured outcomes. Self-assessed changes in trainee knowledge, skills, or attitudes (n = 9) or objectively measured change in knowledge or skills (n = 5) were infrequently reported. The strongest validity evidence has been established for the Mini Clinical Evaluation Exercise (Mini-CEX). Conclusion Although many tools are available for the direct observation of clinical skills, validity evidence and description of educational outcomes are scarce. JAMA. 2009;302(12):1316-1326.

Keywords: Assessment, Authors, Citations, Coding, Communication-Skills, Education, Evaluation, Exercise, Exercise Mini-Cex, Extraction, General-Practice, Internal-Medicine, Interpersonal Skills, Interrater Reliability, Knowledge, Literature, Medical, Observation, Outcomes, Physical-Examination, Pubmed, Resident Performance, Residents, Review, Science, Sources, Students, Surgical Clerkship, Systematic, Systematic Review, Training, Validity, Videotaped Patient Encounters, Web of Science

? Coker, T.R., Chan, L.S., Newberry, S.J., Limbos, M.A., Suttorp, M.J., Shekelle, P.G. and Takata, G.S. (2010), Diagnosis, microbial epidemiology, and antibiotic treatment of acute otitis media in children: A systematic review. *JAMA-Journal of the American Medical Association*, **304** (19), 2161-2169.

Full Text: [2010\JAMA304, 2161.pdf](2010/JAMA304,%202161.pdf)

Abstract: Context Acute otitis media (AOM) is the most common condition for which antibiotics are prescribed for US children; however, wide variation exists in diagnosis and treatment. Objectives To perform a systematic review on AOM diagnosis, treatment, and the association of heptavalent pneumococcal conjugate vaccine (PCV7) use with AOM microbiology. Data Sources PUBMED, Cochrane Databases, and Web of Science, searched to identify articles published from January 1999 through July 2010. Study Selection Diagnostic studies with a criterion standard, observational studies and randomized controlled trials comparing AOM microbiology with and without PCV7, and randomized controlled trials assessing antibiotic treatment. Data Extraction Independent article review and study quality assessment by 2 investigators with consensus resolution of discrepancies. Results of 8945 citations screened, 135 were included. Meta-analysis was performed for comparisons with 3 or more trials. Few studies examined diagnosis; otoscopic findings of tympanic membrane bulging (positive likelihood ratio, 51[95% confidence interval {CI}, 36-73]) and redness (positive likelihood ratio, 8.4 [95% CI, 7-11]) were associated with accurate diagnosis. In the few available studies, prevalence of Streptococcus pneumoniae decreased (eg, 33%-48% vs 23%-31% of AOM isolates), while that of Haemophilus influenzae increased (41%-43% vs 56%-57%) pre-vs post-PCV7. Short-term clinical success was higher for immediate use of ampicillin or amoxicillin vs placebo(73% vs 60%; pooled rate difference, 12% [95% CI, 5%-18%]; number needed to treat, 9 [95% CI, 6-20]), while increasing the rate of rash or diarrhea by 3% to 5%. Two of 4 studies showed greater clinical success for immediate vs delayed antibiotics(95% vs 80%; rate difference, 15% [95% CI, 6%-24%] and 86% vs 70%; rate difference, 16% [95% CI, 6%-26%]). Data are absent on long-term effects on antimicrobial resistance. Meta-analyses in general showed no significant differences in antibiotic comparative effectiveness. Conclusions Otoscopic findings are critical to accurate AOM diagnosis. AOM microbiology has changed with use of PCV7. Antibiotics are modestly more effective than no treatment but cause adverse effects in 4% to 10% of children. Most antibiotics have comparable clinical success. JAMA. 2010; 304(19): 2161-2169.

Keywords: Adverse Effects, Amoxicillin, Antibiotic, Antibiotics, Assessment, Cefaclor, Children, Citations, Clinical-Efficacy, Cochrane, Databases, Diagnosis, Double-Blind Trial, Effectiveness, Epidemiology, Extraction, General-Practice, Management, Media, Meta Analysis, Meta-Analysis, Observational Studies, Placebo, Pneumococcal Conjugate Vaccine, Prescribing Strategies, Prevalence, Pubmed, Randomized Controlled Trials, Randomized Controlled-Trial, Ratio, Resistance, Review, Science, Sources, Success, Systematic, Systematic Review, Treatment, Us, Vaccine, Web of Science

? Ranpura, V., Hapani, S. and Wu, S.H. (2011), Treatment-related mortality with bevacizumab in cancer patients: A meta-analysis. *JAMA-Journal of the American Medical Association*, **305** (5), 487-494.

Full Text: [2011\JAMA305, 487.pdf](2011/JAMA305,%20487.pdf)

Abstract: Context Fatal adverse events (FAEs) have been reported in cancer patients treated with the widely used angiogenesis inhibitor bevacizumab in combination with chemotherapy. Currently, the role of bevacizumab in treatment-related mortality is not clear. Objective To perform a systematic review and meta-analysis of published randomized controlled trials (RCTs) to determine the overall risk of FAEs associated with bevacizumab. Data Sources PUBMED, EMBASE, and Web of Science databases as well as abstracts presented at American Society of Clinical Oncology conferences from January 1966 to October 2010 were searched to identify relevant studies. Study Selection and Data Extraction Eligible studies included prospective RCTs in which bevacizumab in combination with chemotherapy or biological therapy was compared with chemotherapy or biological therapy alone. Summary incidence rates, relative risks (RRs), and 95% confidence intervals (CIs) were calculated using fixed-or random-effects models. Data Synthesis A total of 10 217 patients with a variety of advanced solid tumors from 16 RCTs were included in the analysis. The overall incidence of FAEs with bevacizumab was 2.5% (95% CI, 1.7%-3.9%). Compared with chemotherapy alone, the addition of bevacizumab was associated with an increased risk of FAEs, with an RR of 1.46 (95% CI, 1.09-1.94; P=.01; incidence, 2.5% vs 1.7%). This association varied significantly with chemotherapeutic agents (P=.045) but not with tumor types (P=.13) or bevacizumab doses (P=.16). Bevacizumab was associated with an increased risk of FAEs in patients receiving taxanes or platinum agents (RR, 3.49; 95% CI, 1.82-6.66; incidence, 3.3% vs 1.0%) but was not associated with increased risk of FAEs when used in conjunction with other agents (RR, 0.85; 95% CI, 0.25-2.88; incidence, 0.8% vs 0.9%). The most common causes of FAEs were hemorrhage (23.5%), neutropenia (12.2%), and gastrointestinal tract perforation (7.1%). Conclusion In a meta-analysis of RCTs, bevacizumab in combination with chemotherapy or biological therapy, compared with chemotherapy alone, was associated with increased treatment-related mortality. JAMA. 2011;305(5):487-494 www.jama.com.

Keywords: 1st-Line Therapy, Adverse Drug-Reactions, Analysis, Angiogenesis, Bevacizumab, Breast-Cancer, Cancer, Cell Lung-Cancer, Chemotherapy, Clinical-Trials, Combination, Confidence Intervals, Databases, Embase, Endothelial Growth-Factor, Extraction, Gastrointestinal, Meta Analysis, Meta-Analysis, Metastatic Colorectal-Cancer, Mortality, Oncology, Phase-Iii Trial, Pubmed, Randomized Controlled Trials, Review, Risk, Science, Sources, Systematic, Systematic Review, Therapy, Tract, Tumor-Growth, Web of Science

? Dahabreh, I.J. and Paulus, J.K. (2011), Association of episodic physical and sexual activity with triggering of acute cardiac events systematic: Review and meta-analysis. *JAMA-Journal of the American Medical Association*, **305** (12), 1225-1233.

Full Text: [2011\JAMA305, 1225.pdf](2011/JAMA305,%201225.pdf)

Abstract: Context Evidence has suggested that physical and sexual activity might be triggers of acute cardiac events. Objective To assess the effect of episodic physical and sexual activity on acute cardiac events using data from case-crossover studies. Data Sources MEDLINE and EMBASE (through February 2, 2011) and Web of Science (through October 6, 2010). Study Selection Case-crossover studies investigating the association between episodic physical or sexual activity and myocardial infarction (MI) or sudden cardiac death (SCD). Data Extraction Two reviewers extracted descriptive and quantitative information from each study. We calculated summary relative risks (RRs) using random-effects meta-analysis and absolute event rates based on US data for the incidence of MI and SCD. We used the Fisher P value synthesis method to test whether habitual physical activity levels modify the triggering effect and meta-regression to quantify the interaction between habitual levels of physical activity and the triggering effect. Results We identified 10 studies investigating episodic physical activity, 3 studies investigating sexual activity, and 1 study investigating both exposures. The outcomes of interest were MI (10 studies), acute coronary syndrome (1 study), and SCD (3 studies). Episodic physical and sexual activity were associated with an increase in the risk of MI (RR=3.45; 95% confidence interval [CI], 2.33-5.13, and RR=2.70; 95% CI, 1.48-4.91, respectively). Episodic physical activity was associated with SCD (RR=4.98; 95% CI, 1.47-16.91). The effect of triggers on the absolute rate of events was limited because exposure to physical and sexual activity is infrequent and their effect is transient; the absolute risk increase associated with 1 hour of additional physical or sexual activity per week was estimated as 2 to 3 per 10 000 person-years for MI and 1 per 10 000 person-years for SCD. Habitual activity levels significantly affected the association of episodic physical activity and MI (P<.001), episodic physical activity and SCD (P<.001), and sexual activity and MI (P=.04); in all cases, individuals with lower habitual activity levels had an increased RR for the triggering effect. For every additional time per week an individual was habitually exposed to physical activity, the RR for MI decreased by approximately 45%, and the RR for SCD decreased by 30%. Conclusion Acute cardiac events were significantly associated with episodic physical and sexual activity; this association was attenuated among persons with high levels of habitual physical activity. JAMA. 2011; 305(12): 1225-1233.

Keywords: Acute Cardiovascular-Disease, Acute Coronary Syndrome, Acute Coronary Syndromes, Acute Myocardial-Infarction, American-Heart-Association, Case-Crossover Analysis, Circadian Variation, Embase, Epidemiology Program Sheep, Exertion, Extraction, Information, Interest, Medline, Meta Analysis, Meta-Analysis, Myocardial Infarction, Outcomes, Physical Activity, Quantitative, Review, Risk, Science, Sources, Systematic, Systematic Review, United-States, US, Web of Science

? Ioannidis, J.P.A. and Panagiotou, O.A. (2011), Comparison of effect sizes associated with biomarkers reported in highly cited individual articles and in subsequent meta-analyses. *JAMA-Journal of the American Medical Association*, **305** (21), 2200-2210.

Full Text: [2011\JAMA305, 2200.pdf](2011/JAMA305,%202200.pdf)

Abstract: Context Many biomarkers are proposed in highly cited studies as determinants of disease risk, prognosis, or response to treatment, but few eventually transform clinical practice. Objective To examine whether the magnitude of the effect sizes of biomarkers proposed in highly cited studies is accurate or overestimated. Data Sources We searched ISI Web of Science and MEDLINE until December 2010. Study Selection We included biomarker studies that had a relative risk presented in their abstract. Eligible articles were those that had received more than 400 citations in the ISI Web of Science and that had been published in any of 24 highly cited biomedical journals. We also searched MEDLINE for subsequent meta-analyses on the same associations (same biomarker and same outcome). Data Extraction In the highly cited studies, data extraction was focused on the disease/outcome, biomarker under study, and first reported relative risk in the abstract. From each meta-analysis, we extracted the overall relative risk and the relative risk in the largest study. Data extraction was performed independently by 2 investigators. Results We evaluated 35 highly cited associations. For 30 of the 35 (86%), the highly cited studies had a stronger effect estimate than the largest study; for 3 the largest study was also the highly cited study; and only twice was the effect size estimate stronger in the largest than in the highly cited study. For 29 of the 35 (83%) highly cited studies, the corresponding meta-analysis found a smaller effect estimate. Only 15 of the associations were nominally statistically significant based on the largest studies, and of those only 7 had a relative risk point estimate greater than 1.37. Conclusion Highly cited biomarker studies often report larger effect estimates for postulated associations than are reported in subsequent meta-analyses evaluating the same associations. JAMA. 2011;305(21):2200-2210 www.jama.com.

Keywords: Biomedical, Breast-Cancer, C-Reactive Protein, Citations, Coronary-Heart-Disease, Growth-Factor-I, Helicobacter-Pylori Infection, Journals, Lymphotoxin-Alpha Gene, Medline, Meta-Analysis, Myocardial-Infarction, Platelet Glycoprotein Receptor, Prostate-Cancer Risk, Type-2 Diabetes-Mellitus, Web of Science

# Title: Journal of the American Oriental Society

Full Journal Title: Journal of the American Oriental Society

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Kamberi, D. (1995), Garments from top to toe: Eastern Turki texts relating to articles of clothing - Jarring, G. *Journal of the American Oriental Society*, **115** (1), 140-141.

Keywords: Articles

# Title: Journal of the American Osteopathic Association

Full Journal Title: Journal of the American Osteopathic Association

ISO Abbreviated Title: J. Am. Osteopath. Assoc.

JCR Abbreviated Title: J Am Osteopath Assoc

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

? Licciardone, J.C. (1999), Health hazards reported by international travelers. *Journal of the American Osteopathic Association*, **99** (4), 206-208.

Abstract: International travel projections suggest that physicians will be increasingly involved in counseling their traveling patients on the prevention of health hazards. A mail survey of 121 returning international travelers indicated that their leading problems involved drinking water (odds ratio [OR], 19.4; 95% confidence interval [CI], 9.6 to 39.1), sanitation (OR, 13.8; 95% CI, 6.9 to 27.5), jet lag (OR, 12.4; 95% CI, 6.2 to 24.6), and food (OR, 9.5; 95% CI, 4.8 to 18.8). Medication for treatment of travelers’ diarrhea and countermeasures for jet lag were not significantly associated with better outcomes. Compliance with malaria chemoprophylaxis was greater than previously reported.

# Title: Journal of the American Oil Chemists Society

Full Journal Title: [Journal of the American Oil Chemists Society](http://www.nonprofitjournals.org/journals/oil_chemists.htm)

ISO Abbreviated Title: J. Am. Oil Chem. Soc.

JCR Abbreviated Title: J Am Oil Chem Soc

ISSN: 0003-021X

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Amer Oil Chemists Soc A O C S Press

Publisher Address: 1608 Broadmoor Drive, Champaign, IL 61821-0489

Subject Categories:

Chemistry, Applied: Impact Factor 1.278, 12/55 (2000)

Food Science & Technology: Impact Factor

Krishna, A.G.G. (1992), A method for bleaching rice bran oil with silica-gel. *Journal of the American Oil Chemists Society*, **69** (12), 1257-1259.

Abstract: The color of bleached rice bran oil can be improved by silica gel treatment of the oil miscella before or after dewaxing. A silica gel/oil/solvent ratio of 1:5:5 (wt/wt/vol) is suitable. Silica gel treatment can be carried out either by column percolation or by merely shaking the miscella with the gel followed by decantation. However, column percolation is more efficient, with 30-72% color reduction vs. 19-36% reduction for shaking and decanting.

Keywords: Bleaching, Miscella Decolorization, Oil Color Removal, Oil-Miscella Bleaching, Rice Bran Oil, Silica Gel Bleaching, Silica Gel Oil-Miscella Shaking, Silica Gel Percolation, Silica Gel Treatment

Kissa, E. (1995), Coffee stain on textiles. Mechanisms of staining and stain removal. *Journal of the American Oil Chemists Society*, **72** (7), 793-797.

Abstract: Coffee stains on textiles are mainly caused by the water-soluble and acidic colored substances in coffee. The acidic nature of coffee stain has been shown by ultraviolet and visible spectroscopy of coffee as a function of pH; ion-pair formation with a cationic surfactant and titration with Hyamine 1622 and a surfactant-specific electrode; and precipitation of the colored components in coffee with barium hydroxide as a barium salt. The permanence of coffee stains on textiles depends on the nature of the fibers. The affinity of coffee stain to fibers, indicated by resistance to detergency, increases in the order polyester: cotton: nylon. Coffee stain has little affinity to polyester fibers but adheres to cotton and even more firmly to nylon. The strong affinity to nylon and the pH dependence of staining suggest an ionic interaction of carboxyl and phenolic groups with amine end-groups in nylon. The ionic attraction is augmented by nonionic interactions that are enhanced by the oligomeric or polymeric nature of the staining substances. In accord with the dominantly acidic character of coffee stain, an alkaline medium is needed for the dislodgment of coffee stain from nylon fibers. Bleaching of coffee in solution with perborate, activated with sodium n-nonanoyloxybenzenesulfonate, or Oxone (r) (DuPont, Wilmington, DE) obeys pseudo first-order kinetics. Oxone, a peroxysulfate triple salt, is a more powerful oxidant for coffee stain than sodium perborate, but its use is limited by the bleach fastness of dyes. Reprinted by permission of the Publisher.

Keywords: Bleaching of Coffee Stain, Coffee Color, Coffee Slain on Textiles, Mechanisms of Staining, Mechanisms of Stain Removal, Oxone, Sodium Perborate, Stain Resistance of Nylon, Acids

? Proctor, A. and Toro Vazquez, J.F. (1996), The Freundlich isotherm in studying adsorption in oil processing. *Journal of the American Oil Chemists Society*, **73** (12), 1627-1633.

Full Text: 1996\J Ame Oil Che Soc73, 1627.pdf

Abstract: The objective of this review is to discuss the history of the use of the Freundlich isotherm in investigating adsorption processing of vegetable oils and to evaluate its current value in adsorption studies. The Freundlich isotherm was originally developed to explain the adsorption of a single solute from solution. However, a similar adsorption pattern has been observed when studying a more complex system of adsorption of vegetable oil pigments onto bleaching clay during commercial bleaching of vegetable oils. The Freundlich isotherm has been useful for decades in finding the commercial value of adsorbents as long as a narrow experimental interval of adsorbate is used. More recent studies have shown that a complex series of interactions controls the adsorption process. While the isotherm summarizes these interactions, investigating them is vital to understand the physicochemical factors involved during adsorption. Statistical modeling and spectroscopy are useful in understanding the vegetable oil bleaching/refining process as a multiple-component adsorption system.

Keywords: Adsorbents, Bleaching, Competitive Adsorption, Miscellas, Rice Hull Ash, Transform Infrared-Spectroscopy, Concentrated Miscella System, Soy Oil, Phospholipid Adsorption, Silicic-Acid, Competitive Adsorption, Soybean Oil, Sesame Oil, Lutein

Darnoko, D. and Cheryan, M. (2000), Kinetics of palm oil transesterification in a batch reactor. *Journal of the American Oil Chemists Society*, **77** (12), 1263-1267.

Full Text: [J\J Ame Oil Che Soc77, 1263.pdf](J/J%20Ame%20Oil%20Che%20Soc77,%201263.pdf)

Abstract: Methyl esters were produced by transesterification of palm oil with methanol in the presence of a catalyst (KOH). The rate of transesterification in a batch reactor increased with temperature up to 60 degreesC. Higher temperatures did not reduce the time to reach maximal conversion. The conversion of triglycerides (TG), diglycericles (DG), and monoglycerides (MG) appeared to be second order up to 30 min of reaction time. Reaction rate constants for TG, DG, and MG hydrolysis reactions were 0.018-0.191 (wt%.min)-1, and were higher at higher temperatures and higher for the MC reaction than for TG hydrolysis. Activation energies were 14.7, 14.2, and 6.4 kcal/mol for the TG, DG, and MG hydrolysis reactions, respectively. The optimal catalyst concentration was 1% KOH.

Keywords: Biodiesel, Kinetics, Methyl Esters, Palm Oil, Transesterification, Soybean Oil, Vegetable-Oils, Biodiesel, Esters, Chromatography, Quantitation

Darnoko, D. and Cheryan, M. (2000), Kinetics of palm oil transesterification in a batch reactor. *Journal of the American Oil Chemists Society*, **77** (12), 1263-1267.

Full Text: [2000\J Ame Oil Che Soc77, 1263.pdf](2000/J%20Ame%20Oil%20Che%20Soc77,%201263.pdf)

Abstract: Methyl esters were produced by transesterification of palm oil with methanol in the presence of a catalyst (KOH). The rate of transesterification in a batch reactor increased with temperature up to 60°C. Higher temperatures did not reduce the time to reach maximal conversion. The conversion of triglycerides (TG), diglycerides (DG), and monoglycerides (MG) appeared to be second order up to 30 min of reaction time. Reaction rate constants for TG, DG, and MG hydrolysis reactions were 0.018–0.191 (wt%·min)−1, and were higher at higher temperatures and higher for the MG reaction than for TG hydrolysis. Activation energies were 14.7, 14.2, and 6.4 kcal/mol for the TG, DG, and MG hydrolysis reactions, respectively. The optimal catalyst concentration was 1% KOH.

Keywords: Biodiesel, Kinetics, Methyl Esters, Palm Oil, Transesterification

? Sathivel, S. and Prinyawiwatkul, W. (2004), Adsorption of FFA in crude catfish oil onto chitosan, activated carbon, and activated earth: A kinetics study. *Journal of the American Oil Chemists Society*, **81** (5), 493-496.

Full Text: [2004\J Ame Oil Che Soc81, 493.pdf](2004/J%20Ame%20Oil%20Che%20Soc81,%20493.pdf)

Abstract: The feasibility of using chitosan, activated carbon, and activated earth to remove FFA from crude catfish visceral oil, and the adsorption kinetics of the procedure were evaluated. The effect of adsorbents on water activity and the 18:3 and 22:6 content of crude catfish visceral oil was also studied. The initial adsorption kinetic coefficients of FFA (mL g(-1) min(-1)) were 0.1, 0.07, and 0.03 for chitosan, activated carbon, and activated earth, respectively. The external film mass-transfer coefficient (0.001 mL s(-1)) was similar for the three adsorbents. The adsorption capacity of FFA at saturation (mg g(-1)) was 71.2 for chitosan, 65.5 for activated carbon, and 57.0 for activated earth. The intraparticular diffusion coefficients (mg mL(-1) min(-0.5)) were 0.14, 0.12, and 0.09 for chitosan, activated carbon, and activated earth, respectively. Water activity of the crude oil decreased with increased contact time of the adsorbents. Results indicated that chitosan was a better adsorbent than activated carbon and activated earth for FFA removal from crude catfish visceral oil.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Kinetic, Adsorption Kinetics, Capacity, Carbon, Catfish Oil, Chitosan, Concentrated Miscella System, Diffusion, Feasibility, Free Fatty Acid, Intraparticular Diffusion, Kinetic, Kinetics, Kinetics Study, Mass Transfer, Mass Transfer Coefficient, Removal, Sesame Oil, Viscera, Water

? Karabulut, I., Topcu, A., kmil-Basar, C., Onal, Y. and Lampi, A.M. (2008), Obtaining butter oil triacylglycerols free from *β*-carotene and *α*-tocopherol via activated carbon adsorption and alumina-column chromatography treatments. *Journal of the American Oil Chemists Society*, **85** (3), 213-219.

Full Text: [2008\J Ame Oil Che Soc85, 213.pdf](2008/J%20Ame%20Oil%20Che%20Soc85,%20213.pdf)

Abstract: It is difficult to remove beta-carotene from oils with alumina-column chromatography, because beta-carotene is even less-polar than triacylglycerols (TAGs) are. The objective of this study was to obtain butter oil TAGs free from beta-carotene and antioxidants via sequential treatments with activated carbon (AC) adsorption and alumina column chromatography. The AC used was prepared from waste apricots. The effects of AC dosages, temperatures and time courses on beta-carotene adsorption were studied. The Langmuir and Freundlich isotherms were used to describe the adsorption of beta-carotene onto AC, and it was found to be more consistent with the Freundlich isotherm with a higher R-2 value (0.9784). Adsorption kinetics of beta-carotene was analyzed by pseudo-first order and pseudo-second order models. The pseudo-second order model was found to explain the kinetics of beta-carotene adsorption more effectively (R-2 = 0.9882). The highest beta-carotene reduction was achieved (from 31.9 to 1.84 mg/kg) at an AC dosage of 10 wt%, temperature of 50°C, and adsorption time of 240 min. A considerable amount of alpha-tocopherol was also adsorbed during the AC treatment. Remaining portions of alpha-tocopherol were completely removed with alumina adsorption chromatography. The method described may be used for purification of vegetable oil TAGs, which will be used as model compounds in model oxidation studies.

Keywords: Activated Carbon, Activated Carbon Adsorption, Adsorption, Alumina, Carbon, Column Chromatography, Freundlich Isotherm, Isotherm, Isotherms, Kinetics, Langmuir, Model, Models, Oxidation, Pseudo-Second Order, Purification, Temperature, Treatment

# Title: Journal of the American Pharmaceutical Association-Scientific Edition

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? Swintosky, J.V., Riegelman, S., Higuchi, T. and Busse, L.W. (1949), Studies on pharmaceutical powders and the state of subdivision. 2. Surface area measurements of some pharmaceutical powders by the low-temperature nitrogen adsorption isotherm technique. *Journal of the American Pharmaceutical Association-Scientific Edition*, **38** (6), 308-313.

# Title: Journal of the American Society for Information Science

[American Documentation](http://proquest.umi.com/pqdweb?RQT=318&pmid=66158) 1950-1969 Vol 1-20, [Journal of the American Society for Information Science](http://www3.interscience.wiley.com/journal/117946195/grouphome/home.html) 1970- Vol 21-

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? Donohue, J.C. (1972), Bibliometric analysis of certain information science literature. *Journal of the American Society for Information Science*, **23** (5), 313-317.

Full Text: [1960-80\J Ame Soc Inf Sci23, 313.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci23,%20313.pdf)

Abstract: Several bibliometric techniques previously applied to separate scientific literatures were used together in the analysis of a single corpus of journal articles relating to information science. Techniques included were (a) Bradford analysis, (b) epidemic analysis, (c) identification of research front, and (d) bibliographic coupling. Similar analysis was made of writings cited by the main corpus articles, and of the literature which in turn cites the main corpus. Results were analyzed in terms of structure and processes observable in patterns of authorship, publication, and citation. Their significance is discussed with potential application of the method to the solution of problems in the management of large research libraries.

? Narin, F., Carpente, M. and Berlt, N.C. (1972), Interrelationships of scientific journals. *Journal of the American Society for Information Science*, **23** (5), 323-331.

Full Text: [1960-80\J Ame Soc Inf Sci23, 323.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci23,%20323.pdf)

Abstract: A series of models of the interrelationship of scientific journals has been developed from the cross citing amongst 275 journals in mathematics, physics, chemistry, biochemistry, and biology. The data source was the Journal Citation Index (JCI), a file derived from the Science Citation Index. The JCI consists of a journal by journal tabulation of citings to and from each journal in the Index. A large amount of consistency was found between the citing characteristics of the journals in the different scientific fields, with quite clear boundaries between fields and a few well known cross disciplinary journals as cross field information links. The separate disciplines appear to relate to each other in an orderly manner, with a natural sequence: mathematics http://www3.interscience.wiley.com/giflibrary/12/rarr.gifphysics http://www3.interscience.wiley.com/giflibrary/12/rarr.gifchemistry http://www3.interscience.wiley.com/giflibrary/12/rarr.gifbiochemistry http://www3.interscience.wiley.com/giflibrary/12/rarr.gifbiology. Within disciplines the journals form fully transitive hierarchies with very few relational conflicts.

? Saracevi, T. and Perk, L.J. (1973), Ascertaining activities in a subject area through bibliometric analysis. *Journal of the American Society for Information Science*, **24** (2), 120-134.

Full Text: [1960-80\J Ame Soc Inf Sci24, 120.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci24,%20120.pdf)

Abstract: Lotka’s Law, originally applicable only in physical science, is shown to apply reasonably well to the humanities.

? Murphy, L.J. (1973), Lotka’s law in humanities. *Journal of the American Society for Information Science*, **24** (6), 461-462.

Full Text: [1960-80\J Ame Soc Inf Sci24, 461.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci24,%20461.pdf)

Abstract: It is siressed that Lotka’s Law was originally only applicable in physical science, specifically chemistry and physics. The more recent feneral application of Lotka’s law in mom-physical science, without appropriate new tests of validity, is bemoaned. A recent test in the humanities is discussed, showing that Lotka’s Law does apply reasonabley in that speciallity. A plea is made for more ‘spot checks’ of so called general ‘Lawa,’ which were determined using specific subject samples-not only for Lotka’s Law, which is used here as an example, but in all such ‘laws’ applied in information science, in general.

? Voos, H. (1974), Lotka and information science. *Journal of the American Society for Information Science*, **25** (4), 270-272.

Full Text: [1960-80\J Ame Soc Inf Sci25, 270.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci25,%20270.pdf)

Abstract: Productivity in terms of scientific publication was described by Lotka in 1926. He discovered that in the hard sciences he could predict the number of papers an author would write providing he knew how many authors wrote only one paper during a given time period. The factor for predicting the number of papers in a field like chemistry was found to be 1/n2 of the number of authors writing only one paper. That is, if 100 authors wrote one paper, only 25 would write two papers, and only 11 would write three papers, etc. If the Lotka constant holds for the hard sciences it was hypothesized (and tested) that other disciplines would have other constants, and thereby form a continuum based on productivity from the hard sciences to the non-sciences. The literature of information science has been examined between 1966 and 1970. It was determined that a new constant, 1/n3.5 fitted information science best.

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Full Text: [1960-80\J Ame Soc Inf Sci26, 129.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci26,%20129.pdf)

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Full Text: [1960-80\J Ame Soc Inf Sci26, 189.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci26,%20189.pdf)

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Full Text: [1960-80\J Ame Soc Inf Sci27, 292.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci27,%20292.pdf)

Abstract: A Cumulative Advantage Distribution is proposed which models statistically the situation in which success breeds success. It differs from the Negative Binomial Distribution in that lack of success, being a non-event, is not punished by increased chance of failure. It is shown that such a stochastic law is governed by the Beta Function, containing only one free parameter, and this is approximated by a skew or hyperbolic distribution of the type that is widespread in bibliometrics and diverse social science phenomena. In particular, this is shown to be an appropriate underlying probabilistic theory for the Bradford Law, the Lotka Law, the Pareto and Zipf Distributions, and for all the empirical results of citation frequency analysis. As side results one may derive also the obsolescence factor for literature use. The Beta Function is peculiarly elegant for these manifold purposes because it yields both the actual and the cumulative distributions in simple form, and contains a limiting case of an inverse square law to which many empirical distributions conform.

Hawkins, D.T. (1977), Unconventional uses of online information retrieval systems: On-line bibliometric studies. *Journal of the American Society for Information Science*, **28** (1), 13-18.

Full Text: [1960-80\J Ame Soc Inf Sci28, 13.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%2013.pdf)

Abstract: On-line interactive literature searching systems have “come of age” and have revolutionized information retrieval techniques. They are now widely used for subject-oriented searching. Much more than subject information is available in most of the data bases currently available, such as author names, corporate affiliations, journal titles, and CODEN. These are useful for bibliometric-type studies, that is, quantitative analysis of the bibliographic features of a body of literature. Several examples are given, including journal comparison studies, corporate affiliation studies, and statistical studies.

Inconsistencies and errors in data bases become important, and the searcher must be alert to their existence. Indexing policies of the different data bases must also be taken into consideration.

? Krisciunas, K. (1977), Lotka’s law - Year by year. *Journal of the American Society for Information Science*, **28** (1), 65-66.

Full Text: [1960-80\J Ame Soc Inf Sci28, 65.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%2065.pdf)

? Hubert, J.J. (1977), Lotka’s law in humanities. *Journal of the American Society for Information Science*, **28** (1), 66.

Full Text: [1960-80\J Ame Soc Inf Sci28, 66.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%2066.pdf)

Bookstein, A. (1977), Patterns of scientific productivity and social change: A discussion of Lotka’s law and bibliometric symmetry. *Journal of the American Society for Information Science*, **28** (4), 206-210.

Full Text: [1960-80\J Ame Soc Inf Sci28, 206.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%20206.pdf)

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Full Text: [1960-80\J Ame Soc Inf Sci28, 285.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%20285.pdf)

Abstract: An index of concentration for rank-frequency distributions is proposed which permits comparison of subject and journal concentration in various fields. A mathematical model of random dispersion (the Whit-worth distribution) of articles is suggested. Applications of the measure to several different aspects of bibliometrics are suggested. The measure holds some promise of providing a common measure by which to compare the large number of specific usage and citation studies already completed, and providing a point of departure for new ones.

? Coile, R.C. (1977), Lotka’s frequency distribution of scientific productivity. *Journal of the American Society for Information Science*, **28** (6), 366-370.

Full Text: [1960-80\J Ame Soc Inf Sci28, 366.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci28,%20366.pdf)

Abstract: In 1926, Alfred Lotka examined the frequency distribution of scientific productivity of chemists and physicists. After analyzing the number of publications of chemists listed in Chemical Abstracts 1907-1916 and the contributions of physicists listed in Auerbach’s Geschi-chtstafeln der Physik, he observed that the number of persons making n contributions is about 1/n2 of those making one and the proportion of all contributors that make a single contribution is about 60%. Recently, investigators studying the applicability of “Lotka’s law” to the humanities and to map librarianship may have misinterpreted Lotka’s law and have concluded erroneously that the law applies to these fields. Corrected calculations indicate that Lotka’s law does not apply.

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Full Text: [1960-80\J Ame Soc Inf Sci29, 91.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci29,%2091.pdf)

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Full Text: [1960-80\J Ame Soc Inf Sci29, 225.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci29,%20225.pdf)

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Full Text: [1960-80\J Ame Soc Inf Sci30, 51.pdf](1960-80/J%20Ame%20Soc%20Inf%20Sci30,%2051.pdf)

Abstract: An experiment to verify the satisfaction of Lotka’s law, with the papers published in the area of computer science, is reported. It is seen that the estimates of this law deviate considerably from the observations. Need for further experiments to verify Lotka’s law in the area of applied sciences and engineering is emphasized.

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Full Text: [1981\J Ame Soc Inf Sci32, 113.pdf](1981/J%20Ame%20Soc%20Inf%20Sci32,%20113.pdf)

Abstract: From the detailed analysis of eight previously published mathematical models, a general formulation of Bradford’s distribution can be deduced as follows: y = a log(x + c) + b, where y is the ratio of the cumulative frequency of articles to the total number of articles and x is the ratio of the rank of journal to the total number of journals. The parameters a, b, and c are the slope, the intercept, and the shift in a straight line to log rank, respectively. Each of the eight models is a special case of the general formulation and is one of five types of formulation. In order to estimate three unknown parameters, a statistical method using root-weighted square error is proposed. A comparative experiment using 11 databases suggests that the fifth type of formulation with three unknown parameters is the best fit to the observed data. A further experiment shows that the deletion of the droop data leads to a more accurate value of parameters and less error.

? White, H.D. and Griffith, B.C. (1981), Author cocitation - A literature measure of intellectual structure. *Journal of the American Society for Information Science*, **32** (3), 163-171

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Tague, J. (1981), The success-breeds-success phenomenon and bibliometric processes. *Journal of the American Society for Information Science*, **32** (4), 280-286.

Full Text: [1981\J Ame Soc Inf Sci32, 280.pdf](1981/J%20Ame%20Soc%20Inf%20Sci32,%20280.pdf)

Abstract: Success-breeds-success phenomenon is described by single-and multiple-urn models. It is shown that these models lead to a negative binomial distribution for the total number of successes and a Zipf-Mandelbrot law for the number of sources contributing a specified number of successes.

? Carpenter, M.P. and Narin, F. (1981), The adequacy of the Science Citation Index (SCI) as an indicator of international scientific activity. *Journal of the American Society for Information Science*, **32** (6), 430-439.

Full Text: [1981\J Ame Soc Inf Sci32, 430.pdf](1981/J%20Ame%20Soc%20Inf%20Sci32,%20430.pdf)

Keywords: Citation, Science Citation Index

Parker, R.H. (1982), Bibliometric-models for management of an information store. I. Differential utility among items. *Journal of the American Society for Information Science*, **33** (3), 124-128.

Full Text: [1982\J Ame Soc Inf Sci33, 124.pdf](1982/J%20Ame%20Soc%20Inf%20Sci33,%20124.pdf)

Abstract: Differential demand for use among the items in an information store is a necessary condition for management of the store. Using bibliometric techniques for determination of the distribution of demand, the hypothesis of hyperbolic distribution, and an index of differential demand are developed.

Parker, R.H. (1982), Bibliometric-models for management of an information store. II. Use as a function of age of material. *Journal of the American Society for Information Science*, **33** (3), 129-133.

Full Text: [1982\J Ame Soc Inf Sci33, 129.pdf](1982/J%20Ame%20Soc%20Inf%20Sci33,%20129.pdf)

Abstract: The distribution of use of items in a large information store is examined. The findings suggest that a simple exponential distribution is inadequate and that a multi-factor exponential model describes the process of obsolescence more precisely.

Parker, R.H. (1982), Bibliometric-models for management of an information store. III. Developing an empirical-model. *Journal of the American Society for Information Science*, **33** (3), 134-138.

Full Text: [1982\J Ame Soc Inf Sci33, 134.pdf](1982/J%20Ame%20Soc%20Inf%20Sci33,%20134.pdf)

Abstract: Based on earlier studies by the author relating to differential demand among items in an information store and to the relation of demand to age of material, this article undertakes to develop an empirical model for predicting the size of an information store necessary to satisfy specified levals of demand. A modus operandi for selecting items for retirement or removal with the least adverse impact on effectiveness of the store is suggested.

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Full Text: [1982\J Ame Soc Inf Sci33, 281.pdf](1982/J%20Ame%20Soc%20Inf%20Sci33,%20281.pdf)

Koenig, M.E.D. (1983), Bibliometric indicators versus expert opinion in assessing research performance. *Journal of the American Society for Information Science*, **34** (2), 136-145.

Full Text: [1983\J Ame Soc Inf Sci34, 136.pdf](1983/J%20Ame%20Soc%20Inf%20Sci34,%20136.pdf)

Abstract: This study compares bibliometric indicators versus expert judgment as indicators of the research performance of major pharmaceutical companies, a context which may be uniquely capable of permitting such a comparison. For each company, a refined composite research output score was calculated based on that company’s drug output (1965-1976). These research production scores, normalized by research budget as an indicator of research organizational size, produced an indicator of research productivity, an output/input ratio. The best and most consistent predictors of drug research success in general were the number of clinical articles, and in particular highly cited clinical articles - both their absolute value and their proportionate occurrence among publications. In general, there was a slight but consistent tendency for bibliometric indicators to perform better than expert judgments in predicting research performance as measured by a third and independent indicator of research output. This consistent trend was composed of three aspects. First, the subject-specific bibliometric indicators correlated more highly with the drug output performance measures than did general bibliometric measures or the expert judgments. Second, when the drug output measures were subjected to a regression analysis, the expert judgment variables were conspicuous by their absence, even in secondary or tertiary positions. Third, the expert judgment variables appeared to be very predictable from the bibliometric measures, while no such converse relationship existed.

? Prabha, C.G. (1983), Some aspects of citation behavior: A pilot-study in business administration. *Journal of the American Society for Information Science*, **34** (3), 202-206.

Full Text: [1983\J Ame Soc Inf Sci34, 202.pdf](1983/J%20Ame%20Soc%20Inf%20Sci34,%20202.pdf)

Abstract: This study addressed certain aspects of citation behavior: How many of the sources cited has the author really consulted? How many did the author consult specifically for the preparation of the citing paper? How many of the sources cited does the author consider essential to the development of his own theme? Nineteen members of the faculty from the Department of Business Administration, College of Commerce, University of Illinois, each of whom had published at least one periodical article in the preceding two years, were subjects of the study. Each was given a self-administered questionnaire, along with the bibliography from one of his articles, and each participated in a follow up interview. Ninety-six percent of the sources cited had been consulted by the authors, which indicates little evidence of secondhand citation. However, just 63% were consulted specifically in the preparation of the article; and only less than a third were judged essential raw material by those who cited them. If an item is of critical importance, it is likely to be owned by the author. Also, it is likely to have been consulted specifically in the preparation of the article, but criticality is no guarantee that it has been used heavily by the author.

? Sichel, H.S. (1985), A bibliometric distribution which really works. *Journal of the American Society for Information Science*, **36** (5), 314-321.

Full Text: [1985\J Ame Soc Inf Sci36, 314.pdf](1985/J%20Ame%20Soc%20Inf%20Sci36,%20314.pdf)

Abstract: The Generalized Inverse Gaussian-Poisson Distribution is suggested as an all-embracing mathematical model for bibliometric frequency distributions. Twelve examples are given which show that the new model cannot be rejected by virtue of an objective chi-squared test.

Lancaster, F.W. and Lee, J.L. (1985), Bibliometric techniques applied to issues management: A case-study. *Journal of the American Society for Information Science*, **36** (6), 389-397.

Full Text: [1985\J Ame Soc Inf Sci36, 389.pdf](1985/J%20Ame%20Soc%20Inf%20Sci36,%20389.pdf)

Abstract: Online data bases can be used to track the growth of the literature on some topic and to follow the diffusion of the topic through data bases of various types. This type of tracking may be valuable in identifying topics likely to become significant socOnline data bases can be used to track the growth of the literature on some topic and to follow the diffusion of the topic through data bases of various types. This type of tracking may be valuable in identifying topics likely to become significant social or technological “issues”; it might therefore become a useful tool in issues management. A case study on the subject of acid rain is describe it might therefore become a useful tool in issues management. A case study on the subject of acid rain is described.

? Wallace, D.P. (1985), The use of statistical methods in library and information science. *Journal of the American Society for Information Science*, **36** (6), 402-410.

Full Text: [1985\J Ame Soc Inf Sci36, 402.pdf](1985/J%20Ame%20Soc%20Inf%20Sci36,%20402.pdf)

Abstract: This study compared the use of statistics in 99 journals from four subject areas: library and information science, education, social work, and business. It was found that journals in library and information science produced more articles making no use of statistics than did journals in the other three subject areas, and that only in library and information science were there more articles using descriptive techniques only than articles using inferential techniques. A comparison of the mean number of articles per journal using no statistics, descriptive statistics only, and inferential statistics indicated that the mean number of articles per journal using inferential statistics was much lower for library and information science than for the other subject areas. The only inferential technique not used significantly less in library and information science than in the other subject areas was correlation, one of the simplest of inferential techniques.

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Full Text: [1986\J Ame Soc Inf Sci37, 26.pdf](1986/J%20Ame%20Soc%20Inf%20Sci37,%2026.pdf)

Abstract: There were 48 sets of author productivity data tested against Lotka’s Law of xnmiddot;y = c. Overwhelming conformity to the law was found. However, only seven data sets fitted the inverse square law. For future tests, representative coverage and good sampling techniques should be adhered to in data compilation. A method is suggested to compute the values of n and c from the data. © 1986 John Wiley & Sons, Inc.

Egghe, L. (1986), The dual of Bradford’s law. *Journal of the American Society for Information Science*, **37** (4), 246-255.

Full Text: [J\J Ame Soc Inf Sci37, 246.pdf](J/J%20Ame%20Soc%20Inf%20Sci37,%20246.pdf)

Abstract: In this article, we examine the classical law of Bradford. This law yields groups with an equal number of articles, but where the number of journals increases geometrically. Within each group, and starting with the last ones (the least productive journals) we examine the maximal productivity of the journals. We describe, using only *y*m, the maximal productivity (of the journal of rank one), all the possible productivities of the journals in every Bradford group.

The same method shows that the most productive journal in every group p (starting with the last group) produces a number of articles mp, where:[FORMULA] http://www3.interscience.wiley.com/cgi-bin/TeX2gif.pl?$$m_p\;\approx\;{{k^p}\over{e^E}}$$where *k* is the Bradford multiplicator and *E* is the number of Euler. Hence, the maximal journal productivity in each group forms an approximate Bradford law with fixed universal constant *e*-*E* ≈ 0.56. We can say that the dual law of a Bradford law is an approximate Bradford law.

This approach is not a pure rank method (as is Bradford’s law), nor a pure frequency method (as is Lotka’s law), but a frequency method within a rank method.

The formula for *mp* gives a theoretical formula (and hence an explanation) for *k*, the Bradford multiplier, which is easily applied in practical data. It also sheds more light on the Yablonsky-Goffman-Warren formula for *k*, which has only been established experimentally. © 1986 John Wiley & Sons, Inc.

? Chen, Y.S. and Leimkuhler, F.F. (1986), A relationship between Lotka’s law, Bradford’s law, and Zipf’s law. *Journal of the American Society for Information Science*, **37** (5), 307-314.

Full Text: [1986\J Ame Soc Inf Sci37, 307.pdf](1986/J%20Ame%20Soc%20Inf%20Sci37,%20307.pdf)

Abstract: A common functional relationship among Lotka’s law, Bradford’s law, and Zipf’s law is derived. The proof takes explicit account of the sequences of observed values of the variables by means of an index. This approach results in a more realistic and precise formulation of each law. © 1986 John Wiley & Sons, Inc.

Broadus, R.N. (1987), Early approaches to bibliometrics. *Journal of the American Society for Information Science*, **38** (2), 127-129.

Full Text: [J\J Ame Soc Inf Sci38, 127.pdf](J/J%20Ame%20Soc%20Inf%20Sci38,%20127.pdf)

Abstract: The lines of research leading up to and forming the subfield of bibliometrics are traced from earliest times to the year 1969, when this term was proposed as a substitute for “statistical bibliography.” © 1987 John Wiley & Sons, Inc.

Egghe, L. (1987), Pratt’s measure for some bibliometric distributions and its relation with the 80/20 rule. *Journal of the American Society for Information Science*, **38** (4), 288-297.

Full Text: [J\J Ame Soc Inf Sci38, 288.pdf](J/J%20Ame%20Soc%20Inf%20Sci38,%20288.pdf)

Abstract: Pratt’s measure *C* on the class concentration of distributions is calculated and interpreted for the laws of Zipf, Mandelbrot, and Lotka, and for the geometric distribution. Comparisons between each are made. We show that phenomena agreeing with Zipf’s law are more concentrated than phenomena agreeing with Mandelbrot’s law. On the other hand, data following Lotka’s law are more concentrated than data following Zipf’s law. We also find that the geometric distribution is more concentrated than the Lotka distribution only for high values of the maximal production a source can have. An explicit mathematical formula (in case of the law of Lotka) between *C* and *x*(θ), the fraction of the sources needed to obtain a fraction θ of the items produced by these sources (see my earlier article on the 80/20 rule), is derived and tested, unifying these two theories on class concentration. So far, *C* and *x*(θ) appeared separate in the literature. © 1987 John Wiley & Sons, Inc.

Griffith, B.C. (1988), Exact fits to large ranked, bibliometric distributions. *Journal of the American Society for Information Science*, **39** (6), 423-427.

Full Text: [J\J Ame Soc Inf Sci39, 423.pdf](J/J%20Ame%20Soc%20Inf%20Sci39,%20423.pdf)

Abstract: A system of software and analysis was tested and good fits were obtained to quite large distributions. Its use was found to be sufficiently swift to make repeated modelling feasible. There were results of possible interest regarding the rates of change between adjacent ranks and the identification and contribution of a “core” literature. This approach should facilitate future comparisons among models with large data sets. © 1988 John Wiley & Sons, Inc.

? Cano, V. (1989), Citation behavior: Classification, utility, and location. *Journal of the American Society for Information Science*, **40** (4), 284-290.

Full Text: [J\J Ame Soc Inf Sci40, 284.pdf](J/J%20Ame%20Soc%20Inf%20Sci40,%20284.pdf)

Abstract: This study tested empirically the citation behavior model of Moravcsik and Murugesan and examined the hypothesized relationships between three variables: reported citation type, reported utility level, and citation location. A group of elite scientists constituting an “invisible college” were asked to classify the references they had made in two of their recent papers following the model in question, and to judge the utility content of each reference cited. The response rate constituted 66% of a total of 42 questionnaires. A total of 344 references were examined. Some departures from the Moravcsik and Murugesan citation behavior model were found, as well as indications of complexities of both citation motivation and citation evaluation. Many citations were paired in categories presumed dichotomous by the model: 29 instances of cited documents were reported to have both a conceptual and an operational nature. Indeed, a document may contain many items of information that may be cited for a number of reasons. It is concluded that studies focusing on elements of information cited (coupled to their location parameters) as opposed to full citations, are needed to develop empirically based models reflecting the patterns of information use and the citation behavior of a scientific community. © 1989 John Wiley & Sons, Inc.

Notes: Highly cited

MacRoberts, M.H. and MacRoberts B.R. (1989), Problems of citation analysis: A critical review. *Journal of the American Society for Information Science*, **40** (5), 342-349.

Full Text: [J\J Ame Soc Inf Sci40, 342.pdf](J/J%20Ame%20Soc%20Inf%20Sci40,%20342.pdf)

Abstract: We review the problems of citation analysis. Most of them have either not been studied or have received only cursory attention. Since major error results when these problems are not taken into account, users of citation-based literature should proceed cautiously. © 1989 John Wiley & Sons, Inc.

Nicholls, P.T. (1989), Bibliometric modeling processes and the empirical validity of Lotka’s law. *Journal of the American Society for Information Science*, **40** (6), 379-385.

Full Text: [J\J Ame Soc Inf Sci40, 379.pdf](J/J%20Ame%20Soc%20Inf%20Sci40,%20379.pdf)

Abstract: A considerable literature exists on the empirical validity of Lotka’s law; however, these studies are mainly incomparable and inconclusive, owing to substantial differences in the analytical methods applied. The main elements involved in fitting a bibliometric model to empirical data are: specification of the model, measurement of the variables, organization of the data, parameter estimation, and assessing goodness-of-fit. Each of these modeling variables is examined, a consistent methodology for applying Lotka’s law is proposed, and the results of an empirical test are described. These results support the empirical validity and generality of Lotka’s law as well as the suitability of the proposed methodology. © 1989 John Wiley & Sons, Inc.

Brooks, T.A. (1990), Clustering in comprehensive bibliographies and related literatures. *Journal of the American Society for Information Science*, **41** (3), 183-192.

Full Text: [J\J Ame Soc Inf Sci41, 183.pdf](J/J%20Ame%20Soc%20Inf%20Sci41,%20183.pdf)

Abstract: A Bradford analysis was performed on the author and journal series of four comprehensive bibliographies and four related literatures. Goffman and Warren’s (1969) minimum zone cohort methodology was used. A clustering index was introduced that relates the minimum zone cohort to the total recurring cases of a literature. The comprehensive bibliographies and related literatures were compared by clustering indices, Bradford multipliers, bibliograph slopes, and reference-scattering coefficients. Three of the eight author series were found to be weakly Bradfordian. The distinction between weakly Bradfordian and strongly Bradfordian series found by the clustering index was corroborated by bibliograph slopes. Other bibliometric indicators were unable to discriminate between weakly Bradfordian and strongly Bradfordian series, author and journal series, and comprehensive bibliographies and related literatures. The data were analyzed by The Bibliometrics Toolbox. © 1990 John Wiley & Sons, Inc.

Keywords: Bradford’s Law, Bibliometrics, Author Indexes, Comparison, Cluster Analysis, Bibliographies (Document Lists), Bibliographic Citations, Citation Analysis

Rousseau, R. (1990), Relations between continuous versions of bibliometric laws. *Journal of the American Society for Information Science*, **41** (3), 197-203.

Full Text: [J\J Ame Soc Inf Sci41, 197.pdf](J/J%20Ame%20Soc%20Inf%20Sci41,%20197.pdf)

Abstract: This article will show how by adding a third http://www3.interscience.wiley.com/giflibrary/12/ldquo.gifhiddenhttp://www3.interscience.wiley.com/giflibrary/12/rdquo.gif variable to the two parameters in Lotka’s law, this law becomes equivalent, in a strict logical sense, with Mandelbrot’s. Similarly, Lotka’s inverse square law becomes equivalent with Leimkuhler’s. We will also show how Pareto’s law fits into this framework. © 1990 John Wiley & Sons, Inc.

? Efthimiadis, E.N. (1990), The growth of the OPAC literature. *Journal of the American Society for Information Science*, **41** (5), 342-347.

Full Text: [1990\J Ame Soc Inf Sci41, 342.pdf](1990/J%20Ame%20Soc%20Inf%20Sci41,%20342.pdf)

Abstract: Online Public Access Catalogues (OPACs), despite their recent arrival in the library and information science world, have had a great impact because they have to be designed for the library user. In the few years of their existence the body of literature created cannot be regarded as insignificant. The analysis of the 1970-1985 OPAC literature shows that it could be a very good example of logistic growth. The literature had an initial growth rate of b = .556 (or 74.4% per year), with a corresponding doubling time of 1.25 years, which was probably due to the prolific CLR study. Then, approximate point of inflection in 1984, it started levelling off. © 1990 John Wiley & Sons, Inc.

Notes: highly cited

? McCain, K.W. (1990), Mapping authors in intellectual space: A technical overview. *Journal of the American Society for Information Science*, **41** (6), 433-443.

Full Text: [1990\J Ame Soc Inf Sci41, 433.pdf](1990/J%20Ame%20Soc%20Inf%20Sci41,%20433.pdf)

? Braam, R.R., Moed, H.F. and Vanraan, A.F.J. (1991), Mapping of science by combined cocitation and word analysis. II: Dynamic aspects. *Journal of the American Society for Information Science*, **42** (4), 252-266.

Full Text: [1991\J Ame Soc Inf Sci42, 252.pdf](1991/J%20Ame%20Soc%20Inf%20Sci42,%20252.pdf)

Abstract: Combined analysis of co-citation relations and words is explored to study time-dependent (“dynamical”) aspects of scientific activities, as expressed in research publications. This approach, using words originating from publications citing documents in co-citation clusters, offers an additional and complementary possibility to identify and link specialty literature through time, compared to the exclusive use of citations. Analysis of co-citation relations is used to locate and link groups of publications that share a consensus concerning intellectual base literature. Analysis of word-profile similarity is used to identify and link publication groups that belong to the same subject-matter research specialty. Different types of “content-words” are analyzed, including indexing terms, classification codes, and words from title and abstract of publications. The developed methods and techniques are illustrated using data of a specialty in atomic and molecular physics. For this specialty, it is shown that, over a period of 10 years, continuity in intellectual base was at a lower level than continuity in topics of current research. This finding indicates that a series of interesting new contributions are made in course of time, without vast alteration in general topics of research. However, within this framework, a more detailed analysis based on timeplots of individual cited key-articles and of content-words reveals a change from more rapid succession of new empirical studies to more retrospective, and theoretically oriented studies in later years.

Keywords: Citations, Mapping, Publication, Publications, Research, Scientific Literatures, Specialties

Ajiferuke, I. (1991), A probabilistic model for the distribution of authorships so journal of the American society for information science. *Journal of the American Society for Information Science*, **42** (4), 279-289.

Full Text: [J\J Ame Soc Inf Sci42, 279.pdf](J/J%20Ame%20Soc%20Inf%20Sci42,%20279.pdf)

Abstract: A theoretical model for the distribution of authorships is developed. This model, the shifted Waring distribution, and 15 other discrete probability models are tested for goodness-of- fit against 94 data sets collected from six fields (engineering sciences, medical sciences, physical sciences, mathematical sciences, social sciences, and humanities). The shifted inverse Gaussian-Poisson is found to provide the best fitting. It is suggested that the latter model can be used in the estimation of the number of entries in an author index and in determining the maximum number of authors per paper to be included in an author index.

Keywords: Stationary Scientometric Distributions, Poisson-Distribution

Robinson, M.D. (1991), Applied bibliometrics: Using citation analysis in the journal submission process. *Journal of the American Society for Information Science*, **42** (4), 308-310.

Full Text: [J\J Ame Soc Inf Sci42, 308.pdf](J/J%20Ame%20Soc%20Inf%20Sci42,%20308.pdf)

Abstract: Scholars in all fields who are engaged in the publication process must submit their work to appropriate journals. Selecting the appropriate journal can be a challenging task. This article argues that citation analysis may be an effective tool of journal selection. Citation patterns can be used to determine the extent of bibliographic coupling between an author’s unpublished article and journals in the author’s field. The article could then be submitted to a journal with a similar pattern of citations. Evidence from published articles in economics indicates that this technique is able to determine the journal in which an article is published.

Keywords: Economics Journals

? Nederhof, A.J. and Zwaan, R.A. (1991), Quality judgments of journals as indicators of research performance in the humanities and the social and behavioral-sciences. *Journal of the American Society for Information Science*, **42** (5), 332-340.

Full Text: [1991\J Ame Soc Inf Sci42, 332.pdf](1991/J%20Ame%20Soc%20Inf%20Sci42,%20332.pdf)

Abstract: This study had two main goals. First, an attempt was made to construct and validate an indicator of research performance through collecting peer judgements on the quality of journals by means of a world-wide mail survey among 385 scholars. Second, to study the validity of indicators based on citations, these judgements were used to probe the quality of the coverage by the SSCI and the A & HCI of both core and noncore journals. Four disciplines in the humanities (General Linguistics, General Literature, Dutch Literature, and Dutch Language) and two disciplines in the social and behavioral sciences (Experimental Psychology and Public Administration) were studied. Coverage in both SSCI and A & HCI was generally increased somewhat when journals judged to be nonscholarly were eliminated. For non-locally oriented disciplines, coverage of core journals was good: 85-100%. However, for locally oriented disciplines this varied between 20% and 40%. Despite limitations, the Journal Packet Quality indicator seems useful as a first, but crude approximation of the level of research performance when the number of articles is not too small. On an aggregate level, results showed convergence with those based on journal impact factors.

Keywords: American-Psychological-Association, Economics Departments, Research Productivity, Citation, British, Ratings

? Hooten, P.A. (1991), Frequency and functional use of cited documents in information-science. *Journal of the American Society for Information Science*, **42** (6), 397-404.

Full Text: [1991\J Ame Soc Inf Sci42, 397.pdf](1991/J%20Ame%20Soc%20Inf%20Sci42,%20397.pdf)

Abstract: The purpose of this study was to examine factors which may explain frequency and nature of use of documents in citing document texts over time. Articles published in the Journal of the American Society for Information Science in 1972, 1973, and 1974 were searched on SciSearch to derive two sample groups. One group was frequently cited; the other was infrequently cited. The functional uses of the sample document groups were examined by four classification taxonomies in 417 citing contexts. The patterns of frequency of use, multiple use, and functional use were examined over time. The citation levels of documents citing the two sample groups were examined as well. When measured by functional citation taxonomies, frequently and infrequently cited documents were not used for significantly different functions. Frequently cited documents, however, seemed more tightly linked (essential) than infrequently cited documents to the documents in which they were used. While frequently cited documents were not judged more useful than infrequently cited documents initially, they were used at a stable higher level over a longer period. Infrequently cited documents were used immediately following publication and then their use rapidly diminished. The repeated use of infrequently cited documents within documents tended to decrease over time while the repeated use of frequently cited documents tended to increase. Frequently cited articles were used for different functions in the period immediately following publication and a later time period. Infrequently cited articles were used with greater consistency in the two time periods.

Keywords: Citation, Classification, Motivations, Physics, Publication, Social-Sciences, Successive Citation

? Loughner, W. (1992), Lotka’s law and the Kolmogorov-Smirnov test: An error in calculation. *Journal of the American Society for Information Science*, **43** (2), 149-150.

Full Text: [1992\J Ame Soc Inf Sci43, 149.pdf](1992/J%20Ame%20Soc%20Inf%20Sci43,%20149.pdf)

Keywords: Discrete

Nederhof, A.J. and Noyons, E.C.M. (1992), International comparison of departments research performance in the humanities. *Journal of the American Society for Information Science*, **43** (3), 249-256.

Full Text: [J\J Ame Soc Inf Sci43, 249.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20249.pdf)

Abstract: Methods are developed to compare the research performance of departments in two humanities disciplines, general linguistics and general literature. Departments from an Anglo-Saxon country were compared with several departments from European, non-Anglo-Saxon countries. A method was developed to reconstruct publication lists of departments, based on searches in various databases. We were able to retrieve 98% of the citations given to the work of one particular department. In both disciplines, it was found that the impact of some departments was largely dependent on their books and chapters, while other departments received most citations from their journal articles. The origins of citations were traced. Some departments had a largely local impact, whereas others showed a more cosmopolitan impact. Although there was some evidence of continental “self-citations,” citations were also given across continents. The results indicate that bibliometric assessment of research performance is potentially useful in these humanities disciplines.

Keywords: Citation, Sciences, English

? Martin, F.D. (1992), Information interactions between members of science-profession dyads as reflected by journal use: Ichthyology and fisheries biology. *Journal of the American Society for Information Science*, **43** (4), 276-283.

Full Text: [J\J Ame Soc Inf Sci43, 276.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20276.pdf)

Abstract: The science-profession dyad of ichthyology and fisheries biology was examined through a citation analysis of the journal literature. It was found that these two fields overlap greatly in journals cited. Further, it was found that ichthyologists tended to cite more sources with a greater proportion of these citations to journals, more foreign journals, and a greater diversity of journal sources than did fisheries biologists. Also, investigators holding academic positions in both disciplines tended to cite a greater diversity of journals than did those employed by government agencies. Despite differences in citation behavior, there seems to be at least some exchange of information within this dyad.

Keywords: Citation Analysis, Citer Motivations, East, Information, Medical Literatures, Physics, Technology

Shapiro, F.R. (1992), Origins of bibliometrics, citation indexing, and citation analysis: The neglected legal literature. *Journal of the American Society for Information Science*, **43** (5), 337-339.

Full Text: [J\J Ame Soc Inf Sci43, 337.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20337.pdf)

Abstract: Historians of bibliometrics have neglected legal bibliometrics almost completely. Yet bibliometrics, citation indexing, and citation analysis all appear to have been practiced in the legal field long before they were introduced into scientific literature. Publication counts are found in legal writings as early as 1817. Citation indexing originated with “tables of cases cited, “ which date at least as far back as 1743. A full-fledged citation index book was published in 1860. Two ambitious citation analyses of court decisions appeared in 1894 and 1895.

Keywords: State Supreme Courts, Precedent

Borgman, C.L. and Rice, R.E. (1992), The convergence of information science and communication: A bibliometric analysis. *Journal of the American Society for Information Science*, **43** (6), 397-411.

Full Text: [J\J Ame Soc Inf Sci43, 397.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20397.pdf)

Abstract: This study asks whether the disciplines of information science and communication are converging, as indicated by a bibliometric study of all core journals of both disciplines in the Social Sciences Citation Index (SSCI(R)) for the period 1977 to 1987. Results show very little convergence between these disciplines, at least on the basis of cross-disciplinary journal citation patterns, although the number of journals involved has increased slightly over time. A few journals are mainly responsible for the cross-disciplinary citing, and they are primarily information science journals citing communication journals. The results may be of interest to those studying scholarly communication or bibliometrics, to faculty constructing curricula in either of the disciplines, to communication and information science scholars seeking new areas of research, and to collection development librarians in drawing the boundaries of these disciplines.

Keywords: Co-Citation Analysis, Scholarly Communication, Structural Equivalence, Journal Network, Scientific Literature, Editors Introduction, Technology

? Oluić-Vuković, V. (1992), Journal productivity distribution: Quantitative study of dynamic behavior. *Journal of the American Society for Information Science*, **43** (6), 412-421.

Full Text: [1992\J Ame Soc Inf Sci43, 412.pdf](1992/J%20Ame%20Soc%20Inf%20Sci43,%20412.pdf)

Abstract: In this study, the relation between the distribution curve shape and the structural characteristics of data over an extending time interval is examined. It is found that the distribution curve shape varies over time, and tends to the S-shape as a consequence of the changes in the internal structure of data. The approach applied in the analysis of experimental data involves subdivision of data sets into subsets obtained by dividing the period over which the data are collected into several subperiods.

Keywords: Bradford Law, Empirical-Examination, Existing Models, Groos Droop, Lotka’s Law, Science, Scientific Productivity

Pierce, S.J. (1992), On the origin and meaning of bibliometric indicators: Journals in the social-sciences, 1886-1985. *Journal of the American Society for Information Science*, **43** (7), 477-487.

Full Text: [J\J Ame Soc Inf Sci43, 477.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20477.pdf)

Abstract: In this study, it is demonstrated that, as disciplines mature, research articles in core journals become increasingly similar in their bibliometric features. Data were collected from research articles published in core journals in sociology, political science, and economics from 1886 through 1985 (N = 8,634). Variation in levels of use of footnotes and of visuals within the same discipline was found to decline over time, even though the means about which the variation was measured changed throughout the period. It is suggested that authors, editors, referees, and others come to view prevailing practices in the use of footnotes and visuals as disciplinary standards for the presentation of research. Comparison of change in levels of variation to change in levels of consensus described in disciplinary histories suggested an association between levels of agreement on presentational standards and levels of cognitive consensus.

Keywords: Citation Analysis, Discipline, Sociology

Harter, S.P. and Hooten, P.A. (1992), Information-science and scientists: JASIS, 1972-1990. *Journal of the American Society for Information Science*, **43** (9), 583-593.

Full Text: [J\J Ame Soc Inf Sci43, 583.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20583.pdf)

Abstract: This research reports the results of a bibliometric study of nine volumes of the Journal of the American Society for Information Science (JASIS): 1972-1974, 1982-1984, and 1988-1990. For each full-length article, values of six variables were recorded: the year the article was published, the number of citations to the article, the funding status of the work (funded or not funded), the funding agency (if funded), the subject of the paper, and the institutional affiliation of the first author, and several hypotheses were tested. No relationship was found between whether an article was funded and the quality or utility of the article, as measured by the number of subsequent citations to the work. Funding for information science research has declined, especially at the federal levels. JASIS authors who are affiliated with schools of library and information science have the most difficulty in having their work funded, although the work produced by this group of authors is the most highly cited. While the emphasis on theoretical work has remained essentially constant over the past 20 years, the number of articles related to professional issues and related fields has increased, and the number of articles classified as applied has decreased. More JASIS authors are coming from academic departments in universities; fewer are information practitioners. Information science is developing as a discipline and moving away from its practice-oriented roots.

Keywords: Assessing Basic Research, Research Performance, Citation Analysis, Radio Astronomy, Library, Impact, Publications, Technology, Indicators, Retrieval

Harter, S.P. (1992), Psychological Relevance and Information-Science. *Journal of the American Society for Information Science*, **43** (9), 602-615.

Full Text: [J\J Ame Soc Inf Sci43, 602.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20602.pdf)

Abstract: This article summarizes the theory of psychological relevance proposed by Dan Sperber and Deirdre Wilson (1986), to explicate the relevance of speech utterances to hearers in everyday conversation. The theory is then interpreted as the concept of relevance in information retrieval, and an extended example is presented. Implications of psychological relevance for research in information retrieval; evaluation of information retrieval systems; and the concepts of information, information need, and the information-seeking process are explored. Connections of the theory to ideas in bibliometrics are also suggested.

Keywords: Retrieval Effectiveness, Search Process, Citation, Seeking, Users, Motivations, Systems, Design, Model

Seglen, P.O. (1992), The Skewness of science. *Journal of the American Society for Information Science*, **43** (9), 628-638.

Full Text: [J\J Ame Soc Inf Sci43, 628.pdf](J/J%20Ame%20Soc%20Inf%20Sci43,%20628.pdf)

Abstract: Scientific publications are cited to a variable extent. Distributions of article citedness are therefore found to be very skewed even for articles written by the same author, approaching linearity in a semilog plot. It is suggested that this pattern reflects a basic probability distribution with some similarity to the upper part of a normal (Gaussian) distribution. Such a distribution would be expected for various kinds of highly specialized human activity, parallels being found in the distribution of performance by top athletes and in the publication activity of university scientists. A similar skewness in the distribution of mean citedness of different authors may combine with the variability in citedness of each author’s articles to form a two-leveled citational hierarchy. Such a model would be capable of accounting for the extremely skewed distribution of citedness observed for all articles within a scientific field, which approaches linearity in a double-log rather than in a semilog plot.

The skewness implies that there will always be a large fraction of uncited publications, the size of the fraction depending on the citation practices (such as the number of references per publication) within the field in question. However, as part of a continuous probability distribution even uncited articles have a definite probability of contributing to scientific progress. Since it is furthermore impossible to eliminate uncited articles for statistical reasons, they should be the cause of neither worry nor remedy.

The citational variability between articles in a journal is less (semilog linearity) than in the corresponding field as a whole, suggesting that each journal represents a select, stratified sample of the field. However, the variability is still too large to make the journal impact factor (the average citedness of the journal’s articles) suitable as a parameter for evaluation of science. Fifteen percent of a journal’s articles collect 50% of the citations, and the most cited half of the articles account for nearly 90% of the citations. Awarding the same value to all articles would therefore tend to conceal rather than to bring out differences between the contributing authors.

The skewness in the citedness distribution of each author’s articles, the large overlap between different authors and the existence of field-dependent systematic differences in citedness would seem to make even article citations unsuitable for evaluation of individual scientists or research groups. At the national level, citations may be more useful, provided due corrections are made for the field effects. © 1992 John Wiley & Sons, Inc.

? Coleman, S.R. (1992), The laboratory as a productivity and citation unit in the publications of an experimental-psychology specialty. *Journal of the American Society for Information Science*, **43** (9), 639-643.

Full Text: [1992\J Ame Soc Inf Sci43, 639.pdf](1992/J%20Ame%20Soc%20Inf%20Sci43,%20639.pdf)

Abstract: Five-hundred eighteen publications on the Pavlovian conditioning of the eyeblink reflex in humans were produced by 101 laboratories that examined human-eyeblink conditioning (HEC). Among low- and medium-productive labs, productivity was distributed in a Lotka-like fashion, although high-producing HEC labs were off the curve. The Lotka distribution for labs was flatter than that for a “complete count” of authors. Citations to publications of these 101 labs were obtained in reference lists of HEC publications from 1958-1985, with laboratory self-citations excluded. The frequency of citation by other HEC labs-both overall and adjusted to correct for unequal number of high- and low-productivity labs (see text)-showed high positive correlations with the productivity of the cited HEC lab. In a diachronic format we also examined the decline of references to the publications of laboratories that had become inactive. We related our findings to the idea that the laboratory is the source of production and the target of citation practices within a specialty.

Keywords: Citation, Citations, Conditioned Reflex, Production, Productivity, Publications, References, Self Citations, Self-Citations, Volition

? Rousseau, R. (1992), Breakdown of the robustness property of Lotka’s law - the case of adjusted counts for multiauthorship attribution. *Journal of the American Society for Information Science*, **43** (10), 645-647.

Full Text: [1992\J Ame Soc Inf Sci43, 645.pdf](1992/J%20Ame%20Soc%20Inf%20Sci43,%20645.pdf)

Abstract: We show that fractional counting of authors does not lead to a Lotka distribution. Consequently, in this case, Bookstein’s robustness property of Lotka’s law breaks down. © 1992 John Wiley & Sons, Inc.

? Burrell, Q.L. and Fenton, M.R. (1993), Yes, the GIGP really does work - and is workable. *Journal of the American Society for Information Science*, **44** (2), 61-69.

Full Text: [1993\J Ame Soc Inf Sci44, 61.pdf](1993/J%20Ame%20Soc%20Inf%20Sci44,%2061.pdf)

Abstract: The fact that many informetric data sets exclude the zero-category-corresponding to the nonproducers being unobserved-has led to difficulties in the implementation of Sichel’s generalized inverse Gaussian-Poisson (GIGP) process for informetric modeling, despite its theoretical attraction. These computational problems have been surmounted by the development of a program giving maximum likelihood estimates of the parameters of the zero-truncated GIGP. This allows a unified and theoretically sound approach to the fitting of the GIGP and is illustrated using several of the classic informetric data sets. The method also highlights situations in which the model motivating the GIGP is inappropriate.

Keywords: Bradford, Circulation, Library, Lotka’s Law, Model

? Garfield, E. and Sher, I.H. (1993), KeyWords-PlusTM - algorithmic derivative indexing. *Journal of the American Society for Information Science*, **44** (5), 298-299.

Full Text: [1993\J Ame Soc Inf Sci44, 298.pdf](1993/J%20Ame%20Soc%20Inf%20Sci44,%20298.pdf)

Keywords: Diskette

Lifshin, A. (1993), Citation analysis of Geochimica-et-Cosmochimica-Acta, 1951-1960. *Journal of the American Society for Information Science*, **44** (6), 322-326.

Full Text: [J\J Ame Soc Inf Sci44, 322.pdf](J/J%20Ame%20Soc%20Inf%20Sci44,%20322.pdf)

Abstract: A bibliometric analysis of the field of geochemistry was begun with a citation analysis of the first ten years of Geochimica et Cosmochimica Acta, 1951-1960, the first English language geochemistry journal. Journal articles dominated the citation field with approximately 75% of the citations, followed by books and continuations. English language citations dominate by 1960 with 75% with a corresponding decrease in German language citations. Citations to the geologic literature dominate and increase with time from 40% to 58%. Citations to Geochimica et Cosmochimica Acta grow from 2 to 357 citations within ten years. Self citations are consistent at about 10%. The trends visible within this small sample of geochemical literature will possibly continue and strengthen with increasing data years.

Davis, C.H. and Cronin, B. (1993), Acknowledgments and intellectual indebtedness: A bibliometric conjecture. *Journal of the American Society for Information Science*, **44** (10), 590-592.

Full Text: [J\J Ame Soc Inf Sci44, 590.pdf](J/J%20Ame%20Soc%20Inf%20Sci44,%20590.pdf)

Abstract: Acknowledgments have received relatively little attention in spite of what at least one researcher has called their role as “super-citations.” Unlike many citations, such acknowledgments necessarily imply a high degree of social interaction. Examining those acknowledgments that suggest significant intellectual indebtedness, the authors propose a mathematical model that matches empirical data closely. The proposed model is one of several used to elucidate citation patterns. When applied to acknowledgments, it shows promise for estimating individuals’ influence in a field and may assist in determining cognitive interdependence among disciplines.

Keywords: Productivity, Credits, Law

Peters, H.P.F. and Vanraan, A.F.J. (1994), On determinants of citation scores: A case-study in chemical-engineering. *Journal of the American Society for Information Science*, **45** (1), 39-49.

Full Text: [J\J Ame Soc Inf Sci45, 39.pdf](J/J%20Ame%20Soc%20Inf%20Sci45,%2039.pdf)

Abstract: We investigated a broad spectrum of factors in order to identify one or a few that are the primary determinant of citation scores of scientific papers. Our focus is on a large field of applied science, chemical engineering. A set of 226 papers written by 18 internationally recognized scientists (‘top-authors’) and citations to these papers has been used as a data source. Using multiple regression analysis, we found that the factor ‘top-author, ‘ i.e., the ‘personal variation, ‘ contributes the largest number of citations. Other important factors are number of references, language, journal category, and journal influence.

Keywords: Cum Laude Doctorates, Bibliometric Indicators, Research Performance, Journals, Impact, Tool

Egghe, L. (1994), Special features of the author-publication relationship and a new explanation of Lotka’s law based on convolution theory. *Journal of the American Society for Information Science*, **45** (6), 422-427.

Full Text: [J\J Ame Soc Inf Sci45, 422.pdf](J/J%20Ame%20Soc%20Inf%20Sci45,%20422.pdf)

Abstract: This article makes the obvious but rather unexploited remark that there is a structural difference between author-publication systems and, for example, journal-article systems, in the sense that articles are published in one journal but that papers can have several authors. This difference is then studied mathematically, using convolutions in order to derive the several-author case from the case of a single author per paper.

We show that Lotka’s law ϕ(*i*) = *C*/(*i* +1)α, where *i* ≥ 0 is approximately stable for all α = 2, 3, 4,..., meaning that if Lotka’s law is valid in systems in which every article has one author then it is approximately valid (in a mathematically strong sense) (with the same α) in the general systems, where more than one author per paper is possible. We also show that the same is true (but in an exact way) for the geometric distribution. Hence, this theory provides intrinsic explanations of the Lotka and geometric functions. © 1994 John Wiley & Sons, Inc.

Kostoff, R.N. (1994), Federal research impact assessment: State-of-the-art. *Journal of the American Society for Information Science*, **45** (6), 428-440.

Full Text: [J\J Ame Soc Inf Sci45, 428.pdf](J/J%20Ame%20Soc%20Inf%20Sci45,%20428.pdf)

Abstract: This article describes the practice of federal research impact assessment. Evaluation of research impact is described for three cases: research selection, where the work has not yet been performed; research review, where work and results are ongoing; and ex-post research assessment, where research has been completed and results can be tracked. Retrospective methods (such as projects Hindsight and TRACES), qualitative methods (such as peer review), and quantitative methods (such as cost-benefit analysis and bibliometrics) are described. While peer review in its broadest sense is the most widely used method in research selection, review, and ex-post assessment, it has its deficiencies, and there is no single method which provides a complete impact evaluation.

Chen, Y.S., Chong, P.P. and Tong, M.Y. (1995), Dynamic behavior of Bradford law. *Journal of the American Society for Information Science*, **46** (5), 370-383.

Full Text: [J\J Ame Soc Inf Sci46, 370.pdf](J/J%20Ame%20Soc%20Inf%20Sci46,%20370.pdf)

Abstract: This paper examines two problems associated with Bradford’s law: (1) Since empirical data deviate from the law in many applications, what are the significant factors influencing the Bradford graphs? (2) What will be the evolution over time of the Bradford graphs? A computational analysis of the two problems is made based on Herbert Simon’s model. Several significant findings about the dynamic behavior of Bradford’s law are identified.

Keywords: Index Approach, Lotka’s Law, Zipf’s Law

Koenig, M. and Harrell, T. (1995), Lotka’s Law, Price’s Urn, and electronic publishing. *Journal of the American Society for Information Science*, **46** (5), 386-388.

Full Text: [J\J Ame Soc Inf Sci46, 386.pdf](J/J%20Ame%20Soc%20Inf%20Sci46,%20386.pdf)

? Moed, H.F. and Vanleeuwen, T.N. (1995), Improving the accuracy of institute for scientific information’s journal impact factors. *Journal of the American Society for Information Science*, **46** (6), 461-467.

Full Text: [1995\J Ame Soc Inf Sci46, 461.pdf](1995/J%20Ame%20Soc%20Inf%20Sci46,%20461.pdf)

Abstract: The Institute for Scientific Information (ISI) publishes annually listings of impact factors of scientific journals, based upon data extracted from the Science Citation Index (SCI). The impact factor of a journal is defined as the average number of citations given in a specific year to documents published in that journal in the two preceding years, divided by the number of ‘‘citable’’ documents published in that journal in those 2 years. This article presents evidence that for a considerable number of journals the values of the impact factors published in ISI’s Journal Citation Reports (JCR) are inaccurate, particularly for several journals having a high impact factor. The inaccuracies are due to an inappropriate definition of citable documents. Document types not defined by ISI as citable (particularly letters and editorials) are actually cited and do contribute to the citation counts of a journal. We present empirical data in order to assess the degree of inaccuracy due to this phenomenon. For several journals the results are striking. We propose to calculate for a journal impact factors per type of document rather than one single impact factor as given currently in the JCR.

Keywords: Accuracy, Citation, Citation Counts, Citations, Impact, Impact Factor, Impact Factors, Institute for Scientific Information, ISI, Journal, Journal Citation Reports, Journal Impact, Journals, SCI, Science, Science Citation Index, Scientific Journals

Campanario, J.M. (1996), Have referees rejected some of the most-cited articles of all times? *Journal of the American Society for Information Science*, **47** (4), 302-310.

Full Text: [J\J Ame Soc Inf Sci47, 302.pdf](J/J%20Ame%20Soc%20Inf%20Sci47,%20302.pdf)

Abstract: In this article a quantitative study is reported on the resistance that scientists may encounter when they do innovative work or when they attempt to publish articles that later become highly cited. A set of 205 commentaries by authors of some of the most-cited papers of all times have been examined in order to identify those articles whose authors encountered difficulty in getting his or her work published. There are 22 commentaries (10.7%) in which authors mention some difficulty or resistance in doing or publishing the research reported in the article. Three of the articles which had problems in being published are the most cited from their respective journals. According the authors’ commentaries, although sometimes referees’ negative evaluations can help improve the articles, in other instances referees and editors wrongly rejected the highly cited articles.

Keywords: Citation-Classics, SCI 1945-1988, Delayed Recognition, Science, Journals, Publication, Impact, Disciplinary, Reliability, Proposals

Harter, S.P. and Cheng, Y.R. (1996), Colinked descriptors: Improving vocabulary selection for end-user searching. *Journal of the American Society for Information Science*, **47** (4), 311-325.

Full Text: [J\J Ame Soc Inf Sci47, 311.pdf](J/J%20Ame%20Soc%20Inf%20Sci47,%20311.pdf)

Abstract: This article introduces a new concept and technique for information retrieval called colinked descriptors. Borrowed from an analogous idea in bibliometrics-cocited references-colinked descriptors provide a theory and method for identifying search terms that, by hypothesis, will be superior to those entered initially by a searcher. The theory suggests a means of moving automatically from two or more initial search terms, to other terms that should be superior in retrieval performance to the two original terms. A research project designed to test this colinked descriptor hypothesis is reported. The results suggest that the approach is effective, although methodological problems in testing the idea are reported. Algorithms to generate colinked descriptors can be incorporated easily into system interfaces, front-end or pre-search systems, or help software, in any database that employs a thesaurus. The potential use of colinked descriptors is a strong argument for building richer and more complex thesauri that reflect as many legitimate links among descriptors as possible.

Keywords: Information-Retrieval, Citation, Motivations, Relevance, Science, Online

van den Besselaar, P. and Leydesdorff, L. (1996), Mapping change in scientific specialties: A scientometric reconstruction of the development of artificial intelligence. *Journal of the American Society for Information Science*, **47** (6), 415-436.

Full Text: [J\J Ame Soc Inf Sci47, 415.pdf](J/J%20Ame%20Soc%20Inf%20Sci47,%20415.pdf)

Abstract: Has an identifiable core of activities called AI been established, during the AI-boom in the eighties? Is AI already in a “paradigmatic” phase? There has been a lot of disagreement among commentators and specialists about the nature of Artificial Intelligence as a specialty, This makes AI an interesting case of an emerging specialty, We use aggregated journal-journal citations for describing Artificial Intelligence as sets of journals, factor analytic techniques are used to analyze the development of AI in terms of (an emerging) stability and coherency of the journal-sets during the period 1982-1992, The analysis teaches us that AI has emerged as a set of journals with the characteristics of a discipline only since 1988, The thereafter relatively stable set of journals includes both fundamental and applied AI- journals, and journals with a focus on expert systems, Additionally, specialties related to artificial intelligence (like pattern analysis, computer science, cognitive psychology) are identified, Neural network research is a part neither of AI nor of its direct citation environment, Information science is related to AI only in the early eighties, The citation environment of AI is more stable than AI itself.

Keywords: Citation Analysis, Journals, Science

Alvarez, P. and Pulgarín, A. (1996), The Rasch model. Measuring the impact of scientific journals: Analytical chemistry. *Journal of the American Society for Information Science*, **47** (6), 458-467.

Full Text: [J\J Ame Soc Inf Sci47, 458.pdf](J/J%20Ame%20Soc%20Inf%20Sci47,%20458.pdf)

Abstract: This article focuses on a fresh way to determine a ranking of science journals according to the “number of citations-to and items-published, “ data used by SCI JCR of ISI to determine journal ranking by “impact factor.” This is the first application of latent traits theory to bibliometrics. “Impact” is considered a latent variable defined by a set of items (or indicators), citations, and sources. The theoretical background is Item Response Theory, which suggests that, if we can understand how each item in a set of items operates with an object, then we can estimate a measure for the object. The Rasch model is the commonest formulation of that theory. This technique is here applied to the citations and sources of 43 Analytical Chemistry journals (objects) to provide a Rasch measure for these journals which is compared with the current “impact factor” computation.

Keywords: Citation Analysis, Publications, Indicators, Tool

Dore, J.C., Ojasoo, T., Okubo, Y., Durand, T., Dudognon, G. and Miquel, J.F. (1996), Correspondence factor analysis of the publication patterns of 48 countries over the period 1981-1992. *Journal of the American Society for Information Science*, **47** (8), 588-602.

Full Text: [J\J Ame Soc Inf Sci47, 588.pdf](J/J%20Ame%20Soc%20Inf%20Sci47,%20588.pdf)

Abstract: This study illustrates the application of a descriptive multivariate statistical method, Correspondence Factorial Analysis (CFA), to the analysis of a dataset of over 6 million bibliometric entries (data from ISI). CFA is used to show how the 48 most prolific nations stand in relation to each with regard to their publication interests in 17 specific disciplinary areas and one multidisciplinary field over the period 1981-1992. The output of a CFA is a map displaying proximity among variables (countries and disciplines) and constitutes an impartial working document for experts interested in the evaluation of science. The present study focuses on three aspects of a CFA: (1) The normalized “publication patterns” of countries with a common feature (e.g., that belong to the same geopolitical zone, economic union, etc.) can be pooled in order to highlight the position of the union with respect to individual countries; (2) complex CFA maps can be simplified by selecting reference countries or disciplines and observing how the remaining countries and disciplines relate to these references; (3) data on additional countries (new publication profiles) or on additional variables (e.g., socio-economic data on all the countries under study) can be introduced into the CFA maps used as mathematical models. Our CFA of the ISI dataset reveals the scientific interests of nations in relative terms. The main cleavage (the first factorial axis) is between countries that still concentrate on the disciplines of the industrial revolution such as physics and chemistry (or that have turned toward their offspring, materials sciences) and those that have veered toward more “modern” disciplines such as the life sciences (e.g., clinical medicine), the environment, and computer sciences. The second cleavage, along the second factorial axis, is between countries that focus on the agricultural sciences (the land surface) and those interested in the geosciences (the sea, earth’s mantle, and mining). The third and fourth axes discriminate even further between earth, life, and abstract sciences highlighting the ostensible relationship between (organic) chemistry and all life science disciplines and between physics and disciplines related to engineering, materials sciences, etc. The CFA maps disclose the specific behavior of each country with respect to these cleavages.

Keywords: International Collaboration, Multivariate-Analysis, Link Indicator, Science, Citation, Index

? Mccain, K.W. (1996), Dictionary of bibliometrics - Diodato, V. *Journal of the American Society for Information Science*, **47** (9), 716-717.

Full Text: [1996\J Ame Soc Inf Sci47, 716.pdf](1996/J%20Ame%20Soc%20Inf%20Sci47,%20716.pdf)

Keywords: Bibliometrics, Citation

? Egghe, L. (1996), Source-item production laws for the case that items have multiple sources with fractional counting of credit. *Journal of the American Society for Information Science*, **47** (10), 730-748.

Full Text: [1996\J Ame Soc Inf Sci47, 730.pdf](1996/J%20Ame%20Soc%20Inf%20Sci47,%20730.pdf)

Abstract: This article extends two previous articles on the application of martingale theory to the well-known generalized ‘‘success-breeds-success’’ principle, generalized in order to comprise also other phenomena such as ‘‘failure breeds failure’’ and other production rhythms. The extension lies in the fact that items are allowed to have multiple sources, in which case fractional assignment of weights is taking place. In this sense this article differs from another one in which total counts are the assignment rule. Martingale properties of Y,(q), the number of sources with a weight q at time t are studied. In addition to that, applying a steady stare assumption, we develop formulae for E(P(t,q)), the expected fraction of sources with weight q at time t. We show that the irregular shapes of this function of q, which are encountered in practice, can be explained by this framework to a large extent.

Keywords: Lotka’s Law, Simon-Yule Approach

Liu, Z.M. (1997), Citation theories in the framework of international flow of information: New evidence with translation analysis. *Journal of the American Society for Information Science*, **48** (1), 80-87.

Full Text: [J\J Ame Soc Inf Sci48, 80.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%2080.pdf)

Abstract: Citation is a worldwide phenomenon. It needs to be considered in the international context. This study examines four common modalities (physical accessibility, cognitive accessibility, perceived quality, and perceived importance) underlying the complex citation practice by translation analysis. In an analysis of the Chinese literature in library and information science, it was found that there is a very strong correlation between languages cited and languages translated (r = 0.978). The overall national citation pattern of foreign publications is highly correlated with its translation pattern (r = 0.897). There is approximately 57% overlap between the group of the 60 most heavily cited authors and the group of the 60 most frequently translated authors. Highly cited publications are more likely to be translated (54.5 vs. 13.8%).

Keywords: Scientific Publications, Bibliometric Analysis, Science, Departments, Countries, Behavior, Ratings, Library

Wagner-Döbler, R. (1997), Science-technology coupling: The case of mathematical logic and computer science. *Journal of the American Society for Information Science*, **48** (2), 171-183.

Full Text: [J\J Ame Soc Inf Sci48, 171.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20171.pdf)

Abstract: In the history of science, there have often been periods of sudden rapprochements between pure science and technology-oriented branches of science. Mathematical logic as pure science and computer science as technology-orientated science have experienced such a rapprochement, which is studied in this article in a bibliometric manner.

Ingwersen, P. and Christensen, F.H. (1997), Data sea isolation for bibliometric online analyses of research publications: Fundamental methodological issues. *Journal of the American Society for Information Science*, **48** (3), 205-217.

Full Text: [J\J Ame Soc Inf Sci48, 205.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20205.pdf)

Abstract: The aim of the article is to emphasize and illustrate the retrieval dimensions of data collection activity online and their influence on the research evaluation outcome. The attempt is to reinforce the link between online retrieval and bibliometrics. Given that various forms of publication counts and citation analyses provide a valuable and revealing quantitative starting point for more qualitative indications and assessments of Science and Technology (S&T) performance, it is evident that their reliability and objectivity must be undisputed as far as possible. The article discusses the basic problems and limitations inherent in online bibliometric data collection and analyses, and points to possible solutions by means of illustrative case studies and examples. The reason for performing local publication analyses online often arises because of the increased use of external research assessments made by centralized bodies. For small institutions in small countries, like the North European one, such self-analyses may in addition provide valuable and inexpensive insights into novel S&T niches to explore. The major concern is the extent to which online bibliographic and domain dependent databases, as a supplement to the Institute for Scientific Information (ISI) citation files, are suitable for quantitative analysis and mapping of R&D outcome. By merging these two different types of databases into a single cluster, the method of duplicate removal becomes crucial. The article introduces a novel removal procedure by describing and exemplifying the principle of Reversed Duplicate Removal (RDR). RDR enables the analyst to take control of the location of the duplicates and to perform tailored analyses of the overlap of identical documents between files. It is well known that the databases themselves present obstacles directly associated with the process of performing online retrieval of the information necessary for further analysis. Problems encountered are, for instance, poor or inconsistent subject indexing within a single database or among several databases. Name form inconsistencies as to authors, institutions, and journals, the lack or inaccessibility of vital data in the database structures, etc., also present obstacles. On the other hand, comprehensive online bibliometric analyses are in many ways easier, faster, and less expensive to perform locally than those made using the independent CD-ROM versions of the relevant databases. In contrast to the online versions, the CD-ROM systems demonstrate a vital shortage of robust data processing and manipulation facilities. The downloading of records from a variety of CD-ROM files, the cleaning-up process, and the ensuing data processing activities become cumbersome and resource demanding. Regardless of database versioning, the degree of awareness of these retrieval and set isolation factors, such as the relevant search commands, syntax, and the analysis assumptions on the part of the analyst, plays an important role for the quality of the analysis outcome.

Keywords: Citation Analysis, Performance, Retrieval

Weinberg, B.H. (1997), The earliest Hebrew citation indexes. *Journal of the American Society for Information Science*, **48** (4), 318-330.

Full Text: [J\J Ame Soc Inf Sci48, 318.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20318.pdf)

Abstract: The invention of the citation index was credited to Shepard (1873) until Shapiro described a legal citation index published in 1743. A similar index was embedded in the Talmud two centuries earlier (1546). The first Hebrew citation index to a printed book is dated 1511. The earliest Hebrew manuscript citation index, ascribed to Maimonides, dates from the 12th century. Considerable knowledge was assumed for users of these tools. The substantial knowledge of their compilers contrasts with the semiautomatic production of modern citation indexes. The terms citation, quotation, reference, cross-reference, locator, and concordance are employed inconsistently in publications about Hebrew indexes. There is a lack of citation links between the secondary literature on Hebrew indexes and that of citation analysis.

Keywords: Bibliometrics, Origins

? Lancaster, F.W. (1997), Dictionary of bibliometrics. *Journal of the American Society for Information Science*, **48** (5), 480.

Full Text: [1997\J Ame Soc Inf Sci48, 480.pdf](1997/J%20Ame%20Soc%20Inf%20Sci48,%20480.pdf)

Keywords: Bibliometrics

? Mccain, K.W. (1997), Dictionary of bibliometrics - Response. *Journal of the American Society for Information Science*, **48** (5), 480-481.

Full Text: [1997\J Ame Soc Inf Sci48, 480.pdf](1997/J%20Ame%20Soc%20Inf%20Sci48,%20480.pdf)

Keywords: Bibliometrics

Zhang, H.Q. (1997), More authors, more institutions, and more funding sources: Hot papers in biology from 1991 to 1993. *Journal of the American Society for Information Science*, **48** (7), 662-666.

Full Text: [J\J Ame Soc Inf Sci48, 662.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20662.pdf)

Abstract: This bibliometric study is to provide a quantitative analysis of the authorship of Nature, Science, and Cell from 1991 to 1993. The source data consist of two sets: The hot papers in biology and the selective sample of articles, research articles, reports, or letters from three respective periodicals. The results show that the hot papers have more authors, more institutions participating in the research than the non-hot papers. The results also show that funding sources are significantly related to the mean number of authors per paper.

Keywords: Multiple Authorship, Scientific Collaboration, Journals, Sciences, Trends

Buckland, M.K. (1997), What is a “document”? *Journal of the American Society for Information Science*, **48** (9), 804-809.

Full Text: [J\J Ame Soc Inf Sci48, 804.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20804.pdf)

Abstract: Ordinarily the word “document” denotes a textual record. Increasingly sophisticated attempts to provide access to the rapidly growing quantity of available documents raised questions about what should be considered a “document.” The answer is important for any definition of the scope of Information Science. Paul Otlet and others developed a functional view of document and discussed whether, for example, sculpture, museum objects, and live animals, could be considered “documents.” Suzanne Briet equated “document” with organized physical evidence. These ideas appear to resemble notions of “material culture” in cultural anthropology and “object-as-sign” in semiotics. Others, especially in the U.S.A. (e.g., Jesse Shera and Louis Shores) took a narrower view. New digital technology renews old questions and also old confusions between medium, message, and meaning. © 1997 John Wiley & Sons, Inc.

Oluić-Vuković, V. (1997), Bradford’s distribution: From the classical bibliometric “law” to the more general stochastic models. *Journal of the American Society for Information Science*, **48** (9), 833-842.

Full Text: [1997\J Ame Soc Inf Sci48, 833.pdf](1997/J%20Ame%20Soc%20Inf%20Sci48,%20833.pdf)

Abstract: The significant qualitative shift from the conventional conceptual framework within which the Bradford distribution has usually been considered begins by attempting to bring it to a par with some well-known distributions and laws within and outside bibliometrics. This article outlines some of the important tendencies that helped this development, focusing on those oriented toward more fundamental problems such as the implementation of general models that can explain the process by which the Bradford and the related distributions are generated. Shifting of the focus and scope to these issues represents a strong current tendency, though some of the basic assumptions regarding this had been advanced about 50 years ago. The reasons for their slow implementation in the research concepts are also discussed.

Keywords: Stationary Scientometric Distributions, Journal Productivity Distribution, Simon-Yule Approach, Informetric Distributions, Scientific Productivity, Dynamic Behavior, Theoretical Foundation, Groos Droop, Lotka’s Law, Zipf’s Law

Qin, J., Lancaster, F.W. and Allen, B. (1997), Types and levels of collaboration in interdisciplinary research in the sciences. *Journal of the American Society for Information Science*, **48** (10), 893-916.

Full Text: [J\J Ame Soc Inf Sci48, 893.pdf](J/J%20Ame%20Soc%20Inf%20Sci48,%20893.pdf)

Abstract: It is common today for scientists to conduct research in collaboration with their colleagues from different institutions and disciplines. This study collected a sample of 846 scientific research papers published in 1992 and tested three hypotheses on the relationship between research collaboration and interdisciplinarity. Collaboration was measured by the number of authors, number of institutional affiliations, number of affiliation disciplines, and type of collaboration. Interdisciplinarity was measured by the number of disciplines represented in the journals cited. The results showed significant differences in degrees of interdisciplinarity among different levels of collaboration and among different disciplines. Some disciplines were shown to be highly collaborative, while others were not. This analysis led to the conclusion that collaboration contributed significantly to the degree of interdisciplinarity in some disciplines and not in others. In addition to an analysis of publications, this investigation used a survey that asked authors about their forms of collaboration, channels of communication, and use of information. The survey provided some qualitative explanation for the bibliometric findings. Findings are discussed from the perspective of scientist-scientist interaction, scientist-information interaction, and information-information interaction.

Keywords: Scientific Collaboration, Multiple Authorship

? Alvarez, P. and Pulgarin, A. (1997), The diffusion of scientific journals analyzed through citations. *Journal of the American Society for Information Science*, **48** (10), 953-958.

Full Text: [1997\J Ame Soc Inf Sci48, 953.pdf](1997/J%20Ame%20Soc%20Inf%20Sci48,%20953.pdf)

Abstract: A method is described for analyzing the diffusion of scientific journals, using the Rasch model as the measuring instrument. It is applied to the 10-year distribution of citations to journals of the Subject Category “Physics” by year of publication of cited articles with data obtained from the SCI Journal Citation Reports of ISI for the year 1994. Diffusion in a scientific field would be regarded as the dissemination of knowledge, channeled through citations that are distributed over different periods of time and propagated by means of scientific journals: here it is considered to be a latent variable defined by a particular set of items (the citations made in different time periods), and the Rasch model is used as an instrument for measuring that variable.

Keywords: Author, Citation, Citations, Diffusion, Journal, Journal Citation Reports, Journals, Model, Publication, Rasch Model, SCI

? Kopcsa, A. and Schiebel, E. (1998), Science and technology mapping: A new iteration model for representing multidimensional relationships. *Journal of the American Society for Information Science*, **49** (1), 7-17.

Full Text: [1998\J Ame Soc Inf Sci49, 7.pdf](1998/J%20Ame%20Soc%20Inf%20Sci49,%207.pdf)

Abstract: Much effort has been done to develop more objective quantitative methods to analyze and integrate survey information for understanding research trends and research structures. Go-word analysis is one class of techniques that exploits the use of co-occurrences of items in written information. However, there are some bottlenecks in using statistical methods to produce mappings of reduced information in a comfortable manner. On one hand, often used statistical software for PCs has restrictions for the amount for calculable data; on the other hand, the results of the multidimensional scaling routines are not quite satisfying. Therefore, this article introduces a new iteration model for the calculation of co-word maps that eases the problem. The iteration model is for positioning words in the two-dimensional plane due to their connections to each other, and it consists of a quick and stabile algorithm that has been implemented with software for personal computers. A graphic module represents the data in well-known “technology maps.”

Keywords: Algorithm, Analysis, Calculation, Computers, Data, Information, Mapping, Methods, Model, Multidimensional, Multidimensional Scaling, Quantitative Methods, Research, Restrictions, Scaling, Software, Survey, Techniques, Technology, Trends, Understanding

? Grupp, H., Schmoch, U. and Koschatzky, K. (1998), Science and technology infrastructure in Baden-Wuerttemberg and its orientation towards future regional development. *Journal of the American Society for Information Science*, **49** (1), 18-29.

Full Text: [1998\J Ame Soc Inf Sci49, 18.pdf](1998/J%20Ame%20Soc%20Inf%20Sci49,%2018.pdf)

Abstract: This article deals with technological and innovation processes, and the economic benefits in a region with open borderlines as part of a national innovation and economic system. Innovations and technologies compete for resources in an environment characterized by economic scarcity. Ultimately, the technology most suited to the times and the regional conditions triumphs. The article focuses the (present) innovative structures in industry in a selected region of Germany (i.e., the federal state of Baden-Wuerttemberg) and provides new scientometric data on the (present) contribution of public institutions to technological development in the region under scrutiny. The article concludes with a synopsis of present structures and a new information database on future technologies, thereby pointing out the regional challenges originating from structural change.

Keywords: Database, Development, Germany, Innovation, Innovations, Science, System, Technology

Melin, G. and Persson, O. (1998), Hotel cosmopolitan: A bibliometric study of collaboration at some European universities. *Journal of the American Society for Information Science*, **49** (1), 43-48.

Full Text: [J\J Ame Soc Inf Sci49, 43.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%2043.pdf)

Abstract: The collaborative pattern of all Nordic universities, as well as a few universities in the UK and the Netherlands, is analyzed using institutionally co-authored articles retrieved from *Science Citation Index.*TM The study shows that there are no major differences between universities of various size when it comes to the proportion of articles with internal, national, or international co-authorships. There are some country variations, but within each country, the differences among the universities are small, if any. When co-authorships were fractionalized according to the number of times a given university occurs among the addresses of an article, there were still no significant differences between universities of varying size. Since external collaboration, whether it is national or international, accounts for more than half of all articles produced by the universities, one is inclined to conclude that the universities function as a kind of cosmopolitan hotel housing nodes of scientific networks that are becoming increasingly international. © 1998 John Wiley & Sons, Inc.

Debackere, K. and Clarysse, B. (1998), Advanced bibliometric methods to model the relationship between entry behavior and networking in emerging technological communities. *Journal of the American Society for Information Science*, **49** (1), 49-58.

Full Text: [J\J Ame Soc Inf Sci49, 49.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%2049.pdf)

Abstract: Organizational ecology and social network theory are used to explain entries in technological communities. Using bibliometric data on 411 organizations in the field of plant biotechnology, we test several hypotheses that entry is not only influenced by the density of the field, but also by the structure of the R&D network within the community. The empirical findings point to the usefulness of bibliometric data in mapping change and evolution in technological communities, as well as to the effects of networking on entry behavior.

Keywords: Organizational Environments, Collective Strategy, Event Counts, Centrality, Discontinuities, Embeddedness, Isomorphism, Diffusion, Knowledge, Exchange

Van den Berghe, H., Houben, J.A., de Bruin, R.E., Moed, H.F., Kint, A., Luwel, M. and Spruyt, E.H.J. (1998), Bibliometric indicators of university research performance in Flanders. *Journal of the American Society for Information Science*, **49** (1), 59-67.

Full Text: [J\J Ame Soc Inf Sci49, 59.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%2059.pdf)

Abstract: During the past few years, bibliometric studies were conducted on research performance at three Flemish universities: The University of Ghent, the Catholic University of Leuven, and the University of Antwerp. Longitudinal analyses of research input, publication output, and impact covering a time span of 12 years were made of hundreds of research departments. This article outlines the general methodology used during these studies, and presents the main outcomes with respect to the faculties of medicine, science, and pharmaceutical science at the three universities involved. It focuses on the reactions of the researchers working in these faculties and of the university evaluation authorities on the studies.

Keywords: Bibliometric, Bibliometric Studies, Evaluation, Indicators, Medicine, Methodology, Outcomes, Publication, Research, Research Performance, Science, Universities, University

Noyons, E.C.M. and van Raan, A.F.J. (1998), Monitoring scientific developments from a dynamic perspective: Self-organized structuring to map neural network research. *Journal of the American Society for Information Science*, **49** (1), 68-81.

Full Text: [J\J Ame Soc Inf Sci49, 68.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%2068.pdf)

Abstract: With the help of bibliometric mapping techniques, we have developed a methodology of “self-organized” structuring of scientific fields. This methodology is applied to the field of neural network research, We propose a field-definition based on the present situation, This is done by letting the data themselves generate a structure, and, with that, define the subdivision of the research field into meaningful subfields. In order to study the evolution over time, the above “self-organized” definition of the present structure is taken as a framework for the past structure. We explore this evolution by monitoring the interrelations between subfields and by zooming into the internal structure of each subfield. The overall (“coarse”) structure and the detailed subfield maps (“fine structure”) are used for monitoring the dynamical features of the entire research field. Furthermore, by determining the positions of the main actors on the map, these structures can also be used to assess the activities of these main actors (universities, firms, countries, etc.). Finally, we “reverse” our approach by analyzing the developments based on a structure generated in the past. Comparison of the “real present” and the “present constructed from the past” may provide new insight into successful, as well as unsuccessful, patterns and “trajectories” of developments. Thus, we explore the potential of our method to put the observed “actual” developments into a possible future perspective.

Keywords: Word Analysis, Combined Cocitation, Science Maps, Interdisciplinarity, Representations

Zhang, H.Q. and Yamazaki, S. (1998), Citation indicators of Japanese journals. *Journal of the American Society for Information Science*, **49** (4), 375-379.

Full Text: [J\J Ame Soc Inf Sci49, 375.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%20375.pdf)

Abstract: The purpose of this study is to evaluate the Japanese journals in bibliometric parameters such as impact factors (Ifs), mean Ifs from citing and cited journals, and self-citing and self-cited rates. The data consists of 128 Japanese journals indexed in the 1994 Journal Citation Reports. The results note that only 15 journals, with a wide variation of self-citing and self-cited rates, have obtained a current impact higher than 1.00. The results also note that the Japanese journals have not achieved a high international reputation, although some of the citing journals are the top most-cited journals identified by Garfield as a small core of journals worldwide.

Keywords: Impact Factors, Science

? Huber, J.C. (1998), Cumulative advantage and success-breeds-success: The value of time pattern analysis. *Journal of the American Society for Information Science*, **49** (5), 471-476.

Full Text: [1998\J Ame Soc Inf Sci49, 471.pdf](1998/J%20Ame%20Soc%20Inf%20Sci49,%20471.pdf)

Abstract: Many different theoretical models can be made to fit empirical informetric data. For the case of the distribution of papers across authors, the Success-Breeds-Suecess or Cumulative Advantage model is a popular candidate. This article shows that examination of the time pattern of production allows independent evaluation of the component processes that generate the distribution of papers across authors. Specifically for inventors, the Cumulative Advantage model for increasing rate of production with experience is not confirmed. Furthermore, the distribution of individual production is Poisson and the distribution of the rate of production across the population fits the Gamma distribution. Thus, the non-uniform giftedness model is more appropriate for inventors.

Keywords: Inequality, Informetric Distributions, Lotka’s Law, Model, Poisson, Scientific Productivity, Simon-Yule Approach

? Bar-Ilan, J. (1998), Proceedings of the sixth conference of the International Society for Scientometrics and Informetrics. Jerusalem, June 16-19, 1997. *Journal of the American Society for Information Science*, **49** (6), 568-569

Full Text: [1998\J Ame Soc Inf Sci49, 568.pdf](1998/J%20Ame%20Soc%20Inf%20Sci49,%20568.pdf)

Keywords: Informetrics, Scientometrics

Kaminer, N. and Braunstein, Y.M. (1998), Bibliometric analysis of the impact of Internet use on scholarly productivity. *Journal of the American Society for Information Science*, **49** (8), 720-730.

Full Text: [J\J Ame Soc Inf Sci49, 720.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%20720.pdf)

Abstract: Variables measuring the nature and level of Internet usage by natural scientists improve the explanatory power of a traditional bibliographic model of scholarly productivity. The data used to construct these variables come from the log files generated by the internal accounting modules of the UNIX operating system. The effects of Internet usage on productivity are quantifiable, and it is possible to calculate tradeoffs between Internet usage and the more traditional inputs.

Keywords: Information-Science Faculty, Publication Productivity, Scientific Productivity, Academic Librarians, Computer-Networks, Career

Van Hooydonk, G. (1998), Standardizing relative impacts: Estimating the quality of research from citation counts. *Journal of the American Society for Information Science*, **49** (10), 932-941.

Full Text: [J\J Ame Soc Inf Sci49, 932.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%20932.pdf)

Abstract: The relative impact of local research units is obtained by dividing the observed number of citations to their publications by the expected number of citations, It is argued that the expected citation rates used in the standard method cannot lead to relevant bibliometric scores for specific research topics. Extracting information about quality of research with the standard method is, therefore, almost impossible. The existence of empirical relations between the number of citations and the number of publications for scientific disciplines and for journals, leads to alternative ways to determine relative impact. Hereby, reference data are taken from within a given research topic. Only observed citation and publication (activity) patterns for research topics are taken into account for calculating bibliometric scores. The new methods are not restricted to ISI-publications. The resulting bibliometric scores can contain information about the quality of research, and lead to different rankings than those obtained with the standard method, although the same citation and publication data are used.

Keywords: Scientific Journals

Bates, M.J. (1998), Indexing and access for digital libraries and the Internet: Human, database, and domain factors. *Journal of the American Society for Information Science*, **49** (13), 1185-1205.

Full Text: [J\J Ame Soc Inf Sci49, 1185.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%201185.pdf)

Abstract: Discussion in the research community and among the general public regarding content indexing (especially subject indexing) and access to digital resources, especially on the Internet, has underutilized research on a variety of factors that are important in the design of such access mechanisms. Some of these factors and issues are reviewed and implications drawn for information system design in the era of electronic access. Specifically the following are discussed: Human factors: Subject searching vs, indexing, multiple terms of access, folk classification, basic-level terms, and folk access; Database factors: Bradford’s Law, vocabulary scalability, the Resnikoff-Dolby 30: 1 Rule; Domain factors: Role of domain in indexing.

Keywords: Online Searching Project, Information-Retrieval, Bradford Law, Subject Access, User Persistence, Zipf Law, Design, Vocabulary, Relevance, Thesaurus

? Coulter, N., Monarch, I. and Konda, S. (1998), Software engineering as seen through its research literature: A study in co-word analysis. *Journal of the American Society for Information Science*, **49** (13), 1206-1223.

Full Text: [1998\J Ame Soc Inf Sci49, 1206.pdf](1998/J%20Ame%20Soc%20Inf%20Sci49,%201206.pdf)

Abstract: This empirical research demonstrates the effectiveness of content analysis to map the research literature of the software engineering discipline. The results suggest that certain research themes in software engineering have remained constant, but with changing thrusts. Other themes have arisen, matured, and then faded as major research topics, while still others seem transient or immature. Go-word analysis is the specific technique used. This methodology identifies associations among publication descriptors (indexing terms) from the ACM Computing Classification System and produces networks of descriptors that reveal these underlying patterns. This methodology is applicable to other domains with a supporting corpus of textual data. While this study utilizes index terms from a fixed taxonomy, that restriction is not inherent; the descriptors can be generated from the corpus. Hence, co-word analysis and the supporting software tools employed here can provide unique insights into any discipline’s evolution.

Keywords: Analysis, Citation, Co-Word, Co-Word Analysis, Content Analysis, Descriptors, Education, Indexing, Literature, Publication, Research, Research Topics, Scientometrics, Software, Software Engineering, Systems, Taxonomy

Tsay, M.Y. (1998), Library journal use and citation half-life in medical science. *Journal of the American Society for Information Science*, **49** (14), 1283-1292.

Full Text: [J\J Ame Soc Inf Sci49, 1283.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%201283.pdf)

Abstract: This study investigated the in-house use half-life of journals in the Library of Veterans General Hospital, Taipei, and their citation half-life, and the difference between them. The use study employed the sweep method and the study period lasted for 6 months. The citation half-life of each journal of this study was based on the data listed in the Science Citation Index, Journal Citation Reports, 1993. The results of this study illustrate that publication frequency, journal age, language, and country of publication, and subject category all are related to both use and citation half-lives. In addition, the use half-life also reflects the extent of holdings of particular titles in the local library. The mean use half-life of the total 835 journals is 3.43 years, which is significantly shorter than the mean citation half-life, 6.28 years. The difference between mean use half-life and mean citation half-life is 2.85 years, and is statistically significant as revealed by the t test.

Keywords: Obsolescence

Cronin, B., Snyder, H.W., Rosenbaum, H., Martinson, A. and Callahan, E. (1998), Invoked on the web. *Journal of the American Society for Information Science*, **49** (14), 1319-1328.

Full Text: [J\J Ame Soc Inf Sci49, 1319.pdf](J/J%20Ame%20Soc%20Inf%20Sci49,%201319.pdf)

Abstract: Where, how, and why are scholars invoked on the World Wide Web? An inductively derived typology was used to capture genres of invocation. Comparative data were gathered using five commercial search engines. It is argued that the Web fosters new modalities of scholarly communication. Different categories of invocation are identified and analyzed in terms of their potential to inform sociometric and bibliometric analyses of academic interaction.

Keywords: World-Wide-Web, Search Engines, Information, Science, Communication, Performance, Library, System

Noyons, E.C.M, Moed, H.F. and Luwel, M. (1999), Combining mapping and citation analysis for evaluative bibliometric purposes: A bibliometric study. *Journal of the American Society for Information Science*, **50** (2), 115-131.

Full Text: [J\J Ame Soc Inf Sci50, 115.pdf](J/J%20Ame%20Soc%20Inf%20Sci50,%20115.pdf)

Abstract: The general aim of the article is to demonstrate how the results both of a structural analysis, and of a research performance assessment of a research field, can be enriched by combining elements of both into one integrated analysis. In addition, a procedure is discussed to select and analyse candidate benchmark institutes to assess the position of a particular research institute, in terms of both its cognitive orientation and its scientific production and impact at the international research front, The combined method is applied in an evaluation of the research scope and performance of the Interuniversity Centre for Micro-Electronics (IMEC) in Leuven, Belgium. On the basis of the comments of an international panel of experts in micro-electronics, the method was discussed in detail. We concluded that the method provides a detailed and useful picture of the position of the institute from an international perspective. Moreover, we found that the results of each of the two parts are an added value to the other.

Keywords: Co-Word Analysis, Basic Research, Scientific Literatures, Performance-Measures, Science, Indicators, Policy

? Ellis, D., Allen, D. and Wilson, T. (1999), Information science and information systems: Conjunct subjects disjunct disciplines. *Journal of the American Society for Information Science*, **50** (12), 1095-1107.

Full Text: [1999\J Ame Soc Inf Sci50, 1095.pdf](1999/J%20Ame%20Soc%20Inf%20Sci50,%201095.pdf)

Abstract: The relationship between information science and information systems (IS) research is examined through analysis of the subject literature of each field and by citation and cc-citation analysis of highly cited researchers in each field. The subfields of user studies (US) and information retrieval (IR) research were selected to represent information science research as these subject areas are central to information science and seemed also to represent areas in which there was most overlap of interest or subject matter. The two forms of analysis revealed that although there seemed considerable overlap or potential far overlap in research subjects that there was almost none in relation to the disciplinary fields as assessed by the cc-citation analysis of the most highly cited authors in the three subject areas. An examination of the reasons for this is offered in relation to the nature of scientific disciplines, the socialization process of researchers in the different fields and with institutional pressures.

Keywords: Assessment Exercise Ratings, Author Cocitation, Citation, Citation Counts, Cocitation Analysis, Design, Information Retrieval, Information Science, Information Systems, Intellectual Structure, IR, Literature, Pressures, Research, Researchers, Retrieval Conference TREC-2, Science, Search Interface, Technology, US, User

Kostoff, R.N., Eberhart, H.J. and Toothman, D.R. (1999), Hypersonic and supersonic flow roadmaps using bibliometrics and database tomography. *Journal of the American Society for Information Science*, **50** (5), 427-447.

Full Text: [J\J Ame Soc Inf Sci50, 427.pdf](J/J%20Ame%20Soc%20Inf%20Sci50,%20427.pdf)

Abstract: Database Tomography (DT) is a textual database analysis system consisting of two major components: 1) Algorithms for extracting multiword phrase frequencies and phrase proximities (physical closeness of the multiword technical phrases) from any type of large textual database, to augment 2) interpretative capabilities of the expert human analyst. DT was used to derive technical intelligence from a hypersonic/supersonic flow (HSF) database derived from the Science Citation Index and the Engineering Compendex. pHrase frequency analysis by the technical domain expert provided the pervasive technical themes of the HSF database, and the phrase proximity analysis provided the relationships among the pervasive technical themes. Bibliometric analysis of the HSF literature supplemented the DT results with author/journal/institution publication and citation data. Comparisons of HSF results with past analyses of similarly structured near-earth space and Chemistry databases are made. One important finding is that many of the normalized bibliometric distribution functions are extremely consistent across these diverse technical domains

Cano, V. (1999), Bibliometric overview of Library and Information Science research in Spain. *Journal of the American Society for Information Science*, **50** (8), 675-680.

Full Text: [J\J Ame Soc Inf Sci50, 675.pdf](J/J%20Ame%20Soc%20Inf%20Sci50,%20675.pdf)

Abstract: This paper reviews 17 years of research in Library and Information Science in Spain. The total production of two major Spanish periodical publications in the field were analyzed from 1977-1994 according to productivity variables and thematic content, A total of 354 articles were analyzed using as a framework the conceptual and methodological model of L&IS research proposed by Jarvelin and Vakkari (1990), The Spanish research output seems to concentrate in the areas of information retrieval, description of services, and studies of scientific communication. However, there are differences in the concentration of topics per journal studied. The Spanish L&IS community seems straddled between a professional and a research orientation. Descriptive and discursive methods amount to 36% of the articles studied, while empirical methods amount to 33% of the articles. Authorship patterns suggest a prevalence for individual authorship (68%) and isolated instances of publication in non-Spanish language journals indexed by Library and Information Science Abstracts (LISA).

Keywords: Research Articles, Documentation, Authorship, Patterns, Journals

? Lipetz, B.A. (1999), Aspects of JASIS authorship through five decades. *Journal of the American Society for Information Science*, **50** (11), 994-1003.

Full Text: [1999\J Ame Soc Inf Sci50, 994.pdf](1999/J%20Ame%20Soc%20Inf%20Sci50,%20994.pdf)

Abstract: The Journal of the American Society for Information Science (JASIS) is completing 50 years of publication. Aspects of authorship of papers in JASIS were studied by examining one volume from each decade of JASIS’s existence. For each substantial paper in these volumes, data were collected regarding number of authors, type of affiliation of each author, author’s gender, and author’s country if it was not the United States. Also noted were data on length, content, and “colonicity” of the title, and data on the extent of citing and self-citing in the paper. Findings are presented, and are compared with findings of other studies of JASIS and related publications. Based on this survey of JASIS, the literature of information science has grown exponentially, as would be expected in a new or developing discipline. Authorship has been growing even a little faster, because multiple authorship of information science papers has become much more common. Representation of authors from different countries has increased greatly. But, compared to various library journals, JASIS is not outstanding in either multiple authorship or degree of foreign representation. Individual authors, at least in JASIS, are increasingly likely to produce multiple papers; the extent, explanation, and significance of this phenomenon warrant further inquiry. The percentage of authors who are female has grown, but is higher in many related journals than it is in JASIS. Trends in the titling of papers suggest that writings have become more informative, but also considerably wordier. “Scholarliness” of papers has increased on the basis of a rapid rise in use of colons in titles. More importantly, scholarship has increased greatly on the basis of the disappearance of papers that lack citations and the exponential growth in the average number of references per paper. It appears that the field of information science underwent an important transition in authorship characteristics after the 1950s. The proportion of authors with academic affiliations has grown so large that other types of affiliations, although significant in the 1950s, are now hardly represented at all. Contributions by authors whose professional concerns are primarily with applied aspects of information science have thus become rarer. Such changes may have serious implications for information science and for JASIS, and deserve study.

Keywords: Author, Authorship, Citation, Citations, Collaboration, College, Concerns, Growth, Information Science, Information-Science, Jasis, Journals, Library-Science Journals, Literature, Profile, Publication, Publications, References, Scholarship, Science, Scientists

Nisonger, T.E. (1999), *JASIS* and library and information science journal rankings: A review and analysis of the last half-century. *Journal of the American Society for Information Science*, **50** (11), 1004-1019.

Full Text: [J\J Ame Soc Inf Sci50, 1004.pdf](J/J%20Ame%20Soc%20Inf%20Sci50,%201004.pdf)

Abstract: The concept of journal ranking is explained along with the theoretical and practical significance of ranking journals. An eight-variable model for classifying journal-ranking studies is outlined. A review of LIS journal rankings of the last half-century identifies 178 published between 1952 and 1997. The majority of these used some type of citation measure, followed by rankings based on production, subjective judgment, and reading, respectively. Analysis of JASIS’s, and its immediate predecessor, American Documentation’s, position in these rankings, found that they were logically excluded from 18. In the remaining 160, they ranked first in 20 and in the top five in 88. It is noted that JASIS also appears on many lists of “core” LIS journals, and that it has been the object of investigation in numerous studies.

Keywords: Citation Analysis, Professional Journals, Periodical Literature, Research Productivity, Bibliometric Analysis, Perceived Prestige, Faculty, Librarianship, Practitioners, Authorship

? Meho, L.I. and Sonnenwald, D.H. (2000), Citation ranking versus peer evaluation of senior faculty research performance: A case study of Kurdish scholarship. *Journal of the American Society for Information Science*, **51** (2), 123-138.

Full Text: [2000\J Ame Soc Inf Sci51, 123.pdf](2000/J%20Ame%20Soc%20Inf%20Sci51,%20123.pdf)

Abstract: The purpose of this study is to analyze the relationship between citation ranking and peer evaluation in assessing senior faculty research performance. Other studies typically derive their peer evaluation data directly from referees, often in the form of ranking, This study uses two additional sources of peer evaluation data: citation content analysis and book review content analysis. Two main questions are investigated: (a) To what degree does citation ranking correlate with data from citation content analysis, book reviews, and peer ranking? (b) Is citation ranking a valid evaluative indicator of research performance of senior faculty members? Citation data, book reviews, and peer ranking were compiled and examined for faculty members specializing in Kurdish studies. Analysis shows that normalized citation ranking and citation content analysis data yield identical ranking results. Analysis also shows that normalized citation ranking and citation content analysis, book reviews, and peer ranking perform similarly (i.e., are highly correlated) for high-ranked and low-ranked senior scholars, Additional evaluation methods and measures that take into account the context and content of research appear to be needed to effectively evaluate senior scholars whose performance ranks relatively in the middle. Citation content analysis data did appear to give some specific and important insights into the quality of research of these middle performers, however, further analysis and research is needed to validate this finding. This study shows that citation ranking can provide a valid indicator for comparative evaluation of senior faculty research performance.

Keywords: Information-Science Research, Book Selection, Basic Research, Indicators, Psychology, Library, Art

? Qin, J. (2000), Semantic similarities between a keyword database and a controlled vocabulary database: An investigation in the antibiotic resistance literature. *Journal of the American Society for Information Science*, **51** (2), 166-180.

Full Text: [2000\J Ame Soc Inf Sci51, 166.pdf](2000/J%20Ame%20Soc%20Inf%20Sci51,%20166.pdf)

Abstract: The KeyWords Plus in the Science Citation Index database represents an approach to combining citation and semantic indexing in describing the document content. This paper explores the similarities or dissimilarities between citation-semantic and analytic indexing. The dataset consisted of over 400 matching records in the SCI and MEDLINE databases on antibiotic resistance in pneumonia. The degree of similarity in indexing terms was found to vary on a scale from completely different to completely identical with various levels in between. The within-document similarity in the two databases was measured by a variation on the Jaccard Coefficient-the Inclusion Index. The average inclusion coefficient was 0.4134 for SCI and 0.3371 for MEDLINE, The 20 terms occurring most frequently in each database were identified. The two groups of terms shared the same terms that consist of the “intellectual base” for the subject. Conceptual similarity was analyzed through scatterplots of matching and nonmatching terms vs, partially identical and broader/narrower terms. The study also found that both databases differed in assigning terms in various semantic categories. Implications of this research and further studies are suggested.

Keywords: Online Data-Bases, Retrieval Performance, Information-Retrieval, Indexing Consistency, Medical Literature, Free Text, Citation, Documents, Relevance, Science

? Brooks, T.A. (2000), How good are the best papers of JASIS? *Journal of the American Society for Information Science*, **51** (5), 485-486.

Full Text: [2000\J Ame Soc Inf Sci51, 485.pdf](2000/J%20Ame%20Soc%20Inf%20Sci51,%20485.pdf)

Abstract: A citation analysis examined the 28 best articles published in JASIS (Journal of the American Society for Information Science) from 1969-1996. Best articles tend to be single-authored works twice as long as the average article published in JASIS. They are cited and self-cited much more often than the average article. The greatest source of references made to the best articles is from JASIS itself. The top five best papers focus largely on information retrieval and online searching.

Keywords: Analysis, Citation, Citation Analysis, Information Retrieval, JASIS, References

Case, D.O. and Higgins, G.M. (2000), How can we investigate citation behavior? A study of reasons for citing literature in communication. *Journal of the American Society for Information Science*, **51** (7), 635-645.

Full Text: [J\J Ame Soc Inf Sci51, 635.pdf](J/J%20Ame%20Soc%20Inf%20Sci51,%20635.pdf)

Abstract: Authors’ motivations for citing documents are addressed through a literature review and an empirical study. Replicating an investigation in psychology, the works of two highly-cited authors in the discipline of communication were identified, and all of the authors who cited them during the period 1995-1997 were surveyed. The instrument posed 32 questions about why a certain document was cited, plus questions about the citer’s relationship to the cited author and document. Most findings were similar to the psychology study, including a tendency to cite “concept markers” representing a genre of work. Authors in communication were more likely to have an interpersonal connection to cited authors, and to cite literature reviews-their most common reason for citation. Three types of judgments about cited works were found to best predict citation: (1) that the work was novel, well-known, and a concept-marker; (2) that citing it might promote the authority of one’s own work; and (3) that the work deserved criticism. Suggestions are made for further research, especially regarding the anomalous role of creativity in cited works.

Keywords: Classification, Journals, Cite

? Egghe, L. and Rousseau, R. (2000), Partial orders and measures for language preferences. *Journal of the American Society for Information Science*, **51** (12), 1123-1130.

Full Text: [2000\J Ame Soc Inf Sci51, 1123.pdf](2000/J%20Ame%20Soc%20Inf%20Sci51,%201123.pdf)

Abstract: Relative own-language preference depends on two parameters: the publication share of the language, and the self-citing rate, Openness of language L with respect to language J depends on three parameters: the publication share of language L, the publication share of language J, and the citation share of language J among all citations given by language L. It is shown that the relative own-language preference end the openness of one language with respect to another one, can be represented by a partial order. This partial order can be represented by a polygonal line (for the relative own-language preference) or a three-dimensional solid (for openness), somewhat in the same spirit as the Lorenz curve for concentration and evenness. Any function used to measure relative own-language preference or openness of one language with respect to another one should at least respect the corresponding partial orders. This is a minimum requirement for such measures. Depending on the use one wants to make of these measures other requirements become necessary. A logarithmic dependence on the language share(s) seems a natural additional requirement, This would correspond with the logarithmic behavior of psychophysical sensations. We give examples of normalized functions satisfying this additional requirement. It is further investigated if openness partial orders can lead to measures for relative own-language preference. The article ends with some examples related to the language use in some sociological journals.

Keywords: Citation, Citations, Diversity, Journals, Lead, Preferences, Publication, Self-Citation

Ding, Y., Chowdhury, G.G., Foo, S. and Qian, W.Z. (2000), Bibliometric Information Retrieval System (BIRS): A Web search interface utilizing bibliometric research results. *Journal of the American Society for Information Science*, **51** (13), 1190-1204.

Full Text: [J\J Ame Soc Inf Sci51, 1190.pdf](J/J%20Ame%20Soc%20Inf%20Sci51,%201190.pdf)

Abstract: The aim of this article is to test whether the results obtained from a specific bibliographic research can be applied to a real search environment and enhance the level of utility of an information retrieval session for all levels of end users. In this respect, a Web-based Bibliometric Information Retrieval System (BIRS) has been designed and created, with facilities to assist the end users to get better understanding of their search domain, formulate and expand their search queries, and visualize the bibliographic research results. There are three specific features in the system design of the BIRS: the information visualization feature of the BIRS (cocitation maps) to guide the end users to identify the important research groups and capture the detailed information about the intellectual structure of the search domain; the multilevel browsing feature to allow the end users to go to different levels of interesting topics; and the common user interface feature to enable the end users to search all kinds of databases regardless of different searching systems, different working platforms, different database producer and supplier, such as different Web search engines, different library OPACs, or different on-line databases, A preliminary user evaluation study of BIRS revealed that users generally found it easy to form and expand their queries, and that BIRS helped them acquire useful background information about the search domain. They also pointed out aspects of information visualization, multilevel browsing, and common user interface as novel characteristics exhibited by BIRS.

Keywords: Authors, Bibliometric, Citation, Citation Indexes, Citations, Counts, Documentation, Google Scholar, Immediacy Index, Impact, Impact Factor, Information Science, Journal Articles, Journals, Library And Information Science, Open Access, Publication, Research Performance, Science, Self-Citation, Subject Distribution, Web

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Full Text: [J\J Ame Soc Inf Sci52, 18.pdf](J/J%20Ame%20Soc%20Inf%20Sci52,%2018.pdf)

Keywords: Scientific Discovery

? Bookstein, A. (2001), Implications of ambiguity for scientometric measurement. *Journal of the American Society for Information Science and Technology*, **52** (1), 74-79.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 74.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%2074.pdf)

Abstract: The essence of Scientometrics is precise measurement. Yet the measurements made in Scientometric research is steeped in ambiguity. This article explores the nature of ambiguity in measurement, and probes for mechanisms that allow regularities to be discovered in an environment in which ambiguity is pronounced.

Keywords: Environment, Informetric Distributions, Measurement, Mechanisms, Research, Scientometric, Scientometrics

? White, H.D. (2001), Authors as citers over time. *Journal of the American Society for Information Science and Technology*, **52** (2), 87-108.

Full Text: [2001\J Ame Soc Inf Sci52, 87.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%2087.pdf)

Abstract: This study explores the tendency of authors to recite themselves and others in multiple works over time, using the insights gained to build citation theory. The set of all authors whom an author cites is defined as that author’s citation identity. The study explains how to retrieve citation identities from the Institute for Scientific Information’s files on Dialog and how to deal with idiosyncrasies of these files, As the author’s oeuvre grows, the identity takes the form of a core-and-scatter distribution that may be divided into authors cited only once (unicitations) and authors cited at least twice (recitations), The latter group, especially those recited most frequently, are interpretable as symbols of a citer’s main substantive concerns, As illustrated by the top recitees of eight information scientists, identities are intelligible, individualized, and wide-ranging, They are ego-centered without being egotistical. They are often affected by social ties between citers and citees, but the universal motivator seems to be the perceived relevance of the citees’ works. Citing styles in identities differ: “scientific-paper style” authors recite heavily, adding to core; “bibliographic-essay style” authors are heavy on unicitations, adding to scatter; “literature-review style” authors do both at once. Identities distill aspects of citers’ intellectual lives, such as orienting figures, interdisciplinary interests, bidisciplinary careers, and conduct in controversies. They can also be related to past schemes for classifying citations in categories such as positive-negative and perfunctory-organic; indeed, one author’s frequent recitation of another, whether positive or negative, may be the readiest indicator of an organic relation between them. The shape of the core-and-scatter distribution of names in identities can be explained by the principle of least effort, Citers economize on effort by frequently reciting only a relatively small core of names in their identities. They also economize by frequent use of perfunctory citations, which require relatively little context, and infrequent use of negative citations, which require contexts more laborious to set.

Keywords: Author, Citation, Citation Analysis, Citations, Citers, Classification, Concerns, Documentation, Identity, Information-Science, Knowledge, Model, Motivations, Ortega Hypothesis, References, Self-Citations

Brown, C. (2001), The E-volution of preprints in the scholarly communication of physicists and astronomers. *Journal of the American Society for Information Science and Technology*, **52** (3), 187-200.

Full Text: [J\J Ame Soc Inf Sci52, 187.pdf](J/J%20Ame%20Soc%20Inf%20Sci52,%20187.pdf)

Abstract: To learn how e-prints are cited, used, and accepted in the literature of physics and astronomy, the philosophies, policies, and practices of top-tier physics and astronomy journals regarding e-prints from the Los Alamos e-print archive, arXiv.org, were examined, Citation analysis illustrated e-prints were cited with increasing frequency by a variety of journals in a wide range of physics and astronomy fields from 1998 to 1999, The peak e-print citation rate of 3 years observed was comparable to that of print journals, suggesting a similarity in citation patterns of e-prints and printed articles. The number of citations made to 37 premier physics and astronomy journals and their impact factors have remained constant since arXiv.org’s inception in 1991, indicating that e-prints have yet to make an impact on the use of the printed literature. The degree of acceptance stated by the journals’ editors and the policies given in the journal’s instructions to authors sections concerning the citing of e-prints and subsequent publication of papers that have appeared as e-prints differed from journal to journal, ranging from emphatically unacceptable to ‘why not?’ Even though the use of the traditional literature has not changed since arXiv.org began and the policies concerning e-print citation and publication were inconsistent, the number of citations (35,928) and citations rates (34.1%) to 12 arXiv.org archives were found to be large and increasing. It is, therefore, evident that arXiv.org e-prints have evolved into an important facet of the scholarly communication of physics and astronomy.

Keywords: Library Journal Use, Citation Patterns, Medical Science, Publications, Researchers, Archive, Plan

? Szava-Kovats, E. (2001), Indirect-collective referencing (ICR) in the elite journal literature of physics. I. A literature science study on the journal level. *Journal of the American Society for Information Science and Technology*, **52** (3), 201-211.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 201.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20201.pdf)

Abstract: In the author’s previous article (JASIS, 50, 1999, 1284-1294) it was shown that the quantity of nonindexed indirect-collective references in the representative elite general physics journal, The Physical Review, now alone exceeds many times over the quantity of references taken into account by the ISI as “citations” and listed in the Science Citation Index. The present article reports the findings of a new ICR investigation carried out in a representative sample of the elite journal literature of physics: in the January 1997 issue of 44 source journals covering the domain of physics, i.e., in 2,662 scientific communications of 38 normal and 6 letter journals. The methods of the investigation were most rigorous, and consequently, only the indisputable minimum of the literature phenomenon examined was revealed. It is demonstrated that the ICR phenomenon is present in all source journals processed of bibliometrically very heterogeneous nature, in both the normal and the letter journals. The frequency of the generally occurring ICR phenomenon is very high: it is found in 17.2% of the sample. There is very little scattering in the rate of frequency: it is 17.0% in the group of normal journals and 17.9% in the letter journals. The bibliometrically very heterogeneous representative sample is very homogeneous regarding the presence and frequency of the ICR phenomenon. On the basis of these facts it can be stated that the quantity of nonindexed indirect-collective references in the elite physics journal literature now alone exceeds many times over the quantity of references listed in the Science Citation Index. The meaning of this fact and its logical consequences must be taken into consideration in the evaluation of results of sciento- and other “-metrics” studies based only on the reference stock of the Citation Indexes.

Keywords: Communications, Evaluation, General, Investigation, ISI, JASIS, Journal, Journals, Literature, Methods, Minimum, Normal, Reference, References, Referencing, Scattering, Science, Science Citation Index, Source, Spectra

? Marion, L.S. and McCain, K.W. (2001), Contrasting views of software engineering journals: Author cocitation choices and indexer vocabulary assignments. *Journal of the American Society for Information Science and Technology*, **52** (4), 297-308.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 297.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20297.pdf)

Abstract: We explore the intellectual subject structure and research themes in software engineering through the identification and analysis of a core journal literature. We examine this literature via two expert perspectives: that of the author, who identified significant work by citing it (journal cocitation analysis), and that of the professional indexer, who tags published work with subject terms to facilitate retrieval from a bibliographic database (subject profile analysis). The data sources are SCISEARCH (the on-line version of Science Citation Index), and INSPEC (a database covering software engineering, computer science, and information systems), We use data visualization tools (cluster analysis, multidimensional scaling, and PFNets) to show the ‘intellectual maps’ of software engineering. Cocitation and subject profile analyses demonstrate that software engineering is a distinct interdisciplinary field, valuing practical and applied aspects, and spanning a subject continuum from ‘programming-in-the-small’ to ‘programming-in-the-large.’ This continuum mirrors the software development life cycle by taking the operating system or major application from initial programming through project management, implementation, and maintenance, Object orientation is an integral but distinct subject area in software engineering. Key differences are the importance of management and programming: (1) cocitation analysis emphasizes project management and systems development; (2) programming techniques/languages are more influential in subject profiles; (3) cocitation profiles place object-oriented journals separately and centrally while the subject profile analysis locates these journals with the programming/languages group.

Keywords: Research-and-Development, Science, Discipline, Biotechnology, Cartography, Technology, Core

Davis, P.M. and Cohen, S.A. (2001), The effect of the Web on undergraduate citation behavior 1996-1999. *Journal of the American Society for Information Science and Technology*, **52** (4), 309-314.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 309.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20309.pdf)

Abstract: citation analysis of undergraduate term papers in microeconomics revealed a significant decrease in the frequency of scholarly resources cited between 1996 and 1999. Book citations decreased from 30% to 19%, newspaper citations increased from 7% to 19%, and Web citations increased from 9% to 21%. Web citations checked in 2000 revealed that only 18% of URLs cited in 1996 led to the correct Internet document. For 1999 bibliographies, only 55% of URLs led to the correct document. The authors recommend (1) setting stricter guidelines for acceptable citations in course assignments; (2) creating and maintaining scholarly portals for authoritative Web sites with a commitment to long-term access; and (3) continuing to instruct students how to critically evaluate resources.

Cronin, B. (2001), Hyperauthorship: A postmodern perversion or evidence of a structural shift in scholarly communication practices? *Journal of the American Society for Information Science and Technology*, **52** (7), 558-569.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 558.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20558.pdf)

Abstract: Classical assumptions about the nature and ethical entailments of authorship (the standard model) are being challenged by developments in scientific collaboration and multiple authorship. In the biomedical research community, multiple authorship has increased to such an extent that the trustworthiness of the scientific communication system has been called into question. Documented abuses, such as honorific authorship, have serious implications in terms of the acknowledgment of authority, allocation of credit, and assigning of accountability. Within the biomedical world it has been proposed that authors be replaced by lists of contributors (the radical model), whose specific inputs to a given study would be recorded unambiguously. The wider implications of the ‘hyperauthorship’ phenomenon for scholarly publication are considered.

Keywords: Acknowledgments, Articles, Bibliometrics, Coauthorship, Collaboration, Contributors, Dissemination, Multiple Authorship, Order, Research, Scholarly Communication, Science

? Kretschmer, H. and Rousseau, R. (2001), Author inflation leads to a breakdown of Lotka’s law. *Journal of the American Society for Information Science and Technology*, **52** (8), 610-614.

Full Text: [2002\J Ame Soc Inf Sci Tec52, 610.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20610.pdf)

Abstract: It is empirically shown that, even using the normal or total counting procedure, Lotka’s law breaks down when articles with a large, i.e., more than hundred, number of authors are included in the bibliography, The explanation of this phenomenon is that the conditions for an application of the basic success-breeds-success model are not fulfilled any more. Studying articles with many authors means dealing with items (the articles) having multiple sources (the authors), hence Egghe’s generalized success-breeds-success model, leading to not necessarily decreasing distributions, explains the observed irregularities.

Keywords: Attribution, Breakdown, Counts, Distributions, Informetric Distributions, Law, Lotka’s Law, Model, Productivity, Scientific Collaboration, Sources

Frohlich, C. and Resler, L. (2001), Analysis of publications and citations from a geophysics research institute. *Journal of the American Society for Information Science and Technology*, **52** (9), 701-713.

Full Text: [2001\J Ame Soc Inf Sci Tec52, 701.pdf](2001/J%20Ame%20Soc%20Inf%20Sci%20Tec52,%20701.pdf)

Abstract: We here perform an analysis of all 1128 publications produced by scientists during their employment at the University of Texas Institute for Geophysics, a geophysical research laboratory founded in 1972 that currently employs 23 Ph.D.- level scientists. We thus assess research performance using as bibliometric indicators such statistics as publications per year, citations per paper, and cited half-lives. To characterize the research style of individual scientists and to obtain insight into the origin of certain publication-counting discrepancies, we classified the 1128 publications into four categories that differed significantly with respect to statistics such as lifetime citation rates, fraction of papers never-cited after 10 years, and cited half-life. The categories were: mainstream (prestige journal) publications -32.6 lifetime cit, pap, 2.4% never cited, and 6.9 year half-life; archival (other refereed)-12.0 lifetime cit, pap. 21.5% never cited, and 9.5 years half-life; articles published as proceedings of conferences-5.4 lifetime cit, pap, 26.6% never cited, and 5.4 years half-life; and ‘other’ publications (news articles, book reviews, etc.)-4.2 lifetime cit, pap, 57.1% never cited, and 1.9 years half-life. Because determining cited half-lives is highly similar to a well-studied phenomenon in earthquake seismology, which was familiar to us, we thoroughly evaluate five different methods for determining the cited half-life and discuss the robustness and limitations of the various methods. Unfortunately, even when data are numerous the various methods often obtain very different values for the half-life. Our preferred method determines half-life from the ratio of citations appearing in back-to-back 5-year periods. We also evaluate the reliability of the citation count data used for these kinds of analysis and conclude that citation count data are often imprecise. All observations suggest that reported differences in cited half-lives must be quite large to be significant

Keywords: Authors, B-Values, Bibliometric, Citation, Citations, Consequences, Half-Life, Methods, Obsolescence, Performance, Quality, Research, Research Performance, SCI, Science, Statistics

Bensman, S.J. (2001), Urquhart’s and Garfield’s laws: The British controversy over their validity. *Journal of the American Society for Information Science and Technology*, **52** (9), 714-724.

Full Text: [2001\J Ame Soc Inf Sci52, 714.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%20714.pdf)

Abstract: The British controversy over the validity of Urquhart’s and Garfield’s Laws during the 1970s constitutes an important episode in the formulation of the probability structure of human knowledge. This controversy took place within the historical context of the convergence of two scientific revolutions-the bibliometric and the biometric-that had been launched in Britain. The preceding decades had witnessed major breakthroughs in understanding the probability distributions underlying the use of human knowledge. Two of the most important of these breakthroughs were the laws posited by Donald J. Urquhart and Eugene Garfield, who played major roles in establishing the institutional bases of the bibliometric revolution, For his part, Urquhart began his realization of S, C. Bradford’s concept of a national science library by analyzing the borrowing of journals on interlibrary loan from the Science Museum Library in 1956. He found that 10% of the journals accounted for 80% of the loans and formulated Urquhart’s Law, by which the interlibrary use of a journal is a measure of its total use. This law underlay the operations of the National Lending Library for Science and Technology (NLLST), which Urquhart founded. The NLLST became the British Library Lending Division (BLLD) and ultimately the British Library Document Supply Centre (BLDSC), In contrast, Garfield did a study of 1969 journal citations as part of the process of creating the Science Citation Index (SCI) formulating his Law of Concentration, by which the bulk of the information needs in science can be satisfied by a relatively small, multidisciplinary core of journals. This law became the operational principle of the Institute for Scientific Information created by Garfield, A study at the BLLD under Urquhart’s successor, Maurice B, Line, found low correlations of NLLST use with SCI citations, and publication of this study started a major controversy, during which both laws were called into question. The study was based on the faulty use of the Spearman rank-correlation coefficient, and the controversy over it was instrumental in causing B. C, Brookes to investigate bibliometric laws as probabilistic phenomena and begin to link the bibliometric with the biometric revolution. This paper concludes with a resolution of the controversy by means of a statistical technique that incorporates Brookes’ criticism of the Spearman rank-correlation method and demonstrates the mutual supportiveness of the two laws.

Keywords: Bibliometric, Britain, British, Citation, Citations, Context, Contrast, Convergence, Correlations, Distributions, Formulation, Frequency, Human, Information, Information-Science, Institute for Scientific Information, Institutional, Journal, Journal Citations, Journals, Knowledge, Law, Laws, Loans, Measure, Multidisciplinary, National, Needs, Process, Publication, Roles, Sci, Science, Science Citation Index, Small, Structure, Technique, Understanding, Validity

Dore, J.C. and Ojasoo, T. (2001), How to analyze publication time trends by correspondence factor analysis: Analysis of publications by 48 countries in 18 disciplines over 12 years. *Journal of the American Society for Information Science and Technology*, **52** (9), 763-769.

Full Text: [2001\J Ame Soc Inf Sci52, 763.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%20763.pdf)

Abstract: This study is a follow-up to a published Correspondence Factorial Analysis (CFA) of a dataset of over 6 million bibliometric entries (Dore et al, JASIS, 47(8), 588-602, 1996), which compared the publication output patterns of 48 countries in 18 disciplines over a 12-year period (1981-1992). It analyzes by methods suitable for investigating short time series how these output patterns evolved over the 12-year span. Three types of approach are described: (1) the chi(2) distances of the publication output patterns from the center of gravity of the multidimensional system-which represents an average world pattern-were calculated for each country and for each year. We noted whether the patterns moved toward or away from the center with time; (2) individual annual output patterns were introduced-as supplementary variables into an existing global overview covering the whole time-span [CFA map of (countries x disciplines)]. We observed how these patterns moved about within the map year by year; (3) the matrix (disciplines x time) was analyzed by CFA to derive time trends for each country. CFA revealed the ‘inner clocks’ governing publication trends. The time scale that best fitted the data was not a linear but an elastic scale. Although different countries laid emphasis on publication in different disciplines, the overall tendency was toward greater uniformity in publication patterns with time.

Keywords: Analysis, Approach, Bibliometric, Country, Data, Factor Analysis, Follow-Up, Matrix, Methods, Multidimensional, Publication, Publications, Scale, Time Scale, Time Series, Time Trends, Trends, World

Burrell, Q.L. (2001), ‘Ambiguity’ and scientometric measurement: A dissenting view. *Journal of the American Society for Information Science and Technology*, **52** (12), 1075-1080.

Full Text: [2001\J Ame Soc Inf Sci52, 1075.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%201075.pdf)

Abstract: Abe Bookstein has long been a persuasive advocate of the central role of the classical Lotka-Bradford-Zipf ‘laws’ in bibliometrics and, subsequently, scientometrics and informetrics. In a series of often-quoted papers (Bookstein, 1977, 1990a, 1990b, 1997), he has sought to demonstrate that ‘Lotka-type’ laws have a unique resilience to various forms of reporting, which leads inevitably and naturally to their observance in empirical informetric data collected under a wide variety of circumstances. A general statement of his position was featured in the recent JASIST Special Topic Issue on Information Science at the Millennium (Bookstein, 2001). We shall argue that there are grounds to dispute some of the logic, the mathematics, and the reality of the development. The contention is on the one hand that Bookstein’s development lacks a rigorous mathematical basis, and on the other, that, in general, informetric processes are adequately described within a standard probabilistic framework with stochastic modelling offering the more productive approach.

Keywords: Attribution, Bibliometrics, Counts, Dynamic Behavior, Informetric Distributions, Law, Measurement, Modelling

Huber, J.C. (2001), A new method for analyzing scientific productivity. *Journal of the American Society for Information Science and Technology*, **52** (13), 1089-1099.

Full Text: [2001\J Ame Soc Inf Sci52, 1089.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%201089.pdf)

Abstract: Previously, a new method for measuring scientific productivity was demonstrated for authors in mathematical logic and some subareas of 19th-century physics. The purpose of this article is to apply this new method to other fields to support its general applicability. We show that the method yields the same results for modern physicists, biologists, psychologists, inventors, and composers. That is, each individual’s production is constant over time, and the time-period fluctuations follow the Poisson distribution. However, the productivity (e.g., papers per year) varies widely across individuals. We show that the distribution of productivity does not follow the normal (i.e., bell curve) distribution, but rather follows the exponential distribution. Thus, most authors produce at the lowest rate and very few authors produce at the higher rates. We also show that the career duration of individuals follows the exponential distribution. Thus, most authors have a very short career and very few have a long career. The principal advantage of the new method is that the detail structure of author productivity can be examined, such as trends, etc. Another advantage is that information science studies have guidance for the length of time interval being examined and estimating when an author’s entire body of work has been recorded.

Keywords: 19th Century, Author Productivity, Distribution, Duration, General, Guidance, Information, Information Science, Interval, Length, Logic, Normal, Papers, Productivity, Purpose, Rates, Science, Scientific Productivity, Structure, Support, Trends, Work

Ivancheva, L.E. (2001), The non-Gaussian nature of bibliometric and scientometric distributions: A new approach to interpretation. *Journal of the American Society for Information Science and Technology*, **52** (13), 1100-1105.

Full Text: [2001\J Ame Soc Inf Sci52, 1100.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%201100.pdf)

Abstract: An attempt has been made to give an answer to the question: Why do most bibliometric and scientometric laws reveal characters of Non-Gaussian distributions, i.e., have unduly long ‘tails’? We tried to apply the approach of the so-called ‘Universal Law,’ discovered by G. Stankov (1997, 1998). The basic principle we have used here is that of the reciprocity of energy and space. A new ‘wave concept’ of scientific information has been propounded, in which terms the well-known bibliometric and scientometric distributions find a rather satisfactory explanation. One of the made corollaries is that alpha = 1 is the most reasonable value for the family of Zipf laws, applied to information or social phenomena.

Keywords: Productivity

Kostoff, R.N., del Río, J.A., Humenik, J.A., García, E.O. and Ramírez, A.M. (2001), Citation mining: Integrating text mining and bibliometrics for research user profiling. *Journal of the American Society for Information Science and Technology*, **52** (13), 1148-1156.

Full Text: [2001\J Ame Soc Inf Sci52, 1148.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%201148.pdf)

Abstract: Identifying the users and impact of research is important for research performers, managers, evaluators, and sponsors. It is important to know whether the audience reached is the audience desired. It is useful to understand the technical characteristics of the other research/development/applications impacted by the originating research, and to understand other characteristics (names, organizations, countries) of the users impacted by the research. Because of the many indirect pathways through which fundamental research can impact applications, identifying the user audience and the research impacts can be very complex and time consuming. The purpose of this article is to describe a novel approach for identifying the pathways through which research can impact other research, technology development, and applications, and to identify the technical and infrastructure characteristics of the user population. A novel literature-based approach was developed to identify the user community and its characteristics. The research performed is characterized by one or more articles accessed by the Science Citation Index (SCI) database, beccause the SCI’s citation-based structure enables the capability to perform citation studies easily.

Keywords: Database Tomography, Science, Impact

Garfield, E. (2001), Recollections of Irving H. Sher 1924-1996: Polymath/information scientist extraordinaire. *Journal of the American Society for Information Science and Technology*, **52** (14), 1197-1202.

Full Text: [2001\J Ame Soc Inf Sci52, 1197.pdf](2001/J%20Ame%20Soc%20Inf%20Sci52,%201197.pdf)

Abstract: Over a 35-year period, Irving H. Sher played a critical role in the development and implementation of the Science Citation Index (R) and other ISI (R) products. Trained as a biochemist, statistician, and linguist, Sher brought a unique combination of talents to ISI as Director of Quality Control and Director of Research and Development. His talents as a teacher and mentor evoked loyalty. He was a particularly inventive but self-taught programmer. In addition to the SCI, (R) Social Sciences Citation Index, (R) and Arts and Humanities Citation Index, (R) Sher was involved with the development of the first commercial SDI system, the Automatic Subject Citation Alert, now called Research Alert, (R) and Request-A-Print Cards. Together we developed the journal impact factor and the Journal Citation Reports.(R) Sher was also the inventor of the SYSTABAR System of coding references and Sherhand. He was involved in key reports on citation-based historiography, forecasting Nobel prizes, and served as a referee for JASIS over a 20-year period.

Keywords: Coding, Development, First, Forecasting, Impact, Impact Factor, Implementation, ISI, Journal, Journal Impact, Journal Impact Factor, Role, Science Citation Index, SDI

? Szava-Kovats, E. (2002), Indirect-collective referencing (ICR) in the Elite Journal Literature of Physics. II. A literature science study on the level of communications. *Journal of the American Society for Information Science and Technology*, **53** (1), 47-56.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 47.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%2047.pdf)

Abstract: In the author’s three previous articles dealing with the ICR phenomenon (JASIS, 49, 1998, 477-481; 50, 1999, 1284-1294; JASIST, 52, 2001, 201-211) the nature, life course, and importance of this phenomenon of scientific literature was demonstrated. It was shown that the quantity of nonindexed indirect-collective references in The Physical Review now alone exceeds many times over the quantity of formal references listed in the Science Citation Index as “citations.” It was shown that the ICR phenomenon is present in all the 44 elite physics journals of a representative sample of this literature. The bibliometrically very heterogeneous sample is very homogeneous regarding the presence and frequency of the ICR phenomenon. However, no real connection could be found between the simple degree of documentedness and the presence and frequency of the ICR phenomenon on the journal level of the sample. The present article reports the findings of the latest ICR investigation carried out on the level of communications of the representative sample. Correlation calculations were carried out in the stock of all 458 communications containing the ICR phenomenon as a statistical population, and within this population also in the groups of communications of the “normal” and the “letter” journals, and the “short communications.” The correlation analysis did not find notable statistical correlation between the simple and specific degree of documentedness of a communication and the number of works cited in it by ICR act(s) either in the total population or in the selected groups. There is no correlation either statistical or real (i.e., cause-and-effect) between the documentedness of scientific communications made by their authors and the presence and intensity of the ICR method used by their authors. However, in reality there exists a very strong connection between these two statistically independent variables: both depend on the referencing author, on his/her subjectivity and barely limited subjective free will. This subjective free will shapes the stock of the formal-direct references of scientific communications, thereby placing the achievements cited in this way and their creators into the (indexed) showcase of present Big Science. The same free will decides on the use or nonuse of the ICR method, and in the case of use also on the intensity with which the method is used.

Keywords: Analysis, Authors, Communication, Communications, Correlation, Correlation Analysis, Course, Investigation, Jasis, Journal, Journals, Life, Life Course, Literature, Population, References, Referencing, Science, Science Citation Index, Scientific Literature

? Huber, J.C. (2002), A new model that generates Lotka’s Law. *Journal of the American Society for Information Science and Technology*, **53** (3), 209-219.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 209.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%20209.pdf)

Abstract: In this paper, we develop a new model for a process that generates Lotka’s Law. We show that four relatively mild assumptions create a process that fits five different informetric distributions: rate of production, career duration, randomness, and Poisson distribution overtime, as well as Lotka’s Law. By simulation, we obtain good fits to three empirical samples that exhibit the extreme range of the observed parameters. The overall error is 7% or less. An advantage of this model is that the parameters can be linked to observable human factors. That is, the model is not merely descriptive, but also provides insight into the causes of differences between samples. Furthermore, the differences can be tested with powerful statistical tools.

Keywords: Creativity, Cumulative Advantage, Distribution, Distributions, Exceedances, Human, Human Factors, Informetric Distributions, Inventive Productivity, Model, New Model, Paper, Parameters, Process, Production, Publication, Randomness, Range, Scientific Productivity, Simulation, Statistics, Success-Breeds-Success, Tools

? Jones, S. and Paynter, G.W. (2002), Automatic extraction of document keyphrases for use in digital libraries: Evaluation and applications. *Journal of the American Society for Information Science and Technology*, **53** (8), 653-677.

Full Text: [2002\J Ame Soc Inf Sci53, 653.pdf](2002/J%20Ame%20Soc%20Inf%20Sci53,%20653.pdf)

Abstract: This article describes an evaluation of the Kea automatic keyphrase extraction algorithm. Document keyphrases are conventionally used as concise descriptors of document content, and are increasingly used in novel ways, including document clustering, searching and browsing interfaces, and retrieval engines. However, it is costly and time consuming to manually assign keyphrases to documents, motivating the development of tools that automatically perform this function. Previous studies have evaluated Kea’s performance by measuring its ability to identify author keywords and keyphrases, but this methodology has a number of well-known limitations. The results presented in this article are based on evaluations by human assessors of the quality and appropriateness of Kea keyphrases. The results indicate that, in general, Kea produces keyphrases that are rated positively by human assessors. However, typical Kea settings can degrade performance, particularly those relating to keyphrase length and domain specificity. We found that for some settings, Kea’s performance is better than that of similar systems, and that Kea’s ranking of extracted keyphrases is effective. We also determined that author-specified keyphrases appear to exhibit an inherent ranking, and that they are rated highly and therefore suitable for use in training and evaluation of automatic keyphrasing systems.

Keywords: Applications, Author Keywords, Clustering, Development, Digital Libraries, Document Clustering, Evaluation, Human, Jun, Libraries, Methodology, Performance, Retrieval, Tools, Training

Gu, Y.N. (2002), An exploratory study of Malaysian publication productivity in computer science and information technology. *Journal of the American Society for Information Science and Technology*, **53** (12), 974-986.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 974.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%20974.pdf)

Abstract: Explores the Malaysian computer science and information technology publication productivity. A total of 547 unique Malaysian authors, affiliated to 52 organizations in Malaysia, contributed 461 publications between 1990 and 1999 as indicated by data collected from three Web-based databases. The majority (378 or 69.1%) of authors wrote one publication. The productive authors and the number of their papers as well as the position of their names in the articles are listed to indicate their productivity and degree of involvement in their research publications. Researchers from the universities contribute about 428 (92.8%) publications. The three most productive institutions together account for a total of 258 (56.0%) publications. The composition of the publications are 197 (42.7%) journal articles, 263 (57.1%) conference papers, and 1 (0.2%) monograph chapters. The results indicate that the scholars published in a few core proceedings but contributed to a wide variety of journals. Thirty-nine fields of research undertaken by the scholars are also revealed. The possible reasons for the amount and pattern of contributions are related to the size of researcher population in the country, the availability of refereed scholarly journals, and the total expenditure allocated to information, computers, and communication technology (ICCT) research in Malaysia.

Keywords: Scientometric Weight, 50 Nations, Countries, World, Areas, Scientists, Patterns

Leydesdorff, L. (2002), Dynamic and evolutionary updates of classificatory schemes in scientific journal structures. *Journal of the American Society for Information Science and Technology*, **53** (12), 987-994.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 987.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%20987.pdf)

Abstract: Can the inclusion of new journals in the Science Citation index be used for the indication of structural change in the database, and how can this change be compared with reorganizations of relations among previously included journals? Change in the number of journals (n) is distinguished from change in the number of journal categories (m). Although the number of journals can be considered as a given at each moment in time, the number of journal categories is based on a reconstruction that is time-stamped ex post. The reflexive reconstruction is in need of an update when new information becomes available in a next year. Implications of this shift towards an evolutionary perspective are specified

Keywords: Bibliometric Assessment, British Science, Decline, Indicators, Journals, Nations, Performance, SCI

Notes: RReference, PPage

Abt, H. and Garfield, E. (2002), Is the relationship between numbers of references and paper lengths the same for all sciences? *Journal of the American Society for Information Science and Technology*, **53** (13), 1106-1112.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 1106.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%201106.pdf)

Abstract: In each of 41 research journals in the physical, life, and social sciences there is a linear relationship between the average number of references and the normalized paper lengths. For most of the journals in a given field, the relationship is the same within statistical errors. For papers of average lengths in different sciences the average number of references is the same within 17%. Because papers of average lengths in various sciences have the same number of references, we conclude that the citation counts to them can be inter-compared within that accuracy. However, review journals are different: after scanning 18 review journals we found that those papers average twice the number of references as research papers of the same lengths.

Pudovkin, A.I. and Garfield, E. (2002), Algorithmic procedure for finding semantically related journals. *Journal of the American Society for Information Science and Technology*, **53** (13), 1113-1119.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 1113.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%201113.pdf)

Abstract: Using citations, papers and references as parameters a relatedness factor (RF) is computed for a series of journals. Sorting these journals by the RF produces a list of journals most closely related to a specified starting journal. The method appears to select a set of journals that are semantically most similar to the target journal. The algorithmic procedure is illustrated for the journal Genetics. Inter-journal citation data needed to calculate the RF were obtained from the 1996 ISI Journal Citation Reports on CD-ROM(C). Out of the thousands of candidate journals in JCR(C), 30 have been selected. Some of them are different from the journals in the JCR category for genetics and heredity. The new procedure is unique in that it takes varying journal sizes into account.

Keywords: Citation Relationships, Scientific Journals, Biology Journals, Self-Citation

? Whitley, K.M. (2002), Analysis of SciFinder scholar and web of science citation searches. *Journal of the American Society for Information Science and Technology*, **53** (14), 1210-1215.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 1210.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%201210.pdf)

Abstract: Chemical Abstracts Service recently unveiled citation searching in Chemical Abstracts. With Chemical Abstracts and Science Citation Index both now available for citation searching, this study compares the duplication and uniqueness of citing references for works of chemistry researchers for the years 1999-2001. The two indexes cover very similar source material, so one would expect the citation results to be very similar. This analysis of SciFinder Scholar and Web of Science shows some important differences as the databases are currently offered. Authors and institutions using citation counts as measures of scientific productivity should take note.

Keywords: Analysis, Chemistry, Citation, Citation Counts, Databases, Institutions, Productivity, References, Science, Science Citation Index, Scientific Productivity, Source, Web, Web of Science

Cronin, B. and Shaw, D. (2002), Banking (on) different forms of symbolic capital. *Journal of the American Society for Information Science and Technology*, **53** (14), 1267-1270.

Full Text: [2002\J Ame Soc Inf Sci Tec53, 1267.pdf](2002/J%20Ame%20Soc%20Inf%20Sci%20Tec53,%201267.pdf)

Abstract: The accrual of symbolic capital is an important aspect of academic life. Successful capital formation is commonly signified by the trappings of scholarly distinction or acknowledged status as a public intellectual. We consider and compare three potential indices of symbolic capital: citation counts, Web hits, and media mentions. Our findings, which are domain specific, suggest that public intellectuals are notable by their absence within the information studies community.

Keywords: Bibliometrics, Citation, Web

Newby, G.B., Greenberg, J. and Jones, P. (2003), Open source software development and Lotka’s Law: Bibliometric patterns in programming. *Journal of the American Society for Information Science and Technology*, **54** (2), 169-178.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 169.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20169.pdf)

Abstract: This research applies Lotka’s Law to metadata on open source software development. Lotka’s Law predicts the proportion of authors at different levels of productivity. Open source software development harnesses the creativity of thousands of programmers worldwide, is important to the progress of the Internet and many other computing environments, and yet has not been widely researched. We examine metadata from the Linux Software Map (LSM), which documents many open source projects, and Sourceforge, one of the largest resources for open source developers. Authoring patterns found are comparable to prior studies of Lotka’s Law for scientific and scholarly publishing. Lotka’s Law was found to be effective in understanding software development productivity patterns, and offer promise in predicting aggregate behavior of open source developers.

Hyland, K. (2003), Self-citation and self-reference: Credibility and promotion in academic publication. *Journal of the American Society for Information Science and Technology*, **54** (3), 251-259.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 251.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20251.pdf)

Abstract: Author self-citation has long been of interest to those working in informetrics for what it reveals about the publishing behavior of individuals and their relationships within academic networks. While this research has produced interesting insights, it typically assumes either that self-citation is a neutral form of reporting not unlike references to others’ work or an unsavory kind of academic egotism. By examining self-citation in a wider context of self-mention, however, the phenomenon can be seen as part of a more comprehensive rhetorical strategy for emphasizing a writer’s personal contribution to a piece of research and strengthening his or her knowledge claims, research credibility, and wider standing in the discipline. These meanings are not easily revealed through quantitative bibliometric methods and require careful text analyses and discourse-based interviews with academics. In this paper I explore the use of self-citation and authorial mention in a corpus of 240 research articles and 800 abstracts in eight disciplines. Through an analysis of these texts and interviews with expert informants I show how self-mention is used and the ways these uses reflect both the promotional strategies of individuals and the epistemological practices of their disciplines.

Keywords: Authors

Burrell, Q.L. (2003), Predicting future citation behavior. *Journal of the American Society for Information Science and Technology*, **54** (5), 372-378.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 372.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20372.pdf)

Abstract: In this article we further develop the theory for a stochastic model for the citation process in the presence of obsolescence to predict the future citation pattern of individual papers in a collection. More precisely, we investigate the conditional distribution -and its mean -of the number of citations to a paper after time t, given the number of citations it has received up to time t. In an important parametric case it is shown that the expected number of future citations is a linear function of the current number, this being interpretable as an example of a success-breeds-success phenomenon.

Keywords: Library Circulation Model, Success-Breeds-Success, Stochastic-Model, Markov

Small, H. (2003), Paradigms, citations, and maps of science: A personal history. *Journal of the American Society for Information Science and Technology*, **54** (5), 394-399.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 394.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20394.pdf)

Abstract: Can maps of science tell us anything about paradigms? The author reviews his earlier work on this question, including Kuhn’s reaction to it. Kuhn’s view of the role of bibliometrics differs substantially from the kinds of reinterpretations of paradigms that information scientists are currently advocating. But these reinterpretations are necessary if his theory will ever be empirically tested, and further progress is to be made in understanding the growth of scientific knowledge. A new Web tool is discussed that highlights rapidly changing specialties that may lead to new ways of monitoring revolutionary change in real time. It is suggested that revolutionary and normal science be seen as extremes on a continuum of rates of change rather than, as Kuhn originally asserted, as an all or none proposition.

Keywords: Bibliometrics, Change, Citations, Co-Citation, Documents, Growth, History, Information, Knowledge, Lead, Mar, Monitoring, Normal, Paradigms, Progress, Rates, Real Time, Reviews, Role, Science, Theory, Time, Tool, Understanding, Work

Garfield, E., Pudovkin, A.I. and Istomin, V.S. (2002), Why do we need Algorithmic Historiography? *Journal of the American Society for Information Science and Technology*, **54** (5), 400-412.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 400.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20400.pdf)

Abstract: This article discusses the rationale for creating historiographs of scholarly topics using a new program called *HistCite*., which produces a variety of analyses to aid the historian identify key events (papers), people (authors), and journals in a .eld. By creating a genealogic pro.le of the evolution, the program AIDS the scholar in evaluating the paradigm involved.

White, H.D. (2003), Pathfinder networks and author cocitation analysis: A remapping of paradigmatic information scientists. *Journal of the American Society for Information Science and Technology*, **54** (5), 423-434.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 423.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20423.pdf)

Abstract: In their 1998 article ‘Visualizing a discipline: An author cocitation analysis of information science, 1972-1995,’ White and McCain used multidimensional scaling, hierarchical clustering, and factor analysis to display the specialty groupings of 120 highly-cited (‘paradigmatic’) information scientists. These statistical techniques are traditional in author cocitation analysis (ACA). It is shown here that a newer technique, Pathfinder Networks (PFNETs), has considerable advantages for ACA. In PFNETs, nodes represent authors, and explicit links represent weighted paths between nodes, the weights in this case being cocitation counts. The links can be drawn to exclude all but the single highest counts for author pairs, which reduces a network of authors to only the most salient relationships. When these are mapped, dominant authors can be defined as those with relatively many links to other authors (i.e., high degree centrality). Links between authors and dominant authors define specialties, and links between dominant authors connect specialties into a discipline. Maps are made with one rather than several computer routines and in one rather than many computer passes. Also, PFNETs can, and should, be generated from matrices of raw counts rather than Pearson correlations, which removes a computational step associated with traditional ACA. White and McCain’s raw data from 1998 are remapped as a PFNET. It is shown that the specialty groupings correspond closely to those seen in the factor analysis of the 1998 article. Because PFNETs are fast to compute, they are used in AuthorLink, a new Web-based system that creates live interfaces for cocited author retrieval on the fly.

Keywords: Scholarly Communication, Intellectual Structure, Co-Citation, Science, Retrieval, Bibliometrics, Technology, Online, Space

Boyack, K.W. and Borner, K. (2003), Indicator-assisted evaluation and funding of research: Visualizing the influence of grants on the number and citation counts of research papers. *Journal of the American Society for Information Science and Technology*, **54** (5), 447-461.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 447.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20447.pdf)

Abstract: This article reports research on analyzing and visualizing the impact of governmental funding on the amount and citation counts of research publications. For the first time, grant and publication data appear interlinked in one map. We start with an overview of related work and a discussion of available techniques. A concrete example- grant and publication data from Behavioral and Social Science Research, one of four extramural research programs at the National Institute on Aging (NIA)-is analyzed and visualized using the VxInsight(R) visualization tool. The analysis also illustrates current existing problems related to the quality and existence of data, data analysis, and processing. The article concludes with a list of recommendations on how to improve the quality of grant-publication maps and a discussion of research challenges for indicator-assisted evaluation and funding of research.

Keywords: Latent Semantic Analysis, Bibliometric Methods, Sciences, Information, Retrieval, Impact

Hassan, E. (2003), Simultaneous mapping of interactions between scientific and technological knowledge bases: The case of space communications. *Journal of the American Society for Information Science and Technology*, **54** (5), 462-468.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 462.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20462.pdf)

Abstract: This article examines the knowledge structure of the field of space communications using bibliometric mapping techniques based on textual analysis. A new approach with the aim of visualizing simultaneously the configuration of its scientific and technological knowledge bases is presented. This approach enabled us to overcome various limits of existing bibliometric methods dealing with science and technology relationships. The bibliometric map revealed weak cognitive interactions between science and technology at the worldwide level, although it brought out the systemic nature of the process of knowledge production at either side. We extended the mapping approach to the R&D activities of the Triad countries in order to characterize their specialization profiles and cognitive links on both sides in comparison with the structure of the field at the worldwide level. Results showed different patterns in the way the Triad countries organized their scientific and technological activities within the field.

Keywords: Academic Research, Science, Innovations, Networks

Thelwall, M. and Harries, G. (2003), The connection between the research of a university and counts of links to its web pages: An investigation based upon a classification of the relationships of pages to the research of the host university. *Journal of the American Society for Information Science and Technology*, **54** (7), 594-602.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 594.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20594.pdf)

Abstract: Results from recent advances in link metrics have demonstrated that the hyperlink structure of national university systems can be strongly related to the research productivity of the individual institutions. This paper uses a page categorization to show that restricting the metrics to subsets more closely related to the research of the host university can produce even stronger associations. A partial overlap was also found between the effects of applying advanced document models and separating page types, but the best results were achieved through a combination of the two

Keywords: Bibliometrics, Citation Analysis, Communication, Impact Factors, Information, Internet, Search Engine, Site, Webometrics, World-Wide-Web

? Huber, J.C. and Wagner-Dobler, R. (2003), Using the Mann-Whitney test on informetric data. *Journal of the American Society for Information Science and Technology*, **54** (8), 798-801.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 798.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%20798.pdf)

Abstract: The fields of informetrics and scientometrics have suffered from the lack of a powerful test to detect the differences between two samples. We show that the Mann-Whitney test is a good test on the publication productivity of journals and of authors. Its main limitation is a lack of power on small samples that have small differences. This is not the fault of the test, but rather reflects the fact that small, similar samples have little to distinguish between them.

Keywords: 20th-Century, Authors, Data, Informetrics, Journals, Limitation, Mathematical Logic, Power, Productivity, Publication, Scientific Production, Scientometrics, Small, Stationary Scientometric Distributions, Statistical-Analysis

? Poworoznek, E.L. (2003), Linking of errata: Current practices in Online physical sciences journals. *Journal of the American Society for Information Science and Technology*, **54** (12), 1153-1159.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 1153.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%201153.pdf)

Abstract: Reader awareness of article corrections can be of critical importance in the physical and biomedical sciences. Comparison of errata and corrigenda in online versions of high-impact physical sciences journals across titles and publishers yielded surprising variability. Of 43 online journals surveyed, 17 had no links between original articles and later corrections. When present, hyperlinks between articles and errata showed patterns in presentation style, but lacked consistency. Variability in the presentation, linking, and availability of online errata indicates that practices are not evenly developed across the field. Comparison of finding tools showed excellent coverage of errata by Science Citation Index, lack of indexing in INSPEC, and lack of retrieval with SciFinder Scholar. The development of standards for the linking of original articles to errata is recommended.

Keywords: Articles, Awareness, Biomedical, Citation, Coverage, Development, Hyperlinks, Journals, Libraries, Science, Science Citation Index, Standards, Tools, Variability

? Morillo, F., Bordons, M. and Gómez, I. (2003), Interdisciplinarity in science: A tentative typology of disciplines and research areas. *Journal of the American Society for Information Science and Technology*, **54** (13), 1237-1249.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 1237.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%201237.pdf)

Abstract: Interdisciplinarity is considered the best way to face practical research topics since synergy between traditional disciplines has proved very fruitful. Studies on interdisciplinarity from all possible perspectives are increasingly demanded. Different interdisciplinarity measures have been used in case studies but, up to now, no general interdisciplinarity indicator useful for Science Policy purposes has been accepted. The bibliometric methodology presented here provides a general overview of all scientific disciplines, with special attention to their interrelation. This work aims to establish a tentative typology of disciplines and research areas according to their degree of interdisciplinarity. Interdisciplinarity is measured through a series of indicators based on Institute for Scientific Information (ISI) multi-assignation of journals in subject categories. Research areas and categories are described according to the quantity of their links (number of related categories) and their quality (with close or distant categories, diversity, and strength of links). High levels of interrelations between categories are observed. Four different types of categories are found through cluster analysis. This differentiates “big” interdisciplinarity, which links distant categories, from “small” interdisciplinarity, in which close categories are related. The location of specific categories in the clusters is discussed.

Keywords: Analysis, Attention, Bibliometric, Case Studies, Cluster, Cluster Analysis, Collaboration, Diversity, Fields, Flows, General, Indicator, Indicators, Institute for Scientific Information, Interdisciplinarity, ISI, Journals, Knowledge, Location, Methodology, Nov, Quality, Research, Science, Strength, University, Work

? Wouters, P. and de Vries, R. (2004), Formally citing the web. *Journal of the American Society for Information Science and Technology*, **55** (14), 1250-1260.

Full Text: 2004\J Ame Soc Inf Sci55, 1250.pdf

Abstract: How do authors refer to Web-based information sources in their formal scientific publications? It is not yet well known how scientists and scholars actually include new types of information sources, available through the new media, in their published work. This article reports on a comparative study of the lists of references in 38 scientific journals in five different scientific and social scientific fields. The fields are sociology, library and information science, biochemistry and biotechnology, neuroscience, and the mathematics of computing. As is well known, references, citations, and hyperlinks play different roles in academic publishing and communication. Our study focuses on hyperlinks as attributes of references in formal scholarly publications. The study developed and applied a method to analyze the differential roles of publishing media in the analysis of scientific and scholarly literature references. The present secondary databases that include reference and citation data (the Web of Science) cannot be used for this type of research. By the automated processing and analysis of the full text of scientific and scholarly articles, we were able to extract the references and hyperlinks contained in these references in relation to other features of the scientific and scholarly literature. Our findings show that hyperlinking references are indeed, as expected, abundantly present in the formal literature. They also tend to cite more recent literature than the average reference. The large majority of the references are to Web instances of traditional scientific journals. Other types of Web-based information sources are less well represented in the lists of references, except in the case of pure e-journals. We conclude that this can be explained by taking the role of the publisher into account. Indeed, it seems that the shift from print-based to electronic publishing has created new roles for the publisher. By shaping the way scientific references are hyperlinking to other information sources, the publisher may have a large impact on the availability of scientific and scholarly information.

Keywords: Academic Publishing, Analysis, Authors, Bibliometrics, Biotechnology, Citation, Citations, Collaboration, Communication, Comparative Study, Databases, Impact, Information, Information Science, Internet, Journals, Literature, Motivations, Persistence, Publications, Publishing, Research, Scholarly Communication, Science, Science Citation Index, Scientific Communication, Scientific Publications, Social, Sociology, Traditional, Web of Science, World-Wide-Web

? Walters, W.H. and Wilder, E.I. (2003), Bibliographic index coverage of a multidisciplinary field. *Journal of the American Society for Information Science and Technology*, **54** (14), 1305-1312.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 1305.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%201305.pdf)

Abstract: This study examines the literature of a multidisciplinary field, later-life migration, and evaluates the effectiveness of 12 bibliographic databases in indexing that literature. Five journals-three in social gerontology, one in rural sociology, and one in regional science-account for 40% of the papers published in this area. The disciplines that publish the most work on later-life migration are not necessarily those that provide the best index coverage, however. Moreover, four multidisciplinary databases each provide better index coverage than any single-subject index. The relatively low degree of overlap among the 12 databases suggests that scholars working on topics such as later-life migration must continue to rely on a wide range of bibliographic tools, both disciplinary and multidisciplinary.

Keywords: Bibliographic Databases, Coverage, Databases, Effectiveness, Field, Gerontology, Index, Indexing, Literature, Migration, Multidisciplinary, Papers, Regional, Rural, Social, Sociology, Work

? Vaughan, L. and Shaw, D. (2003), Bibliographic and web citations: What is the difference? *Journal of the American Society for Information Science and Technology*, **54** (14), 1313-1322.

Full Text: [2003\J Ame Soc Inf Sci Tec54, 1313.pdf](2003/J%20Ame%20Soc%20Inf%20Sci%20Tec54,%201313.pdf)

Abstract: Web citations have been proposed as comparable to, even replacements for, bibliographic citations, notably in assessing the academic impact of work in promotion and tenure decisions. We compared bibliographic and Web citations to articles in 46 journals in library and information science. For most journals (57%), Web citations correlated significantly with both bibliographic citations listed in the Social Sciences Citation Index and the ISI’s Journal Impact Factor. Many of the Web citations represented intellectual impact, coming from other papers posted on the Web (30%) or from class readings lists (12%). Web citation counts were typically higher than bibliographic citation counts for the same article. Journals with more Web citations tended to have Web sites that provided tables of contents on the Web, while less cited journals did not have such publicity. The number of Web citations to journal articles increased from 1992 to 1997.

Keywords: Assessing, Citation, Citation Counts, Citations, Impact, Information, Information Science, Journal, Journal Articles, Journals, Library and Information Science, Papers, Promotion, Promotion and Tenure, Science, Tenure, Web, Work

Tsay, M.Y. (2004), Literature growth, journal characteristics, and author productivity in subject indexing, 1977 to 2000. *Journal of the American Society for Information Science and Technology*, **55** (1), 64-73.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 64.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%2064.pdf)

Abstract: This study employed the Perl program, Excel software, and some bibliometric techniques to investigate growth pattern, journal characteristics, and author productivity of the subject index ing literature from 1977 to 2000, based on the subject search of a descriptor field in the Library and Information Science Abstracts (LISA) database. The literature growth from 1977 to 2000 in subject indexing could be fitted well by the logistic curve. The Bradford plot of journal literature fits the typical Bradford-Zipf S-shaped curve. Twenty core journals making a significant contribution could be identified from the Bradford-Zipf distribution. Four major research topics in the area of subject indexing were identified as: (1) information organization, (2) information processing, (3) information storage and retrieval, and (4) information systems and services. It was also found that a vast majority of authors (76.7%) contributed only one article, which is a much larger percentage than the 60% of original Lotka’s data. The 15 most productive authors and the key concepts of their research were identified.

Keywords: Author Productivity, Authors, Bibliometric, Bibliometric Techniques, Bradford-Zipf Distribution, Characteristics, Contribution, Data, Database, Distribution, Field, Growth, Index, Indexing, Information, Information Processing, Information Storage And Retrieval, Information Systems, Journal, Journals, Literature, Majority, Organization, Pattern, Productivity, Research, Science, Search, Services, Software, Storage, Systems, Techniques

White, H.D., Wellman, B. and Nazer, N. (2004), Does citation reflect social structure? Longitudinal evidence from the ‘Globenet’ interdisciplinary research group. *Journal of the American Society for Information Science and Technology*, **55** (2), 111-126.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 111.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%20111.pdf)

Abstract: Many authors have posited a social component in citation, the consensus being that the citers and citees often have interpersonal as well as intellectual ties. Evidence for this belief has been rather meager, however, in part because social networks researchers have lacked bibliometric data (e.g., pairwise citation counts from online databases), and citation analysts have lacked sociometric data (e.g., pairwise measures of acquaintanceship). In 1997 Nazer extensively measured personal relationships and communication behaviors in what we call ‘Globenet,’ an international group of 16 researchers from seven disciplines that was established in 1993 to study human development. Since Globenet’s membership is known, it was possible during 2002 to obtain citation records\* for all members in databases of the Institute for Scientific Information. This permitted examination of how members cited each other (intercited) in journal articles over the past three decades and in a 1999 book to which they all contributed. It was also possible to explore links between the intercitation data and the social and communication data. Using network-analytic techniques, we look at the growth of intercitation over time, the extent to which it follows disciplinary or interdisciplinary lines, whether it covaries with degrees of acquaintanceship, whether it, reflects Globenet’s organizational structure, whether it is associated, with particular in-group communication patterns, and whether it is related to the cocitation of Globenet members. Results show cocitation to be a powerful predictor of intercitation in the journal articles, while being an editor or co-author is an important predictor in the book. Intellectual ties based on shared content did better as predictors than content-neutral social ties like friendship. However, interciters in Globenet communicated more than did noninterciters.

Keywords: Hybrid Problem Area, Scholarly Communication, Scientific Literature, Organization, Dyslexia, Authors, Model, TIES

Thelwall, M. and Harries, G. (2004), Do the Web sites of higher rated scholars have significantly more online impact? *Journal of the American Society for Information Science and Technology*, **55** (2), 149-159.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 149.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%20149.pdf)

Abstract: The quality and impact of academic Web sites is of interest to many audiences, including the scholars who use them and Web educators who need to identify best practice. Several large-scale European Union research projects have been funded to build new indicators for online scientific activity, reflecting recognition of the importance of the Web for scholarly communication. In this paper we address the key question of whether higher rated scholars produce higher impact Web sites, using the United Kingdom as a case study and measuring scholars’ quality in terms of university-wide average research ratings. Methodological issues concerning the measurement of the online impact are discussed, leading to the adoption of counts of links to a university’s constituent single domain Web sites from an aggregated counting metric. The findings suggest that universities with higher rated scholars produce significantly more Web content but with a similar average online impact. Higher rated scholars therefore attract more total links from their peers, but only by being more prolific, refuting earlier suggestions. It can be surmised that general Web publications are very different from scholarly journal articles and conference papers, for which scholarly quality does associate with citation impact. This has important implications for the construction of new Web indicators, for example that online impact should not be used to assess the quality of small groups of scholars, even within a single discipline.

Keywords: Bibliometric Methods, Citation, Citation Analysis, Communication, Departments, Information, Links, Publications, Research, Scholarly Communication, Science, Search Engine, United Kingdom, Universities, University, World-Wide-Web

? Vinkler, P. (2004), Characterization of the impact of sets of scientific papers: The Garfield (Impact) Factor. *Journal of the American Society for Information Science and Technology*, **55** (5), 431-435.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 431.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%20431.pdf)

Abstract: The Garfield (impact) Factor (GF) is one of the most frequently used scientometric indicators. In the present article it is shown that the main factors determining the value of the mean GF representing a set of journals are the number of articles published recently (articles referencing) related to those published in a previous time period (articles to be referenced) and the mean number of references in journal papers referring to the time period selected. It has been proved further that GF corresponds to the mean chance for citedness of journal papers. A new indicator, Specific Impact Contribution (SIC), is introduced, which characterizes the contribution of a subset of articles or a journal to the total impact of the respective articles or journals. The SIC index relates the share of a journal in citations divided by that in publications within a set of papers or journals appropriately selected. It is shown, however, that the normalized GFs of journals and the normalized SIC indicators are identical measures within any set of journals selected. It may be stated therefore that Garfield Factors of journals (calculated correctly) are appropriate scientometric measures for characterizing the relative international eminence of journals within a set of journals appropriately selected. It is demonstrated further that SIC indicators (and so GF indexes) correspond to the (number of citations per paper) indicators generally used, within the same set of papers.

Keywords: Characterization, Citation, Citations, Impact, Index, Indicator, Indicators, International, Journal, Journals, Mar, Model, Papers, Publications, References, Referencing, Scientometric, Scientometrics, Value

Bordons, M., Bravo, C. and Barrigón, S. (2004), Time-tracking of the research profile of a drug using bibliometric tools. *Journal of the American Society for Information Science and Technology*, **55** (5), 445-461.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 445.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%20445.pdf)

Abstract: This study explores the usefulness of bibliometric analyses to detect trends in the research profile of a therapeutic drug, for which Aspirin was selected. A total of 22,144 documents dealing with Aspirin and published in journals covered by MEDLINE during the years 1965-2001 are studied. The research profile of Aspirin over the 37-year period is analyzed through Aspirin subheadings and MeSH indexing terms. Half of the documents had Aspirin as a major indexing term, being the main aspects studied therapeutic uses (28% of the documents), pharmacodynamics (26%), adverse effects (18%), and administration and dosage (10%). A frequency data table crossing indexing terms × years is examined by correspondence analysis to obtain time trends, which are shown graphically in a map. Four time periods with a different distribution of indexing terms are identified through cluster analysis. The indexing term profile of every period is obtained by comparison of the distribution of indexing terms of each cluster with that of the whole period by means of the Chi-2 test. The research profile of the drug tends to change faster with time. The most relevant finding is the expanding therapeutic profile of Aspirin over the period. The main advantages and limitations of the methodology are pointed out.

Keywords: Administration, Adverse Effects, Analyses, Analysis, Bibliometric, Bibliometric Analyses, Cluster, Cluster Analysis, Comparison, Correspondence Analysis, Crossing, Data, Distribution, Drug, Indexing, Journals, MEDLINE, Methodology, Pharmacodynamics, Research, Term, Therapeutic, Time Trends, Trends

Jin, B.H. and Li, L. and Rousseau, R. (2004), Long-term influences of interventions in the normal development of science: China and the cultural revolution. *Journal of the American Society for Information Science and Technology*, **55** (6), 544-550.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 544.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%20544.pdf)

Abstract: Intellectual and technological talents and skills are the driving force for scientific and industrial development, especially in our times characterized by a knowledgebased economy. Major events in society and related political decisions, however, can have a long-term effect on a country’s scientific well-being. Although the Cultural Revolution took place from 1966 to 1976, its aftermath can still be felt. This is shown by this study of the production and productivity of Chinese scientists as a function of their age. Based on the 1995–2000 data from the Chinese Science Citation database (CSCD), this article investigates the year-by-year age distribution of scientific and technological personnel publishing in China. It is shown that the ‘Talent Fault’ originating during the Cultural Revolution still exists, and that a new gap resulting from recent brain drain might be developing. The purpose of this work is to provide necessary information about the current situation and especially the existing problems of the S&T workforce in China.

? Schloegl, C. and Stock, W.G. (2004), Impact and relevance of LIS journals: A scientometric analysis of international and German-language LIS journals - Citation analysis versus reader survey. *Journal of the American Society for Information Science and Technology*, **55** (13), 1155-1168.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1155.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201155.pdf)

Abstract: The goal of the scientometric analysis presented in this article was to investigate international and regional (i.e., German-language) periodicals in the field of library and information science (LIS). This was done by means of a citation analysis and a reader survey. For the citation analysis, impact factor, citing half-life, number of references per article, and the rate of self-references of a periodical were used as indicators. In addition, the leading LIS periodicals were mapped. For the 40 international periodicals, data were collected from ISI’s Social Sciences Citation Index Journal Citation Reports (JCR); the citations of the 10 German-language journals were counted manually (overall 1,494 source articles with 10,520 citations). Altogether, the empirical base of the citation analysis consisted of nearly 90,000 citations in 6,203 source articles that were published between 1997 and 2000. The expert survey investigated reading frequency, applicability of the journals to the job of the reader, publication frequency, and publication preference both for all respondents and for different groups among them (practitioners vs. scientists, librarians vs. documentalists vs. LIS scholars, public sector vs. information industry vs. other private company employees). The study was conducted in spring 2002. A total of 257 questionnaires were returned by information specialists from Germany, Austria, and Switzerland. Having both citation and readership data, we performed a comparative analysis of these two data sets. This enabled us to identify answers to questions like: Does reading behavior correlate with the journal impact factor? Do readers prefer journals with a short or a long half-life, or with a low or a high number of references? Is there any difference in this matter among librarians, documentalists, and LIS scholars?

Keywords: Analysis, Austria, Behavior, Citation, Citation Analysis, Citations, Data, Field, Germany, Half-Life, Impact, Impact Factor, Indicators, Information, Information Science, International, Journal, Journal Citation Reports, Journal Impact, Journal Impact Factor, Journals, Library And Information Science, LIS, Periodical, Periodicals, Preference, Public, Public Sector, Publication, Questionnaires, Reading, Regional, Relevance, Science, Scientometric, Sector, Source, Survey, Switzerland

? Burrell, Q.L. (2004), Fitting Lotka’s Law: Some cautionary observations on a recent paper by Newby et al. (2003). *Journal of the American Society for Information Science and Technology*, **55** (13), 1209-1210

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1209.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201209.pdf)

Keywords: Paper, Recent

? Thelwall, M. and Vaughan, L. (2004), Webometrics: An introduction to the special issue. *Journal of the American Society for Information Science and Technology*, **55** (14), 1213-1215.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1213.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201213.pdf)

Abstract: Webometrics, the quantitative study of Web phenomena, is a field encompassing contributions from information science, computer science, and statistical physics. Its methodology draws especially from bibliometrics. This special issue presents contributions that both push forward the field and illustrate a wide range of webometric approaches.

Keywords: Bibliometrics, Field, Impact, Information, Information Science, Methodology, Science, Sites, Web

Björneborn, L. and Ingwersen, P. (2004), Toward a basic framework for webometrics. *Journal of the American Society for Information Scie**nce and Technology*, **55** (14), 1216-1227.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1216.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201216.pdf)

Abstract: In this article, we define webometrics within the framework of informetric studies and bibliometrics, as belonging to library and information science, and as associated with cybermetrics as a generic subfield. We develop a consistent and detailed link typology and terminology and make explicit the distinction among different Web node levels when using the proposed conceptual framework. As a consequence, we propose a novel diagram notation to fully appreciate and investigate link structures between Web nodes in webometric analyses. We warn against taking the analogy between citation analyses and link analyses too far.

Keywords: Bibliometrics, Citation, Communication, Complex Networks, Connectivity, Documentation, Impact, Information, Internet, University, World-Wide-Web

? Cothey, V. (2004), Web-crawling reliability. *Journal of the American Society for Information Science and Technology*, **55** (14), 1228-1238.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1228.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201228.pdf)

Abstract: In this article, I investigate the reliability, in the social science sense, of collecting informetric data about the World Wide Web by Web crawling. The investigation includes a critical examination of the practice of Web crawling and contrasts the results of content crawling with the results of link crawling. It is shown that Web crawling by search engines is intentionally biased and selective. I also report the results of a large-scale experimental simulation of Web crawling that illustrates the effects of different crawling policies on data collection. It is concluded that the reliability of Web crawling as a data collection technique is improved by fuller reporting of relevant crawling policies.

Keywords: Bibliometrics, Collection, Data, Data Collection, Examination, Experimental, Information, Internet, Investigation, Policies, Practice, Reliability, Reporting, Science, Search Engines, Simulation, Social, World Wide Web, World-Wide-Web

Wouters, P. and de Vries, R. (2004), Formally citing the web. *Journal of the American Society for Information Science and Technology*, **55** (14), 1250-1260.

Full Text: [2004\J Ame Soc Inf Sci Tec55, 1250.pdf](2004/J%20Ame%20Soc%20Inf%20Sci%20Tec55,%201250.pdf)

Abstract: How do authors refer to Web-based information sources in their formal scientific publications? It is not yet well known how scientists and scholars actually include new types of information sources, available through the new media, in their published work. This article reports on a comparative study of the lists of references in 38 scientific journals in five different scientific and social scientific fields. The fields are sociology, library and information science, biochemistry and biotechnology, neuroscience, and the mathematics of computing. As is well known, references, citations, and hyperlinks play different roles in academic publishing and communication. Our study focuses on hyperlinks as attributes of references in formal scholarly publications. The study developed and applied a method to analyze the differential roles of publishing media in the analysis of scientific and scholarly literature references. The present secondary databases that include reference and citation data (the Web of Science) cannot be used for this type of research. By the automated processing and analysis of the full text of scientific and scholarly articles, we were able to extract the references and hyperlinks contained in these references in relation to other features of the scientific and scholarly literature. Our findings show that hyperlinking references are indeed, as expected, abundantly present in the formal literature. They also tend to cite more recent literature than the average reference. The large majority of the references are to Web instances of traditional scientific journals. Other types of Web-based information sources are less well represented in the lists of references, except in the case of pure e-journals. We conclude that this can be explained by taking the role of the publisher into account. Indeed, it seems that the shift from print-based to electronic publishing has created new roles for the publisher. By shaping the way scientific references are hyperlinking to other information sources, the publisher may have a large impact on the availability of scientific and scholarly information.

Keywords: Bibliometrics, Biotechnology, Citation, Collaboration, Information, Internet, Motivations, Persistence, Publications, Research, Scholarly Communication, Science Citation Index, Scientific Communication, World-Wide-Web

Kurtz, M.J., Eichhorn, G., Accomazzi, A., Grant, C., Demleitner, M. and Murray, S.S. (2005), Worldwide use and impact of the NASA astrophysics data system digital library. *Journal of the American Society for Information Science and Technology*, **56** (1), 36-45.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 36.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%2036.pdf)

Abstract: The NASA Astrophysics Data System (ADS), along with astronomy’s journals and data centers (a collaboration dubbed URANIA), has developed a distributed online digital library which has become the dominant means by which astronomers search, access, and read their technical literature. Digital libraries permit the easy accumulation of a new type of bibliometric measure: the number of electronic accesses (‘reads’) of individual articles. By combining data from the text, citation, and reference databases with data from the ADS readership logs we have been able to create second-order bibliometric operators, a customizable class of collaborative filters that permits substantially improved accuracy in literature queries. Using the ADS usage logs along with membership statistics from the International Astronomical Union and data on the population and gross domestic product (GDP), we have developed an accurate model for worldwide basic research where the number of scientists in a country is proportional to the GDP of that country, and the amount of basic research done by a country is proportional to the number of scientists in that country times that country’s per capita GDP. We introduce the concept of utility time to measure the impact of the ADS/URANIA and the electronic astronomical library on astronomical research. We find that in 2002 it amounted to the equivalent of 736 full-time researchers, or $250 million, or the astronomical research done in France.

Keywords: Astronomy, Bibliometric, Citation, Collaboration, Gross Domestic Product, Journals, Nations, Population, Research, Retrieval, Urania

Kurtz, M.J., Eichhorn, G., Accomazzi, A., Grant, C., Demleitner, M., Murray, S.S., Martimbeau, N. and Elwell, B. (2005), The bibliometric properties of article readership information. *Journal of the American Society for Information Science and Technology*, **56** (2), 111-128.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 111.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%20111.pdf)

Abstract: Digital libraries such as the NASA Astrophysics Data System (Kurtz et al., 2005) permit the easy accumulation of a new type of bibliometric measure, the number of electronic accesses (‘reads’) of individual articles. We explore various aspects of this new measure. We examine the obsolescence function as measured by actual reads and show that it can be well fit by the sum of four exponentials with very different time constants. We compare the obsolescence function as measured by readership with the obsolescence function as measured by citations. We find that the citation function is proportional to the sum of two of the components of the readership function. This proves that the normative theory of citation is true in the mean. We further examine in detail the similarities and differences among the citation rate, the readership rate, and the total citations for individual articles, and discuss some of the causes. Using the number of reads as a bibliometric measure for individuals, we introduce the read-cite diagram to provide a two-dimensional view of an individual’s scientific productivity. We develop a simple model to account for an individual’s reads and cites and use it to show that the position of a person in the read-cite diagram is a function of age, innate productivity, and work history. We show the age biases of both reads and cites and develop two new bibliometric measures which have substantially less age bias than citations: *SumProd*, a weighted sum of total citations and the readership rate, intended to show the total productivity of an individual; and *Read10*, the readership rate for articles published in the last 10 years, intended to show an individual’s current productivity. We also discuss the effect of normalization (dividing by the number of authors on a paper) on these statistics. We apply SumProd and Read10 using new, nonparametric techniques to compare the quality of different astronomical research organizations.

Keywords: Bibliographic Citations, Bibliometrics, Obsolescence, Citation Analysis, Temporal Currency, Materials Selection, Readers, Human Productivity, Information Needs

Bensman, S.J. (2005), Urquhart and probability: The transition from librarianship to library and information science. *Journal of the American Society for Information Science and Technology*, **56** (2), 189-214.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 189.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%20189.pdf)

Abstract: In this article, I analyze the role of Donald J. Urquhart in the creation of modern library and information science. Urquhart was one of the chief architects of information science in Britain and founder of the National Lending Library for Science and Technology (NLL), which evolved into the present-day British Library Document Supply Centre (BLDSC). In particular, I focus on the part played by Urquhart in the development of that branch of information science termed bibliometrics, the application of mathematical and statistical techniques to information phenomena, pursuing both historical and practical aims. The article is intended not only to trace the history of the probability distributions applicable to library use and other facets of human knowledge but also to demonstrate how these distributions can be used in the evaluation and management of scientific journal collections. For these purposes, the paper is divided into three parts of equal importance. The first part is statistical and establishes the theoretical framework, within which Urquhart’s work is considered. It traces the historical development of the applicable probability distributions, discussing their origins on the European continent and how Continental principles became incorporated in the biometric statistics that arose in Britain as a result of the Darwinian revolution. This part analyzes the binomial and Poisson processes, laying out the reasons why the Poisson process is more suitable for modeling information phenomena. In doing so, it describes key distributions arising from these processes as well as the various tests for these distributions, citing the literature that shows how to conduct these tests. Throughout the discussion, the relationship of these distributions to library use and the laws of information science is-emphasized. The second part of the article analyzes the pioneering role of Urquhart as a conduit for the entry of these probability distributions into librarianship, converting it into library and information science. He was the first librarian to apply probability to library use, utilizing it not only to establish and manage the scientific journal collections of the NLL but also to evolve his Law of Supralibrary Use. Urquhart’s work is portrayed within the context of a general trend to adopt probabilistic methods for analytical purposes, and a major premise of this article is that his law and the probabilistic breakthrough, on which it was based, were most likely in Britain. which was one of the few countries not only to develop but also maintain the necessary scientific preconditions. The third-and concluding section-discusses how Urquhart’s Law forces a probabilistic reconceptualization of the functioning of the scientific journal system as well as the law’s practical implications for journal sales, collection evaluation and management, resource sharing, and the transition from the paper to the electronic format.

Keywords: Application, Bibliometrics, Breakthrough, Britain, Collection, Context, Development, Evaluation, First, Framework, General, History, Human, Information, Information Science, Journal, Knowledge, Law, Laws, Librarianship, Library and Information Science, Literature, Management, Methods, Modeling, Principles, Role, Science, Statistics, Techniques, Trend, Work

Faba-Pérez, C., Zapico-Alonso, F., Guerrero-Bote, V.P. and de Moya-Anegón, F. (2005), Comparative analysis of webometric measurements in thematic environments. *Journal of the American Society for Information Science and Technology*, **56** (8), 779-785.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 779.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%20779.pdf)

Abstract: There have been many attempts to evaluate Web spaces on the basis of the information that they provide, their form or functionality, or even the importance given to each of them by the Web itself. The indicators that have been developed for this purpose fall into two groups: those based on the study of a Web space’s formal characteristics, and those related to its link structure. In this study we examine most of the webometric indicators that have been proposed in the literature together with others of our own design by applying them to a set of thematically related Web spaces and analyzing the relationships between the different indicators.

Keywords: Bibliometrics, Citation Analysis, Design, Impact Factors, Internet, Issues, Model, Sites, Spaces, World-Wide-Web

Kostoff, R.N. and Block, J.A. (2005), Factor matrix text filtering and clustering. *Journal of the American Society for Information Science and Technology*, **56** (9), 946-968.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 946.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%20946.pdf)

Abstract: The presence of trivial words in text databases can affect record or concept (words/phrases) clustering adversely. Additionally, the determination of whether a word/phrase is trivial is context-dependent. Our objective in the present article is to demonstrate a context-dependent trivial word filter to improve clustering quality. Factor analysis was used as a context-dependent trivial word filter for subsequent term clustering. MEDLINE records for Raynaud’s Phenomenon were used as the database, and words were extracted from the record abstracts. A factor matrix of these words was generated, and the words that had low factor loadings across all factors were identified, and eliminated. The remaining words, which had high factor loading values for at least one factor and therefore were influential in determining the theme of that factor, were input to the clustering algorithm. Both quantitative and qualitative analyses were used to show that factor matrix filtering leads to higher quality clusters and subsequent taxonomies.

Keywords: Bibliometrics, Database Tomography, Discovery, Extraction, Identification, Information, Number, Retrieval, System, Technology

Vaughan, L. and Shaw, D. (2005), Web citation data for impact assessment: A comparison of four science disciplines. *Journal of the American Society for Information Science and Technology*, **56** (10), 1075-1087.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 1075.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%201075.pdf)

Abstract: The number and type of Web citations to journal articles in four areas of science are examined: biology, genetics, medicine, and multidisciplinary sciences. For a sample of 5,972 articles published in 114 journals, the median Web citation counts per journal article range from 6.2 in medicine to 10.4 in genetics. About 30% of Web citations in each area indicate intellectual impact (citations from articles or class readings, in contrast to citations from bibliographic services or the author’s or journal’s home page). Journals receiving more Web citations also have higher percentages of citations indicating intellectual impact. There is significant correlation between the number of citations reported in the databases from the Institute for Scientific Information (ISI, now Thomson Scientific) and the number of citations retrieved using the Google search engine (Web citations). The correlation is much weaker for journals published outside the United Kingdom or United States and for multidisciplinary journals. Web citation numbers are higher than ISI citation counts, suggesting that Web searches might be conducted for an earlier or a more fine-grained assessment of an article’s impact. The Web-evident impact of non-UK/USA publications might provide a balance to the geographic or cultural biases observed in ISI’s data, although the stability of Web citation counts is debatable.

Keywords: Search Engines, Online Impact, Communication, Sites, Links, Classification, Bibliometrics, Coverage, Internet

? Moed, H.F. (2005), Statistical relationships between downloads and citations at the level of individual documents within a single journal. *Journal of the American Society for Information Science and Technology*, **56** (10), 1088-1097.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 1088.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%201088.pdf)

Abstract: Statistical relationships between downloads from ScienceDirect of documents in Elsevier’s electronic journal Tetrahedron Letters and citations to these documents recorded in journals processed by the Institute for Scientific Information/Thomson Scientific for the Science Citation Index (SCI) are examined. A synchronous approach revealed that downloads and citations show different patterns of obsolescence of the used materials. The former can be adequately described by a model consisting of the sum of two negative exponential functions, representing an ephemeral and a residual factor, whereas the decline phase of the latter conforms to a simple exponential function with a decay constant statistically similar to that of the downloads residual factor. A diachronous approach showed that, as a cohort of documents grows older, its download distribution becomes more and more skewed, and more statistically similar to its citation distribution. A method is proposed to estimate the effect of citations upon downloads using obsolescence patterns. It was found that during the first 3 months after an article is cited, its number of downloads increased 25% compared to what one would expect this number to be if the article had not been cited. Moreover, more downloads of citing documents led to more downloads of the cited article through the citation. An analysis of 1,190 papers in the journal during a time interval of 2 years after publication date revealed that there is about one citation for every 100 downloads. A Spearman rank correlation coefficient of 0.22 was found between the number of times an article was downloaded and its citation rate recorded in the SCI. When initial down loads-defined as downloads made during the first 3 months after publication-were discarded, the correlation raised to 0.35. However, both outcomes measure the joint effect of downloads upon citation and that of citation upon downloads. Correlating initial downloads to later citation counts, the correlation coefficient drops to 0.11. Findings suggest that initial downloads and citations relate to distinct phases in the process of collecting and processing relevant scientific information that eventually leads to the publication of a journal article.

Keywords: Analysis, Approach, Citation, Citation Counts, Citations, Cohort, Correlation, Correlation Coefficient, Distribution, First, Function, Functions, Information, Interval, Journal, Journal Article, Journals, Measure, Model, Obsolescence, Outcomes, Papers, Publication, Rank, SCI, Science Citation Index, Scientific Information

Meho, L.I. and Spurgin, K.M. (2005), Ranking the research productivity of library and information science faculty and schools: An evaluation of data sources and research methods. *Journal of the American Society for Information Science and Technology*, **56** (12), 1314-1331.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 1314.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%201314.pdf)

Abstract: This study evaluates the data sources and research methods used in earlier studies to rank the research productivity of Library and Information Science (LIS) faculty and schools. In doing so, the study identifies both tools and methods that generate more accurate publication count rankings as well as data-bases that should be taken into consideration when conducting comprehensive searches in the literature for research and curricular needs. Using a list of 2,625 items published between 1982 and 2002 by 68 faculty members from 18 ALA-accredited LIS schools, hundreds of databases were searched. Results show that there are only ten databases that provide significant coverage of the LIS indexed literature. Results also show that restricting the data sources to one, two, or even three databases leads to inaccurate rankings and erroneous conclusions. Because no database provides comprehensive coverage of the LIS literature, researchers must rely on a wide range of disciplinary and multidisciplinary databases for ranking and other research purposes. The study answers such questions as: is ALISE’s directory of members a reliable tool to identify a complete list of faculty members at LIS schools, how many and which databases are needed in a multifile search to arrive at accurate publication count rankings, what coverage will be achieved using a certain number of databases, which research areas are well covered by which databases, what alternative methods and tools are available to supplement gaps among databases, did coverage performance of databases change over time, and what counting method should be used when determining what and how many items each LIS faculty and school has published? Recommends advanced analysis of research productivity to provide a more detailed assessment of research productivity of authors and programs.

? Leydesdorff, L. and Jin, B.H. (2005), Mapping the *Chinese Science Citation Database* in terms of aggregated journal-journal citation relations. *Journal of the American Society for Information Science and Technology*, **56** (14), 1469-1479.

Full Text: [2005\J Ame Soc Inf Sci Tec56, 1469.pdf](2005/J%20Ame%20Soc%20Inf%20Sci%20Tec56,%201469.pdf)

Abstract: Methods developed for mapping the journal structure contained in aggregated journal-journal citations in the Science Citation Index (SCI; Thomson ISI, 2002) are applied to the Chinese Science Citation Database of the Chinese Academy of Sciences. This database covered 991 journals in 2001, of which only 37 originally had English titles; only 31 of which were covered by the SCI. Using factor-analytical and graph-analytical techniques, the authors show that the journal relations are dually structured. The main structure is the intellectual organization of the journals in journal groups (as in the international SCI), but the university-based journals provide an institutional layer that orients this structure towards practical ends (e.g., agriculture). This mechanism of integration is further distinguished from the role of general science journals. The Chinese Science Citation Database thus exhibits the characteristics of “Mode 2” or transdisciplinary science in the production of scientific knowledge more than its Western counterpart does. The contexts of application lead to correlation among the components.

Keywords: Agriculture, Application, Author Cocitation Analysis, Authors, Characteristics, Chinese, Citation, Citations, Correlation, Database, General, Index, Indicators, Integration, International, ISI, Journal, Journals, Knowledge, Lead, Mapping, Mechanism, Networks, Organization, Pearsons R, Relations, Research Performance, Role, SCI, Science, Science Citation Index, Science Journals, Scientific Journals, Structure, Techniques

Kuperman, V. (2006), Productivity in the Internet mailing lists: A bibliometric analysis. *Journal of the American Society for Information Science and Technology*, **57** (1), 51-59.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 51.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%2051.pdf)

Abstract: The author examines patterns of productivity in the Internet mailing lists, also known as discussion lists or discussion groups. Datasets have been collected from electronic archives of two Internet mailing lists, the LINGUIST and the History of the English Language. Theoretical models widely used in informetric research have been applied to fit the distribution of posted messages over the population of authors. The Generalized Inverse Poisson-Gaussian and Poisson-log normal distributions show excellent results in both datasets, while Lotka and Yule-Simon distribution demonstrate poor-to-mediocre fits. In the mailing list where moderation and quality control are enforced to a higher degree, i.e., the LINGUIST, Lotka, and Yule-Simon distributions perform better. The findings can be plausibly explained by the lesser applicability of the success-breeds-success model to the information production in the electronic communication media, such as Internet mailing lists, where selectivity of publications is marginal or nonexistent. The hypothesis is preliminary, and needs to be validated against the larger variety of datasets. Characteristics of the quality control, competitiveness, and the reward structure in Internet mailing lists as compared to professional scholarly journals are discussed.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Communication, Control, Cumulative Advantage, Distribution, Distributions, Groups, Information, Informetric Distributions, Internet, Lotkas Law, Media, Model, Models, Newsgroups, Population, Production, Productivity, Publications, Quality, Quality Control, Research, Science, Scientific Productivity, Selectivity, Structure, Success-Breeds-Success, Zipfs Law

Thelwall, M. (2006), Interpreting social science link analysis research: A theoretical framework. *Journal of the American Society for Information Science and Technology*, **57** (1), 60-68.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 60.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%2060.pdf)

Abstract: Link analysis in various forms is now an established technique in many different subjects, reflecting the perceived importance of links and of the Web. A critical but very difficult issue is how to interpret the results of social science link analyses. It is argued that the dynamic nature of the Web, its lack of quality control, and the online proliferation of copying and imitation mean that methodologies operating within a highly positivist, quantitative framework are ineffective. Conversely, the sheer variety of the Web makes application of qualitative methodologies and pure reason very problematic to large-scale studies. Methodology triangulation is consequently advocated, in combination with a warning that the Web is incapable of giving definitive answers to large-scale link analysis research questions concerning social factors underlying link creation. Finally, it is claimed that although theoretical frameworks are appropriate for guiding research, a Theory of Link Analysis is not possible.

Keywords: Bibliometrics, Citation Analysis, Hyperlink, Network, Research, Scholarly Communication, Sites, Web Impact Factors, Webometrics, World-Wide-Web

Aksnes, D.W. (2006), Citation rates and perceptions of scientific contribution. *Journal of the American Society for Information Science and Technology*, **57** (2), 169-185.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 169.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20169.pdf)

Abstract: In this study scientists were asked about their own publication history and their citation counts. The study shows that the citation counts of the publications correspond reasonably well with the authors’ own assessments of scientific contribution. Generally, citations proved to have the highest accuracy in identifying either major or minor contributions. Nevertheless, according to these judgments, citations are not a reliable indicator of scientific contribution at the level of the individual article. In the construction of relative citation indicators, the average citation rate of the subfield appears to be slightly more appropriate as a reference standard than the journal citation rate. The study confirms that review articles are cited more frequently than other publication types. Compared to the significance authors attach to these articles they appear to be considerably ‘overcited.’ However, there were only marginal differences in the citation rates between empirical, methods, and theoretical contributions.

Keywords: Accuracy, Assessments, Bibliometric Indicators, Citations, Criteria, Highly Cited Papers, History, Indicator, Indicators, Journal Impact Factors, Judgments, Methods, Perceptions, Performance, Progress, Publication, Publications, Quality, Review, Science, Standard

Jimenez-Contreras, E., De La Moneda, M., de Osma, E.R., Bailón-Moreno, R. and Ruiz-Baños, R. (2006), A bibliometric model for journal discarding policy at academic libraries. *Journal of the American Society for Information Science and Technology*, **57** (2), 198-207.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 198.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20198.pdf)

Abstract: The authors propose a bibliometric model for discarding journal volumes at academic libraries, i.e., removal to offsite storage as part of the library’s serials collection. The method is based on the volume as the unit of measurement and on user satisfaction with given titles. The discarding age, calculated for each volume, from the year of publication to the year of decision to discard, is dependent on citation half-life, relative productivity, knowledge area, and residual utility (potential consultations). The model makes it possible to predict the approximate size of a collection when a stationary state is reached in which the inflow of journal volumes is equal to the outflow from discarding. The model is also able to determine the rate of growth of the holdings. This information can be used to optimize future use of available space and economic and maintenance resources; thus promoting efficient management of the collection.

Keywords: Academic, Age, Bibliometric, Discard, Economic, Growth, Half-Life, Inflow, Information, Knowledge, Libraries, Management, Measurement, Model, Outflow, Policy, Predict, Productivity, Publication, Removal, Serials, Storage, Utility

Klavans, R. and Boyack, K.W. (2006), Identifying a better measure of relatedness for mapping science. *Journal of the American Society for Information Science and Technology*, **57** (2), 251-263.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 251.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20251.pdf)

Abstract: Measuring the relatedness between bibliometric units (journals, documents, authors, or words) is a central task in bibliometric analysis. Relatedness measures are used for many different tasks, among them the generating of maps, or visual pictures, showing the relationship between all items from these data. Despite the importance of these tasks, there has been little written on how to quantitatively evaluate the accuracy of relatedness measures or the resulting maps. The authors propose a new framework for assessing the performance of relatedness measures and visualization algorithms that contains four factors: accuracy, coverage, scalability, and robustness. This method was applied to 10 measures of journal-journal relatedness to determine the best measure. The 10 relatedness measures were then used as inputs to a visualization algorithm to create an additional 10 measures of journal-journal relatedness based on the distances between pairs of journals in two-dimensional space. This second step determines robustness (i.e., which measure remains best after dimension reduction). Results show that, for low coverage (under 50%) the Pearson correlation is the most accurate raw relatedness measure. However, the best overall measure, both at high coverage, and after dimension reduction, is the cosine index or a modified cosine index. Results also showed that the visualization algorithm increased local accuracy for most measures. Possible reasons for this counterintuitive finding are discussed.

Keywords: Accuracy, Algorithm, Analysis, Area, Bibliometric, Bibliometric Analysis, Citation-Reports, Correlation, Graphs, Importance, Index, Indicators, Inputs, Interdisciplinary Research, Journal Cocitation Analysis, Local, Low, Management, Mapping, Maps, Modified, Network Structure, Performance, Reduction, Robustness, Science, Visualization

van Raan, A.F.J. (2006), Statistical properties of Bibliometric indicators: Research group indicator distributions and correlations. *Journal of the American Society for Information Science and Technology*, **57** (3), 408-430.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 408.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20408.pdf)

Abstract: In this article we present an empirical approach to the study of the statistical properties of bibliometric indicators on a very relevant but not simply ‘available’ aggregation level: the research group. We focus on the distribution functions of a coherent set of indicators that are used frequently in the analysis of research performance. In this sense, the coherent set of indicators acts as a measuring instrument. Better insight into the statistical properties of a measuring instrument is necessary to enable assessment of the instrument itself. The most basic distribution in bibliometric analysis is the distribution of citations over publications, and this distribution is very skewed. Nevertheless, we clearly observe the working of the central limit theorem and find that at the level of research groups the distribution functions of the main indicators, particularly the journal-normalized and the field-normalized indicators, approach normal distributions. The results of our study underline the importance of the idea of ‘group oeuvre,’ that is, the role of sets of related publications as a unit of analysis.

Keywords: Aggregation, Analysis, Assessment, Bibliometric, Bibliometric Analysis, Bibliometric Indicators, Citation Distributions, Citations, Competition, Correlations, Distribution, Distributions, Group, Groups, Importance, Indicator, Indicators, Instrument, Journal Impact, Networks, Performance, Properties, Publications, Research, Research Performance, Role, Science, Scientific Publication

? Leydesdorff, L. (2006), Can scientific journals be classified in terms of aggregated journal-journal citation relations using the *Journal Citation Reports*? *Journal of the American Society for Information Science and Technology*, **57** (5), 601-613.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 601.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20601.pdf)

Abstract: The aggregated citation relations among journals included in the Science Citation Index provide us with a huge matrix, which can be analyzed in various ways. By using principal component analysis or factor analysis, the factor scores can be employed as indicators of the position of the cited journals in the citing dimensions of the database. Unrotated factor scores are exact, and the extraction of principal components can be made stepwise because the principal components are independent. Rotation may be needed for the designation, but in the rotated solution a model is assumed. This assumption can be legitimated on pragmatic or theoretical grounds. Because the resulting outcomes remain sensitive to the assumptions in the model, an unambiguous classification is no longer possible in this case. However, the factor-analytic solutions allow us to test classifications against the structures contained in the database; in this article the process will be demonstrated for the delineation of a set of biochemistry journals.

Keywords: Analysis, Assumptions, Biochemistry, Citation, Classification, Database, Extraction, Factor Analysis, Factor Scores, Indicators, Journal Citation Reports, Journals, Mappings, Mar, Matrices, Matrix, Model, Outcomes, Principal Component Analysis, Relations, Science, Science Citation Index, Scientific Journals, Solution, Solutions, Specialties

Lariviere, V., Archambault, E., Gingras, Y. and Vignola-Gagne, E. (2006), The place of serials in referencing practices: Comparing natural sciences and engineering with social sciences and humanities. *Journal of the American Society for Information Science and Technology*, **57** (8), 997-1004.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 997.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%20997.pdf)

Abstract: Journal articles constitute the core documents for the diffusion of knowledge in the natural sciences. It has been argued that the same is not true for the social sciences and humanities where knowledge is more often disseminated in monographs that are not indexed in the journal-based databases used for bibliometric analysis. Previous studies have made only partial assessments of the role played by both serials and other types of literature. The importance of journal literature in the various scientific fields has therefore not been systematically characterized. The authors address this issue by providing a systematic measurement of the role played by journal literature in the building of knowledge in both the natural sciences and engineering and the social sciences and humanities. Using citation data from the CD-ROM versions of the Science Citation Index (SCI), Social Science Citation Index (SSCI), and Arts and Humanities Citation Index (AHCI) databases from 1981 to 2000 (Thomson ISI, Philadelphia, PA), the authors quantify the share of citations to both serials and other types of literature. Variations in time and between fields are also analyzed. The results show that journal literature is increasingly important in the natural and social sciences, but that its role in the humanities is stagnant and has even tended to diminish slightly in the 1990s. Journal literature accounts for less than 50% of the citations in several disciplines of the social sciences and humanities; hence, special care should be used when using bibliometric indicators that rely only on journal literature.

Keywords: Accounts, Analysis, Arts and Humanities Citation Index, Assessments, Bibliometric, Bibliometric Analysis, Bibliometric Indicators, Building, CD-ROM, Citation Indexes, Citations, Core, Databases, Diffusion, Importance, Indicators, ISI, Knowledge, Made, Measurement, Natural, Philadelphia, Referencing, Role, SCI, Science Citation Index, Sciences, Serials, Social, Social Science Citation Index, Social Sciences, Sociology

Al, U., Şahiner, M. and Tonta, Y. (2006), Arts and humanities literature: Bibliometric characteristics of contributions by Turkish authors. *Journal of the American Society for Information Science and Technology*, **57** (8), 1011-1022.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1011.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201011.pdf)

Abstract: Scholarly communication in arts and humanities differs from that in the sciences. Arts and humanities scholars rely primarily on monographs as a medium of publication whereas scientists consider articles that appear in scholarly journals as the single most important publication outlet. The number of journal citation studies in arts and humanities is therefore limited. In this article, we investigate the bibliometric characteristics of 507 arts and humanities journal articles written by authors affiliated with Turkish institutions and indexed in the Arts & Humanities Citation Index (A&HCI) between the years 1975-2003. Journal articles constituted more than 60% of all publications. One third of all contributions were published during the last 4 years (1999-2003) and appeared in 16 different journals. An overwhelming majority of contributions (91%) were written in English, and 83% of them had single authorship. Researchers based at Turkish universities produced 90% of all publications. Two thirds of references in publications were to monographs. The median age of all references was 12 years. Eighty percent of publications authored by Turkish arts and humanities scholars were not cited at all while the remaining 20% (or 99 publications) were cited 304 times (an average of three citations per publication). Self-citation ratio was 31%. Two thirds of the cited publications were cited for the first time within 2 years of their publications.

Keywords: 50 Nations, Age, Areas, Authors, Authorship, Behavioral-Sciences, Bibliometric, Characteristics, Citation, Citation Analysis, Citations, Communication, First, Humanities, Indicators, Institutions, Journal, Journal Articles, Journals, Jun, Literature, Publication, Publications, References, Research Performance, Scholarly Journals, Sciences, Scientific Production, Scientometric Weight, Social-Science Publications, Turkish, Universities

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Full Text: [2006\J Ame Soc Inf Sci Tec57, 1275.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201275.pdf)

Abstract: The authors apply a new bibliometric measure, the *h*-index (Hirsch, 2005), to the literature of information science. Faculty rankings based on raw citation counts are compared with those based on *h*-counts. There is a strong positive correlation between the two sets of rankings. It is shown how the h-index can be used to express the broad impact of a scholar’s research output over time in more nuanced fashion than straight citation counts.

Keywords: Bibliometric, Citation, Citation Counts, Faculty, h Index, h-Index, Information, Information Science, Literature, Productivity, Rankings, Research, Science

Aguillo, I.F., Granadino, B., Ortega, J.L. and Prieto, J.A. (2006), Scientific research activity and communication measured with cybermetrics indicators. *Journal of the American Society for Information Science and Technology*, **57** (10), 1296-1302.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1296.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201296.pdf)

Abstract: To test feasibility of cybermetric indicators for describing and ranking university activities as shown in their Web sites, a large set of 9,330 institutions worldwide was compiled and analyzed. Using search engines’ advanced features, size (number of pages), visibility (number of external inlinks), and number of rich files (pdf, ps, doc, ppt, and As formats) were obtained for each of the institutional domains of the universities. We found a statistically significant correlation between a Web ranking built on a combination of Webometric data and other university rankings based on bibliometric and other indicators. Results show that cybermetric measures could be useful for reflecting the contribution of technologically oriented institutions, increasing the visibility of developing countries, and improving the rankings based on Science Citation Index (SCI) data with known biases.

Keywords: Activity, Bibliometric, Communication, Correlation, Country, Departments, Developing Countries, Features, Indicators, Information-Science, Inlinks, Institutions, Patterns, Ranking, Rankings, Research, SCI, Science Citation Index, Sites, Size, Spanish, Test, Universities, Visibility, Web Impact Factors, Web Sites, Webometrics

? Samoylenko, I., Chao, T.C., Liu, W.C. and Chen, C.M. (2006), Visualizing the scientific world and its evolution. *Journal of the American Society for Information Science and Technology*, **57** (11), 1461-1469.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1461.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201461.pdf)

Abstract: We propose an approach to visualizing the scientific world and its evolution by constructing minimum spanning trees (MSTs) and a two-dimensional map of scientific journals using the database of the Science Citation Index (SCI) during 1994-2001. The structures of constructed MSTs are consistent with the sorting of SCI categories. The map of science is constructed based on our MST results. Such a map shows the relation among various knowledge clusters and their citation properties. The temporal evolution of the scientific world can also be delineated in the map. In particular, this map clearly shows a linear structure of the scientific world, which contains three major domains including physical sciences, life sciences, and medical sciences. The interaction of various knowledge fields can be clearly seen from this scientific world map. This approach can be applied to various levels of knowledge domains.

Keywords: Approach, Citation, Constructed, Database, Evolution, Interaction, Journals, Knowledge, Knowledge Domains, Life, Life Sciences, Literatures, Medical, Minimum, MST, Networks, Physical, Physical Sciences, Points, SCI, Science, Science Citation Index, Sciences, Scientific Journals, Structure, Temporal, Trees, World

? Zuccala, A. (2006), Author cocitation analysis is to intellectual structure as web colink analysis is to ... ? *Journal of the American Society for Information Science and Technology*, **57** (11), 1487-1502.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1487.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201487.pdf)

Abstract: Author Cocitation Analysis (ACA) and Web Colink Analysis (WCA) are examined as sister techniques in the related fields of bibliometrics and webometrics. Comparisons are made between the two techniques based on their data retrieval, mapping, and interpretation procedures, using mathematics as the subject in focus. An ACA is carried out and interpreted for a group of participants (authors) involved in an Isaac Newton Institute (2000) workshop-Singularity Theory and Its Applications to Wave Propagation Theory and Dynamical Systems-and compared/contrasted with a WCA for a list of international mathematics research institute home pages on the Web. Although the practice of ACA may be used to inform a WCA, the two techniques do not share many elements in common. The most important departure between ACA and WCA exists at the interpretive stage when ACA maps become meaningful in light of citation theory, and WCA maps require interpretation based on hyperlink theory. Much of the research concerning link theory and motivations for linking is still new; therefore further studies based on colinking are needed, mainly map-based studies, to understand what makes a Web colink structure meaningful.

Keywords: Analysis, Author Cocitation Analysis, Authors, Bibliometrics, Citation, Cocitation, Data, Hyperlink, Information, Intellectual Structure, International, Links, Mapping, Practice, Procedures, Research, Science, Similarity, Sites, Space, Structure, Techniques, Theory, Web, Webometrics

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Full Text: [2006\J Ame Soc Inf Sci Tec57, 1616.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201616.pdf)

Abstract: Co-occurrence matrices, such as cocitation, coword, and colink matrices, have been used widely in the information sciences. However, confusion and controversy have hindered the proper statistical analysis of these data. The underlying problem, in our opinion, involved understanding the nature of various types of matrices. This article discusses the difference between a symmetrical cocitation matrix and an asymmetrical citation matrix as well as the appropriate statistical techniques that can be applied to each of these matrices, respectively. Similarity measures (such as the Pearson correlation coefficient or the cosine) should not be applied to the symmetrical cocitation matrix but can be applied to the asymmetrical citation matrix to derive the proximity matrix. The argument is illustrated with examples. The study then extends the application of co-occurrence matrices to the Web environment, in which the nature of the available data and thus data collection methods are different from those of traditional databases such as the Science Citation Index. A set of data collected with the Google Scholar search engine is analyzed by using both the traditional methods of multivariate analysis and the new visualization software Pajek, which is based on social network analysis and graph theory.

Keywords: Analysis, Application, Author Cocitation Analysis, Citation, Cocitation, Collection, Correlation, Correlation Coefficient, Data, Data Collection, Databases, Engine, Environment, Graph Theory, Information, Information Science, Matrix, Methods, Multivariate, Multivariate Analysis, Network, Network Analysis, Pearsons-R, Science, Science Citation Index, Sciences, Social, Social Network Analysis, Software, Statistical Analysis, Techniques, Theory, Understanding, Visualization

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Full Text: [2006\J Ame Soc Inf Sci Tec57, 1804.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201804.pdf)

Abstract: A measure of formal journal utility designed to offset some of the more noteworthy limitations of the impact factor (IF)-i.e., short follow-up, citations to items in the numerator that are not included in the denominator, self-citations, and the greater citation rate of review articles-was constructed and applied to 15 crime-psychology journals. This measure, referred to as Citations Per Article (CPA), was correlated with a measure of informal journal utility defined as the frequency with which 58 first authors in the field consulted these 15 crime-psychology journals. Results indicated that the CPA, but not the IF, correlated significantly with informal utility. Two journals (Law and Human Behavior and Criminal Justice and Behavior) displayed consistently high impact across measures of formal and informal utility while several other journals (Journal of Interpersonal Violence; Psychology, Public Policy, and Law, Sexual Abuse: A Journal of Research and Treatment, and Behavioral Sciences and the Law) showed signs of moderate impact when formal and informal measures were combined.

Keywords: Citation, Citations, Impact Factor, Journals, Psychology, Research, Sciences, Self Citations, Self-Citations

? Knothe, G. (2006), Comparative citation analysis of duplicate or highly related publications. *Journal of the American Society for Information Science and Technology*, **57** (13), 1830-1839.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1830.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201830.pdf)

Abstract: Four cases, illustrated by four examples, of duplicate or highly related publications can be distinguished and are analyzed here using citation data obtained from the Science Citation Index (SCI): (1) publication by different authors in the same journal; (2) the same author(s) publishing in different journals; (3) publication by different authors in different journals; (4) the same author(s) publishing highly related papers simultaneously in the same journal, often as part of a series of papers. Example 1, illustrating case 1, is an occurrence of highly related publications in mechanistic organic chemistry. Example 2, from analytical organic chemistry, contains elements of cases 2 and 3. Example 3, dealing solely with case 3, discusses two time-delayed publications from analytical biochemistry, which were highlighted by Garfield several times in the past to show how the SCI could be utilized to avoid duplicate publication. Example 4, derived from synthetic organic chemistry (total syntheses of taxol), contains elements of cases 1, 3, and 4 and, to a lesser extent, case 2. The citation records of the highly related or duplicate publications can deviate considerably from the journal impact factors; this was observed in three of the four examples relating to cases 2, 3, and 4. The examples suggest that citation of a paper may depend significantly on the journal in which it is published. As an indicator of this dependence, the journals in which the papers used in the present examples appeared were examined. Other factors such as key words in the paper title may also play a role.

Keywords: 1st Total-Synthesis, Acid, Analysis, Authors, Biochemistry, Chemistry, Citation, Citation Analysis, Data, Double-Bond, Enantioselective Total-Synthesis, Impact, Impact Factors, Indicator, Journal, Journal Impact, Journal Impact Factors, Journals, Mass-Spectrometry, Nov, Organic, Papers, Pinene Path, Position, Publication, Publications, Publishing, Records, Role, SCI, Science Citation Index, Stereocontrolled Synthesis, Taxol

? van Raan, A.F.J. (2006), Performance-related differences of bibliometric statistical properties of research groups: Cumulative advantages and hierarchically layered networks. *Journal of the American Society for Information Science and Technology*, **57** (14), 1919-1935.

Full Text: [2006\J Ame Soc Inf Sci Tec57, 1919.pdf](2006/J%20Ame%20Soc%20Inf%20Sci%20Tec57,%201919.pdf)

Abstract: In this article we distinguish between top-performance and lower-performance groups in the analysis of statistical properties of bibliometric characteristics of two large sets of research groups. We find intriguing differences between top-performance and lower-performance groups, and between the two sets of research groups. These latter differences may indicate the influence of research management strategies. We report the following two main observations: First, lower-performance groups have a larger size-dependent cumulative advantage for receiving citations than top-performance groups. Second, regardless of performance, larger groups have fewer not-cited publications. Particularly for the lower-performance groups, the fraction of not-cited publications decreases considerably with size. We introduce a simple model in which processes at the microlevel lead to the observed phenomena at the macrolevel. Next, we fit our findings into the novel concept of hierarchically layered networks. In this concept, which provides the ‘infrastructure’ for the model, a network of research groups constitutes a layer of one hierarchical step higher than the basic network of publications connected by citations. The cumulative size advantage of citations received by a group resembles preferential attachment in the basic network in which highly connected nodes (publications) increase their connectivity faster than less connected nodes. But in our study it is size that causes an advantage. In general, the larger a group (node in the research group network), the more incoming links this group acquires in a nonlinear, cumulative way. Nevertheless, top-performance groups are about an order of magnitude more efficient in creating linkages (i.e., receiving citations) than lower-performance groups. This implies that together with the size-dependent mechanism, preferential attachment, a quite common characteristic of complex networks, also works. Finally, in the framework of this study on performance-related differences of bibliometric properties of research groups, we also find that top-performance groups are, on average, more successful in the entire range of journal impact.

Keywords: Analysis, Attachment, Bibliometric, Characteristics, Citations, Complex, Complex Networks, Concept, Connectivity, DEC, Excellence, Fraction, General, Group, Groups, Impact, Indicators, Journal, Journal Impact, Lead, Management, Mechanism, Model, Networks, Nonlinear, Order, Performance, Physics, Properties, Publication, Publications, Range, Research, Science, Size, Strategies

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 25.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%2025.pdf)

Abstract: Aggregated journal-journal citation networks based on the Journal Citation Reports 2004 of the Science Citation Index (5,968 journals) and the Social Science Citation Index (1,712 journals) are made accessible from the perspective of any of these journals. A vector-space model is used for normalization, and the results are brought online at http:,, www.leydesdorff.net, jcr04 as input files for the visualization program Pajek. The user is thus able to analyze the citation environment in terms of links and graphs. Furthermore, the local impact of a journal is defined as its share of the total citations in the specific journal’s citation environments; the vertical size of the nodes is varied proportionally to this citation impact. The horizontal size of each node can be used to provide the same information after correction for within-journal (self-)citations.In the “citing” environment, the equivalents of this measure can be considered as a citation activity index which maps how the relevant journal environment is perceived by the collective of authors of a given journal. As a policy application, the mechanism of interdisciplinary developments among the sciences is elaborated for the case of nanotechnology journals.

Keywords: Algorithm, Citations, Domains, Graphs, Indicators, Knowledge, Matrices, Networks, Physics, Scientific Journals, Social-Sciences, Web

? Hamilton, E.C. (2007), The impact of survey data: Measuring success. *Journal of the American Society for Information Science and Technology*, **58** (2), 190-199.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 190.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20190.pdf)

Abstract: Large national social surveys are expensive to conduct and to process into usable data files. The purpose of this article is to assess the impact of these national data sets on research using bibliometric measures. Peer-reviewed articles from research using numeric data files and documentation from the Canadian National Population Health Survey (NPHS) were searched in ISI’s Web of Science and in Scopus for articles citing the original research. This article shows that articles using NPHS data files and products have been used by a diverse and global network of scholars, practitioners, methodologists, and policy makers. Shifts in electronic publishing and the emergence of new tools for citation analysis are changing the discovery process for published and unpublished work based on inputs to the research process. Evidence of use of large surveys throughout the knowledge transfer process can be critical in assessing grant and operating funding levels for research units, and in influencing design, methodology, and access channels in planning major surveys. The project has gathered citations from the peer-reviewed article stage of knowledge transfer, providing valuable evidence on the use of the data files and methodologies of the survey and of limitations of the survey. Further work can be done to expand the scope of material cited and analyze the data to understand how the longitudinal aspect of the survey contributes to the value of the research output. Building a case for continued funding of national, longitudinal surveys is a challenge. As far as I am aware, however, little use has been made of citation tracking to assess the long-term value of such surveys. Conducting citation analysis on research inputs (data file use and survey products) provides a tangible assessment of the value accrued from large-scale (and expensive) national surveys.

Keywords: Access, Analysis, Assessment, Bibliometric, Bibliometric Analysis, Canada, Citation, Citation Analysis, Citations, Citedness, Design, Emergence, Funding, Global, Impact, Information-Science, Inputs, Journals, Knowledge, Knowledge Transfer, Levels, Limitations, Long-Term, Longitudinal, Made, Methodology, Output, Planning, Policy, Process, Products, Publishing, Research, Social, Survey, Surveys, Tools, Tracking, Transfer, Web, Web of Science

? Zhou, P. and Leydesdorff, L. (2007), A comparison between the China Scientific and Technical Papers and Citations Database and the Science Citation Index in terms of journal hierarchies and interjournal citation relations. *Journal of the American Society for Information Science and Technology*, **58** (2), 223-236.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 223.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20223.pdf)

Abstract: The journal structure in the China Scientific and Technical Papers and Citations Database (CSTPCD) is analyzed from three perspectives: the database level, the specialty level, and the institutional level (i.e., university journals vs. journals issued by the Chinese Academy of Sciences). The results are compared with those for (Chinese) journals included in the Science Citation Index (SCI). The frequency of journal-journal citation relations in the CSTPCD is an order of magnitude lower than in the SCI. Chinese journals, especially high-quality journals, prefer to cite international journals rather than domestic ones; however, Chinese journals do not get an equivalent reception from their international counterparts. The international visibility of Chinese journals is low, but varies among fields of science. Journals of the Chinese Academy of Sciences have a better reception in the international scientific community than university journals.

Keywords: China, Chinese, Citation, Citations, Community, Comparison, Database, International, Journal, Journals, Reception, Relations, Research Performance, SCI, Science, Science Citation Index, Specialty, Structure, University, Visibility

? Gonzalez, L. and Campanario, J.M. (2007), Structure of the impact factor of journals included in the *Social Sciences Citation Index*: Citations from documents labeled “editorial material”. *Journal of the American Society for Information Science and Technology*, **58** (2), 252-262.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 252.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20252.pdf)

Abstract: We investigated how citations from documents labeled by the Institute for Scientific Information (ISI) as ‘‘ editorial material ‘‘ contribute to the impact factor of academic journals in which they were published. Our analysis is based on records corresponding to the documents classified by the ISI as editorial material published in journals covered by the Social Sciences Citation Index between 1999 and 2003 (50,273 records corresponding to editorial material published in 2,374 journals). The results appear to rule out widespread manipulation of the impact factor by academic journals publishing large amounts of editorial material with many citations to the journal itself as a strategy to increase the impact factor.

Keywords: Analysis, Citations, Impact, Impact Factor, Institute for Scientific Information, ISI, Journal, Journals, Publishing, Records

? Oppenheim, C. (2007), Using the h-index to rank influential British researchers in information science and librarianship. *Journal of the American Society for Information Science and Technology*, **58** (2), 297-301.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 297.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20297.pdf)

Abstract: The recently developed h-index has been applied to the literature produced by senior British-based academics in librarianship and information science. The majority of those evaluated currently hold senior positions in UK information science and librarianship departments; however, a small number of staff in other departments and retired “founding fathers” were analyzed as well. The analysis was carried out using the Web of Science (Thomson Scientific, Philadelphia, PA) for the years from 1992 to October 2005, and included both second authored papers and self-citations. The top-ranking British information scientist, Peter Willett, has an h-index of 31. However, it was found that Eugene Garfield, the founder of modern citation studies, has an even higher h-index of 36. These results support other studies suggesting that the 17-index is a useful tool in the armory of bibliometrics.

Keywords: Analysis, Bibliometrics, British, Citation, Fathers, h Index, h-Index, Information, Information Science, Librarianship, Literature, Papers, Rank, Science, Scientists, Self-Citations, Small, Support, Tool, UK, Web of Science

? Egghe, L. (2007), Dynamic h-index: The Hirsch index in function of time. *Journal of the American Society for Information Science and Technology*, **58** (3), 452-454.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 452.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20452.pdf)

Abstract: When there are a group of articles and the present time is fixed we can determine the unique number h being the number of articles that received h or more citations while the other articles received a number of citations which is not larger than h. In this article, the time dependence of the h-index is determined. This is important to describe the expected career evolution of a scientist’s work or of a journal’s production in a fixed year. We use the earlier established cumulative n(th) citation distribution. We show that h = ((1-a(1))T alpha-1)(1, alpha) where a is the aging rate, alpha is the exponent of Lotka’s law of the system, and T is the total number of articles in the group. For t = +infinity we refind the steady state (static) formula h = T-1, alpha which we proved in a previous article. Functional properties of the above formula are proven. Among several results we show (for a., a, T fixed) that h is a concavely increasing function of time, asymptotically bounded by T1-alpha.

Keywords: Aging, Citation, Citations, Evolution, Function, H Index, h-Index, Hirsch, Hirsch Index, Law, Ranking, Scientists, Steady State, T, Work

? Schwartz, F. and Fang, Y.C. (2007), Citation data analysis on hydrogeology. *Journal of the American Society for Information Science and Technology*, **58** (4), 518-525.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 518.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20518.pdf)

Abstract: This article explores the status of research in hydrogeology using data mining techniques. First we try to explain what citation analysis is and review some of the previous work on citation analysis. The main idea in this article is to address some common issues about citation numbers and the use of these data. To validate the use of citation numbers, we compare the citation patterns for Water Resources Research papers in the 1980s with those in the 1990s. The citation growths for highly cited authors from the 1980s are used to examine whether it is possible to predict the citation patterns for highly-cited authors in the 1990s. If the citation data prove to be steady and stable, these numbers then can be used to explore the evolution of science in hydrogeology. The famous quotation, “If you are not the lead dog, the scenery never changes,” attributed to Lee Iacocca, points to the importance of an entrepreneurial spirit in all forms of endeavor. In the case of hydrogeological research, impact analysis makes it clear how important it is to be a pioneer. Statistical correlation coefficients are used to retrieve papers among a collection of 2,847 papers before and after 1991 sharing the same topics with 273 papers in 1991 in Water Resources Research. The numbers of papers before and after 1991 are then plotted against various levels of citations for papers in 1991 to compare the distributions of paper population before and after that year. The similarity metrics based on word counts can ensure that the “before” papers are like ancestors and “after” papers are descendants in the same type of research. This exercise gives us an idea of how many papers are populated before and after 1991 (1991 is chosen based on balanced numbers of papers before and after that year). In addition, the impact of papers is measured in terms of citation presented as “percentile,” a relative measure based on rankings in one year, in order to minimize the effect of time.

Keywords: Citation, Citation Analysis, Citations, Data Analysis, Data Mining, Evolution, Impact, Lead, Metrics, Rankings, Research, Review, Science, Techniques, Topics, Water

? White, H.D. (2007), Combining bibliometrics, information retrieval, and relevance theory, Part 1: First examples of a synthesis. *Journal of the American Society for Information Science and Technology*, **58** (4), 536-559.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 536.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20536.pdf)

Abstract: In Sperber and Wilson’s relevance theory (RT), the ratio Cognitive Effects/Processing Effort defines the relevance of a communication. The tf\*idf formula from information retrieval is used to operationalize this ratio for any item co-occurring with a user-supplied seed term in bibliometric distributions. The tf weight of the item predicts its effect on the user in the context of the seed term, and its idf weight predicts the user’s processing effort in relating the item to the seed term. The idf measure, also known as statistical specificity, is shown to have unsuspected applications in quantifying interrelated concepts such as topical and nontopical relevance, levels of user expertise, and levels of authority. A new kind of visualization, the pennant diagram, illustrates these claims. The bibliometric distributions visualized are the works cocited with a seed work (Moby Dick), the authors cocited with a seed author (White HD, for maximum interpretability), and the books and articles cocited with a seed article (S.A. Harter’s ‘Psychological Relevance and Information Science,’ which introduced RT to information scientists in 1992). Pennant diagrams use bibliometric data and information retrieval techniques on the system side to mimic a relevance-theoretic model of cognition on the user side. Relevance theory may thus influence the design of new visual information retrieval interfaces. Generally, when information retrieval and bibliometrics are interpreted in light of RT, the implications are rich: A single sociocognitive theory may serve to integrate research on literature-based systems with research on their users, areas now largely separate.

Keywords: Applications, Author Cocitation Analysis, Bibliometric, Bibliometrics, Cognition, Communication, Design, Distributions, Idf, Information, Information Retrieval, Interfaces, Ir, Language, Levels, Light, Literatures, Model, Philosophy, Processing, Research, Science, Seed, Space, Specificity, Synthesis, Techniques, Theory, Time, Visual Information, Visualization

? White, H.D. (2007), Combining bibliometrics, information retrieval, and relevance theory, Part 2: Some implications for information science. *Journal of the American Society for Information Science and Technology*, **58** (4), 583-605.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 583.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20583.pdf)

Abstract: When bibliometric data are converted to term frequency (tf) and inverse document frequency (idf) values, plotted as pennant diagrams, and interpreted according to Sperber and Wilson’s relevance theory (RT), the results evoke major variables of information science (IS). These include topicality, in the sense of intercohesion and intercoherence among texts; cognitive effects of texts in response to people’s questions; people’s levels of expertise as a precondition for cognitive effects; processing effort as textual or other messages are received; specificity of terms as it affects processing effort; relevance, defined in RT as the effects/effort ratio; and authority of texts and their authors. While such concerns figure automatically in dialogues between people, they become problematic when people create or use or judge literature-based information systems. The difficulty of achieving worthwhile cognitive effects and acceptable processing effort in human-system dialogues explains why relevance is the central concern of IS. Moreover, since relevant communication with both systems and unfamiliar people is uncertain, speakers tend to seek cognitive effects that cost them the least effort. Yet hearers need greater effort, often greater specificity, from speakers if their responses are to be highly relevant in their turn. This theme of mismatch manifests itself in vague reference questions, underdeveloped online searches, uncreative judging in retrieval evaluation trials, and perfunctory indexing. Another effect of least effort is a bias toward topical relevance over other kinds. RT can explain these outcomes as well as more adaptive ones. Pennant diagrams, applied here to a literature search and a Bradford-style journal analysis, can model them. Given RT and the right context, bibliometrics may predict psychometrics.

Keywords: Analysis, Bias, Bibliometric, Bibliometrics, Communication, Cost, Criteria, Domain-Analysis, Effects, Evaluation, Indexing, Individual-Differences, Information, Information Retrieval, Information Science, Information Systems, Journal, Levels, Libraries, Model, Outcomes, Philosophy, Predict, Processing, Psychometrics, Reference, Science, Scientific Discovery, Seeking, Specificity, Systems, Theory, Users, Web

? Weessies, K.W. (2007), The publishing dynamics of catastrophic events. *Journal of the American Society for Information Science and Technology*, **58** (6), 856-861.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 556.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20556.pdf)

Abstract: This article studies the effect that two major disasters, the Three Mile Island nuclear disaster and the Chernobyl nuclear disaster, had on the publishing world. We expect consumer publishing to concentrate on major events as they unfold. The technical and scholarly publishing world, however, is believed to progress and develop in conjunction with the growth of science, as established in bibliometric laws. Articles about these disasters were tracked in four bibliographic databases representing scholarly, technical-scholarly, technical, and consumer literature. Several analyses of the data revealed that each body of literature responds in its own way to disasters and anniversaries of events affect publishing, other than government-sponsored research. More focused databases have a more highly correlated response to disasters than broad-based databases. Comparison to two previously published studies of fast-growing literatures reveals that while some measures are consistent, disasters experience participation from a larger number of researchers with publications spread across a broader base of journal titles.

Keywords: Affect, Base, Bibliographic Databases, Bibliometric, Chernobyl, Databases, Dynamics, Growth, Journal, Participation, Publications, Publishing, Research, Science

? Coleman, A. (2007), Assessing the value of a journal beyond the impact factor. *Journal of the American Society for Information Science and Technology*, **58** (8), 1148-1161.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 1148.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201148.pdf)

Abstract: The well-documented limitations of journal impact factor rankings and perceptual ratings, the evolving scholarly communication system, the open-access movement, and increasing globalization are some reasons that prompted an examination of journal value rather than just impact. Using a single, specialized journal established in 1960, about education for the Information professions, the author discusses the fall from citation grace of the Journal of Education for Library and Information Science (JELIS) in terms of impact factor and declining subscriptions. Journal evaluation studies in Library and Information Science based on subjective ratings are used to show the high rank of JELIS during the same period (1984-2004) and explain why impact factors and perceptual ratings either singly or jointly are inadequate measures for understanding the value of specialized, scholarly journals such as JELIS. This case study was also a search for bibliometric measures of journal value. Three measures, namely journal attraction power, author associativity, and journal consumption power, were selected; two of them were redefined as journal measures of affinity (the proportion of foreign authors), associativity (the amount of collaboration), and calculated as objective indicators of journal value. The affinity and associativity for JELIS calculated for 1984, 1994, 2004, and consumption calculated for 1985 and 1994 show a holding pattern; however, they also reveal interesting dimensions for future study. Journal value is multidimensional and citations do not capture all the facets, costs, benefits, and measures for informative and scientific value must be distinguished and developed in a fuller model of journal value.

Keywords: Affinity, ARL Library Directors, Bibliometric, Case Study, Citation, Citation Analysis, Citations, Collaboration, Communication, Consumption, Costs, Education, Evaluation, Evaluation Studies, Examination, Fall, Impact, Impact Factor, Impact Factors, Indicators, Information-Science, JEL, Journal, Journals, Kohl-Davis, Limitations, Model, Movement, Publications, Rank, Rankings, Replication, Scientific Journals, Uncitedness

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 1285.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201285.pdf)

Abstract: We present evidence that in some research fields, research published in journals and reported on the Web may collectively represent different evolutionary stages of the field, with journals lagging a few years behind the Web on average, and that a ‘two-tier’ scholarly communication system may therefore be evolving. We conclude that in such fields, (a) for detecting current research fronts, author co-citation analyses (ACA) using articles published on the Web as a data source can outperform traditional ACAs using articles published in journals as data, and that (b) as a result, it is important to use multiple data sources in citation analysis studies of scholarly communication for a complete picture of communication patterns. Our evidence stems from comparing the respective intellectual structures of the XML research field, a subfield of computer science, as revealed from three sets of ACA covering two time periods: (a) from the field’s beginnings in 1996 to 2001, and (b) from 2001 to 2006. For the first time period, we analyze research articles both from journals as indexed by the Science Citation Index (SCl) and from the Web as indexed by CiteSeer. We follow up by an ACA of SCI data for the second time period. We find that most trends in the evolution of this field from the first to the second time period that we find when comparing ACA results from the SCI between the two time periods already were apparent in the ACA results; from CiteSeer during the first time period.

Keywords: Analyses, Analysis, Citation, Citation Analysis, Co-Citation, Cocitation, Communication, Data, Evidence, Evolution, Field, First, Follow-Up, Journals, Publications, Research, Research Fronts, Scholarly Communication, SCI, Science, Science Citation Index, Source, Sources, Trends, XML

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 1303.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201303.pdf)

Abstract: In addition to science citation indicators of journals like impact and immediacy, social network analysis provides a set of centrality measures like degree, betweenness, and closeness centrality. These measures are first analyzed for the entire set of 7,379 journals included in the Journal Citation Reports of the Science Citation Index and the Social Sciences Citation Index 2004 (Thomson ISI, Philadelphia, PA), and then also in relation to local citation environments that can be considered as proxies of specialties and disciplines. Betweenness centrality is shown to be an indicator of the interdisciplinarity of journals, but only in local citation environments and after normalization; otherwise, the influence of degree centrality (size) overshadows the betweenness-centrality measure. The indicator is applied to a variety of citation environments, including policy-relevant ones like biotechnology and nanotechnology. The values of the indicator remain sensitive to the delineations of the set because of the indicator’s local character. Maps showing interdisciplinarilty of journals in terms of betweenness centrality can be drawn using information about journal citation environments, which is available online.

Keywords: Analysis, Biotechnology, Citation, First, Impact, Indicator, Indicators, Information, Interdisciplinarity, ISI, Journal, Journal Citation Reports, Journals, Local, Measure, Nanotechnology, Network, Network Analysis, Normalization, Science, Science Citation Index, Scientific Journals, Size, Social, Social Network Analysis

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 1381.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201381.pdf)

Abstract: Jorge Hirsch (2005a, 2005b) recently proposed the h index to quantify the research output of individual scientists. The new index has attracted a lot of attention in the scientific community. The claim that the h index in a single number provides a good representation of the scientific lifetime achievement of a scientist as well as the (supposed) simple calculation of the h index using common literature databases lead to the danger of improper use of the index. We describe the advantages and disadvantages of the h index and summarize the studies on the convergent validity of this index. We also introduce corrections and complements as well as single-number alternatives to the h index.

Keywords: Achievement, Alternatives, Community, Convergent Validity, Decisions, Fairness, h Index, h-Index, Hirsch, Hirsch-Index, Impact, Lead, Literature, Predictive-Validity, Ranking, Representation, Research, Scientists, Selection, Validity

? Vanclay, J.K. (2007), On the robustness of the *h*-index. *Journal of the American Society for Information Science and Technology*, **58** (10), 1547-1550.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 1547.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201547.pdf)

Abstract: The h-index (Hirsch, 2005) is robust, remaining relatively unaffected by errors in the long tails of the citations-rank distribution, such as typographic errors that shortchange frequently cited articles and create bogus additional records. This robustness, and the ease with which h-indices can be verified, support the use of a Hirschtype index over alternatives such as the journal impact factor. These merits of the h-index apply both to individuals and to journals.

Keywords: Alternatives, h Index, h-Index, Hirsch, Impact, Impact Factor, Journal, Journal Impact, Journals, Records, Robustness, Scientists, Support

? Sotudeh, H. and Horri, A. (2007), Tracking open access journals evolution: Some considerations in open access data collection validation. *Journal of the American Society for Information Science and Technology*, **58** (11), 1578-1585.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 1578.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201578.pdf)

Abstract: This article examines the evolution of a collection of open access journals (OAJs,) indexed by the Science Citation Index (SCI; Thomson Scientific Philadelphia, PA) against four validity criteria including a free, immediate, full and constant access policy for at least 5 years. Few journals are found to be wrongly identified as OAJ or to have a dubious access policy. Some delayed journals evolved into gold OA; however, these are scarce compared to the number of journals that withdrew from gold OA to be an embargoed or a partially OAJ. A majority of the journals meet three of the criteria as they provide free and immediate access to their entire contents. Although a lot are found to follow a constant policy, a large number has an OA lifetime shorter than 5 years, due to the high frequency of newly launched or newly converted journals. That is the major factor affecting the validity of the collection. Only half of the collection meets all the requirements.

Keywords: Access, Collection, Criteria, Data, Data Collection, Evolution, Gold, Impact, Internet, Journals, Open, Open Access, Policy, SCI, Science Citation Index, Validation, Validity

? Cronin, B. and Meho, L.I. (2007), Timelines of creativity: A study of intellectual innovators in information science. *Journal of the American Society for Information Science and Technology*, **58** (13), 1948-1959.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 1948.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%201948.pdf)

Abstract: We explore the relationship between creativity and both chronological and professional age in information science using a novel bibliometric approach that allows us to capture the shape of a scholar’s career. Our approach draws on D.W. Galenson’s (2006) analyses of artistic creativity, notably his distinction between conceptual and experimental innovation, and also H.C. Lehman’s (1953) seminal study of the relationship between stage of career and outstanding performance. The data presented here suggest that creativity is expressed in different ways, at different times, and with different intensities in academic information science.

Keywords: Age, Analyses, Approach, Author Cocitation, Bibliometric, Creativity, Data, Design, Experimental, Information, Information Science, Innovation, Model, Nov, Performance, Retrieval, Science, Search Process, Seeking Strategies, Selection, Text, Undiscovered Public Knowledge, Users

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 960.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%20960.pdf)

Abstract: This article shows how finite-state methods can be employed in a new and different task: the conflation of personal name variants in standard forms. In bibliographic databases and citation index systems, variant forms create problems of inaccuracy that affect information retrieval, the quality of information from databases, and the citation statistics used for the evaluation of scientists’ work. A number of approximate string matching techniques have been developed to validate variant forms, based on similarity and equivalence relations. We classify the personal name variants as nonvalid and valid forms. In establishing an equivalence relation between valid variants and the standard form of its equivalence class, we defend the application of finite-state transducers. The process of variant identification requires the elaboration of: (a) binary matrices and (b) finite-state graphs. This procedure was tested on samples of author names from bibliographic records, selected from the Library and Information Science Abstracts and Science Citation Index Expanded databases. The evaluation involved calculating the measures of precision and recall, based on completeness and accuracy. The results demonstrate the usefulness of this approach, although it should be complemented with methods based on similarity relations for the recognition of spelling variants and misspellings.

Keywords: Accuracy, Application, Approach, Authors, Automatic Spelling Correction, Bibliographic Databases, Citation, Computer, Databases, Evaluation, Forms, Gettys, Identification, Index, Information, Information Retrieval, Linkage, Methods, Nov, Precision, Procedure, Quality, Quality of, Quality of Information, Recall, Recognition, Records, Relations, Retrieval, Scholarly Text, Science Citation Index, Similarity, Standard, Statistics, Systems, Techniques, Transducers, Undetected Typing Errors, Work

? Meho, L.I. and Yang, K. (2007), Impact of data sources on citation counts and rankings of LIS faculty: Web of Science versus Scopus and Google scholar. *Journal of the American Society for Information Science and Technology*, **58** (13), 2105-2125.

Full Text: [2007\J Ame Soc Inf Sci Tec58, 2105.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%202105.pdf)

Abstract: The Institute for Scientific Information’s (ISI, now Thomson Scientific, Philadelphia, PA) citation databases have been used for decades as a starting point and often as the only tools for locating citations and/or conducting citation analyses. The ISI databases (or Web of Science (WoS]), however, may no longer be sufficient because new databases and tools that allow citation searching are now available. Using citations to the work of 25 library and information science (LIS) faculty members as a case study, the authors examine the effects of using Scopus and Google Scholar (GS) on the citation counts and rankings of scholars as measured by WoS. Overall, more than 10,000 citing and purportedly citing documents were examined. Results show that Scopus significantly alters the relative ranking of those scholars that appear in the middle of the rankings and that GS stands out in its coverage of conference proceedings as well as international, non-English language journals. The use of Scopus and GS, in addition to WoS, helps reveal a more accurate and comprehensive picture of the scholarly impact of authors. The WoS data took about 100 hours of collecting and processing time, Scopus consumed 200 hours, and GS a grueling 3,000 hours.

Keywords: Analyses, Authors, Bibliometric Methods, Case Study, Citation, Citation Counts, Citations, Communication, Coverage, Data, Databases, Effects, Faculty, Google Scholar, GS, h-Index, Impact, Indicators, Information, Information Science, Information-Science, International, ISI, Journals, Language, Library and Information Science, LIS, NOV, of-Science, Performance, Productivity, Ranking, Rankings, Scholarly Impact, Science, Scopus, Sources, Web of Science, Work

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Full Text: [2007\J Ame Soc Inf Sci Tec58, 2372.pdf](2007/J%20Ame%20Soc%20Inf%20Sci%20Tec58,%202372.pdf)

Abstract: The second half of the twentieth century saw the emergence of three knowledge-system models: Mode 2 knowledge production, the Triple Helix, and Post-Norma I Science (PNS). Today, this emphasis on knowledge use is the focus of such important health movements as evidence-based medicine. Building on the methodological work of Shinn (2002) and the theoretical work of Holzner and Marx (1979), we conducted a bibliometric study of the extent to which the three knowledge-system models are used by researchers to frame problems of health-knowledge use. By doing so, we reveal how these models fit into a larger knowledge system of health and evidence-based decision making. The study results show clearly that although these knowledge models are extremely popular for contextualizing research, there is a distinct lack of emphasis on use of the models in knowledge utilization or evidence-based medicine. We recommend using these models for further research in three specific dimensions of health systems analysis: (a) differences in language use, (b) transformative thinking about health-knowledge functions, and (c) ethical analysis of institutional linkages.

Keywords: Academic Subjects, Analysis, Bibliometric, Bibliometric Study, Clinical-Evaluation, Decision, Decision Making, Decision-Making, Ethical, Evidence Based, Evidence Based Medicine, Evidence-Based, Evidence-Based Medicine, Functions, Growth, Health, Health Systems, Health-Care, Industry-Government Relations, Innovation, Knowledge, Medicine, Models, Organization, Post-Normal Medicine, Research, Science, Society, Systems, Technology, Theory, Triple-Helix, Utilization, Work

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 150.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20150.pdf)

Abstract: The main fields of research in Library Science and Documentation are identified by quantifying the frequency of appearance and the analysis of co-occurrence of the descriptors assigned to 11,273 indexed works in the Library and Information Science Abstracts (LISA) database for the 2004-2005 period. The analysis made has enabled three major core research areas to be identified: World Wide Web, Libraries and Education. There are a further 12 areas of research with specific development, one connected with the library sphere and another 11 connected with the World Wide Web and Internet: Networks, Computer Security, Information technologies, Electronic Resources, Electronic Publications, Bibliometrics, Electronic Commerce, Computer applications, Medicine, Searches and Online Information retrieval.

Keywords: Analysis, Bibliometrics, Database, Development, Information, Information Science, Internet, Journal, Journal Articles, Research, Science, Science Research, Technologies, World Wide Web

? Rrencibia-Jorge, R., Barrios-Almaguer, I., Fernández-Hernández, S. and Carvajal-Espino, R. (2008), Applying successive h indices in the institutional evaluation: A case study. *Journal of the American Society for Information Science and Technology*, **59** (1), 155-157.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 155.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20155.pdf)

Abstract: The present work shows the applying of successive H indices in the evaluation of a scientific institution, using the researcher-department-institution hierarchy as level of aggregation. The scientific production covered by the Web of Science of the researcher’s staff from the Cuban National Scientific Research Center, during the period 2001-2005, was studied. The Hirsch index (h-index; J.E. Hirsch, 2005) was employed to calculate the individual performance of the staff, using the g-index created by Leo Egghe (2006) and the A-index developed by Jin Bi-Hui (2006) as complementary indicators. The successive H indices proposed by Andras Schubert (2007) were used to determine the scientific performance of each department as well as the general performance of the institution. The possible advantages of the method for the institutional evaluation processes were exposed.

Keywords: A-Index, Aggregation, Case Study, Complementary, Evaluation, g Index, g-Index, General, h Index, h-Index, Hierarchy, Hirsch, Hirsch Index, Index, Indicators, Indices, Performance, Production, Scientific Performance, Scientific Production, Web of Science, Work

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 278.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20278.pdf)

Abstract: Aging of publications, percentage of self-citations, and impact vary from journal to journal within fields of science. The assumption that citation and publication practices are homogenous within specialties and fields of science is invalid. Furthermore, the delineation of fields and among specialties is fuzzy. Institutional units of analysis and persons may move between fields or span different specialties. The match between the citation index and institutional profiles varies among institutional units and nations. The respective matches may heavily affect the representation of the units. Non-institute of Scientific Information (ISI) journals are increasingly cornered into “transdisciplinary” Mode-2 functions with the exception of specialist journals publishing in languages other than English. An “externally cited impact factor” can be calculated for these journals. The citation impact of non-ISI journals will be demonstrated using Science and Public Policy as the example.

Keywords: Angewandte-Chemie, Betweenness, Centrality, China, Citation, Impact, Impact Factors, Index, Interdisciplinarity, ISI, Journals, Knowledge, Publication, Publications, Publishing, Research, Science, Scientometrics, Self-Citations

? van Raan, A.F.J. (2008), Bibliometric statistical properties of the 100 largest European research universities: Prevalent scaling rules in the science system. *Journal of the American Society for Information Science and Technology*, **59** (3), 461-475.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 461.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20461.pdf)

Abstract: The statistical properties of bibliometric indicators related to research performance, field citation density, and journal impact were studied for the 100 largest European research universities. A size-dependent cumulative advantage was found for the impact of universities in terms of total number of citations. In the author’s previous work, a similar scaling rule was found at the level of research groups. Therefore, this scaling rule is conjectured to be a prevalent property of the science system. The lower performance universities have a larger size-dependent cumulative advantage for receiving citations than top performance universities. For the lower performance universities, the fraction of noncited publications decreases considerably with size. Generally, the higher the average journal impact of the publications of a university, the lower the number of noncited publications. The average research performance was found not to dilute with size. Evidently, large universities, particularly top performance universities are characterized by being “big and beautiful.” They succeed in keeping a high performance over a broad range of activities. This most probably is an indication of their overall attractive scientific and intellectual power. It was also found that particularly for the lower performance universities, the field citation density provides a strong cumulative advantage in citations per publication. The relation between number of citations and field citation density found in this study can be considered as a second basic scaling rule of the science system. Top performance universities publish in journals with significantly higher journal impact as compared to the lower performance universities. A significant decrease of the fraction of self-citations with increasing research performance, average field citation density, and average journal impact was found.

Keywords: Bibliometric, Bibliometric Indicators, Citation, Citations, Journals, Publication, Publications, Research, Science, Self Citations, Self-Citations, System

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 551.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20551.pdf)

Abstract: The authors describe a large-scale, longitudinal citation analysis of intellectual trading between information studies and cognate disciplines. The results of their investigation reveal the extent to which information studies draws on and, in turn, contributes to the ideational substrates of other academic domains. Their data show that the field has become a more successful exporter of ideas as well as less introverted than was previously the case. In the last decade, information studies has begun to contribute significantly to the literatures of such disciplines as computer science and engineering on the one hand and business and management on the other, while also drawing more heavily on those same literatures.

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 565.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20565.pdf)

Abstract: A representation of science as a citation density landscape is proposed and scaling rules with the field-specific citation density as a main topological property are investigated. The focus is on the size-dependence of several main bibliometric indicators for a large set of research groups while distinguishing between top-performance and lower-performance groups. It is demonstrated that this representation of the science system is particularly effective to understand the role and the interdependencies of the different bibliometric indicators and related topological properties of the landscape.

Keywords: Bibliometric, Bibliometric Indicators, Characteristics, Citation, Competition, Cumulative Advantage, Distributions, Evolution, Impact, Indicators, Landscape, Networks, Paper, Physics, Property, Representation, Research, Role, Scaling, Science, Scientific Publication, Statistical Properties

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 805.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20805.pdf)

Abstract: Open-access online publication has made available an increasingly wide range of document types for scientometric analysis. In this article, we focus on citations in online presentations, seeking evidence of their value as nontraditional indicators of research impact. For this purpose, we searched for online PowerPoint files mentioning any one of 1,807 ISI-indexed journals in ten science and ten social science disciplines. We also manually classified 1,378 online PowerPoint citations to journals in eight additional science and social science disciplines. The results showed that very few journals were cited frequently enough in online PowerPoint files to make impact assessment worthwhile, with the main exceptions being popular magazines like Scientific American and Harvard Business Review. Surprisingly, however, there was little difference overall in the number of PowerPoint citations to science and to the social sciences, and also in the proportion representing traditional impact (about 60%) and wider impact (about 15%). It seems that the main scientometric value for online presentations may be in tracking the popularization of research, or for comparing the impact of whole journals rather than individual articles.

Keywords: 4 Science Disciplines, Abstracts, Access, Analysis, Assessment, Citations, Communication, Evidence, Google Scholar Citations, Impact, Impact Assessment, Indicators, Information, Internet, Journals, Mar, Meetings, Participation, Publication, Purpose, Research, Science, Sciences, Scientific Impact, Scientometric, Social, Social Sciences, Source, Value, Web Citations

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 830.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20830.pdf)

Abstract: In this study, we examined empirical results on the h index and its most important variants in order to determine whether the variants developed are associated with an incremental contribution for evaluation purposes. The results of a factor analysis using bibliographic data on postdoctoral researchers in biomedicine indicate that regarding the h index and its variants, we are dealing with two types of indices that load on one factor each. One type describes the most productive core of a scientist’s output and gives the number of papers in that core. The other type of indices describes the impact of the papers in the core. Because an index for evaluative purposes is a useful yardstick for comparison among scientists if the index corresponds strongly with peer assessments, we calculated a logistic regression analysis with the two factors resulting from the factor analysis as independent variables and peer assessment of the postdoctoral researchers as the dependent variable. The results of the regression analysis show that peer assessments can be predicted better using the factor ‘impact of the productive core’ than using the factor ‘quantity of the productive core’.

Keywords: Analysis, Assessment, Biomedicine, Citation Analysis, Comparison, Evaluation, Factor Analysis, H Index, H-Index, Impact, Logistic Regression, Logistic Regression Analysis, Papers, Power, Ranking, Regression, Regression Analysis, Scientific-Research

Antonakis, J. and Lalive, R. (2008), Quantifying scholarly impact: IQp versus the Hirsch h. *Journal of the American Society for Information Science and Technology*, **59** (6), 956-969.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 956.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%20956.pdf)

Abstract: Hirsch’s (2005) h index of scholarly output has generated substantial interest and wide acceptance because of its apparent ability to quantify scholarly impact simply and accurately. We show that the excitement surrounding h is premature for three reasons: h stagnates with increasing scientific age; it is highly dependent on publication quantity; and it is highly dependent on field-specific citation rates. Thus, it is not useful for comparing scholars across disciplines. We propose the scholarly “index of quality and productivity” (IQp) as an alternative to h. The new index takes into account a scholar’s total impact and also corrects for field-specific citation rates, scholarly productivity, and scientific age. The IQp accurately predicts group membership on a common metric, as tested on a sample of 80 scholars from three populations: (a) Nobel winners in physics (n = 10), chemistry (n = 10), medicine (n = 10), and economics (n = 10), and towering psychologists (n = 10); and scholars who have made more modest contributions to science including randomly selected (b) fellows (n = 15) and (c) members (n = 15) of the Society of Industrial and Organizational Psychology. The IQp also correlates better with expert ratings of greatness than does the h index.

Keywords: Acceptance, Age, Alternative, Chemistry, Citation, Correlates, Economics, h Index, h-Index, Hirsch, Impact, Index, Interrater Agreement, Medicine, Premature, Publication, Quality, Ranking, Rates, Researchers, Science, Scientists

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1002.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201002.pdf)

Abstract: The author describes an exploratory analysis of the influence of place and proximity on collaboration. Bibliometric data and biographical information are combined to reveal the extent to which co-authorship relationships are a function of physical collocation.

Keywords: Analysis, Co-Authorship, Coauthorship, Collaboration, Data, Function, Information, Physical, Significance

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1184.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201184.pdf)

Abstract: A brief communication appearing in this journal ranked UK-based LIS and (some) IR academics by their h-index using data derived from the Thomson ISI Web of Science (TM) (WoS). In this brief communication, the same academics were re-ranked, using other popular citation databases. It was found that for academics who publish more in computer science forums, their h was significantly different due to highly cited papers missed by WoS; consequently, their rank changed substantially. The study was widened to a broader set of UK-based LIS and IR academics in which results showed similar statistically significant differences. A variant of h, h(mx), was introduced that allowed a ranking of the academics using all citation databases together.

Keywords: Citation, Communication, Counts, Google Scholar, h Index, h-Index, Index, IR, ISI, Journal, LIS, Papers, Rank, Ranking, Science, UK, Web of Science

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1276.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201276.pdf)

Abstract: In this article, for any group of authors, we define three different h-indices. First, there is the successive h-index h(2) based on the ranked list of authors and their h-indices h, as defined by Schubert (2007). Next, there is the h-index hp based on the ranked list of authors and their number of publications. Finally, there is the h-index h(c) based on the ranked list of authors and their number of citations. We present formulae for these three indices in Lotkaian informetrics from which it also follows that h(2) < h(p) < h(c). We give a concrete example of a group of 167 authors on the topic “optical flow estimation.” Besides these three h-indices, we also calculate the two-by-two Spearman rank correlation coefficient and prove that these rankings are significantly related.

Keywords: Bibliometric Indicators, Citations, Concrete, Correlation, Correlation Coefficient, Flow, h Index, h-Index, Hirsch-Type Indexes, Indices, Informetrics, Journals, Lotkaian Informetrics, Publications, Rank, Ranking, Rankings, Scientific-Research Output

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1304.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201304.pdf)

Abstract: In a previous article, we introduced a general transformation on sources and one on items in an arbitrary information production process (11212). In this article, we investigate the influence of these transformations on the h-index and on the g-index. General formulae that describe this influence are presented. These are applied to the case that the size-frequency function is Lotkaian (i.e., is a decreasing power function). We further show that the h-index of the transformed IPP belongs to the interval bounded by the two transformations of the h-index of the original IPP, and we also show that this property is not true for the g-index.

Keywords: Bibliometric Indicators, Function, g Index, g-Index, General, h Index, h-Index, Hirsch-Type Indexes, Information, Information Production Process, Interval, Ipp, Journals, Model, Positive Reinforcement, Power, Ranking, Scientific-Research Output, Sources, Systems, Transformation

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1313.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201313.pdf)

Abstract: This study surveyed 536 CAL publications in 71 SSCI (Social Science Citation Index) journals from 1998 to February 2006 to identify trends and lacunae for future research. The parameters and keywords employed by the authors are first presented, followed by a description of the study’s general findings. A comparison is then drawn between CAL and recent depictions of the “biogosphere,” for the majority of the contributors to the field produced only a few articles and authors of individual publications demonstrated a far greater collective influence on the field than the more frequently-cited authors. Results also revealed that the amount of articles pertaining to the aged, disabled children, and home schooling were significantly lower than those relating to school student’s learning. This study offers an interesting snapshot of a field that is apparently on the rise; moreover, it raises some issues to be addressed in further research on CAL-related topics.

Keywords: Aged, Assessment, Authors, Children, Comparison, Disabled, Disabled Children, Field, First, General, International-Business, Journals, Law, Learning, Literature, Nutrition Education, Publications, Research, Science Citation Index, Social Science Citation Index, SSCI, Technology, Trends

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1366.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201366.pdf)

Abstract: This paper examines the probability structure of the 2005 Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) Journal Citation Reports (JCR) by analyzing the Impact Factor distributions of their journals. The distribution of the SCI journals corresponded with a distribution generally modeled by the negative binomial distribution, whereas the SSCI distribution fit the Poisson distribution modeling random, rare events. Both Impact Factor distributions were positively skewed-the SCI much more so than the SSCI-indicating excess variance. One of the causes of this excess variance was that the journals highest in the Impact Factor in both JCRs tended to class in subject categories well funded by the National Institutes of Health. The main reason for the SCI Impact Factor distribution being more skewed than the SSCI one was that review journals defining disciplinary paradigms play a much more important role in the sciences than in the social sciences.

Keywords: Analysis, Distribution, Events, Journal Citation Reports, Journals, Modeling, National Institutes of Health, Review, Role, SCI, Science Citation Index, Sciences, Social, Social Sciences, SSCI, Structure

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1433.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201433.pdf)

Abstract: Research evaluation is increasingly popular and important among research funding bodies and science policy makers. Various indicators have been proposed to evaluate the standing of individual scientists, institutions, journals, or countries. A simple and popular one among the indicators is the h-index, the Hirsch index (Hirsch 2005), which is an indicator for lifetime achievement of a scholar. Several other indicators have been proposed to complement or balance the h-index. However, these indicators have no conception of aging. The AR-index (Jin et al. 2007) incorporates aging but divides the received citation counts by the raw age of the publication. Consequently, the decay of a publication is very steep and insensitive to disciplinary differences. In addition, we believe that a publication becomes outdated only when it is no longer cited, not because of its age. Finally, all indicators treat citations as equally material when one might reasonably think that a citation from a heavily cited publication should weigh more than a citation froma non-cited or little-cited publication. We propose a new indicator, the Discounted Cumulated Impact (DCI) index, which devalues old citations in a smooth way. It rewards an author for receiving new citations even if the publication is old. Further, it allows weighting of the citations by the citation weight of the citing publication. DCI can be used to calculate research performance on the basis of the h-core of a scholar or any other publication data set. Finally, it supports comparing research performance to the average performance in the domain and across domains as well.

Keywords: Achievement, Age, Aging, AR-Index, Bodies, Citation, Citation Counts, Citations, Conception, Data, Evaluation, Funding, h Index, h-Index, Hirsch, Hirsch Index, Hirsch-Index, Impact, Index, Indicator, Indicators, Information-Science, Institutions, Journals, Performance, Policy, Publication, Research, Research Evaluation, Research Funding, Research Performance, Science, Science Policy, Weight, Weighting

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1441.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201441.pdf)

Abstract: This study utilized bibliometric tools to analyze the relationship between two separate, but related, fields: Library and Information Science (LIS) and Management Information Systems (MIS). The top-ranked 48 journals in each field were used as the unit of analysis. Using these journals, field cocitation was introduced as a method for evaluating the relationships between the two fields. The three-phased study evaluated (a) the knowledge imported/exported between LIS and MIS, (b) the body of knowledge influenced by both fields, and (c) the overlap in fields as demonstrated by multidimensional scaling. Data collection and analysis were performed using DIALOG and SPSS programs. The primary findings from this study indicate that (a) the MIS impact on LIS is greater than the reverse, (b) there is a growing trend for shared impact between the two disciplines, and (c) the area of overlap between the two fields is predominately those journals focusing on technology systems and digital information. Additionally, this study validated field cocitation as a method by which to evaluate relationships between fields.

Keywords: Analysis, Bibliometric, Citation Relations, Cocitation, Cocited Author Retrieval, Collection, Communication, Disciplines, Field, Impact, Information, Journals, Knowledge, LIS, Management-Information-Systems, MIS, Multidimensional, Multidimensional Scaling, Networks, Pearsons-R, Primary, Scaling, Science, Scientific Journals, Systems, Technology, Trend

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1513.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201513.pdf)

Abstract: J.E. Hirsch (2005) introduced the h-index to quantify an individual’s scientific research output by the largest number h of a scientist’s papers that received at least h citations. To take into account the highly skewed frequency distribution of citations, L. Egghe (2006a) proposed the g-index as an improvement of the h-index. I have worked out 26 practical cases of physicists from the Institute of Physics at Chemnitz University of Technology, and compare the h and g values in this study. It is demonstrated that the 9-index discriminates better between different citation patterns. This also can be achieved by evaluating B.H. Jin’s (2006) A-index, which reflects the average number of citations in the h-core, and interpreting it in conjunction with the h-index. h and A can be combined into the R-index to measure the h-core’s citation intensity. I also have determined the A and R values for the 26 datasets. For a better comparison, I utilize interpolated indices. The correlations between the various indices as well as with the total number of papers and the highest citation counts are discussed. The largest Pearson correlation coefficient is found between g and R. Although the correlation between g and h is relatively strong, the arrangement of the datasets is significantly different depending on whether they are put into order according to the values of either h or g.

Keywords: A-Index, Citation, Citation Counts, Citation Patterns, Citations, Comparison, Correlation, Correlation Coefficient, Correlations, Distribution, g Index, g-Index, h Index, h-Index, Hirsch, Hirsch-Index, Improvement, Indicators, Indices, Interpreting, Investigation, Measure, Papers, R-Index, Research, Scientific Research, Scientists, Values

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1570.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201570.pdf)

Abstract: Bibliographic databases (including databases based on open access) are routinely used for bibliometric research. The value of a specific database depends to a large extent on the coverage of the discipline(s) under study. A number of studies have determined the coverage of databases in specific disciplines focusing on interdisciplinary differences; however, little is known about the potential existence of intradisciplinary differences in database coverage. Focusing on intradisciplinary differences, the article documents large database-coverage differences within two disciplines (economics and psychology). The point extends to include both the uneven coverage of specialties and research traditions. The implications for bibliometric research are discussed, and precautions which need to be taken are outlined.

Keywords: Access, Behavioral-Sciences, Bibliometric, Bibliometric Research, Citation Analysis, Communication, Coverage, Database, Databases, Economics, Google Scholar, Humanities, Index, Interdisciplinary, Open, Open Access, Potential, Psychology, Research, Research Performance, Sociology, Top Journals, Value

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1598.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201598.pdf)

Abstract: Developed countries have an even distribution of published papers on the seventeen model organisms. Developing countries have biased preferences for a few model organisms which are associated with endemic human diseases. A variant of the Hirsch-index, that we call the mean (mo)h-index (“model organism h-index”), shows an exponential relationship with the amount of papers published in each country on the selected model organisms. Developing countries cluster together with low mean (mo)h-indexes, even those with high number of publications. The growth curves of publications on the recent model Caenorhabditis elegans in developed countries shows different formats. We also analyzed the growth curves of indexed publications originating from developing countries. Brazil and South Korea were selected for this comparison. The most prevalent model organisms in those countries show different growth curves when compared to a global analysis, reflecting the size and composition of their research communities.

Keywords: Amplification, Analysis, Brazil, Chromosomes, Cluster, Comparison, Composition, Country, Developing, Developing Countries, Diseases, Distribution, Growth, Growth Curves, Hirsch Index, Human, Korea, Model, Papers, Publications, Research, Sequence, Size, Trans-Sialidase, Trypanosoma-Cruzi

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1608.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201608.pdf)

Abstract: This article studies the h-index (Hirsch index) and the g-index of authors, in case one counts authorship of the cited articles in a fractional way. There are two ways to do this: One counts the citations to these papers in a fractional way or one counts the ranks of the papers in a fractional way as credit for an author. In both cases, we define the fractional h- and g-indexes, and we present inequalities (both upper and lower bounds) between these fractional h- and g-indexes and their corresponding unweighted values (also involving, of course, the coauthorship distribution). Wherever applicable, examples and counterexamples are provided. In a concrete example (the publication citation list of the present author), we make explicit calculations of these fractional h- and g-indexes and show that they are not very different from the unweighted ones.

Keywords: Authorship, Citation, Citations, Coauthorship, Concrete, Course, G Index, G-Index, h Index, h-Index, Hirsch, Hirsch Index, Hirsch-Index, Inequalities, Papers, Publication, Ranking, Scientists, Theory

? van Raan, A.F.J. (2008), Self-citation as an impact-reinforcing mechanism in the science system. *Journal of the American Society for Information Science and Technology*, **59** (10), 1631-1643.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 1631.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201631.pdf)

Abstract: Previous research has demonstrated that lower performance groups have a larger size-dependent cumulative advantage for receiving citations than do top-performance groups. Furthermore, regardless of performance, larger groups have less not-cited publications. Particularly for the lower performance groups, the fraction of not-cited publications decreases considerably with size. These phenomena can be explained with a model in which self-citation acts as a promotion mechanism for external citations. In this article, we show that for self-citations, similar size-dependent scaling rules apply as for citations, but generally the power law exponents are higher for self-citations as compared to citations. We also find that the fraction of self-citations is smaller for the higher performance groups, and this fraction decreases more rapidly with increasing journal impact than that for lower performance groups. An interesting novel finding is that the variance in the correlation of the number of self-citations with size is considerably less than the variance for external citations. This is a clear indication that size is a stronger determinant for self-citations than it is for external citations. Both higher and particularly lower performance groups have a size-dependent cumulative advantage for self-citations, but for the higher performance groups only in the lower impact journals and in fields with low citation density.

Keywords: Bibliometric Statistical Properties, Citation, Citations, Correlation, Cumulative, Cumulative Advantage, Impact, Indication, Indicators, Journal, Journal Impact, Journals, Law, Macro, Mechanism, Model, Networks, Performance, Physics, Power, Power Law, Promotion, Publications, Research, Scaling, Science, Self-Citation, Self-Citations, Size, Time, Universities

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1653.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201653.pdf)

Abstract: We provide in this article a number of new insights into the methodological discussion about author co-citation analysis. We first argue that the use of the Pearson correlation for measuring the similarity between authors’ co-citation profiles is not very satisfactory. We then discuss what kind of similarity measures may be used as an alternative to the Pearson correlation. We consider three similarity measures in particular. One is the well-known cosine. The other two similarity measures have not been used before in the bibliometric literature. We show by means of an example that the choice of an appropriate similarity measure has a high practical relevance. Finally, we discuss the use of similarity measures for statistical inference.

Keywords: Alternative, Analysis, Author Cocitation Analysis, Bibliometric, Choice, Co-Citation, Co-Citation Analysis, Cocitation, Cooccurrence Data, Correlation, Correlation-Coefficient, First, Inference, Information-Science, Intellectual Structure, Literature, Pearsons R, Profiles, Relevance, Similarity

? Egghe, L. and Rao, I.K.R. (2008), The influence of the broadness of a query of a topic on its h-index: Models and examples of the h-index of N-grams. *Journal of the American Society for Information Science and Technology*, **59** (10), 1688-1693.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 1688.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201688.pdf)

Abstract: The article studies the influence of the query formulation of a topic on its h-Index. In order to generate pure random sets of documents, we used N-grams (N variable) to measure this influence: strings of zeros, truncated at the end. The used databases are WoS and Scopus. The formula h =T-1, alpha, proved in Egghe and Rousseau (2006) where T is the number of retrieved documents and a is Lotka’s exponent, is confirmed being a concavely increasing function of T. We also give a formula for the relation between h and N the length of the N-gram: h = D10(-N, alpha). where D is a constant, a convexly decreasing function, which is found in our experiments. Nonlinear regression on h=T-1, alpha gives an estimation of alpha, which can then be used to estimate the h-index of the entire database (Web of Science [WoS] and Scopus): h=S-1, alpha, where S is the total number of documents in the database.

Keywords: Database, Experiments, Formulation, Function, h Index, h-Index, Hirsch-Index, Length, Regression, Scopus, Web of Science

? Meho, L.I. and Rogers, Y. (2008), Citation counting, citation ranking, and h-index of human-computer interaction researchers: A comparison of Scopus and Web of Science. *Journal of the American Society for Information Science and Technology*, **59** (11), 1711-1726.

Full Text: [2008\J Ame Soc Inf Sci Tec59, 1711.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201711.pdf)

Abstract: This study examines the differences between Scopus and Web of Science in the citation counting, citation ranking, and h-index of 22 top human-computer interaction (HCI) researchers from EQUATOR-a large British Interdisciplinary Research Collaboration project. Results indicate that Scopus provides significantly more coverage of HCI literature than Web of Science, primarily due to coverage of relevant ACM and IEEE peer-reviewed conference proceedings. No significant differences exist between the two databases if citations in journals only are compared. Although broader coverage of the literature does not significantly alter the relative citation ranking of individual researchers, Scopus helps distinguish between the researchers in a more nuanced fashion than Web of Science in both citation counting and h-index. Scopus also generates significantly different maps of citation networks of individual scholars than those generated by Web of Science. The study also presents a comparison of h-index, scores based on Google Scholar with those based on the union of Scopus and Web of Science. The study concludes that Scopus can be used as a sole data source for citation-based research and evaluation in HCI, especially when citations in conference proceedings are sought, and that researchers should manually calculate h scores instead of relying on system calculations.

Keywords: Bibliometric Methods, Citation, Citations, Comparison, Coverage, Data, Databases, Disciplines, Evaluation, Google-Scholar, h Index, h-Index, HCI, Impact, Information-Science, Interaction, Journals, LIS, Literature, Networks, Peer-Reviewed, Physics, Ranking, Research, Research Assessment Exercises, Scopus, Source, Web of Science

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1776.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201776.pdf)

Abstract: While several authors have argued that conference proceedings are an important source of scientific knowledge, the extent of their importance has not been measured in a systematic manner. This article examines the scientific impact and aging of conference proceedings compared to those of scientific literature in general. It shows that the relative importance of proceedings is diminishing over time and currently represents only 1.7% of references made in the natural sciences and engineering, and 2.5% in the social sciences and humanities. Although the scientific impact of proceedings is losing ground to other types of scientific literature in nearly all fields, it has grown from 8% of the references in engineering papers in the early 1980s to its current 10%. Proceedings play a particularly important role in computer sciences, where they account for close to 20% of the references. This article also shows that not unexpectedly, proceedings age faster than cited scientific literature in general. The evidence thus shows that proceedings have a relatively limited scientific impact, on average representing only about 2% of total citations, that their relative importance is shrinking, and that they become obsolete faster than the scientific literature in general.

Keywords: Age, Aging, Analysis, Bibliometric, Bibliometric Analysis, Citations, Engineering, Evidence, General, Humanities, Impact, Information, Knowledge, Literature, Papers, Role, Sciences, Scientific Information, Scientific Literature, Social, Social Sciences, Social-Sciences, Source

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1841.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201841.pdf)

Abstract: All journals that use peer review have to deal with the following question: Does the peer review system fulfill its declared objective to select the “best” scientific work? We investigated the journal peer-review process at Angewandte Chemie International Edition (AC-IE), one of the prime chemistry journals worldwide, and conducted a citation analysis for Communications that were accepted by the journal (n = 878) or rejected but published elsewhere (n = 959). The results of negative binomial-regression models show that holding all other model variables constant, being accepted by AC-IE increases the expected number of citations by up to 50%. A comparison of average citation counts (with 95% confidence intervals) of accepted and rejected (but published elsewhere) Communications with international scientific reference standards was undertaken. As reference standards, (a) mean citation counts for the journal set provided by, Thomson Reuters corresponding to the field “chemistry” and (b) specific reference standards that refer to the subject areas of Chemical Abstracts were used. When compared to reference standards, the mean impact on chemical research is for the most part far above average riot only for accepted Communications but also for rejected (but published elsewhere) Communications. However, average and below-average scientific impact is to be expected significantly less frequently for accepted Communications than for rejected Communications. All in all, the results of this study confirm that peer review at AC-IE is able to. select the “best” scientific work with the highest impact on chemical research.

Keywords: Science, Publication, Articles, Indicators, Counts, Index, Bias, Pay

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1853.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201853.pdf)

Abstract: A time-dependent h-type indicator is proposed. This indicator depends on the size of the h-core, the number of citations. received, and recent change in the value of the h-index. As such, it tries to combine in a dynamic way older information about the source (e.g., a scientist or research institute that is evaluated) with recent information.

Keywords: Change, Citations, Dynamic, h Index, h-Index, Hirsch Index, Index, Indicator, Information, Older, Research, Size, Source, Time-Dependent, Value

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 1948.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%201948.pdf)

Abstract: With the program HistCite (TM) it is possible to generate and visualize the most relevant papers in a set of documents retrieved from the Science Citation Index. Historical reconstructions of scientific developments can be represented chronologically as developments in networks of citation relations extracted from scientific literature. This study aims to go beyond the historical reconstruction of scientific knowledge, enriching the output of HistCite (TM) with algorithms from social-network analysis and information theory. Using main-path analysis, it is possible to highlight the structural backbone in the development of a scientific field. The expected information value of the message can be used to indicate whether change in the distribution (of citations) has occurred to such an extent that a path-dependency is generated. This provides us with a measure of evolutionary change between subsequent documents. The “forgetting and rewriting” of historically prior events at the research front can thus be indicated. These three methods-HistCite, main path and path dependent transitions-are applied to a set of documents related to fullerenes and the fullerene-like structures known as nanotubes.

Keywords: Algorithms, Analysis, Citation, Citations, Communication, Development, Distribution, Events, Field, Fullerenes, Information, Knowledge, Literature, Measure, Nanotubes, Networks, Papers, Reconstruction, Relations, Research, Research Front, Science, Science Citation Index, Scientific Literature, Social Network Analysis, System, Theory, Value

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Full Text: [2008\J Ame Soc Inf Sci Tec59, 2146.pdf](2008/J%20Ame%20Soc%20Inf%20Sci%20Tec59,%202146.pdf)

Abstract: To study the structure of Iranian chemistry research, we identified 43 Iranian and international chemists who were highly cited in 7,682 Iranian chemistry publications (defined as an article with at least one Iranian author address) indexed in Science Citation Index (SciSearch) between 1990 and 2006, inclusive. We collected cocitation data for these authors from the entire SciSearch file (Dialog, File 34) over the time period. A principal components analysis identified seven interrelated factors accounting for 78% of the variance in the cocitation matrix. Iranian and international authors tended to load on separate factors. Three factors-synthesis of carbonyl compounds, solvent-free synthesis of organic compounds and oxidation of organic compounds-had an inter-correlation of vertical bar 0.3 vertical bar or higher. Physical organic chemistry and ionophores (a mixed factor of Iranian and international authors) connected at a lower value, while crown ethers and analytical chemistry were essentially uncorrelated. The PFNet structure maintained the topical factor groupings and Iranian and international authors tended to appear in separate subnetworks. Geographic and institutional influences, apparently relating in part to institutional affiliation and in part to restricted research topics, appear to underlie the primary structural features of Iranian chemistry in this time period.

Keywords: Analysis, Analytical Chemistry, Authors, Bibliometrics, Chemistry, Citation, Citation Context Analysis, Citation Index, Highly-Cited, Intellectual Space, Own-Language Preference, Patterns, Publications, Quality, Quantity, Research, Research Topics, Science, Science Citation Index, Scientific Publications, Self-Citation

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 27.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%2027.pdf)

Abstract: The bibliometric measure impact factor is a leading indicator of journal influence, and impact factors are routinely used in making decisions ranging from selecting journal subscriptions to allocating research funding to deciding tenure cases. Yet journal impact factors have increased gradually over time, and moreover impact factors vary widely across academic disciplines. Here we quantify inflation over time and differences across fields in impact factor scores and determine the sources of these differences. We find that the average number of citations in reference lists has increased gradually, and this is the predominant factor responsible for the inflation of impact factor scores over time. Field-specific variation in the fraction of citations to literature indexed by Thomson Scientific’s Journal Citation Reports is the single greatest contributor to differences among the impact factors of journals in different fields. The growth rate of the scientific literature as a whole, and cross-field differences in net size and growth rate of individual fields, have had very little influence on impact factor inflation or on cross-field differences in impact factor.

Keywords: Academic, Bibliometric, Cases, Citation, Citations, Decisions, Disciplines, Factor Scores, Factors, Funding, Growth, Growth Rate, Impact, Impact Factor, Impact Factor Scores, Impact Factors, Indicator, Inflation, Influence, Journal, Journal Citation Reports, Journal Impact, Journal Impact Factors, Journal Influence, Journals, Literature, Measure, Reference, Reference Lists, Research, Research Funding, Scientific Literature, Size, Sources, Tenure, Time

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 35.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%2035.pdf)

Abstract: As an acceptable proxy for innovative activity, patents have become increasingly important in recent years. Patents and patent citations have been used for construction of technology indicators. This article presents an alternative to other citation-based indicators, i.e., the patent h-index, which is borrowed from bibliometrics. We conduct the analysis on a sample of the world’s top 20 firms ranked by total patents granted in the period 1996-2005 from the Derwent Innovations Index in the semiconductor area. We also investigate the relationships between the patent h-index and other three indicators, i.e., patent counts, citation counts, and the mean family size (MFS). The findings show that the patent h-index is indeed an effective indicator for evaluating the technological importance and quality, or impact, for an assignee. In addition, the MFS indicator correlates negatively and not significantly with the patent h-index, which indicates that the “social value” of a patent is in disagreement with its “private value.” The two indicators, patent h-index and MFS, both provide an overview of the value of patents, but from two different angles.

Keywords: Activity, Alternative, Analysis, Bibliometrics, Citation, Citation Counts, Citations, Construction, Correlates, Disagreement, Family, Firms, h Index, h-Index, Hirsch-Index, Impact, Indicator, Indicators, Innovative Activity, Journals, Patent, Patent Citations, Patents, Proxy, Quality, Relationships, Scientists, Semiconductor, Size, Technology, Value

? Harzing, A.W. and van der Wal, R. (2009), A Google Scholar h-Index for journals: An alternative metric to measure journal impact in economics and business. *Journal of the American Society for Information Science and Technology*, **60** (1), 41-46.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 41.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%2041.pdf)

Abstract: We propose a new data source (Google Scholar) and metric (Hirsch’s h-index) to assess journal impact in the field of economics and business. A systematic comparison between the Google Scholar h-index and the ISI Journal Impact Factor for a sample of 838 journals in economics and business shows that the former provides a more accurate and comprehensive measure of journal impact.

Keywords: Bibliometric Data, Business, Citation Analysis, Comparison, Data, Economics, Field, Google, Google Scholar, h Index, h-Index, Impact, ISI, Journal, Journal Impact, Journal Impact Factor, Journals, Management, Measure, Ranking, Source, Systematic

? Fernandez-Alles, M. and Ramos-Rodriguez, A. (2009), Intellectual structure of human resources management research: A bibliometric analysis of the journal human resource management, 1985-2005. *Journal of the American Society for Information Science and Technology*, **60** (1), 161-175.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 161.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20161.pdf)

Abstract: The multidisciplinary character of the theories supporting research in the discipline of human resources management (HRM), the increasing importance of a more rigorous approach to HRM studies by academics, and the impact of HRM on the competitive advantage of firms are just some of the indicators demonstrating the relevance of this discipline in the broader field of the social sciences. These developments explain why a quantitative analysis of HRM studies based on bibliometric techniques is particularly opportune. The general objective of this article is to analyze the intellectual structure of the HRM discipline; this can be divided into two specific objectives. The first is to identify the most frequently cited studies, with the purpose of identifying the key topics of research in the HRM discipline. The second objective is to represent the networks of relationships between the most-cited studies, grouping them under common themes, with the object of providing a diagrammatic description of the knowledge base constituted by accumulated works of research in the HRM field. The methodology utilized is based on the bibliometric techniques of citation analysis.

Keywords: Analysis, Approach, Author Cocitation Analysis, Bibliometric, Bibliometric Analysis, Bibliometric Techniques, Character, Citation, Citation Analysis, Competitive, Competitive Advantage, Discipline, Field, Firms, First, General, Grouping, HRM, Human, Human Resources, Impact, Indicators, Intellectual Structure, Knowledge, Knowledge Base, Literatures, Management, Manufacturing Performance, Methodology, Multidisciplinary, Networks, Objective, Organizational Performance, Purpose, Quantitative Analysis, Relationships, Relevance, Research, Resources, Science, Sciences, Social, Social Sciences, Structure, Sustained Competitive Advantage, Systems, Techniques

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 176.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20176.pdf)

Abstract: The Journal Impact Factor (JIF) published by Thomson Reuters is often used to evaluate the significance and performance of scientific journals. Besides methodological problems with the JIF, the critical issue is whether a single measure is sufficient for characterizing the impact of journals, particularly the impact of multidisciplinary and wide-scope journals that publish articles in a broad range of research fields. Taking Angewandte Chemie International Edition and the Journal of the American Chemical Society as examples, we examined the two journals’ publication and impact profiles across the sections of Chemical Abstracts and compared the results with the JIF. The analysis was based primarily on Communications published in Angewandte Chemie International Edition and the Journal of the American Chemical Society during 2001 to 2005. The findings show that the information available in the Science Citation Index is a rather unreliable indication of the document type and is therefore inappropriate for comparative analysis. The findings further suggest that the composition of the journal in terms of contribution types, the length of the citation window, and the thematic focus of the journal in terms of the sections of Chemical Abstracts has a significant influence on the overall journal citation impact. Therefore, a single measure of journal citation impact such as the JIF is insufficient for characterizing the significance and performance of wide-scope journals. For the comparison of journals, more sophisticated methods such as publication and impact profiles across subject headings of bibliographic databases (e.g., the sections of Chemical Abstracts) are valuable.

Keywords: Chemical Abstracts, Citation, Databases, Impact, Indication, Indicators, Information, Online Databases, Publication, Quality, Research, Science, Science Citation Index, Scientific Literature, Searches

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 318.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20318.pdf)

Abstract: In most disciplines of scholarly endeavor, there are many efforts at ranking research journals. There are two common methods for such efforts. One of these is based on tabulations of opinions offered by persons having some kind of relationship with the discipline. The other is based on analyses of the extent to which a journal’s articles have been cited by papers appearing in some selected set of publications. In either case, construction of a journal ranking for a discipline makes no effort to distinguish between private and public universities. That is, data are aggregated from both private and public faculty researchers. It is thus assumed that the resultant ranking is applicable for both kinds of institutions. But, is this assumption reasonable? The answer is very important because these rankings are applied in the evaluation of promotion, tenure, and merit cases of faculty members working in a discipline. Here, we examine this widespread bibliometric assumption through the use of a ranking methodology that is based on the actual publishing behaviors of tenured researchers in a discipline. The method is used to study the behaviors of researchers at leading private universities versus those at leading public universities. Illustrating this approach within the information systems discipline, we find that there are indeed different publication patterns for the private versus public institutions. This finding suggests that journal-ranking exercises should not ignore private-public distinctions and that care should be taken to avoid evaluation standards that confound private and public rankings of journals.

Keywords: Analyses, Approach, Behaviors, Bibliometric, Care, Cases, Construction, Data, Disciplines, Effort, Evaluation, Exercises, Faculty, Information, Information Systems, Institutions, Journal, Journals, Methodology, Methods, Opinions, Papers, Promotion, Public, Publication, Publications, Publishing, Ranking, Rankings, Relationship, Research, Research Journals, Standards, Systems, Tenure, Universities

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 348.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20348.pdf)

Abstract: The decomposition of scientific literature into disciplinary and subdisciplinary structures is one of the core goals of scientometrics. How can we achieve a good decomposition? The ISI subject categories classify journals included in the Science Citation Index (SCI). The aggregated journal-journal citation matrix contained in the Journal Citation Reports can be aggregated on the basis of these categories. This leads to an asymmetrical matrix (citing versus cited) that is much more densely populated than the underlying matrix at the journal level. Exploratory factor analysis of the matrix of subject categories suggests a 14-factor solution. This solution could be interpreted as the disciplinary structure of science. The nested maps of science (corresponding to 14 factors, 172 categories, and 6,164 journals) are online at http://www.leydesdortf.net/map06. Presumably, inaccuracies in the attribution of journals to the ISI subject categories average out so that the factor analysis reveals the main structures. The mapping of science could, therefore, be comprehensive and reliable on a large scale albeit imprecise in terms of the attribution of journals to the ISI subject categories.

Keywords: Aggregation, Analysis, Citation, Citation Index, Classification, Cocitation, Core, Decomposability, Factor Analysis, Indicators, Interdisciplinarity, ISI, Journal Citation Reports, Journal-Citation-Reports, Journals, Literature, Mapping, Mapping of Science, Performance, Relevance, SCI, Science, Science Citation Index, Scientific Journals, Scientific Literature, Scientometrics

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 434.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20434.pdf)

Abstract: Collaboration is a major research policy objective, but does it deliver higher quality research? This study uses citation analysis to examine the Web of Science (WoS) Information Science & Library Science subject category (IS&LS) to ascertain whether, in general, more highly cited articles are more highly collaborative than other articles. It consists of two investigations. The first investigation is a longitudinal comparison of the degree and proportion of collaboration in five strata of citation; it found that collaboration in the highest four citation strata (all in the most highly cited 22%) increased in unison over time, whereas collaboration in the lowest citation strata (un-cited articles) remained low and stable. Given that over 40% of the articles were un-cited, it seems important to take into account the differences found between un-cited articles and relatively highly cited articles when investigating collaboration in IS&LS. The second investigation compares collaboration for 35 influential information scientists; it found that their more highly cited articles on average were not more highly collaborative than their less highly cited articles. In summary, although collaborative research is conducive to high citation in general, collaboration has apparently not tended to be essential to the success of current and former elite information scientists.

Keywords: Author, Authorship, Biomedical-Research, Citation, Citation Analysis, Coauthorship, Collaboration, Cooperation, England, Highly Cited Articles, Impact, Indicators, Information, Information Science, International Collaboration, Library and Information Science, Molecular-Biology, Networks, Policy, Research, Science, Scientific Collaboration, Subject Category, Web of Science

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 581.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20581.pdf)

Abstract: Using 17 fully open-access journals published uninterruptedly during 2000 to 2004 in the field of library and information science, the present study investigates the impact of these open-access journals in terms of quantity of articles published, subject distribution of the articles, synchronous and diachronous impact factor, immediacy index, and journals’ and authors’ self-citation. The results indicate that during this 5-year publication period, there are as many as 1,636 articles published by these journals. At the same time, the articles have received a total of 8,591 Web citations during a 7-year citation period. Eight of 17 journals have received more than 100 citations. First Monday received the highest number of citations; however, the average number of citations per article was the highest in D-Lib Magazine. The value of the synchronous impact factor varies from 0.6989 to 1.0014 during 2002 to 2005, and the diachronous impact factor varies from 1.472 to 2.487 during 2000 to 2004. The range of the immediacy index varies between 0.0714 and 1.395. D-Lib Magazine has an immediacy index value above 0.5 in all the years whereas the immediacy index value varies from year to year for the other journals. When the citations of sample articles were analyzed according to source, it was found that 40.32% of the citations came from full-text articles, followed by 33.35% from journal articles. The percentage of journals’ self-citation was only 6.04%.

Keywords: Authors, Bibliometric, Citation, Citation Indexes, Citations, Counts, Distribution, Documentation, Field, Google, Google Scholar, Immediacy Index, Impact, Impact Factor, Index, Information, Information Science, Journal, Journal Articles, Journals, Library and Information Science, MAR, Open Access, Publication, Research Performance, Science, Self-Citation, Source, Time, Value, Web

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 728.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20728.pdf)

Abstract: This article focuses on the process of scientific and scholarly communication. Data on open access publications on the Internet not only provides a supplement to the traditional citation indexes but also enables analysis of the microprocesses and daily practices that constitute scientific communication. This article focuses on a stage in the life cycle of scientific and scholarly information that precedes the publication of formal research articles in the scientific and scholarly literature. Binomial logistic regression models are used to analyse precise mechanisms at work in the transformation of a working paper (WP) into a journal article (JA) in the field of economics. The study unveils a fine-grained process of adapting WPs to their new context as JAs by deleting and adding literature references, which perhaps can be best captured by the term sculpting.

Keywords: Analysis, Challenges, Citation, Core Journals, European Economics, Journal Article, Literature, Networks, Publication, Publications, References, Research, Scholarly Communication, Science, Self-Citations, Stage, Visibility, Webometrics

? Costas, R., Bordons, M., van Leeuwen, T.N. and van Raan, A.F.J. (2009), Scaling rules in the science system: Influence of field-specific citation characteristics on the impact of individual researchers. *Journal of the American Society for Information Science and Technology*, **60** (4), 740-753.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 740.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20740.pdf)

Abstract: The representation of science as a citation density landscape and the study of scaling rules with the field-specific citation density as a main topological property was previously analyzed at the level of research groups. Here, the focus is on the individual researcher. In this new analysis, the size dependence of several main bibliometric indicators for a large set of individual researchers is explored. Similar results as those previously observed for research groups are described for individual researchers. The total number of citations received by scientists increases in a cumulatively advantageous way as a function of size (in terms of number of publications) for researchers in three areas: Natural Resources, Biology & Biomedicine, and Materials Science. This effect is stronger for researchers in low citation density fields. Differences found among thematic areas with different citation densities are discussed.

Keywords: Analysis, Bibliometric, Bibliometric Indicators, Citation, Citations, Cumulative Advantage, Distributions, Impact, Indicators, Networks, Performance, Physics, Publications, Research, Science, Statistical Properties, University

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 754.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%20754.pdf)

Abstract: Why authors choose some references in preference to others is a question that is still not wholly answered despite its being of interest to scientists. The relevance of references is twofold: They are a mechanism for tracing the evolution of science, and because they enhance the image of the cited authors, citations are a widely known and used indicator of scientific endeavor. Following an extensive review of the literature, we selected all papers that seek to answer the central question and demonstrate that the existing theories are not sufficient: Neither citation nor indicator theory provides a complete and convincing answer. Some perspectives in this arena remain, which are isolated from the core literature. The purpose of this article is to offer a fresh perspective on a 30-year-old problem by extending the context of the discussion. We suggest reviving the discussion about citation theories with a new perspective, that of the readers, by layers or phases, in the final choice of references, allowing for a new classification in which any paper, to date, could be included.

Keywords: Author Self-Citations, Citation, Citation Context Analysis, Citations, Cited Old Papers, Classification, Complete, Discourse Analysis, Information-Science, Intellectual Property, Literature, Normative Theory, References, Science, Scientific Literature, Social-Sciences

? Katsaros, D., Akritidis, L. and Bozanis, P. (2009), The f Index: Quantifying the impact of coterminal citations on scientists’ ranking. *Journal of the American Society for Information Science and Technology*, **60** (5), 1051-1056.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 1051.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201051.pdf)

Abstract: Designing fair and unbiased metrics to measure the “level of excellence” of a scientist is a very significant task because they recently also have been taken into account when deciding faculty promotions, when allocating funds, and so on. Despite criticism that such scientometric evaluators are confronted with, they do have their merits, and efforts should be spent to arm them with robustness and resistance to manipulation. This article alms at initiating the study of the coterminal citations-their existence and implications-and presents them as a generalization of self-citations and of co-citation; it also shows how they can be used to capture any manipulation attempts against scientometric indicators, and finally presents a new index, the f index, that takes into account the coterminal citations. The utility of the new index is validated using the academic production of a number of esteemed computer scientists. The results confirm that the new index can discriminate those individuals whose work penetrates many scientific communities.

Keywords: Author Self-Citations, Citations, Co-Citation, Collaboration, Faculty, Indicators, Metrics, Ranking, Scientometric Indicators

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1083.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201083.pdf)

Abstract: Bibliometric measures for evaluating research units in the book-oriented humanities and social sciences are underdeveloped relative to those available for journal-oriented science and technology. We therefore present a new measure designed for book-oriented fields: the “libcitation count.” This is a count of the libraries holding a given book, as reported in a national or international union catalog. As librarians decide what to acquire for the audiences they serve, they jointly constitute an instrument for gauging the cultural impact of books. Their decisions are informed by knowledge not only of audiences but also of the book world (e.g., the reputations of authors and the prestige of publishers). From libcitation counts, measures can be derived for comparing research units. Here, we imagine a match-up between the departments of history, philosophy, and political science at the University of New South Wales and the University of Sydney in Australia. We chose the 12 books from each department that had the highest libcitation counts in the Libraries Australia union catalog during 2000 to 2006. We present each book’s raw libcitation count, its rank within its Library of Congress (LC) class, and its LC-class normalized libcitation score. The latter is patterned on the item-oriented field normalized citation score used in evaluative bibliometrics. Summary statistics based on these measures allow the departments to be compared for cultural impact. Our work has implications for programs such as Excellence in Research for Australia and the Research Assessment Exercise in the United Kingdom. It also has implications for data mining in OCLC’s WorldCat.

Keywords: Archaeology, Authors, Bibliometric, Bibliometrics, Citation, Citation Counts, Coverage, Data Mining, Evaluating Research, History, Humanities, Impact, Integration, Knowledge, Librarianship, Libraries, Political-Science, Publications, Publisher Quality, Ranking, Research, Research Assessment Exercise, Research Performance, Science, Science and Technology, Sciences, Social Sciences, Statistics, Technology, United Kingdom, University, Urquhart

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1097.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201097.pdf)

Abstract: This paper explores the ISI Journal Citation Reports (JCR) bibliographic and subject structures through Library of Congress (LC) and American research libraries cataloging and classification methodology. The 2006 Science Citation Index JCR Behavioral Sciences subject category journals are used as an example. From the library perspective, the main fault of the JCR bibliographic structure is that the JCR mistakenly identifies journal title segments as journal bibliographic entities, seriously affecting journal rankings by total cites and the impact factor. In respect to JCR subject structure, the title segment, which constitutes the JCR bibliographic basis, is posited as the best bibliographic entity for the citation measurement of journal subject relationships. Through factor analysis and other methods, the JCR subject categorization of journals is tested against their LC subject headings and classification. The finding is that JCR and library journal subject analyses corroborate, clarify, and correct each other.

Keywords: Bibliographic, Citation, Impact, Impact Factor, Market, Multiple Versions, Research, Science, Science Citation Index, Sciences, Scientific Literature, Serials, Universities, Work

? Jeong, S., Lee, S. and Kim, H.G. (2009), Are you an invited speaker? A bibliometric analysis of elite groups for scholarly events in bioinformatics. *Journal of the American Society for Information Science and Technology*, **60** (6), 1118-1131.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 1118.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201118.pdf)

Abstract: Participating in scholarly events (e.g., conferences, workshops, etc.) as an elite-group member such as an organizing committee chair or member, program committee chair or member, session chair, invited speaker, or award winner is beneficial to a researcher’s career development. The objective of this study is to investigate whether elite-group membership for scholarly events is representative of scholars’ prominence, and which elite group is the most prestigious. We collected data about 15 global (excluding regional) bioinformatics scholarly events held in 2007. We sampled (via stratified random sampling) participants from elite groups in each event. Then, bibliometric indicators (total citations and h index) of seven elite groups and a non-elite group, consisting of authors who submitted at least one paper to an event but were not included in any elite group, were observed using the Scopus Citation Tracker. The Kruskal-Wallis test was performed to examine the differences among the eight groups. Multiple comparison tests (Dwass, Steel, Critchlow-Fligner) were conducted as follow-up procedures. The experimental results reveal that scholars in an elite group have better performance in bibliometric indicators than do others. Among the elite groups, the invited speaker group has statistically significantly the best performance while the other elite-group types are not significantly distinguishable. From this analysis, we confirm that elite-group membership in scholarly events, at least in the field of bioinformatics, can be utilized as an alternative marker for a scholar’s prominence, with invited speaker being the most important prominence indicator among the elite groups.

Keywords: Analysis, Authors, Bibliometric, Bibliometric Analysis, Bibliometric Indicators, Biotechnology, Career Development, Chair, Citation, Citations, Communication, Conferences, Development, Editorial-Boards, h Index, h-Index, Indicators, Information, Journals, Participation, Representation, Science, Scientific Meetings, Scopus

? Marchant, T. (2009), Score-based bibliometric rankings of authors. *Journal of the American Society for Information Science and Technology*, **60** (6), 1132-1137.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 1132.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201132.pdf)

Abstract: Scoring rules (or score-based rankings or summation-based rankings) form a family of bibliometric rankings of authors such that authors are ranked according to the sum over all their publications of some partial scores. Many of these rankings are widely used (e.g., number of publications, weighted or not by the impact factor, by the number of authors, or by the number of citations). We present an axiomatic analysis of the family of all scoring rules and of some particular cases within this family.

Keywords: Analysis, Authors, Bibliometric, Citations, Hirsch-Index, Impact, Impact Factor, Output, Publications, Rankings

? Nah, I.W., Kang, D.S., Lee, D.H. and Chung, Y.C. (2009), A bibliometric evaluation of research performance in different subject categories. *Journal of the American Society for Information Science and Technology*, **60** (6), 1138-1143.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 1138.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201138.pdf)

Abstract: In this article, bibliometric indicators with publications and citations are used for a direct research-performance comparison among different or interdisciplinary categories, the work of individual scientists, and their research teams and institutions. For example, basic research performances of some projects at the Korea Institute of Science and Technology (KIST) were assessed using bibliographic factors with IPQ-Normalized impact factor to compare with an international level and other research groups in different or interdisciplinary fields. Some research teams at KIST showed higher quality publications in terms of the international measures.

Keywords: Bibliometric, Bibliometric Indicators, Citations, Future-Prospects, Impact, Impact Factor, Impact Factors, Indicators, Korea, Past Performance, Publications, Quality, Research, Research Performance, Science

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1283.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201283.pdf)

Abstract: We analyze the publication output of 119 Chilean ecologists and find strong evidence that self-citations significantly affect the h-index increase. Furthermore, we show that the relationship between the increase in the h-index and the proportion of self-citations differs between high and low h-index researchers. In particular, our results show that it is in the low h-index group where self-citations cause the greater impact.

Keywords: h Index, h-Index, Publication, Researchers, Self Citations, Self-Citations

? Bornmann, L., Mutz, R. and Daniel, H.D. (2009), Do we need the h index and its variants in addition to standard bibliometric measures? *Journal of the American Society for Information Science and Technology*, **60** (6), 1286-1289.

Full Text: [2009\J Ame Soc Inf Sci Tec60, 1286.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201286.pdf)

Abstract: In this study, we investigate whether there is a need for the h index and its variants in addition to standard bibliometric measures (SBMs). Results from our recent study (L. Bornmann, R. Mutz, & H.-D. Daniel, 2008) have indicated that there are two types of indices: One type of indices (e.g., h index) describes the most productive core of a scientist’s output and informs about the number of papers in the core. The other type of indices (e.g., a index) depicts the impact of the papers in the core. In evaluative bibliometric studies, the two dimensions quantity and quality of output are usually assessed using the SBMs “number of publications” (for the quantity dimension) and “total citation counts” (for the impact dimension). We additionally included the SBMs into the factor analysis. The results of the newly calculated analysis indicate that there is a high intercorrelation between “number of publications” and the indices that load substantially on the factor Quantity of the Productive Core as well as between “total citation counts” and the indices that load substantially on the factor Impact of the Productive Core. The high-loading indices and SBMs within one performance dimension could be called redundant in empirical application, as high intercorrelations between different indicators are a sign for measuring something similar (or the same). Based on our findings, we propose the use of any pair of indicators (one relating to the number of papers in a researcher’s productive core and one relating to the impact of these core papers) as a meaningful approach for comparing scientists.

Keywords: Analysis, Bibliometric, Bibliometric Studies, Citation, Core, Factor Analysis, h Index, h-Index, Impact, Indicators, Papers, Power, Purposes, Quality

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1320.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201320.pdf)

Abstract: For more than 40 years, the Institute for Scientific Information (ISI, now part of Thomson Reuters) produced the only available bibliographic databases from which bibliometricians could compile large-scale bibliometric indicators. ISI’s citation indexes, now regrouped under the Web of Science (WoS), were the major sources of bibliometric data until 2004, when Scopus was launched by the publisher Reed Elsevier. For those who perform bibliometric analyses and comparisons of countries or institutions, the existence of these two major databases raises the important question of the comparability and stability of statistics obtained from different data sources. This paper uses macrolevel bibliometric indicators to compare results obtained from theWoS and Scopus. It shows that the correlations between the measures obtained with both databases for the number of papers and the number of citations received by countries, as well as for their ranks, are extremely high (R-2 approximate to .99). There is also a very high correlation when countries’ papers are broken down by field. The paper thus provides evidence that indicators of scientific production and citations at the country level are stable and largely independent of the database.

Keywords: Bibliometric, Bibliometric Indicators, Citation, Citations, Coverage, Databases, Google-Scholar, h-Index, Impact, Indicators, Journals, of-Science, Rankings, Science, Scientific Production, Scopus, Statistics, Web of Science

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1327.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201327.pdf)

Abstract: The launching of Scopus and Google Scholar, and methodological developments in social-network analysis have made many more indicators for evaluating journals available than the traditional impact factor, cited half-life, and immediacy index of the ISI. In this study, these new indicators are compared with one another and with the older ones. Do the various indicators measure new dimensions of the citation networks, or are they highly correlated among themselves? Are they robust and relatively stable overtime? Two main dimensions are distinguished-size and impact-which together shape influence. The h-index combines the two dimensions and can also be considered as an indicator of reach (like Indegree). PageRank is mainly an indicator of size, but has important interactions with centrality measures. The Scimago Journal Ranking (SJR) indicator provides an alternative to the journal impact factor, but the computation is less easy.

Keywords: Betweenness, Bibliometric, Centrality, Chemistry, Citation, Developing-Countries, Google Scholar, h Index, h-Index, Impact, Impact Factor, Index, Indicators, Individuals, Journal Impact, Journal Impact Factor, Networks, Ranking, Science, Scientific Journals, Scopus

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1635.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201635.pdf)

Abstract: In scientometric research, the use of cooccurrence data is very common. In many cases, a similarity measure is employed to normalize the data. However, there is no consensus among researchers on which similarity measure is most appropriate for normalization purposes. In this article, we theoretically analyze the properties of similarity measures for cooccurrence data, focusing in particular on four well-known measures: the association strength, the cosine, the inclusion index, and the Jaccard index. We also study the behavior of these measures empirically. Our analysis reveals that there exist two fundamentally different types of similarity measures, namely, set-theoretic measures and probabilistic measures. The association strength is a probabilistic measure, while the cosine, the inclusion index, and the Jaccard index are set-theoretic measures. Both our theoretical and our empirical results indicate that cooccurrence data can best be normalized using a probabilistic measure. This provides strong support for the use of the association strength in scientometric research.

Keywords: Author Cocitation Analysis, Co-Link Data, Computational Intelligence Field, Dissimilarity Coefficients, Information-Science, International Scientific Collaboration, Mapping Science, Neural-Network Research, Proximity-Measures, Research, Word Analysis

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1823.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201823.pdf)

Abstract: The aggregated journal-journal citation matrix-based on the Journal Citation Reports (JCR) of the Science Citation Index-can be decomposed by indexers or algorithmically. In this study, we test the results of two recently available algorithms for the decomposition of large matrices against two content-based classifications of journals: the ISI Subject Categories and the field/subfield classification of Glanzel and Schubert (2003). The content-based schemes allow for the attribution of more than a single category to a journal, whereas the algorithms maximize the ratio of within-category citations over between-category citations in the aggregated category-category citation matrix. By adding categories, indexers generate between-category citations, which may enrich the database, for example, in the case of inter-disciplinary developments. Algorithmic decompositions, on the other hand, are more heavily skewed towards a relatively small number of categories, while this is deliberately counteracted upon in the case of content-based classifications. Because of the indexer effects, science policy studies and the sociology of science should be careful when using content-based classifications, which are made for bibliographic disclosure, and not for the purpose of analyzing latent structures in scientific communications. Despite the large differences among them, the four classification schemes enable us to generate surprisingly similar maps of science at the global level. Erroneous classifications are cancelled as noise at the aggregate level, but may disturb the evaluation locally.

Keywords: Aggregation, Algorithmic, Citation, Citation-Reports, Citations, Community Structure, Decomposability, Evaluation, Interdisciplinarity, Map, Networks, Policy, Science

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1845.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201845.pdf)

Abstract: Nobel Prizes are an important indicator of research excellence for a country. Spain has not had a science Nobel Prize winner since 1906, although its gross domestic product (GDP) is high, research and development (R&D) investments, in monetary terms, are high, and conventional bibliometric parameters are fairly good. Spanish research produces many sound papers that are reasonably cited but does not produce top-cited publications. This absence of top-cited publications suggests that important achievements are scarce and, consequently, explains the absence of Nobel Prize awards. I argue that this negative research trend in Spain is caused by the extensive use of formal research evaluations based on the number of publications, impact factors, and journal rankings. These formal evaluations were introduced to establish a national salary bonus that mitigated the lack of research incentives in universities. When the process was started, the results were excellent but, currently, it has been kept too long and should be replaced by methods to determine the actual interest of the research. However, this replacement requires greater involvement of universities in stimulating research.

Keywords: Evaluation, Evolution, Future, Hirschs h-Index, Impact, Institutions, Nations, Nobel-Prizes, Publications, Research, Science, Scientific-Research, Spain, Trends, Universities

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 1950.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%201950.pdf)

Abstract: We investigate different approaches based on correlation analysis to reduce the complexity of a space of quantitative indicators for the assessment of research performance. The proposed methods group bibliometric indicators into clusters of highly intercorrelated indicators. Each cluster is then associated with a representative indicator. The set of all representatives corresponds to a base of orthogonal metrics capturing independent aspects of research performance and can be exploited to design a composite performance indicator. We apply the devised methodology to isolate orthogonal performance metrics for scholars and journals in the field of computer science and to design a global performance indicator. The methodology is general and can be exploited to design composite indicators that are based on a set of possibly overlapping criteria.

Keywords: Assessment, Bibliometric, Bibliometric Indicators, Cluster, Complexity, Composite, Computer, Correlation, Criteria, Faculty, Global, h-Index, Indicators, Journals, Methodology, Methods, Metrics, Networks, Quantitative, Research, Research Performance, Science

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2095.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202095.pdf)

Abstract: We are witnessing a rapid trend toward the adoption of exercises for evaluation of national research systems, generally based on peer review. They respond to two main needs: stimulating higher efficiency in research activities by public laboratories, and realizing better allocative efficiency in government funding of such institutions. However, the peer review approach is typified by several limitations that raise doubts for the achievement of the ultimate objectives. In particular, subjectivity of judgment, which occurs during the step of selecting research outputs to be submitted for the evaluations, risks heavily distorting both the final ratings of the organizations evaluated and the ultimate funding they receive. These distortions become ever more relevant if the evaluation is limited to small samples of the scientific production of the research institutions. The objective of the current study is to propose a quantitative methodology based on bibliometric data that would provide a reliable support for the process of selecting the best products of a laboratory, and thus limit distortions. Benefits are twofold: single research institutions can maximize the probability of receiving a fair evaluation coherent with the real quality of their research. At the same time, broader adoptions of this approach could also provide strong advantages at the macroeconomic level, since it guarantees financial allocations based on the real value of the institutions under evaluation. In this study the proposed methodology was applied to the hard science sectors of the Italian university research system for the period 2004-2006.

Keywords: Achievement, Adoption, Approach, Bibliometric, Data, Efficiency, Evaluation, Exercises, Funding, Government Funding, Institutions, Methodology, Needs, Peer Review, Peer-Review, Public, Quality, Quality of, Research, Review, Risks, Science, Scientific Production, Small, Support, Systems, Trend, University, Value

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2229.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202229.pdf)

Abstract: This paper studies how varied damping factors in the PageRank algorithm influence the ranking of authors and proposes weighted PageRank algorithms. We selected the 108 most highly cited authors in the information retrieval (IR) area from the 1970s to 2008 to form the author co-citation network. We calculated the ranks of these 108 authors based on PageRank with the damping factor ranging from 0.05 to 0.95. In order to test the relationship between different measures, we compared PageRank and weighted PageRank results with the citation ranking, h-index, and centrality measures. We found that in our author co-citation network, citation rank is highly correlated with PageRank with different damping factors and also with different weighted PageRank algorithms; citation rank and PageRank are not significantly correlated with centrality measures; and h-index rank does not significantly correlate with centrality measures but does significantly correlate with other measures. The key factors that have impact on the PageRank of authors in the author co-citation network are being co-cited with important authors.

Keywords: Algorithm, Authors, Citation, Co-Citation, h Index, h-Index, Impact, Information Retrieval, IR, Networks, PageRank, Ranking

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2378.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202378.pdf)

Abstract: We show that between 1999 and 2008 the percentage of articles with more than one corresponding author or with several authors that contributed equally, leading to so-called “equal first authors;” has steadily been on the rise. Increasing numbers of corresponding authors and equally contributing authors may lead to increased stress on teamwork if not properly acknowledged in research evaluation exercises.

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2388.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202388.pdf)

Abstract: Social tagging is one of the major phenomena transforming the World Wide Web from a static platform into an actively shared information space. This paper addresses various aspects of social tagging, including different views on the nature of social tagging, how to make use of social tags, and how to bridge social tagging with other Web functionalities; it discusses the use of facets to facilitate browsing and searching of tagging data; and it presents an analogy between bibliometrics and tagometrics, arguing that established bibliometric methodologies can be applied to analyze tagging behavior on the Web. Based on the Upper Tag Ontology (UTO), a Web crawler was built to harvest tag data from Delicious, Flickr, and YouTube in September 2007. In total, 1.8 million objects, including bookmarks, photos, and videos, 3.1 million taggers, and 12.1 million tags were collected and analyzed. Some tagging patterns and variations are identified and discussed.

Keywords: Bibliometrics

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2488.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202488.pdf)

Abstract: When using scientific literature to model scholarly discourse, a research specialty can be operationalized as an evolving set of related documents. Each publication can be expected to contribute to the further development of the specialty at the research front. The specific combinations of title words and cited references in a paper can then be considered as a signature of the knowledge claim in the paper: New words and combinations of words can be expected to represent variation, while each paper is at the same time selectively positioned into the intellectual organization of a field using context-relevant references. Can the mutual information among these three dimensions-title words, cited references, and sequence numbers-be used as an indicator of the extent to which intellectual organization structures the uncertainty prevailing at a research front? The effect of the discovery of nanotubes (1991) on the previously existing field of fullerenes is used as a test case. Thereafter, this method is applied to science studies with a focus on scientometrics using various sample delineations. An emerging research front about citation analysis can be indicated.

Keywords: Citation Analysis, Co-Words, Communication, Information, Journals, Knowledge, Mathematical-Theory, Nanotubes, Research, Science, Technology, Triple-Helix

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2499.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202499.pdf)

Abstract: This study uses citations, from 1996 to 2007, to the work of 80 randomly selected full-time, information studies (IS) faculty members from North America to examine differences between Scopus and Web of Science in assessing the scholarly impact of the field focusing on the most frequently citing journals, conference proceedings, research domains and institutions, as well as all citing countries. Results show that when assessment is limited to smaller citing entities (e.g., journals, conference proceedings, institutions), the two databases produce considerably different results, whereas when assessment is limited to larger citing entities (e.g., research domains, countries), the two databases produce very similar pictures of scholarly impact. In the former case, the use of Scopus (for journals and institutions) and both Scopus and Web of Science (for conference proceedings) is necessary to more accurately assess or visualize the scholarly impact of IS, whereas in the latter case, assessing or visualizing the scholarly impact of IS is independent of the database used.

Keywords: Assessment, Bibliometric Analysis, Citations, Communication, Coverage, Disciplines, Faculty, Google-Scholar, Impact, Informetrics, Journals, Mapping Interdisciplinarity, of-Science, Research

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Full Text: [2009\J Ame Soc Inf Sci Tec60, 2577.pdf](2009/J%20Ame%20Soc%20Inf%20Sci%20Tec60,%202577.pdf)

Abstract: Simple bibliometric indicators, such as average number of citations per publication per researcher, or the recently proposed Hirsch index (*h*-index), are nowadays tracked by online repositories, including Web of Science (WOS), and often affect critical decision making. This work proposes appropriate scaling of the h-index based on its probability distribution that is calculated for any underlying citation distribution. The proposed approach outperforms existing index estimation models that have focused on the expected value only (i.e., first moment). Furthermore, it is shown that average number of citations per publication per scientific field, total number of publications per researcher, as well as researcher’s *h*-index measured value, expected value, and standard deviation constitute the minimum information required for meaningful h-index ranking campaigns; otherwise contradicting ranking results emerge. This work may potentially shed light to (current or future) large-scale, h-index-based bibliometric evaluations.

Keywords: Bibliometric Indicators, Citations, *h* index, *h*-index, Hirsch Index, Model, Publications, Rankings

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201.pdf)

Abstract: To determine influences on the production of a scientific article, the content of the article must be studied. We examined articles in biogeography and found that most of the influence is not cited, specific types of articles that are influential are cited while other types of that also are influential are not cited, and work that is “uncited” and “seldom cited” is used extensively. As a result, evaluative citation analysis should take uncited work into account.

Keywords: Big Thicket, Citation, Citation Analysis, Global Patterns, Literature Science, North-America, Ortega Hypothesis, Richness, Scale, Species-Area Relationships, United-States, Vascular Plant Diversity

? Abramo, G., D’Angelo, C.A. and Di Costa, F. (2010), Testing the trade-off between productivity and quality in research activities. *Journal of the American Society for Information Science and Technology*, **61** (1), 132-140.

Full Text: [2010\J Ame Soc Inf Sci Tec61, 132.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20132.pdf)

Abstract: In recent years there has been an increasingly pressing need for the evaluation of results from public-sector research activity, particularly to permit the efficient allocation of ever scarcer resources. Many of the studies and evaluation exercises that have been conducted at the national and international levels emphasize the quality dimension of research output, while neglecting that of productivity. This work is intended to test for the possible existence of correlation between quantity and quality of scientific production and determine whether the most productive researchers are also those that achieve results that are qualitatively better than those of their colleagues. The analysis proposed refers to the entire Italian university system and is based on the observation of production in the hard sciences by more than 26,000 researchers in the period 2001-2005. The results show that the output of more-productive researchers is superior in quality than that of less-productive researchers. The relation between productivity and quality results is largely insensitive to the types of indicators or the test methods applied and also seems to differ little among the various disciplines examined.

Keywords: Bibliometric Indicators, Chemistry Research, Citation Characteristics, Evaluation, Exercises, Impact, Methodology, Netherlands, Performance, Research, Research Output, Scaling Rules, Science System, Scientific Production, University

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 205.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20205.pdf)

Keywords: Bibliometrics, Citation, Citation Analysis, Ortega Hypothesis, Science Citation Index

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 319.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20319.pdf)

Abstract: The specific impact index, or s-index, is introduced as a measure of a scientist’s projected impact per paper. The index is complementary to other indices that measure overall impact as it can distinguish between authors maximizing the quantity of their output and authors maximizing the quality of their output. It also can be used to monitor career progress. The main advantage of the new index is that it reduces age bias from older papers that have more time to accumulate citations than do more recent papers. The index was tested on 24 scientists in different fields and of different statures. The overall projected impact estimated from the index correlates well with Hirsch’s h-index squared (r(2) = 0.99). The impact of different aging models was evaluated as well.

Keywords: A-Index, Aging, Citations, Egghes g-Index, h Index, h-Index, Hirsch-Index, Impact, Ranking, Scientometric Indicators, Sleeping Beauties, Stochastic-Model, Variants

? Costas, R., van Leeuwen, T.N. and van Raan, A.F.J. (2010), Is scientific literature subject to a ‘sell-by-date’? A general methodology to analyze the ‘durability’ of scientific documents. *Journal of the American Society for Information Science and Technology*, **61** (2), 329-339.

Full Text: [2010\J Ame Soc Inf Sci Tec61, 329.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20329.pdf)

Abstract: The study of the citation histories and ageing of documents are topics that have been addressed from several perspectives, especially in the analysis of documents with “delayed recognition” or “sleeping beauties.” However, there is no general methodology that can be extensively applied for different time periods or research fields. In this article, a new methodology for the general analysis of the ageing and “durability” of scientific papers is presented. This methodology classifies documents into three general types: delayed documents, which receive the main part of their citations later than normal documents; flashes in the pan, which receive citations immediately after their publication but are not cited in the long term; and normal documents, documents with a typical distribution of citations over time. These three types of durability have been analyzed considering the whole population of documents in the Web of Science with at least 5 external citations (i.e., not considering self-citations). Several patterns related to the three types of durability have been found and the potential for further research of the developed methodology is discussed.

Keywords: Analysis, Articles, Citation, Citation Patterns, Citations, Collaboration, Highly Cited Papers, Impact, Indicators, Journals, Publication, Ranking, Research, Science, Self Citations, Self-Citations, Web of Science

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 340.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20340.pdf)

Abstract: Two forms of diffusion are studied: diffusion by publications, originating from the fact that a group publishes in different fields; and diffusion by citations, originating from the fact that the group’s publications are cited in different fields. The first form of diffusion originates from an internal mechanism by which the group itself expands its own borders. The second form is partly driven by an external mechanism, in the sense that other fields use or become interested in the original group’s expertise, and partly by the group’s internal dynamism, in the sense that their articles, being published in more and more fields, have the potential to be applied in these other fields. In this contribution, we focus on basic counting measures as measures of diffusion. We introduce the notions of field diffusion breadth, defined as the number of for Essential Science Indicators (ESI) fields in which a set of articles is cited, and field diffusion intensity, defined as the number of citing articles in one particular ESI field. Combined effects of publications and citations can be measured by the Gin! evenness measure. Our approach is illustrated by a study of mathematics at Tongji University (Shanghai, China).

Keywords: Articles, China, Citations, Contribution, Counting, Diffusion, Essential Science Indicators, Index, Indicators, Interdisciplinarity, Journal Diffusion, Mathematics, Mechanism, Publications, Science

? Egghe, L. (2010), Influence of adding or deleting items and sources on the h-Index. *Journal of the American Society for Information Science and Technology*, **61** (2), 370-373.

Full Text: [2010\J Ame Soc Inf Sci Tec61, 370.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20370.pdf)

Abstract: Adding or deleting items such as self-citations has an influence on the h-index of an author. This influence will be proved mathematically in this article. We hereby prove the experimental finding in E. Gianoli and M.A. Molina-Montenegro (2009) that the influence of adding or deleting self-citations on the h-index is greater for low values of the h-index. Why this is logical also is shown by a simple theoretical example. Adding or deleting sources such as adding or deleting minor contributions of an author also has an influence on the h-index of this author; this influence is modeled in this article. This model explains some practical examples found in X. Flu, R. Rousseau, and J. Chen (in press).

Keywords: Author, Google Scholar, h Index, h-Index, Hirsch-Index, Indicators, Model, Science, Scopus, Self Citations, Self-Citations

? Lariviere, V. and Gingras, Y. (2010), The impact factor’s Matthew effect: A natural experiment in bibliometrics. *Journal of the American Society for Information Science and Technology*, **61** (2), 424-427.

Full Text: [2010\J Ame Soc Inf Sci Tec61, 424.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20424.pdf)

Abstract: Since the publication of Robert K. Merton’s theory of cumulative advantage in science (Matthew Effect), several empirical studies have tried to measure its presence at the level of papers, individual researchers, institutions, or countries. However, these studies seldom control for the intrinsic “quality” of papers or of researchers-”better” (however defined) papers or researchers could receive higher citation rates because they are indeed of better quality. Using an original method for controlling the intrinsic value of papers-identical duplicate papers published in different journals with different impact factors-this paper shows that the journal in which papers are published have a strong influence on their citation rates, as duplicate papers published in high-impact journals obtain, on average, twice as many citations as their identical counterparts published in journals with lower impact factors. The intrinsic value of a paper is thus not the only reason a given paper gets cited or not, there is a specific Matthew Effect attached to journals and this gives to papers published there an added value over and above their intrinsic quality.

Keywords: Bibliometrics, Citation, Citation Characteristics, Citations, Impact, Impact Factors, Indicators, Journals, Publication, Researchers, Scaling Rules, Science, Science System, Theory

？ Wu, Q. (2010), The w-Index: A measure to assess scientific impact by focusing on widely cited papers. *Journal of the American Society for Information Science and Technology*, **61** (3), 609-614.

Full Text: 2010\J Ame Soc Inf Sci Tec61, 609.pdf

Abstract: Based on the principles of the h-index, I propose a new measure, the w-index, as a particularly simple and more useful way to assess the substantial impact of a researcher’s work, especially regarding excellent papers. The w-index can be defined as follows: If w of a researcher’s papers have at least 10w citations each and the other papers have fewer than 10(w + 1) citations, that researcher’s w-index is w. The results demonstrate that there are noticeable differences between the w-index and the h-index, because the w-index plays close attention to the more widely cited papers. These discrepancies can be measured by comparing the ranks of 20 astrophysicists, a few famous physical scientists, and 16 Price medalists. Furthermore, I put forward the w(q)-index to improve the discriminatory power of the w-index and to rank scientists with the same w. The factor q is the least number of citations a researcher with w needed to reach w + 1. In terms of both simplicity and accuracy, the w-index or w(q)-index can be widely used for evaluation of scientists, journals, conferences, scientific topics, research institutions, and so on.

Keywords: Citations, h Index, h-Index, Impact, Journals, Papers, Ranking, Research, Successive h-Indexes

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 787.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20787.pdf)

Abstract: The possibilities of using the Arts & Humanities Citation Index (A&HCI) for journal mapping have not been sufficiently recognized because of the absence of a Journal Citations Report (JCR) for this database. A quasi-JCR for the A&HCI (2008) was constructed from the data contained in the Web of Science and is used for the evaluation of two journals as examples: Leonardo and Art Journal. The maps on the basis of the aggregated journal journal citations within this domain can be compared with maps including references to journals in the Science Citation Index and Social Science Citation Index. Art journals are cited by (social) science journals more than by other art journals, but these journals draw upon one another in terms of their own references. This cultural impact in terms of being cited is not found when documents with a topic such as “digital humanities” are analyzed. This community of practice functions more as an intellectual organizer than a journal.

Keywords: Citation, Citations, Cocitation, Database, Evaluation, History, Impact, Indicators, Journal, Journal Citations, Journals, Mapping, Pearsons Correlation-Coefficient, Performance, Science, Science Citation Index, Social Science Citation Index, Topic, Web of Science

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 964.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%20964.pdf)

Abstract: The rapid advancement of nanotechnology research and development during the past decade presents an excellent opportunity for a scientometric study because it can provide insights into the dynamic growth of the fastevolving social networks associated with this field. In this article, we describe a case study conducted on nanotechnology to discover the dynamics that govern the growth process of rapidly advancing scientific-collaboration networks. This article starts with the definition of temporal social networks and demonstrates that the nanotechnology collaboration network, similar to other real-world social networks, exhibits a set of intriguing static and dynamic topological properties. Inspired by the observations that in collaboration networks new connections tend to be augmented between nodes in proximity, we explore the locality elements and the attachedness factor in growing networks. In particular, we develop two distance-based computational network growth schemes, namely the distance-based growth model (DG) and the hybrid degree and distance-based growth model (DOG). The DG model considers only locality element while the DDG is a hybrid model that factors into both locality and attachedness elements. The simulation results from these models indicate that both clustering coefficient rates and the average shortest distance are closely related to the edge densification rates. In addition, the hybrid DDG model exhibits higher clustering coefficient values and decreasing average shortest distance when the edge densification rate is fixed, which implies that combining locality and attachedness can better characterize the growing process of the nanotechnology community. Based on the simulation results, we conclude that social network evolution is related to both attachedness and locality factors.

Keywords: Clustering, Coauthorship, Collaboration, Evolution, Growth, Locality, Model, Models, Nanotechnology, Nanotechnology Research, Networks, Research, Research and Development, Simulation, Social Networks

? Liu, X.H., Yu, S., Janssens, F., Glanzel, W., Moreau, Y. and De Moor, B. (2010), Weighted hybrid clustering by combining text mining and bibliometrics on a large-scale journal database. *Journal of the American Society for Information Science and Technology*, **61** (6), 1105-1119.

Full Text: [2010\J Ame Soc Inf Sci Tec61, 1105.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201105.pdf)

Abstract: We propose a new hybrid clustering framework to incorporate text mining with bibliometrics in journal set analysis. The framework integrates two different approaches: clustering ensemble and kernel-fusion clustering. To improve the flexibility and the efficiency of processing large-scale data, we propose an information-based weighting scheme to leverage the effect of multiple data sources in hybrid clustering. Three different algorithms are extended by the proposed weighting scheme and they are employed on a large journal set retrieved from the Web of Science (WoS) database. The clustering performance of the proposed algorithms is systematically evaluated using multiple evaluation methods, and they were cross-compared with alternative methods. Experimental results demonstrate that the proposed weighted hybrid clustering strategy is superior to other methods in clustering performance and efficiency. The proposed approach also provides a more refined structural mapping of journal sets, which is useful for monitoring and detecting new trends in different scientific fields.

Keywords: Bibliometrics, Clustering, Combined Cocitation, Consensus, Database, Documents, Evaluation, Hybrid, Information-Science, Journal, Mapping, Methods, Partitions, Processing, Science, Text Mining, Text-Mining, Trends, Web of Science, Word Analysis, WoS

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1377.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201377.pdf)

Abstract: A central issue in evaluative bibliometrics is the characterization of the citation distribution of papers in the scientific literature. Here, we perform a large-scale empirical analysis of journals from every field in Thomson Reuters’ Web of Science database. We find that only 30 of the 2,184 journals have citation distributions that are inconsistent with a discrete lognormal distribution at the rejection threshold that controls the false discovery rate at 0.05. We find that large, multidisciplinary journals are over-represented in this set of 30 journals, leading us to conclude that, within a discipline, citation distributions are lognormal. Our results strongly suggest that the discrete lognormal distribution is a globally accurate model for the distribution of “eventual impact” of scientific papers published in single-discipline journal in a single year that is removed sufficiently from the present date.

Keywords: Behavior, Bibliometrics, Impact, Power, Science

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1386.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201386.pdf)

Abstract: A multiple-perspective cocitation analysis method is introduced for characterizing and interpreting the structure and dynamics of cocitation clusters. The method facilitates analytic and sense making tasks by integrating network visualization, spectral clustering, automatic cluster labeling, and text summarization. Cocitation networks are decomposed into cocitation clusters. The interpretation of these clusters is augmented by automatic cluster labeling and summarization. The method focuses on the interrelations between a cocitation cluster’s members and their citers. The generic method is applied to a three-part analysis of the field of information science as defined by 12 journals published between 1996 and 2008: (a) a comparative author cocitation analysis (ACA), (b) a progressive ACA of a time series of cocitation networks, and (c) a progressive document cocitation analysis (DCA). Results show that the multiple-perspective method increases the interpretability and accountability of both ACA and DCA networks.

Keywords: Combining Bibliometrics, Concept Symbols, Google Scholar, Information-Science, Knowledge, Networks, Relevance Theory, Research Fronts, Scientific Literature, Web

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1440.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201440.pdf)

Abstract: This paper analyzes the applicability of the article mean citation rate measures in the Science Citation Index Journal Citation Reports (SCI JCR) to the five JCR mathematical subject categories. These measures are the traditional 2-year impact factor as well as the recently added 5-year impact factor and 5-year article influence score. Utilizing the 2008 SCI JCR, the paper compares the probability distributions of the measures in the mathematical categories to the probability distribution of a scientific model of impact factor distribution. The scientific model distribution is highly skewed, conforming to the negative binomial type, with much of the variance due to the important role of review articles in science. In contrast, the three article mean citation rate measures’ distributions in the mathematical categories conformed to either the binomial or Poisson, indicating a high degree of randomness. Seeking reasons for this, the paper analyzes the bibliometric structure of Mathematics, finding it a disjointed discipline of isolated subfields with a weak central core of journals, reduced review function, and long cited half-life placing most citations beyond the measures’ time limits. These combine to reduce the measures’ variance to one commensurate with random error. However, the measures were found capable of identifying important journals. Using data from surveys of the Louisiana State University (LSU) faculty, the paper finds a higher level of consensus among mathematicians and others on which are the important mathematics journals than the measures indicate, positing that much of the apparent randomness may be due to the measures’ inapplicability to mathematical disciplines. Moreover, tests of the stability of impact factor ranks across a 5-year time span suggested that the proper model for Mathematics is the negative binomial.

Keywords: Chemistry, Impact Factor, Index, Market, Science

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1464.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201464.pdf)

Abstract: Despite over 10 years of research there is no agreement on the most suitable roles for Webometric indicators in support of research policy and almost no field-based Webometrics. This article partly fills these gaps by analyzing the potential of policy-relevant Webometrics for individual scientific fields with the help of 4 case studies. Although Webometrics cannot provide robust indicators of knowledge flows or research impact, it can provide some evidence of networking and mutual awareness. The scope of Webometrics is also relatively wide, including not only research organizations and firms but also intermediary groups like professional associations, Web portals, and government agencies. Webometrics can, therefore, provide evidence about the research process to compliment peer review, bibliometric, and patent indicators: tracking the early, mainly prepublication development of new fields and research funding initiatives, assessing the role and impact of intermediary organizations and the need for new ones, and monitoring the extent of mutual awareness in particular research areas.

Keywords: Academic Web, Author Cocitation, Citations, Collaboration, Communication, Impact Factors, Information-Science, Links, Search Engines, Web-Site Interlinking

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1476.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201476.pdf)

Abstract: We present a theoretical and empirical analysis of a number of bibliometric indicators of journal performance. We focus on three indicators in particular: the Eigenfactor indicator, the audience factor, and the influence weight indicator. Our main finding is that the last two indicators can be regarded as a kind of special case of the first indicator. We also find that the three indicators can be nicely characterized in terms of two properties. We refer to these properties as the property of insensitivity to field differences and the property of insensitivity to insignificant journals. The empirical results that we present illustrate our theoretical findings. We also show empirically that the differences between various indicators of journal performance are quite substantial.

Keywords: Citation Influence, Economics Journals, Journal Impact Factor, Pagerank, Science

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1514.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201514.pdf)

Keywords: h-Index

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1564.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201564.pdf)

Abstract: The authors set forth a general methodology for conducting bibliometric analyses at the micro level. It combines several indicators grouped into three factors or dimensions, which characterize different aspects of scientific performance. Different profiles or “classes” of scientists are described according to their research performance in each dimension. A series of results based on the findings from the application of this methodology to the study of Spanish National Research Council scientists in Spain in three thematic areas are presented. Special emphasis is made on the identification and description of top scientists from structural and bibliometric perspectives. The effects of age on the productivity and impact of the different classes of scientists are analyzed. The classificatory approach proposed herein may prove a useful tool in support of research assessment at the individual level and for exploring potential determinants of research success.

Keywords: Academic Scientists, Age, Analyses, Application, Approach, Assessment, Authors, Basic Research, Bibliometric, Bibliometric Analyses, Citation Characteristics, General, h-Index, Identification, Impact, Indicators, Methodology, Performance, Potential, Productivity, Profiles, Research, Research Assessment, Research Collaboration, Research Output, Research Performance, Scaling Rules, Science System, Scientific Performance, Scientific Productivity, Spain, Support

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1622.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201622.pdf)

Abstract: Using Google Earth, Google Maps, and/or network visualization programs such as Pajek, one can overlay the network of relations among addresses in scientific publications onto the geographic map. The authors discuss the pros and cons of various options, and provide software (freeware) for bridging existing gaps between the Science Citation Indices (Thomson Reuters) and Scopus (Elsevier), on the one hand, and these various visualization tools on the other. At the level of city names, the global map can be drawn reliably on the basis of the available address information. At the level of the names of organizations and institutes, there are problems of unification both in the ISI databases and with Scopus. Pajek enables a combination of visualization and statistical analysis, whereas the Google Maps and its derivatives provide superior tools on the Internet.

Keywords: Communication, Evolution, Indicators, Information-Science, Journals, Knowledge, Scientific Collaboration, Teams

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 1800.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%201800.pdf)

Abstract: The Eigenfactor (TM) Metrics provide an alternative way of evaluating scholarly journals based on an iterative ranking procedure analogous to Google’s Page Rank algorithm. These metrics have recently been adopted by Thomson Reuters and are listed alongside the Impact Factor in the Journal Citation Reports. But do these metrics differ sufficiently so as to be a useful addition to the bibliometric toolbox? Davis (2008) has argued that they do not, based on his finding of a 0.95 correlation coefficient between Eigenfactor score and Total Citations for a sample of journals in the field of medicine. This conclusion is mistaken; in this article, we illustrate the basic statistical fallacy to which Davis succumbed. We provide a complete analysis of the 2006 Journal Citation Reports and demonstrate that there are statistically and economically significant differences between the information provided by the Eigenfactor Metrics and that provided by Impact Factor and Total Citations.

Keywords: Algorithm, Alternative, Analysis, Bibliometric, Correlation, Correlation Coefficient, Field, Impact Factor, Information, Journal Citation Reports, Journals, Medicine, Metrics, Procedure, Ranking

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 2086.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%202086.pdf)

Abstract: Author research impact was examined based on citer analysis (the number of citers as opposed to the number of citations) for 90 highly cited authors grouped into three broad subject areas. Citer-based outcome measures were also compared with more traditional citation-based measures for levels of association. The authors found that there are significant differences in citer-based outcomes among the three broad subject areas examined and that there is a high degree of correlation between citer and citation-based measures for all measures compared, except for two outcomes calculated for the social sciences. Citer-based measures do produce slightly different rankings of authors based on citer counts when compared to more traditional citation counts. Examples are provided. Citation measures may not adequately address the influence, or reach, of an author because citations usually do not address the origin of the citation beyond self-citations.

Keywords: Analysis, Author, Authors, Citation, Citation Counts, Citations, Citing Behavior, Cocitation, Counts, Documentation, Identity, Image-Makers, Indexes, Research, Science, Scientific Literature, Self Citations, Self-Citations

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 2337.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%202337.pdf)

Abstract: The preface to a 16th-century Hebrew book entitled Devek Toy, a supercommentary on the Pentateuch, includes an apology by the author for not citing all his sources. In his defense, he cites a passage in the Jerusalem Talmud that discusses the obliteration phenomenon. Following the trail of Jewish sayings on the importance of citation leads to a discussion of stealing ideas, i.e., plagiarism. Details of the search process, cataloging issues, incomplete indexes, and descriptions of complex locator systems found in Hebrew texts, concordances, and full-text databases are included. This detective work led to the discovery that Devek Toy was itself obliterated by incorporation into a later commentary on the Pentateuch.

Keywords: Citation, Databases, Indexes, Plagiarism

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 2405.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%202405.pdf)

Abstract: VOS is a new mapping technique that can serve as an alternative to the well-known technique of multidimensional scaling (MDS). We present an extensive comparison between the use of MDS and the use of VOS for constructing bibliometric maps. In our theoretical analysis, we show the mathematical relation between the two techniques. In our empirical analysis, we use the techniques for constructing maps of authors, journals, and keywords. Two commonly used approaches to bibliometric mapping, both based on MDS, turn out to produce maps that suffer from artifacts. Maps constructed using VOS turn out not to have this problem. We conclude that in general maps constructed using VOS provide a more satisfactory representation of a dataset than maps constructed using well-known MDS approaches.

Keywords: Analysis, Author Cocitation Analysis, Bibliometric, Collaboration, Comparison, Computational Intelligence Field, Cooccurrence Data, Information-Science, Journals, Mapping, Maps, Pathfinder Networks, Representations, River, SCI, Science, Similarity Measures, Techniques, USA, Visualization

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Full Text: [2010\J Ame Soc Inf Sci Tec61, 2575.pdf](2010/J%20Ame%20Soc%20Inf%20Sci%20Tec61,%202575.pdf)

Abstract: The variables investment, benefit, and yield were defined to study the influence of journal self-citations on the impact factor. Investment represents the share of journal self-citations that contribute to the impact factor. Benefit is defined as the ratio of journal impact factor including self-citations to journal impact factor without self-citations. Yield is the relationship between benefit and investment. I selected all journals included in 2008 in the Science Citation Index version of Journal Citation Reports. After deleting 482 records for reasons to be explained, I used a final set of 6,138 journals to study the distribution of the variables defined above. The distribution of benefit differed from the distribution of investment and yield. The top 20-ranked journals were not the same for all three variables. The yield of self-citations on the journal impact factor was, in general, very modest.

Keywords: Citation, Impact Factor, Impact-Factor, Index, Journal, Journal Citation Reports, Journal Impact, Journal Impact Factor, Journal Self-Citations, Journals, Labeled Editorial Material, Reports, River, SCI, Science, Science Citation Index, Self Citations, Self-Citations, Spain, USA

? Zitt, M., Lelu, A. and Bassecoulard, E. (2011), Hybrid citation-word representations in science mapping: Portolan charts of research fields? *Journal of the American Society for Information Science and Technology*, **62** (1), 19-39.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 19.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%2019.pdf)

Abstract: The mapping of scientific fields, based on principles established in the seventies, has recently shown a remarkable development and applications are now booming with progress in computing efficiency. We examine here the convergence of two thematic mapping approaches, citation-based and word-based, which rely on quite different sociological backgrounds. A corpus in the nanoscience field was broken down into research themes, using the same clustering technique on the 2 networks separately. The tool for comparison is the table of intersections of the M clusters (here M = 50) built on either side. A classical visual exploitation of such contingency tables is based on correspondence analysis. We investigate a rearrangement of the intersection table (block modeling), resulting in pseudo-map. The interest of this representation for confronting the two breakdowns is discussed. The amount of convergence found is, in our view, a strong argument in favor of the reliability of bibliometric mapping. However, the outcomes are not convergent at the degree where they can be substituted for each other. Differences highlight the complementarity between approaches based on different networks. In contrast with the strong informetric posture found in recent literature, where lexical and citation markers are considered as miscible tokens, the framework proposed here does not mix the two elements at an early stage, in compliance with their contrasted logic.

Keywords: Analysis, Author Cocitation, Bibliometric, Bibliometric Mapping, Citation, Clustering, Clusters, Cocitation Analysis, Comparison, Compliance, Correspondence Analysis, Development, Efficiency, Field, Framework, Hybrid, Knowledge Domains, Literature, Logic, Map, Mapping, Modeling, Nanoscience, Nanosciences, Networks, Outcomes, Principles, Progress, Recent, Reliability, Representation, Research, Research Fronts, Science, Time, Visualization

? Danell, R. (2011), Can the quality of scientific work be predicted using information on the author’s track record? *Journal of the American Society for Information Science and Technology*, **62** (1), 50-60.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 50.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%2050.pdf)

Abstract: Many countries are moving towards research policies that emphasize excellence; consequently; they develop evaluation systems to identify universities, research groups, and researchers that can be said to be “excellent.” Such active research policy strategies, in which evaluations are used to concentrate resources, are based on an unsubstantiated assumption that researchers’ track records are indicative of their future research performance. In this study, information on authors’ track records (previous publication volume and previous citation rate) is used to predict the impact of their articles. The study concludes that, to a certain degree, the impact of scientific work can be predicted using information on how often an author’s previous publications have been cited. The relationship between past performance and the citation rate of articles is strongest at the high end of the citation distribution. The implications of these results are discussed in the context of a cumulative advantage process.

Keywords: Authors, Bibliometric Indicators, Citation, Concentrate, Context, Cumulative, Cumulative Advantage, Distribution, Evaluation, Impact, Inequality, Information, Performance, Policies, Policy, Productivity, Publication, Publications, Quality, Records, Research, Research Performance, Research Policy, Resources, Science, Systems, Universities, Volume, Work

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 208.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20208.pdf)

Keywords: Evaluation, Garfield, Indicators, Journals, Research, Scientometric

? Ding, Y. (2011), Applying weighted PageRank to author citation networks. *Journal of the American Society for Information Science and Technology*, **62** (2), 236-245.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 236.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20236.pdf)

Abstract: This article aims to identify whether different weighted Page Rank algorithms can be applied to author citation networks to measure the popularity and prestige of a scholar from a citation perspective. Information retrieval (IR) was selected as a test field and data from 1956-2008 were collected from Web of Science. Weighted Page Rank with citation and publication as weighted vectors were calculated on author citation networks. The results indicate that both popularity rank and prestige rank were highly correlated with the weighted Page Rank. Principal component analysis was conducted to detect relationships among these different measures. For capturing prize winners within the IR field, prestige rank outperformed all the other measures.

Keywords: Algorithm, Analysis, Author, Citation, Citation Networks, h-Index, Information Retrieval, IR, Journal Impact Factor, Pagerank, Performance, Principal Component Analysis, Publication, Science, Web of Science

? D’Angelo, C.A., Giuffrida, C. and Abramo, G. (2011), A heuristic approach to author name disambiguation in bibliometrics databases for large-scale research assessments. *Journal of the American Society for Information Science and Technology*, **62** (2), 257-269.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 257.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20257.pdf)

Abstract: National exercises for the evaluation of research activity by universities are becoming regular practice in ever more countries. These exercises have mainly been conducted through the application of peer-review methods. Bibliometrics has not been able to offer a valid large-scale alternative because of almost overwhelming difficulties in identifying the true author of each publication. We will address this problem by presenting a heuristic approach to author name disambiguation in bibliometric datasets for large-scale research assessments. The application proposed concerns the Italian university system, comprising 80 universities and a research staff of over 60,000 scientists. The key advantage of the proposed approach is the ease of implementation. The algorithms are of practical application and have considerably better scalability and expandability properties than state-of-the-art unsupervised approaches. Moreover, the performance in terms of precision and recall, which can be further improved, seems thoroughly adequate for the typical needs of large-scale bibliometric research assessments.

Keywords: Algorithms, Alternative, Application, Approach, Assessments, Bibliometric, Bibliometric Research, Bibliometrics, Evaluation, Exercises, Homonyms, Impact, Implementation, Methods, Needs, Peer Review, Peer-Review, Performance, Practice, Precision, Publication, Recall, Research, Research Productivity, Universities, University

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 421.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20421.pdf)

Abstract: Why authors cite particular documents has been the subject of both speculation and empirical investigation for decades. This article provides a short history of attempts to understand citation motivations and reports a replication of earlier surveys measuring reasons for citations. Comparisons are made among various types of scholars. The present study identified six highly cited articles in the topic area of bibliometrics and surveyed all of the locatable authors who cited those works (n = 112). It was thought that bibliometricians, given that this is their area of expertise, might have a heightened level of awareness of their own citation practices, and hence a different pattern of responses. Several reasons indicated by the 56% of the sample who identified themselves as bibliometricians differed in statistically significant ways from nonbibliometricians, and also from earlier samples of scholars in Communication and Psychology. By far the most common reason for citing a document is that it represents a genre. A factor analysis shows that 20 motivations, clustered in seven factors, can represent the most common motivations for citation. The implications of these findings are discussed in the light of recent debates about the role of social factors in citation. Alternative methods for investigating citation behavior are discussed.

Keywords: Analysis, Authors, Behavior, Bibliometrics, Citation, Citation Behavior, Citations, Citing Behavior, Classification, Communication, Documentation, Factor Analysis, History, Investigation, Mar, Methods, Motivations, Pattern, Persuasion, Practices, Recent, Replication, Role, Science, Self-Citation, Social, Sociology, Surveys

? Marx, W. (2011), Special features of historical papers from the viewpoint of bibliometrics. *Journal of the American Society for Information Science and Technology*, **62** (3), 433-439.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 433.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20433.pdf)

Abstract: This paper deals with the specific features of historical papers relevant for information retrieval and bibliometrics. The analysis is based mainly on the citation indexes accessible under the Web of Science (WoS) but also on field-specific databases: the Chemical Abstracts Service (CAS) literature database and the INSPEC database. First, the journal coverage of the WoS (in particular of the WoS Century of Science archive), the limitations of specific search fields as well as several database errors are discussed. Then, the problem of misspelled citations and their “mutations” is demonstrated by a few typical examples. Complex author names, complicated journal names, and other sources of errors that result from prior citation practice are further issues. Finally, some basic phenomena limiting the meaning of citation counts of historical papers are presented and explained.

Keywords: Analysis, Bibliometrics, Citation, Citation Counts, Citation Indexes, Citations, Coverage, Database, Databases, Errors, Impact, Information, Information Retrieval, Journal, Light, Literature, Mar, Papers, Practice, Science, Sources, Web of Science

? Yan, E., Ding, Y. and Sugimoto, C.R. (2011), P-rank: An indicator measuring prestige in heterogeneous scholarly networks. *Journal of the American Society for Information Science and Technology*, **62** (3), 467-477.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 467.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20467.pdf)

Abstract: Ranking scientific productivity and prestige are often limited to homogeneous networks. These networks are unable to account for the multiple factors that constitute the scholarly communication and reward system. This study proposes a new informetric indicator, P-Rank, for measuring prestige in heterogeneous scholarly networks containing articles, authors, and journals. P-Rank differentiates the weight of each citation based on its citing papers, citing journals, and citing authors. Articles from 16 representative library and information science journals are selected as the dataset. Principle Component Analysis is conducted to examine the relationship between P-Rank and other bibliometric indicators. We also compare the correlation and rank variances between citation counts and P-Rank scores. This work provides a new approach to examining prestige in scholarly communication networks in a more comprehensive and nuanced way.

Keywords: Approach, Articles, Authors, Bibliometric, Bibliometric Indicators, Centrality, Citation, Citation Counts, Communication, Community, Correlation, Documents, Eigenfactor, Impact, Indicator, Indicators, Information, Information Science, Journal Self-Citation, Journals, Library, Library And Information Science, Mar, Mechanism, Networks, Pagerank Algorithm, Papers, Productivity, Rank, Scholarly Communication, Science, Science Journals, Scientific Productivity, Work

? Martens, B.V.V. (2011), The production of practice theories. *Journal of the American Society for Information Science and Technology*, **62** (3), 586-593.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 586.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20586.pdf)

Abstract: This comparative case study explores the impact of four influential practitioner-generated theories from the 1970s to the present in the separate domains of finance, military strategy, nursing, and theology, and it discusses why bibliometric research tends to overlook such “invisible” theories from practice, despite their increasing importance in many areas.The concept of the “practice field” as a site for not only the reception of theories into practice but also the production of practice theories themselves may prove useful.

Keywords: Bibliometric, Bibliometric Research, Case Study, Deficit Nursing Theory, Diffusion, Impact, Mar, Nursing, Practice, Practitioner, Research, Science, Site, State, Strategy, Tacit Knowledge

? Thornley, C.V., Johnson, A.C., Smeaton, A.F. and Lee, H. (2011), The scholarly impact of TRECVid (2003-2009). *Journal of the American Society for Information Science and Technology*, **62** (4), 613-627.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 613.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20613.pdf)

Abstract: This paper reports on an investigation into the scholarly impact of the TRECVid (Text Retrieval and Evaluation Conference, Video Retrieval Evaluation) benchmarking conferences between 2003 and 2009. The contribution of TRECVid to research in video retrieval is assessed by analyzing publication content to show the development of techniques and approaches over time and by analyzing publication impact through publication numbers and citation analysis. Popular conference and journal venues for TRECVid publications are identified in terms of number of citations received. For a selection of participants at different career stages, the relative importance of TRECVid publications in terms of citations vis h vis their other publications is investigated. TRECVid, as an evaluation conference, provides data on which research teams ‘scored’ highly against the evaluation criteria and the relationship between ‘top scoring’ teams at TRECVid and the ‘top scoring’ papers in terms of citations is analyzed. A strong relationship was found between ‘success’ at TRECVid and ‘success’ at citations both for high scoring and low scoring teams. The implications of the study in terms of the value of TRECVid as a research activity, and the value of bibliometric analysis as a research evaluation tool, are discussed.

Keywords: Analysis, Benchmarking, Bibliometric, Bibliometric Analysis, Citation, Citation Analysis, Citations, Conference, Conferences, Criteria, Data, Development, Evaluation, History, Impact, Information-Retrieval, Investigation, Journal, Papers, Publication, Publications, Research, Research Evaluation, Scholarly Impact, Techniques, Value, Video

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 628.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20628.pdf)

Abstract: Numerous studies have shown that female scientists tend to publish significantly fewer publications than do their male colleagues. In this study, we have analyzed whether similar differences also can be found in terms of citation rates. Based on a large-scale study of 8,500 Norwegian researchers and more than 37,000 publications covering all areas of knowledge, we conclude that the publications of female researchers are less cited than are those of men, although the differences are not large. The gender differences in citation rates can be attributed to differences in productivity. There is a cumulative advantage effect of increasing publication output on citation rates. Since the women in our study publish significantly fewer publications than do men, they benefit less from this effect. The study also provides results on how publication and citation rates vary according to scientific position, age, and discipline.

Keywords: Age, Bibliometric Indicators, Citation, Citation Characteristics, Cumulative, Female, Gender, Gender Differences, Impact, Knowledge, Male, Men, Output, Productivity, Publication, Publications, Rates, Rules, Science System, Sex-Differences, Women

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 586.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20586.pdf)

Abstract: An innovative model to measure the influence among scientific journals is developed in this study. This model is based on the path analysis of a journal citation network, and its output is a journal influence matrix that describes the directed influence among all journals. Based on this model, an index of journals’ overall influence, the quality-structure index (QSI), is derived. Journal ranking based on QSI has the advantage of accounting for both intrinsic journal quality and the structural position of a journal in a citation network. The QSI also integrates the characteristics of two prevailing streams of journal-assessment measures: those based on biblio-metric statistics to approximate intrinsic journal quality, such as the Journal Impact Factor, and those using a journal’s structural position based on the Page Rank-type of algorithm, such as the Eigenfactor score. Empirical results support our finding that the new index is significantly closer to scholars’ subjective perception of journal influence than are the two aforementioned measures. In addition, the journal influence matrix offers a new way to measure two-way influences between any two academic journals, hence establishing a theoretical basis for future scientometrics studies to investigate the knowledge flow within and across research disciplines.

Keywords: Algorithm, Analysis, Bibliometric, Business, Characteristics, Citation, Citation Network, Eigenfactor, Flow, Impact, Impact Factor, Index, Journal, Journal Influence, Journal Quality, Journal Ranking, Journals, Knowledge, Knowledge Flow, Management, Matrix, Measure, Model, Network, Path Analysis, Perception, Quality, Ranking, Research, Science, Scientific Journals, Scientometrics, Statistics, Streams, Support

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 819.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20819.pdf)

Abstract: This article employs citation analysis on a micro level- the level of the cited document; in this case, Walter Benjamin’s Illuminations (1968/2007). The study shows how this frequently cited publication-more than 4,000 citations in Web of Science-has been received. The growth of citations and interdisciplinary citing is studied, and a novel approach-page citation analysis-is applied to study how different parts of Illuminations have been cited. The article demonstrates how bibliometric methods can be used together with qualitative accounts to map the impact and dissemination of a particular publication. Furthermore, it shows how bibliometric methods can be utilized to study intellectual structures in the humanities, and highlights the influence of the humanities on the social sciences and sciences.

Keywords: Analysis, Bibliometric, Bibliometric Methods, Citation, Citation Analysis, Citations, Growth, Humanities, Impact, Interdisciplinary, Journals, Methods, Publication, Qualitative, Sciences, Social, Social Sciences, Social-Sciences

? Leydesdorff, L. and Rafols, I. (2011), Local emergence and global diffusion of research technologies: An exploration of patterns of network formation. *Journal of the American Society for Information Science and Technology*, **62** (5), 846-860.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 846.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20846.pdf)

Abstract: Grasping the fruits of “emerging technologies” is an objective of many government priority programs in a knowledge-based and globalizing economy. We use the publication records (in the Science Citation Index) of two emerging technologies to study the mechanisms of diffusion in the case of two innovation trajectories: small interference RNA(siRNA) and nanocrystalline solar cells (NCSC). Methods for analyzing and visualizing geographical and cognitive diffusion are specified as indicators of different dynamics. Geographical diffusion is illustrated with overlays to Google Maps; cognitive diffusion is mapped using an overlay to a map based on the ISI subject categories. The evolving geographical networks show both preferential attachment and small-world characteristics. The strength of preferential attachment decreases over time while the network evolves into an oligopolistic control structure with small-world characteristics. The transition from disciplinary-oriented (“Mode 1”) to transfer-oriented (“Mode 2”) research is suggested as the crucial difference in explaining the different rates of diffusion between siRNA and NCSC.

Keywords: Characteristics, Citation, Collaboration, Control, Diffusion, Diversity, Dynamics, Economy, Emergence, Emerging Technologies, Fruits, Growth, Indicators, Innovation, ISI, ISI Subject Categories, Knowledge-Based, Mechanisms, Network, Networks, Paradigms, Publication, Rates, Records, Research, Science, Science Citation Index, Small, Solar Cells, Strength, Structure, Technologies, Trajectories, Triple-Helix, University-Industry-Government

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 987.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20987.pdf)

Abstract: Our objective was to determine the prevalence of the term preembryo in the scientific literature using a bibliometric study in the Web of Science database. We retrieved data from the Web of Science from 1986 to 2005, covering a range of 20 years since the term was first published. Searches for the terms embryo, blastocyst, preimplantation embryo, and preembryo were performed. Then, Boolean operators were applied to measure associations between terms. Finally, statistical assessments were made to compare the use of each term in the scientific literature, and in specific areas where preembryo is most used. From a total of 93,019 registers, 90,888 corresponded to embryo; 8,366 to blastocyst; 2,397 to preimplantation embryo; and 172 to preembryo. The use frequency for preembryo was 2:1000. The term preembryo showed a lower cumulative impact factor (343) in comparison with the others (25,448; 5,530; and 546; respectively) in the highest scored journal category. We conclude that the term preembryo is not used in the scientific community, probably because it is confusing or inadequate. The authors suggest that its use in the scientific literature should be avoided in future publications. The bibliometric analysis confirms this statement. While preembryo hardly ever is used, terms such as preimplantation embryo and blastocyst have gained wide acceptance in publications from the same areas of study.

Keywords: Acceptance, Analysis, Assessments, Authors, Bibliometric, Bibliometric Analysis, Bibliometric Study, Blastocyst, Community, Comparison, Cumulative, Cumulative Impact, Data, Database, Debate, Embryo, Embryo Research, First, Impact, Impact Factor, Journal, Literature, Measure, Prevalence, Publications, Science, Scientific Literature, Term, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1118.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201118.pdf)

Abstract: Increasing interdisciplinarity has been a policy objective since the 1990s, promoted by many governments and funding agencies, but the question is: How deeply has this affected the social sciences? Although numerous articles have suggested that research has become more interdisciplinary, yet no study has compared the extent to which the interdisciplinarity of different social science subjects has changed. To address this gap, changes in the level of interdisciplinarity since 1980 are investigated for subjects with many articles in the Social Sciences Citation Index (SSCI), using the percentage of cross-disciplinary citing documents (PCDCD) to evaluate interdisciplinarity. For the 14 SSCI subjects investigated, the median level of interdisciplinarity, as measured using cross-disciplinary citations, declined from 1980 to 1990, but rose sharply between 1990 and 2000, confirming previous research. This increase was not fully matched by an increase in the percentage of articles that were assigned to more than one subject category. Nevertheless, although on average the social sciences have recently become more interdisciplinary, the extent of this change varies substantially from subject to subject. The SSCI subject with the largest increase in interdisciplinarity between 1990 and 2000 was Information Science & Library Science (IS&LS) but there is evidence that the level of interdisciplinarity of IS&LS increased less quickly during the first decade of this century.

Keywords: Citation, Citations, Collaboration, Cross-Disciplinary, Impact, Information Science, Information-Science, Interdisciplinarity, Interdisciplinary, Knowledge, Library, Multidisciplinary Research, Patterns, Policy, Research, Social Sciences, University, Work

? Leydesdorff, L. and Shin, J.C. (2011), How to evaluate universities in terms of their relative citation impacts: Fractional counting of citations and the normalization of differences among disciplines. *Journal of the American Society for Information Science and Technology*, **62** (6), 1146-1155.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1146.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201146.pdf)

Abstract: Fractional counting of citations can improve on ranking of multidisciplinary research units (such as universities) by normalizing the differences among fields of science in terms of differences in citation behavior. Furthermore, normalization in terms of citing papers abolishes the unsolved questions in scientometrics about the delineation of fields of science in terms of journals and normalization when comparing among different (sets of) journals. Using publication and citation data of seven Korean research universities, we demonstrate the advantages and the differences in the rankings, explain the possible statistics, and suggest ways to visualize the differences in (citing) audiences in terms of a network.

Keywords: Citation, Citations, Collaboration, Fatal Attraction, Indicators, Journals, Korea, Normalization, Papers, Performance, Publication, Ranking, Research, Science, Scientific Journals, Scientometrics, Statistics, Tool, Universities

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1156.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201156.pdf)

Abstract: Using a database of 1.4 million papers indexed by Web of Science, we examined the global trends in publication inequality and international collaboration in physics. The publication output and citations received by authors hosted in each country were taken into account. Although inequality decreased over time, further progress toward equality has somewhat abated in recent years. The skewedness of the global distribution in publication output was shown to be correlated with article impact, that is, the inequality is more significant in articles of higher impact. It was also observed that, despite the trend toward more equalitarian distribution, scholarly participation in physics is still determined by a select group. Particularly noteworthy has been China’s rapid growth in publication outputs and a gradual improvement in its impact. Finally, the data also suggested regional differences in scientific collaboration. A distinctively high concentration of transnational collaboration and publication performance was found among EU countries.

Keywords: Authors, Bibliometric Analysis, Chemistry, Citation, Citations, Co-Authorship, Collaboration, Impact, Indicators, Papers, Publication, Quality, Science, Scientific Cooperation, Trend, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1370.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201370.pdf)

Abstract: We submit newly developed citation impact indicators based not on arithmetic averages of citations but on percentile ranks. Citation distributions are-as a rule-highly skewed and should not be arithmetically averaged. With percentile ranks, the citation score of each paper is rated in terms of its percentile in the citation distribution. The percentile ranks approach allows for the formulation of a more abstract indicator scheme that can be used to organize and, or schematize different impact indicators according to three degrees of freedom: the selection of the reference sets, the evaluation criteria, and the choice of whether or not to define the publication sets as independent. Bibliometric data of seven principal investigators (PIs) of the Academic Medical Center of the University of Amsterdam are used as an exemplary dataset. We demonstrate that the proposed family indicators [R(6), R(100), R(6, k), R(100, k)] are an improvement on averages-based indicators because one can account for the shape of the distributions of citations over papers.

Keywords: Bibliometric, Chemistry, Citation, Citation Impact, Citations, Distributions, Evaluation, Field Normalization, Impact, Indicators, Journals, Papers, Performance, Publication, Reliability, Science, Universality, University

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1382.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201382.pdf)

Abstract: Science mapping aims to build bibliometric maps that describe how specific disciplines, scientific domains, or research fields are conceptually, intellectually, and socially structured. Different techniques and software tools have been proposed to carry out science mapping analysis. The aim of this article is to review, analyze, and compare some of these software tools, taking into account aspects such as the bibliometric techniques available and the different kinds of analysis.

Keywords: Bibliometric, Citation, Co-Word Analysis, Cocitation Analysis, Domain Visualization, Field, Information Visualization, Maps, Networks, Research, Review, Scientific Literature, Technology

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1403.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201403.pdf)

Abstract: A bibliometric method for analyzing and visualizing national research profiles is adapted to describe national preferences for publishing particular document types. Similarities in national profiles and national peculiarities are discussed based on the publication output of the 26 most active countries indexed in the Web of Science annual volume 2007.

Keywords: Bibliometric, Publication, Publishing, Research, Triple-Helix, Web of Science, World

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Full Text: [2011\J Ame Soc Inf Sci62, 1412.pdf](2011/J%20Ame%20Soc%20Inf%20Sci62,%201412.pdf)

Abstract: In order to examine the phenomena of eponymy and Obliteration by Incorporation at both the aggregate and individual subject level, the literature relating to the game-theoretic concept of the Nash Equilibrium was studied over the period 1950-2008. Almost 5,300 bibliographic database records for publications explicitly citing at least one of two papers by John Nash and/or using the phrase “Nash Equilibrium/Nash Equilibria” were retrieved from the Web of Science and various subject-related databases. Breadth of influence is demonstrated by the wide variety of subject areas in which Nash Equilibrium-related publications occur, including in the natural and social sciences, humanities, law, and medicine. Fifty percent of all items have been published since 2002, suggesting that Nash’s papers have experienced “delayed recognition.” A degree of Obliteration by Incorporation is observed in that implicit citations (use of the phrase without citation) increased over the time period studied, although the proportion of all citations that are implicit has remained relatively stable during the most recent decade with an annual rate of between 60% and 70%; subject areas vary in their level of obliteration.

Keywords: Articles, Bibliographic, Bibliographic Database, Bibliometrics, Big Science, Citation, Citation Context Analysis, Citations, Databases, Diffusion, Equilibrium, Game-Theory, Interdisciplinarity, Literature, Medicine, Obliteration, Papers, Patterns, Publications, Science, Sciences, Scientific Literature, Social, Social Sciences, Social-Science, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1430.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201430.pdf)

Keywords: Impact Factor, Model, Scientometrics

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1498.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201498.pdf)

Abstract: The objective of this research is to examine the interaction of institutions, based on their citation and collaboration networks. The domain of library and information science is examined, using data from 1965-2010. A linear model is formulated to explore the factors that are associated with institutional citation behaviors, using the number of citations as the dependent variable, and the number of collaborations, physical distance, and topical distance as independent variables. It is found that institutional citation behaviors are associated with social, topical, and geographical factors. Dynamically, the number of citations is becoming more associated with collaboration intensity and less dependent on the country boundary and/or physical distance. This research is informative for scientometricians and policy makers.

Keywords: Citation, Citations, Collaboration, Geographic, Indicators, Information, Information Science, Knowledge, Model, Policy, Proximity, Ranking, Research, Science

? Bouyssou, D. and Marchant, T. (2011), Ranking scientists and departments in a consistent manner. *Journal of the American Society for Information Science and Technology*, **62** (9), 1761-1769.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1761.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201761.pdf)

Abstract: The standard data that we use when computing bibliometric rankings of scientists are their publication/ citation records, i.e., so many papers with 0 citation, so many with 1 citation, so many with 2 citations, etc. The standard data for bibliometric rankings of departments have the same structure. It is therefore tempting (and many authors gave in to temptation) to use the same method for computing rankings of scientists and rankings of departments. Depending on the method, this can yield quite surprising and unpleasant results. Indeed, with some methods, it may happen that the “best” department contains the “worst” scientists, and only them. This problem will not occur if the rankings satisfy a property called consistency, recently introduced in the literature. In this article, we explore the consequences of consistency and we characterize two families of consistent rankings.

Keywords: Authors, Bibliometric, Bibliometric Rankings, Citation, Citations, Families, Impact, Literature, Papers, Ranking, Rankings, Research Output, Successive h-Indexes

? Sin, S.C.J. (2011), International coauthorship and citation impact: A bibliometric study of six LIS journals, 1980-2008. *Journal of the American Society for Information Science and Technology*, **62** (9), 1770-1783.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1770.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201770.pdf)

Abstract: International collaborative papers are increasingly common in journals of many disciplines. These types of papers are often cited more frequently. To identify the coauthorship trends within Library and Information Science (LIS), this study analyzed 7,489 papers published in six leading publications (ARIST, IP&M, JAMIA, JASIST, MISQ, and Scientometrics) over the last three decades. Logistic regression tested the relationships between citations received and seven factors: authorship type, author’s subregion, country income level, publication year, number of authors, document type, and journal title. The main authorship type since 1995 was national collaboration. It was also the dominant type for all publications studied except ARIST, and for all regions except Africa. For citation counts, the logistic regression analysis found all seven factors were significant. Papers that included international collaboration, Northern European authors, and authors in high-income nations had higher odds of being cited more. Papers from East Asia, Southeast Asia, and Southern Europe had lower odds than North American papers. As discussed in the bibliometric literature, Merton’s Matthew Effect sheds light on the differential citation counts based on the authors’ subregion. This researcher proposes geographies of invisible colleagues and a geographic scope effect to further investigate the relationships between author geographic affiliation and citation impact.

Keywords: Affiliation, Africa, Analysis, Asia, Author, Authors, Authorship, Bibliometric, Citation, Citation Counts, Citation Impact, Citations, Co-Authorship, Coauthorship, Collaboration, Countries, Europe, Impact, Income, Information Science, Information-Science Journals, International Collaboration, Journal, Journals, Library, Library And Information Science, LIS, Literature, Multi-Disciplinarity, Papers, Patterns, Publication, Publications, Regression Analysis, Research Performance, Science, Scientific Collaboration, Scientometrics, Social Informatics, Southeast Asia, Strategies, Trends

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 1933.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201933.pdf)

Abstract: This study comprises a suite of analyses of words in article titles in order to reveal the cognitive structure of Library and Information Science (LIS). The use of title words to elucidate the cognitive structure of LIS has been relatively neglected. The present study addresses this gap by performing (a) co-word analysis and hierarchical clustering, (b) multidimensional scaling, and (c) determination of trends in usage of terms. The study is based on 10,344 articles published between 1988 and 2007 in 16 LIS journals. Methodologically, novel aspects of this study are: (a) its large scale, (b) removal of non-specific title words based on the “word concentration” measure (c) identification of the most frequent terms that include both single words and phrases, and (d) presentation of the relative frequencies of terms using “heatmaps”. Conceptually, our analysis reveals that LIS consists of three main branches: the traditionally recognized library-related and information-related branches, plus an equally distinct bibliometrics/scientometrics branch. The three branches focus on: libraries, information, and science, respectively. In addition, our study identifies substructures within each branch. We also tentatively identify “information seeking behavior” as a branch that is establishing itself separate from the three main branches. Furthermore, we find that cognitive concepts in LIS evolve continuously, with no stasis since 1992. The most rapid development occurred between 1998 and 2001, influenced by the increased focus on the Internet. The change in the cognitive landscape is found to be driven by the emergence of new information technologies, and the retirement of old ones.

Keywords: Analysis, Co-Words, Combined Cocitation, Development, Discipline, Information, Information Science, Internet, Jasis, Journal Articles, Journals, Library And Information Science, LIS, Neural-Network Research, North-American Library, Removal, Science, Scientometrics, Structure, Time, Trends

? Bornmann, L. and Leydesdorff, L. (2011), Which cities produce more excellent papers than can be expected? A new mapping approach, using Google maps, based on statistical significance testing. *Journal of the American Society for Information Science and Technology*, **62** (10), 1954-1962.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1954.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201954.pdf)

Abstract: The methods presented in this paper allow for a statistical analysis revealing centers of excellence around the world using programs that are freely available. Based on Web of Science data (a fee-based database), field-specific excellence can be identified in cities where highly cited papers were published more frequently than can be expected. Compared to the mapping approaches published hitherto, our approach is more analytically oriented by allowing the assessment of an observed number of excellent papers for a city against the expected number. Top performers in output are cities in which authors are located who publish a statistically significant higher number of highly cited papers than can be expected for these cities. As sample data for physics, chemistry, and psychology show, these cities do not necessarily have a high output of highly cited papers.

Keywords: Analysis, Assessment, Authors, Highly-Cited, Impact, Indicators, Mapping, Maps, Networks, Papers, Science, Statistical, System, Web of Science

? Vinkler, P. (2011), Application of the distribution of citations among publications in scientometric evaluations. *Journal of the American Society for Information Science and Technology*, **62** (10), 1963-1978.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1963.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201963.pdf)

Abstract: The pi-indicator (or pi(v)-indicator) of a set of journal papers is equal to a hundredth of the total number of citations obtained by the elite set of publications. The number of publications in the elite set P(pi) is calculated as the square root of total papers. For greater sets the following equation is used: P(pi(v))=(10 log P) - 10, where P is the total number of publications. For sets comprising a single or several extreme frequently cited paper, the pi-index may be distorted. Therefore, a new indicator based on the distribution of citations is suggested. Accordingly, the publications are classified into citation categories, of which lower limits are given as 0, and (2(n) + 1), whereas the upper limits as 2(n) (n = 0, 2, 3, etc.). The citations distribution score (CDS) index is defined as the sum of weighted numbers of publications in the individual categories. The CDS-index increases logarithmically with the increasing number of citations. The citation distribution rate indicator is introduced by relating the actual CDS-index to the possible maximum. Several size-dependent and size-independent indicators were calculated. It has been concluded that relevant, already accepted scientometric indicators may validate novel indices through resulting in similar conclusions (“converging validation of indicators”).

Keywords: Bibliometric Indicators, Cd, Citation, Citations, Evaluations, H-Index, Highly Cited Papers, Hirsch Index, Impact Factor, Journal, Journal Impact, Papers, Physicists, Publications, R-Index, Science, Scientific Performance, Validation

? Zuccala, A. and van Leeuwen, T. (2011), Book reviews in humanities research evaluations. *Journal of the American Society for Information Science and Technology*, **62** (10), 1979-1991.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1979.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201979.pdf)

Abstract: Bibliometric evaluations of research outputs in the social sciences and humanities are challenging due to limitations associated with Web of Science data; however, background literature has shown that scholars are interested in stimulating improvements. We give special attention to book reviews processed by Web of Science history and literature journals, focusing on two types: Type I (i.e., reference to book only) and Type II (i.e., reference to book and other scholarly sources). Bibliometric data are collected and analyzed for a large set of reviews (1981-2009) to observe general publication patterns and patterns of citedness and co-citedness with books under review. Results show that reviews giving reference only to the book (Type I) are published more frequently while reviews referencing the book and other works (Type II) are more likely to be cited. The referencing culture of the humanities makes it difficult to understand patterns of co-citedness between books and review articles without further in-depth content analyses. Overall, citation counts to book reviews are typically low, but our data showed that they are scholarly and do play a role in the scholarly communication system. In the disciplines of history and literature, where book reviews are prominent, counting the number and type of reviews that a scholar produces throughout his/her career is a positive step forward in research evaluations. We propose a new set of journal quality indicators for the purpose of monitoring their scholarly influence.

Keywords: Attention, Bibliometric, Bibliometric Data, Citation, Citation Analysis, Citation Counts, Communication, Culture, Evaluations, History, Humanities, Journal, Journals, Literature, Monitoring, Publication, Quality Indicators, Research, Review, Scholarly Communication, Science, Sciences, Social, Social Sciences, Social-Sciences, Web of Science

? Franceschet, M. (2011), Collaboration in computer science: A network science approach. *Journal of the American Society for Information Science and Technology*, **62** (10), 1992-2012.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 1992.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%201992.pdf)

Abstract: Co-authorship in publications within a discipline uncovers interesting properties of the analyzed field. We represent collaboration in academic papers of computer science in terms of differently grained networks, namely affiliation and collaboration networks. We also build those sub-networks that emerge from either conference or journal co-authorship only. We take advantage of the network science paraphernalia to take a picture of computer science collaboration including all papers published in the field since 1936. Furthermore, we observe how collaboration in computer science evolved over time since 1960. We investigate bibliometric properties such as size of the discipline, productivity of scholars, and collaboration level in papers, as well as global network properties such as reachability and average separation distance among scholars, distribution of the number of scholar collaborators, network resilience and dependence on star collaborators, network clustering, and network assortativity by number of collaborators.

Keywords: Affiliation, Bibliometric, Co-Authorship, Coauthorship, Collaboration, Computer, Journal, Network, Number, Papers, Productivity, Publications, Quality, Resilience, Science, Scientific Collaboration, Separation

? Bates, M.J. (2011), Birger Hjørland’s Manichean misconstruction of Marcia bates’ work. *Journal of the American Society for Information Science and Technology*, **62** (10), 2038-2044.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 2038.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202038.pdf)

Abstract: It is argued and demonstrated that Birger Hjorland’s critiques of Marcia Bates’ articles on the nature of information and the nature of browsing misrepresent the content of these articles, and further, frame the argument as a Manichean conflict between Hjorland’s enlightened “discursive” and social approach versus Bates’ benighted behavioral approach. It is argued that Bates’ work not only contains much of value that has been ignored by Hjorland but also contains ideas that mostly complement, rather than conflict with, those of Hjorland.

Keywords: Combining Bibliometrics, Information, Information-Retrieval, Relevance Theory, Science, Social

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 236.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%20236.pdf)

Abstract: This article aims to identify whether different weighted Page Rank algorithms can be applied to author citation networks to measure the popularity and prestige of a scholar from a citation perspective. Information retrieval (IR) was selected as a test field and data from 1956-2008 were collected from Web of Science. Weighted Page Rank with citation and publication as weighted vectors were calculated on author citation networks. The results indicate that both popularity rank and prestige rank were highly correlated with the weighted Page Rank. Principal component analysis was conducted to detect relationships among these different measures. For capturing prize winners within the IR field, prestige rank outperformed all the other measures.

Keywords: Algorithm, Analysis, Author, Citation, Citation Networks, h-Index, Information Retrieval, IR, Journal Impact Factor, Pagerank, Performance, Principal Component Analysis, Publication, Science, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2133.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202133.pdf)

Abstract: In bibliometrics, the association of “impact” with central-tendency statistics is mistaken. Impacts add up, and citation curves therefore should be integrated instead of averaged. For example, the journals MIS Quarterly and Journal of the American Society for Information Science and Technology differ by a factor of 2 in terms of their respective impact factors (IF), but the journal with the lower IF has the higher impact. Using percentile ranks (e. g., top-1%, top-10%, etc.), an Integrated Impact Indicator (I3) can be based on integration of the citation curves, but after normalization of the citation curves to the same scale. The results across document sets can be compared as percentages of the total impact of a reference set. Total number of citations, however, should not be used instead because the shape of the citation curves is then not appreciated. I3 can be applied to any document set and any citation window. The results of the integration (summation) are fully decomposable in terms of journals or institutional units such as nations, universities, and so on because percentile ranks are determined at the paper level. In this study, we first compare I3 with IFs for the journals in two Institute for Scientific Information subject categories (“Information Science & Library Science” and “Multidisciplinary Sciences”). The library and information science set is additionally decomposed in terms of nations. Policy implications of this possible paradigm shift in citation impact analysis are specified.

Keywords: Analysis, Association, Bibliometrics, Citation, Citation Analysis, Citation Impact, Citations, Factor Dilemma, Factors, Impact, Impact Analysis, Impact Factors, Indicator, Indicators, Information, Information Science, Journal, Journals, Library, MIS, Policy, Research, Science, Scientific Information, Statistics, Technology, Universities, Worshiping False Idols

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2147.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202147.pdf)

Abstract: Citation indictors are increasingly used in some subject areas to support peer review in the evaluation of researchers and departments. Nevertheless, traditional journal-based citation indexes may be inadequate for the citation impact assessment of book-based disciplines. This article examines whether online citations from Google Books and Google Scholar can provide alternative sources of citation evidence. To investigate this, we compared the citation counts to 1,000 books submitted to the 2008 U. K. Research Assessment Exercise (RAE) from Google Books and Google Scholar with Scopus citations across seven book-based disciplines ( archaeology; law; politics and international studies; philosophy; sociology; history; and communication, cultural, and media studies). Google Books and Google Scholar citations to books were 1.4 and 3.2 times more common than were Scopus citations, and their medians were more than twice and three times as high as were Scopus median citations, respectively. This large number of citations is evidence that in book-oriented disciplines in the social sciences, arts, and humanities, online book citations may be sufficiently numerous to support peer review for research evaluation, at least in the United Kingdom.

Keywords: 4 Science Disciplines, Assessment, Bibliometric Indicators, Books, Citation, Citation Counts, Citation Impact, Citation Indexes, Citations, Communication, Counts, Evaluation, Exercise, Google Scholar, h-Index, History, Humanities, Impact, Indexes, Peer Review, Peer-Review, Politics, Publications, Ratings, Research, Research Assessment Exercise, Research Evaluation, Researchers, Review, Sciences, Scopus, Social, Social Sciences, Social-Sciences, Sociology, Traditional, United Kingdom, Web-of-Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2290.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202290.pdf)

Abstract: It was argued recently that the g-index is a measure of a researcher’s specific impact (i.e., impact per paper) as much as it is a measure of overall impact. While this is true for the productive “core” of publications, it can be argued that the g-index does not differ from the square root of the total number of citations in a bibliometrically meaningful way when the entire publication list is considered. The R-index also has a tendency to follow total impact, leaving only the A-index as a true measure of specific impact. The main difference between the g-index and the h-index is that the former penalizes consistency of impact whereas the latter rewards such consistency. It is concluded that the h-index is a better bibliometric tool than is the g-index, and that the square root of the total number of citations is a convenient measure of a researcher’s overall impact.

Keywords: A-Index, Bibliometric, Citations, Core, G Index, G-Index, h Index, h-Index, Impact, Need, Publication, Publications, R-Index, Variants

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2427.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202427.pdf)

Abstract: The counting of papers and citations is fundamental to the assessment of research productivity and impact. In an age of increasing scientific collaboration across national borders, the counting of papers produced by collaboration between multiple countries, and citations of such papers, raises concerns in country-level research evaluation. In this study, we compared the number counts and country ranks resulting from five different counting methods. We also observed inflation depending on the method used. Using the 1989 to 2008 physics papers indexed in ISI’s Web of Science as our sample, we analyzed the counting results in terms of paper count (research productivity) as well as citation count and citation-paper ratio (CP ratio) based evaluation (research impact). The results show that at the country-level assessment, the selection of counting method had only minor influence on the number counts and country rankings in each assessment. However, the influences of counting methods varied between paper count, citation count, and CP ratio based evaluation. The findings also suggest that the popular counting method (whole counting) that gives each collaborating country one full credit may not be the best counting method. Straight counting that accredits only the first or the corresponding author or fractional counting that accredits each collaborator with partial and weighted credit might be the better choices.

Keywords: Assessment, Author, Authorship, Citation, Citations, Collaboration, Evaluation, Impact, Methods, Papers, Productivity, Publication, Rankings, Ratio, Research, Research Evaluation, Research Impact, Research Productivity, Science, Scientific Collaboration, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2443.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202443.pdf)

Abstract: This study examines longitudinal trends in the university-industry-government (UIG) relationship on the web in the Korean context by using triple helix (TH) indicators. The study considers various Internet resources, including websites/documents, blogs, online cafes, Knowledge-In (comparable to Yahoo! Answers), and online news sites, by employing webometric and co-word analysis techniques to ascertain longitudinal trends in the UIG relationship, which have received considerable attention in the last decade. The results indicate that the UIG relationship varied according to the government’s policies and that there was some tension in the longitudinal UIG relationship. Further, websites/documents and blogs were the most reliable sources for examining the strength of and variations in the bilateral and trilateral UIG relationships on the web. In addition, web-based T(uig) values showed a stronger trilateral relationship and larger variations in the UIG relationship than Science Citation Index-based T(uig) values. The results suggest that various Internet resources (e. g., advanced search engines, websites/documents, blogs, and online cafes), together with TH indicators, can be used to explore the UIG relationship on the web.

Keywords: Analysis, Attention, Citation, Co-Word Analysis, Communication, Dynamics, Innovation Systems, Internet, Knowledge-Base, Policies, Science, South-Korea, Strength, Technology, Terms, Trends, Web-Based, Webometrics

? Lariviere, V. and Macaluso, B. (2011), Improving the coverage of social science and humanities researchers’ output: The case of the Érudit journal platform. *Journal of the American Society for Information Science and Technology*, **62** (12), 2437-2442.

Full Text: [2011\J Ame Soc Inf Sci Tec62, 2437.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202437.pdf)

Abstract: In non-English-speaking countries the measurement of research output in the social sciences and humanities (SSH) using standard bibliographic databases suffers from a major drawback: the underrepresentation of articles published in local, non-English, journals. Using papers indexed (1) in a local database of periodicals (Erudit) and (2) in the Web of Science, assigned to the population of university professors in the province of Quebec, this paper quantifies, for individual researchers and departments, the importance of papers published in local journals. It also analyzes differences across disciplines and between French-speaking and English-speaking universities. The results show that, while the addition of papers published in local journals to bibliometric measures has little effect when all disciplines are considered and for anglophone universities, it increases the output of researchers from francophone universities in the social sciences and humanities by almost a third. It also shows that there is very little relation, at the level of individual researchers or departments, between the output indexed in the Web of Science and the output retrieved from the Erudit database; a clear demonstration that the Web of Science cannot be used as a proxy for the “overall” production of SSH researchers in Quebec. The paper concludes with a discussion on these disciplinary and language differences, as well as on their implications for rankings of universities.

Keywords: Bibliographic, Bibliographic Databases, Bibliometric, Citation Database, Coverage, Databases, Differences, Humanities, Journal, Journals, Measurement, Papers, Periodicals, Publications, Quebec, Rankings, Research, Research Output, Research Performance, Researchers, Science, Sciences, Social, Social Science, Social Sciences, Universities, University, Web of Science

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Full Text: [2011\J Ame Soc Inf Sci Tec62, 2414.pdf](2011/J%20Ame%20Soc%20Inf%20Sci%20Tec62,%202414.pdf)

Abstract: Using the Arts & Humanities Citation Index (A&HCI) 2008, we apply mapping techniques previously developed for mapping journal structures in the Science and Social Sciences Citation Indices. Citation relations among the 110,718 records were aggregated at the level of 1,157 journals specific to the A&HCI, and the journal structures are questioned on whether a cognitive structure can be reconstructed and visualized. Both cosine-normalization (bottom up) and factor analysis (top down) suggest a division into approximately 12 subsets. The relations among these subsets are explored using various visualization techniques. However, we were not able to retrieve this structure using the Institute for Scientific Information Subject Categories, including the 25 categories that are specific to the A&HCI. We discuss options for validation such as against the categories of the Humanities Indicators of the American Academy of Arts and Sciences, the panel structure of the European Reference Index for the Humanities, and compare our results with the curriculum organization of the Humanities Section of the College of Letters and Sciences of the University of California at Los Angeles as an example of institutional organization.

Keywords: Analysis, Arts, Citation, Citations, Cocitations, Disciplines, Factor-Analysis, History, Humanities, Indicators, Interdisciplinarity, Isi, Journal, Journals, Mapping, Maps, Pearsons Correlation-Coefficient, Productivity, Science, Sciences, Scientific Information, Social Sciences, Social-Sciences, Structure, University, Validation, Visualization

# Title: Journal of the American Society for Mass Spectrometry

Full Journal Title: [Journal of the American Society for Mass Spectrometry](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5270&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=e305ed013152c9efd9f03a40e432a8d6)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Kostoff, R.N., Bedford, C.D., Antonio del Río, J., Cortes, H.D. and Karypis, G. (2004), Macromolecule mass spectrometry: Citation mining of user documents. *Journal of the American Society for Mass Spectrometry*, **15** (3), 281-287.

Full Text: [J\J Ame Soc Mas Spe15, 281.pdf](J/J%20Ame%20Soc%20Mas%20Spe15,%20281.pdf)

Abstract: Identifying research users, applications, and impact is important for research performers, managers, evaluators, and sponsors. Identification of the user audience and the research impact is complex and time consuming due to the many indirect pathways through which fundamental research can impact applications. This paper identified the literature pathways through which two highly-cited papers of 2002 Chemistry Nobel Laureates Fenn and Tanaka impacted research, technology development, and applications. Citation Mining, an integration of citation bibliometrics and text mining, was applied to the >1600 first generation Science Citation Index (SCI) citing papers to Fenn’s 1989 Science paper on Electrospray Ionization for Mass Spectrometry, and to the >400 first generation SCI citing papers to Tanaka’s 1988 Rapid Communications in Mass Spectrometry paper on Laser Ionization Time-of-Flight Mass Spectrometry. Bibliometrics was performed on the citing papers to profile the user characteristics. Text mining was performed on the citing papers to identify the technical areas impacted by the research, and the relationships among these technical areas.

# Title: Journal of the American Statistical Association

Full Journal Title: Journal of the American Statistical Association

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

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Full Text: [-1959\J Ame Sta Ass20, 305.pdf](-1959/J%20Ame%20Sta%20Ass20,%20305.pdf)

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Full Text: [-1959\J Ame Sta Ass22, 154.pdf](-1959/J%20Ame%20Sta%20Ass22,%20154.pdf)

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Full Text: [-1959\J Ame Sta Ass35, 595.pdf](-1959/J%20Ame%20Sta%20Ass35,%20595.pdf)

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Full Text: [-1959\J Ame Sta Ass38, 1.pdf](-1959/J%20Ame%20Sta%20Ass38,%201.pdf)

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Full Text: [-1959\J Ame Sta Ass39, 96.pdf](-1959/J%20Ame%20Sta%20Ass39,%2096.pdf)

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Full Text: [1960-80\J Ame Sta Ass39, 697.pdf](1960-80/J%20Ame%20Sta%20Ass39,%20697.pdf)

# Title: The Journal of the American Taxation Association

Full Journal Title: The Journal of the American Taxation Association

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Hutchison, P.D. and White, C.G. (2003), *The Journal of the American Taxation Association* 1979-2000: Content, participation, and citation analyses. *The Journal of the American Taxation Association*, **25** (1), 100-121.

Full Text: [J\J Ame Tax Ass25, 100.pdf](J/J%20Ame%20Tax%20Ass25,%20100.pdf)

Abstract: This study uses three databases to identify and discuss trends within The Journal of the American Taxation Association (DATA) for the 1979 through 2000 time period. This research reports on institutional involvement of the authors publishing in JATA and examines the extent of citations of DATA articles within the journal itself and in other academic, accounting journals. Methodologies utilized are content, participation, and citation analyses.

A review of the data suggests that JATA went through a major shift in emphasis during the late 1980s and early 1990s. This shift brought a narrowing of focus on tax topics and research methodologies consistent with the Scholes and Wolfson paradigm of tax research. In addition, participation in JATA shifted more toward Assistant Professors, although this gap has begun to close in recent years.

# Title: Journal of the American Veterinary Medical Association

Full Journal Title: Journal of the American Veterinary Medical Association

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0003-1488

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

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Full Text: -1959\J Ame Vet Med Ass118, 398.pdf

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Keywords: Beta-Lactam Antibiotics, Clinical-pHarmacology, Hemoglobinuria, Hematuria, Cattle

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Abstract: The accuracy of references and quotations used to substantiate statements of fact in articles published in 6 frequently cited veterinary journals was examined. Three hundred references were randomly selected, and the accuracy of each citation was examined. A subset of 100 references was examined for quotational accuracy; ie, the accuracy with which authors represented the work or assertions of the author being cited. Of the 300 references selected, 295 were located, and 125 major errors were found in 88 (29.8%) of them. Sixty-seven (53.6%) major errors were found involving authors, 12 (9.6%) involved the article title, 14 (11.2%) involved the book or journal title, and 32 (25.6%) involved the volume number, date, or page numbers. Sixty-eight minor errors were detected. The accuracy of 111 quotations from 95 citations in 65 articles was examined. Nine quotations were technical and not classified, 86 (84.3%) were classified as correct, 2 (1.9%) contained minor misquotations, and 14 (13.7%) contained major misquotations. We concluded that misquotations and errors in citations occur frequently in veterinary journals, but at a rate similar to that reported for other biomedical journals.

Keywords: Veterinary Literature, Citation, Peer

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# Title: Journal of the American Water Resources Association

Full Journal Title: [Journal of the American Water Resources Association](http://proquest.umi.com/pqdlink?Ver=1&Exp=06-14-2010&RQT=318&PMID=46029&clientId=3489)

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Dubuc, Y., Janneteau, P., Labonté, R., Roy, C. and Brière, F. (1986), Domestic wastewater treatment by peatlands in a northern climate: A water quality study. *Journal of the American Water Resources Association*, **22** (2), 297-303.

Full Text: [1986\J Ame Wat Res Ass22, 297.pdf](1986/J%20Ame%20Wat%20Res%20Ass22,%20297.pdf)

Notes: highly cited

? Arnold, J.G., Srinivasan, R., Muttiah, R.S. and Williams, J.R. (1998), Large area hydrologic modeling and assessment. Part 1: Model development. *Journal of the American Water Resources Association*, **34** (1), 73-89.

Full Text: [1998\J Ame Wat Res Ass34, 73.pdf](1998/J%20Ame%20Wat%20Res%20Ass34,%2073.pdf)

Abstract: A conceptual, continuous time model called SWAT (Soil and Water Assessment Tool) was developed to assist water resource managers in assessing the impact of management on water supplies and nonpoint source pollution in watersheds and large river basins. The model is currently being utilized in several large area projects by EPA, NOAA, NRCS and others to estimate the off-site impacts of climate and management on water use, nonpoint source loadings, and pesticide contamination. Model development, operation, limitations, and assumptions are discussed and components of the model are described. In Part II, a GIS input/output interface is presented along with model validation on three basins within the Upper Trinity basin in Texas.

Keywords: Agricultural Land Management, Assessment, Catchments, Contamination, Crop, Development, Erosion, Europeen, Impact, Large Area Modeling, Management, Model, Modeling, Nonpoint Source Pollution, Pesticide, Plant Growth, Pollution, Runoff, Sedimentation, SHE, Simulation, Soil, Surface Water Hydrology, System, Validation, Water

? Srinivasan, R., Ramanarayanan, T.S., Arnold, J.G. and Bednarz, S.T. (1998), Large area hydrologic modeling and assessment. Part II: Model application. *Journal of the American Water Resources Association*, **34** (1), 91-101.

Full Text: [1998\J Ame Wat Res Ass34, 91.pdf](1998/J%20Ame%20Wat%20Res%20Ass34,%2091.pdf)

Abstract: This paper describes the application of a river basin scale hydrologic model (described in Part I) to Richland and Chambers Creeks watershed (RC watershed) in upper Trinity River basin in Texas, The inputs to the model were accumulated from hydrographic and geographic databases and maps using a raster-based GIS. Available weather data from 12 weather stations in and around the watershed and stream flow data from two USGS stream gauge station for the period 1965 to 1984 were used in the flow calibration and validation. Sediment calibration was carried out for the period 1988 through 1994 using the 1994 sediment survey data from the Richland-Chambers lake. Sediment validation was conducted on a subwatershed (Mill Creek watershed) situated on Chambers Creek of the RC watershed. The model was evaluated by well established statistical and visual methods and was found to explain at least 84 percent and 65 percent of the variability in the observed stream flow data for the calibration and validation periods, respectively. In addition, the model predicted the accumulated sediment load within 2 percent and 9 percent from the observed data for the RC watershed and Mill Creek watershed, respectively.

Keywords: Assessment, Databases, GIS, GIS Interface, Model, Modeling, Nonpoint Source Pollution, Pollution, Sediment, Sedimentation, Simulation, Statistical, Survey, Validation, Variability, Watershed Modeling

? Blattel, C.R., Williard, K.W.J., Baer, S.G. and Zaczek, J.J. (2005), Abatement of ground water phosphate in giant cane and forest riparian buffers. *Journal of the American Water Resources Association*, **41** (2), 301-307.

Full Text: [2005\J Ame Wat Res Ass41, 301.pdf](2005/J%20Ame%20Wat%20Res%20Ass41,%20301.pdf)

Abstract: Forest and grass riparian buffers have been shown to be effective best management practices for controlling nonpoint source pollution. However, little research has been conducted on giant cane (Arundinaria gigantea (Walt. Muhl.)], a formerly common bamboo species, native to the lower midwestern and southeastern United States, and its ability to reduce nutrient loads to streams. From May 2002 through May 2003, orthophosphate or dissolved reactive phosphate (DRP) concentrations in ground water were measured at successive distances from the field edge through 12 m of riparian buffers of both giant cane and mixed hardwood forest along three streams draining agricultural land in the Cache River watershed in southern Illinois. Giant cane and mixed hardwood forest did not differ in their DRP sequestration abilities. Ground water DRP concentrations were significantly reduced (14 percent) in the first 1.5 m of the buffers, and there was an overall 28 percent reduction in DRP concentration by 12 m from the field edge. The relatively low DRP reductions compared to other studies could be attributed to high DRP input levels, narrow (12 m) buffer lengths, and/or mature (28 to 48 year old) riparian vegetation.

Keywords: Agriculture, Dynamics, Forest, Lithology, Movement, Nitrate Removal, Nitrogen, Nonpoint Source Pollution, Nutrient Retention, Phosphorus Retention, Pollution, Riparian Ecology, Stream, Water Quality, Wells, Zones

# Title: Journal American Water Works Association

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Engineering, Civil: Impact Factor 1.101, 8/80 (2005)

Water Resources: Impact Factor 0.729, 16/47 (2000); Impact Factor 1.101, 20/57 (2005)

Weber, W.J. and Morris, J.C. (1964), Adsorption in heterogeneous aqueous systems. *Journal American Water Works Association*, **56**, 447-456.

Full Text: J Ame Wat Wor Ass56, 447.pdf

? Sigworth, E.A. and Smith, S.B. (1972), Adsorption of inorganic compound by activated carbon. *Journal American Water Works Association*, **64**, 386-391.

Full Text: J Ame Wat Wor Ass64, 386.pdf

Hem, J.D. and Durum, W.H. (1973), Solubility and occurrence of lead in surface water. *Journal American Water Works Association*, **65**, 562-568.

Full Text: J Ame Wat Wor Ass65, 562.pdf

? Bishop, P.L. and Sansoucy, G. (1978), Fluoride removal from drinking water by fluidized activated alumina adsorption. *Journal American Water Works Association*, **70** (10), 554-559.

Full Text: J Ame Wat Wor Ass70, 554.pdf

Abstract: The use of activated alumina in a continuous flow fluidized system is an economical and efficient method for defluoridating water supplies. An activated alumina adsorption reactor operated in the fluidized mode has a greater fluoride removal capacity than does a down flow reactor, as a result of the larger surface area available for adsorption. In addition, the fluidized reactor can be operated at loading rates as much as five times that of a down flow reactor to achieve the same fluoride removal. Because of the efficiency of the process in decreasing fluoride concentrations to below 0.1 mg/l, not all water would require treatment. Treated water could be mixed with untreated water to achieve the desired fluoride concentration. The capacity of the medium decreases with an increase in pH or alkalinity. In addition, alkalinity competes with fluoride for sites on the activated alumina, resulting in a decrease in water alkalinity. Waters of low alkalinity might have all buffer capacity removed by this process and would require pH adjustment after fluoride removal. The use of a fluidized activated alumina bed for fluoride removal was investigated. Research on the use of activated alumina for removing fluorides from water was done on both batch and continuous flow bases. Batch reactor tests were performed to study the effects of medium mesh size, pH, fluoride concentration, and alkalinity of fluoride removal. Continuous flow, fluidized-column studies were performed to evaluate fluidization characteristics, fluoride removal characteristics, regeneration procedures, and extent of deterioration of the medium.

Schock, M.R. (1980), Response of lead solubility to dissolved carbonate in drinking water. *Journal American Water Works Association*, **72**, 695-704.

Full Text: J Ame Wat Wor Ass72, 695.pdf

? Weber, Jr., W.J. and Pirbazari, M. (1982), Adsorption of toxic and carcinogenic compounds from water. *Journal American Water Works Association*, **74** (4), 203-209.

Full Text: J Ame Wat Wor Ass74, 203.pdf

? Weber, Jr., W.J., Voice, T.C. and Jodellah, A. (1983), Adsorption of humic substances: The effects of heterogeneity and system characteristics. *Journal American Water Works Association*, **75** (12), 612-619.

Full Text: J Ame Wat Wor Ass75, 612.pdf

? Pirbazari, M. and Weber, Jr., W.J. (1984), Adsorption of para-dichlorobenzene from water. *Journal American Water Works Association*, **76** (2), 82-84.

Full Text: J Ame Wat Wor Ass76, 82.pdf

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Full Text: J Ame Wat Wor Ass77, 62.pdf

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Full Text: J Ame Wat Wor Ass77, 132.pdf

? Jodellah, A.M. and Weber, Jr., W.J. (1985), Controlling trihalomethane formation potential by chemical treatment and adsorption. *Journal American Water Works Association*, **77** (10), 95-100.

Full Text: J Ame Wat Wor Ass77, 95.pdf

Notes: highly cited

? Krasner, S.W., Mcguire, M.J., Jacangelo, J.G., Patania, N.L., Reagan, K.M. and Aieta, E.M. (1989), The occurrence of disinfection by-products in United States drinking water. *Journal American Water Works Association*, **81** (8), 41-53.

Full Text: 1989\J Ame Wat Wor Ass81, 41.pdf

? Najm, I.N., Snoeyink, V.L., Suidan, M.T., Lee, C.H. and Richard, Y. (1990), Effect of particle-size and background natural organics on the adsorption efficiency of PAC. *Journal American Water Works Association*, **82** (1), 65-72.

Full Text: J Ame Wat Wor Ass82, 65.pdf

? Adham, S.S., Snoeyink, V.L., Clark, M.M. and Bersillon, J.L. (1991), Predicting and verifying organics removal by pac in an ultrafiltration system. *Journal American Water Works Association*, **83** (12), 91-101.

Full Text: J Ame Wat Wor Ass83, 91.pdf

Abstract: The performance of powdered activated carbon (PAC) in a hollow-fiber ultrafiltration (UF) system was successfully predicted and measured with respect to the removal of total organic carbon and a representative synthetic organic chemical, 2,4,6-trichlorophenol, from natural water. Because the adsorption kinetics for smaller PAC particles are much faster than for larger particles, the use of smaller particle sizes allowed the use of shorter PAC contact times. Model predictions for the removal of organic compounds can be used in the design of PAC-UF systems.

Keywords: Adsorption, Pretreatment, Water, Size

? Carter, M.C., Weber, Jr., W.J. and Olmstead, K.P. (1992), Effects of background dissolved organic-matter on TCE adsorption by GAC. *Journal American Water Works Association*, **84** (8), 81-91.

Full Text: J Ame Wat Wor Ass84, 81.pdf

Abstract: The effects of dissolved organic matter, reactor configuration, and granular activated carbon (GAC) particle size on equilibrium adsorption of trichloroethylene (TCE) were examined under simultaneous loading and early preloading conditions. Differences in isotherm capacities obtained using batch-reactor and column-reactor estimation methods were observed when natural background organic matter and TCE were adsorbed simultaneously onto nonpreloaded GAC. Differences in isotherms derived from the two methods were diminished, however, when the carbon was first preloaded with the background organic matter in a river water in the absence of TCE. Significant increases in isotherm slope were observed with increasing preloading time for GAC of two different particle sizes. Isotherms determined using powdered activated carbon sieved from crushed preloaded GAC had essentially parallel slopes, however, with capacities greater than the parent preloaded GAC over the concentration range of interest. The observed effects were analyzed in the context of a proposed dualistic model for interpretation of interactions among background organic matter, target solutes, and microporous adsorbents.

Keywords: Activated Carbon, Activated Carbon Adsorption, Adsorption, Design, Fixed-Bed Adsorbers, Gac, Humic Substances, Mass-Transfer Parameters, Natural Solids, Organic Matter, Predictive Model, Sorption, Synthetic Adsorbents, TCE, Trichloroethylene, Water-Treatment

Kuennen, R.W., Taylor, R.M., van Dyke, K. and Groenevelt, K. (1992), Removing lead from drinking water with a point-of-use GAC fixed-bed adsorber. *Journal American Water Works Association*, **84**, 91-101.

Full Text: J Ame Wat Wor Ass84, 91.pdf

? Clifford, D. and Liu, X.S. (1992), Ion-exchange for nitrate removal. *Journal American Water Works Association*, **85** (4), 135-143.

Full Text: J Ame Wat Wor Ass85, 135.pdf

Abstract: A bench-scale ion exchange process with batch biological denitrification of the spent regenerant brine was developed to remove nitrate from drinking water. This research indicates that the combination procedure results in 50 percent reduction of regenerant consumption and 90 percent reduction in the mass of waste salt discharged. The process features a sequencing batch reactor to accomplish the biological denitrification of a 0.5 N sodium chloride spent regenerant solution. Now being pilot tested in California, the process-which is simple, flexible, and reliable-should be suitable for use by small systems.

Keywords: Biological Denitrification, Ground-Water

Huck, P.M., Zhang, S. and Price, M.L. (1994), BOM removal-during biological treatment: A first-order model. *Journal American Water Works Association*, **86**, 61-71.

Full Text: J Ame Wat Wor Ass86, 61.pdf

Abstract: Part of a special section on the Disinfectants-Disinfection By-products (D-DBP) Rule. The writers present a quantitative analysis of data from full-scale and pilot biological drinking water treatment plants in the U.S. The objective of this work was to determine whether the removal of certain parameters in biological water treatment is a first-order process. Data for assimilable organic carbon, biodegradable dissolved organic carbon, nonpurgeable organic carbon, trihalomethane formation potential, chlorine demand and adsorbable organic halogen formation potential were investigated. The amount removed was calculated through a normalizing procedure and a regression procedure. The results indicate that the correlation coefficient for the regression was significant at the 1 percent level for almost all cases and for all the parameters investigated. Therefore, a first-order relationship provides a good approximation to removals achieved in practice.

Edwards, M. (1994), Chemistry of arsenic removal during coagulation and Fe-Mn oxidation. *Journal American Water Works Association*, **86** (9), 64-78.

Full Text: J Ame Wat Wor Ass86, 64.pdf

Abstract: Arsenic removal during coagulation or Fe-Mn oxidation is examined to aid utilities that desire to improve arsenic removal. Fundamental mechanisms of arsenic removal are discussed, optimization strategies are forwarded, and some new insights are provided to guide future research. Specifically, As(III) removals by coagulation are primarily controlled by coagulant dose and relatively unaffected by solution pH, whereas the converse is true for As(V). When compared on the basis of moles iron or aluminum hydroxide solid formed during coagulation, iron and aluminum coagulants are of demonstrably equal effectiveness in removing As(V) at pH <7.5. However, iron-based coagulants are advantageous if soluble metal residuals are problematic, if pH is >7.5, or if the raw water contains As(III). Arsenic removal during Fe-Mn oxidation is controlled by the quantity of iron removed [Fe(OH)3 formed] and is relatively independent of the quantity of manganese removed (MnOOH formed).

Keywords: Surface-Chemistry, Drinking-Water, Natural Waters, Adsorption, Ferrihydrite, Groundwater, Solubility, pHosphate, Hydroxide, Kinetics

Cheng, R.C., Wang, H.C. and Beuhler, M.D. (1994), Enhanced coagulation for arsenic removal. *Journal American Water Works Association*, **86** (9), 79-90.

Full Text: J Ame Wat Wor Ass86, 79.pdf

Abstract: The possible use of enhanced coagulation for arsenic removal was examined at the facilities of a California utility in 1992 and 1993. The tests were conducted at bench, pilot, and demonstration scales, with two source waters. Alum and ferric chloride, with cationic polymer, were investigated at various influent arsenic concentrations. The investigators concluded that for the source waters tested, enhanced coagulation could be effective for arsenic removal and that less ferric chloride than alum, on a weight basis, is needed to achieve the same removal.

Keywords: Drinking-Water, Adsorption

? Hering, J.G., Chen, P.Y., Wilkie, J.A., Elimelech, M. and Liang, S. (1996), Arsenic removal by ferric chloride. *Journal American Water Works Association*, **88** (4), 155-167.

Full Text: J Ame Wat Wor Ass88, 155.pdf

Abstract: Bench-scale studies were conducted in model freshwater systems to investigate how various parameters affected arsenic removal during coagulation with ferric chloride and arsenic adsorption onto preformed hydrous ferric oxide. Parameters included arsenic oxidation state and initial concentration, coagulant dosage or adsorbent concentration, pH, and the presence of co-occurring inorganic solutes. Comparison of coagulation and adsorption experiments and of experimental results with predictions based on surface complexation modeling demonstrated that adsorption is an important (though not the sole) mechanism governing arsenic removal during coagulation. Under comparable conditions, better removal was observed with arsenic(V) [As(V)] than with arsenic(III) [As(III)] in both coagulation and adsorption experiments. Below neutral pH values, As(III) removal-adsorption was significantly decreased in the presence of sulfate, whereas only a slight decrease in As(V) removal-adsorption was observed. At high pH, removal-adsorption of As(V) was increased in the presence of calcium. Removal of As(V) during coagulation with ferric chloride is both more efficient and less sensitive than that of As(III) to variations in source water composition.

Keywords: Natural-Waters, Adsorption, Speciation

Krupa, N.E. and Cannon, F.S. (1996), GAC: Poe strcture versus dye adsorption. *Journal American Water Works Association*, **88** (6), 94-108.

Full Text: J Ame Wat Wor Ass88, 94.pdf

Abstract: Laboratory tests compared several virgin and reactivated granular activated carbons (GACs) with regard to pore-size distributions versus their water-phase adsorption capacity for several adsorbates. Pore-size characterizations employed N2 adsorption isotherms, as interpreted by the density functional theory (DFT) model. These were compared with previous results that employed the Barrett, Joyner, and Halenda model, as adapted by the authors. The newly developed DFT model offered better correlations to water-phase adsorption behavior, although it also exhibited and apparent anomaly in the 8-12-A pore-width range. For the coal-based GACs used in this study, the pore sizes that provided the greatest adsorption capacity correlated well with the dimensions of the adsorbates; small-compound adsorption correlated most strongly with micropore volume, and larger dye adsorption correlated most strongly with mesopore plus large micropore volume. Coefficients of determination (r2) exceeded 0.95 when the appropriate range of DFT pore-volume distribution was compared with dye or p-nitrophenol adsorption capacity.

? McNeill, L.S. and Edwards, M. (1997), Predicting as removal during metal hydroxide precipitation. *Journal American Water Works Association*, **89** (1), 75-86.

Full Text: J Ame Wat Wor Ass89, 75.pdf

Abstract: A simplified isotherm is described that can predict the extent of arsenate removal at drinking water utilities practicing coagulation or iron-manganese (Fe-Mn) removal. If all possible sources of particulate iron and aluminum hydroxide present in the system are accounted for, the model predicts arsenic (As) removal to within±13 percent (90 percent confidence) for Fe coagulation at pH 6.5-8 and alum coagulation at pH < 7.6. Analysis of full-scale treatment data suggests that colloidal aluminum (Al) flocs with sorbed arsenate [As(V)] may pass through filters, thereby decreasing overall As removal efficiency. Thus, Al solubility and particle stability must be minimized to improve As removal. If stability and solubility of aluminum hydroxide flocs are not a problem, alum and Fe coagulants have, nearly equal capacity for sorbing As(V). Survey results also demonstrate the importance of particulate As.

Keywords: Arsenic Removal, Surface-Chemistry, Adsorption, Coagulation, Ferrihydrite

? Baron, J.M. (1998), Public affairs and the consumer landscape. *Journal American Water Works Association*, **90** (1), 44-48.

Full Text: J Ame Wat Wor Ass90, 44.pdf

Abstract: The water industry needs to develop a public information program that effectively publicizes its efforts to maintain a safe water supply. To do this, the industry needs to know the needs of its customers. Customers are motivated by concerns about health, good value for price, service, and the environment. As groups they may lobby for federal protection when the need is felt, and as individuals they may simply switch their allegiance to bottled water. Although they are overloaded with information, they remain interested in information relating to personal and public health. The industry needs to give customers information that meets their substantive and emotional needs. Asking them is the best way to determine what this information is.

? Kilduff, J.E., Karanfil, T. and Weber, Jr., W.J. (1998), TCE adsorption by GAC preloaded with humic substances. *Journal American Water Works Association*, **90** (5), 76-89.

Full Text: J Ame Wat Wor Ass90, 76.pdf

Abstract: Adsorption of trichloroethylene (TCE) by activated carbon preloaded with humic and fulvic acids was studied under several conditions in completely mixed batch systems. The authors investigated how molecular weight and molecular-weight distribution of preloaded humic substances affected subsequent adsorption of TCE. The capacity of carbon to adsorb TCE was most greatly reduced in carbon that was preloaded with humic acid components having molecular weights less than about 1,400 g/mol as polystyrene sulfonate. The adsorption capacity was greatly reduced in carbon that was preloaded with whole humic mixtures in which lower molecular weights predominated. The energy distributions of adsorbent indicate that preloaded compound preferentially occupy high-energy sites, making them inaccessible to subsequently encountered TCE.

Keywords: Activated Carbon, Activated Carbon Adsorption, Adsorption, Desorption, Gac, Humic Acid, Matter, Molecular-Weight, Organic-Compounds, TCE, Trichloroethylene, Water

? Knappe, D.R.U., Snoeyink, V.L., Roche, P., Prados, M.J. and Bourbigot, M.M. (1999), Atrazine removal by preloaded GAC. *Journal American Water Works Association*, **91** (10), 97-109.

Full Text: J Ame Wat Wor Ass91, 97.pdf

Abstract: The effect of granular activated carbon (GAC) service time on the remaining life of GAC adsorbers that are exposed to periodic pollutant episodes was evaluated. Equilibrium and kinetic parameters describing the adsorption of atrazine were determined for GAC that had been preloaded with background organic matter (BOM) for as long as 25 months, Furthermore, atrazine removal was measured in pilot tests employing GAC that had been preloaded for five and 20 months. Isotherm data showed that (1) preloaded BOM sharply reduced the remaining adsorption capacity of GAC for atrazine, (2) competitive adsorption was not important on the tested preloaded GAC samples, and (3) use of pulverized preloaded GAC led to an overestimate of remaining adsorption capacity. Preloading had the greatest effect on GAC capacity; adsorption kinetics were not affected as severely. The homogeneous surface diffusion model was used to predict atrazine removal in pilot tests and to predict remaining GAC life. For the given adsorbent and background water, remaining life predictions for atrazine removal are presented for scenarios that may be typical for utilities in the midwestern United States and in western Europe.

Keywords: Activated Carbon Adsorption, Fixed-Bed Adsorbers, Background Organic-Matter, Humic Substances, Degradation Products, TCE Adsorption, Size-Exclusion, Natural-Water, Parameters, Mixtures

? Chwirka, J.D., Thomson, B.M. and Stomp, J.M. (1998), Removing arsenic from groundwater. *Journal American Water Works Association*, **92** (3), 79-??.

Full Text: J Ame Wat Wor Ass92, 79.pdf

Abstract: Three treatment technologies for removing arsenic from groundwater in Albuquerque, N.M., were compared: ion exchange (IX), iron hydroxide coagulation followed by microfiltration (C/MF), and activated alumina (AA) adsorption. For an 8, 700-m3/d (2.3-mgd) arsenic treatment facility, capital costs of the three processes were similar: $5.2 million, $4.1 million, and $4.6 million, respectively. Annual operations and maintenance costs were $447,000, $273,000 and $444,000, respectively. The principal differences were the result of large salt requirements for the IX process and the need to reduce the pH to 6 for AA adsorption, followed by base addition to stabilize the water. The C/MF system was selected for a demonstration facility in Albuquerque.

? Harding, A.K. and Anadu, E.C. (2000), Consumer response to public notification. *Journal American Water Works Association*, **92** (8), 32-41.

Full Text: J Ame Wat Wor Ass92, 32.pdf

Abstract: Residents of four Oregon communities were surveyed about their responses to public notification. In the two towns that had issued public notification in response to a water problem, most residents were aware of the notices and responded by boiling their water, drinking bottled water, or both. Residents in the town with a short-term water problem were more likely than residents in the town with a long-term problem. to boil water. Most respondents in both towns favored drinking bottled water over boiling water, despite a boil-water notice. The survey found that residents of these towns as well as those in two control communities considered the newspaper the primary source of information about their drinking water. The sources of information regarded as most reliable, however, were mail from the city water utility, followed by the county health department and news papers, Most respondents reported they were willing to pay for drinking water improvements, particularly to correct chemical and microbiological contamination.

Keywords: Risk Communication, Workers, Issues, Information, Water

? Anadu, E.C. and Harding, A.K. (2000), Risk perception and bottled water use. *Journal American Water Works Association*, **92** (11), 82-??.

Full Text: J Ame Wat Wor Ass92, 82.pdf

Abstract: This study investigated differences in risk perception about public drinking water and the use of bottled water in four oregon communities served by small community systems.

Keywords: Drinking-Water, Small Systems, Health, Communication, Quality

? Di Giano, F.A., Singer, P.C., Parameswar, C. and Le Court, T.D. (2001), Biodegradation kinetics of ozonated NOM and aldehydes. *Journal American Water Works Association*, **93** (8), 92-104.

Full Text: J Ame Wat Wor Ass93, 92.pdf

Abstract: The batch recycle attached growth reactor (BRAGR) was found to be a convenient technique to determine simultaneously the biodegradable dissolved organic carbon (BDOC) concentrations and the biokinetic rate constants for BDOC and aldehyde removal. The rate of biodegradation was first-order with respect to the BDOC remaining. A second-order, intrinsic rate constant was obtained by dividing the first-order rate constant by the attached biomass concentration in the biofilter. The intrinsic rate constant did not increase with an increasing ozone-to-DOC ratio and averaged 8.5×10-5 mg/L cells-1 min-1. The biokinetic rate constants for aldehydes were first-order with respect to remaining substrate concentration. The second-order, intrinsic rate constants (mg/L cells-1 min-1) for the aldehydes were much larger than those for BDOC, with the order being: methyl glyoxal (5.93×10-4) > glyoxal (4.42×10-4) > formaldehyde (2.23×10-4) >> BDOC (8.5×10-5). Removal of aldehydes in a laboratory-scale, continuous-flow biofilter packed with anthracite and exhausted granular activated carbon (GAC) was predicted fairly well with rate constants derived from the BRAGR. BDOC removal was significantly underpredicted on GAC biofilters, possibly because of residual adsorption capacity. An empty bed contact time that achieves good natural organic matter (NOM) removal will also yield very high removal of aldehydes because aldehydes are degraded much faster than NOM, regardless of the ozonation level. Biokinetic modeling could possibly be improved by accounting for differences in the biodegradability of NOM fractions and by better techniques to measure the concentration and activity of attached biomass in calculation of the intrinsic rate constant.

Keywords: Disinfection By-Products, Biological Treatment, Biofiltration, Performance, Drinking-Water, Organic-Matter, BOM Removal, Humic-Acid, Carbon, Biomass, Filters

? Vasquez, F.A., Heaviside, R., Tang, Z.J. and Taylor, J.S. (2001), Effect of free chlorine and chloramines on lead release in a distribution system. *Journal American Water Works Association*, **98** (2), 144-154.

Full Text: J Ame Wat Wor Ass98, 144.pdf

Abstract: Total lead release in the presence of free chlorine and chloramine residuals was investigated in drinking waters produced from ground, surface, desalinated, and blended water sources. For desalinated and blended finished waters, more total lead was released in the presence of chloramine than in the presence of free chlorine; for finished groundwater and surface water, however, no statistical differences in total lead release were found. Finished water oxidation-reduction potential (ORP) differed by residual type but was equivalent by source and not affected by the addition of 100 mg/L of sulfates or chlorides. ORP measurement and development of Pourbaix diagrams showed that lead dioxide was the controlling solid phase in the presence of chlorine, and hydrocerussite was the controlling solid phase in the presence of chloramine. Lead dioxide is less soluble than hydrocerussite, which mechanistically accounted for the lower lead release in the presence of free chlorine.

Keywords: Drinking-Water, Plumbing Materials, Corrosion Control, Nitrate Solutions, Dissolution, Solubility, Carbonate, Exposure, Solder

# Title: Journal of Analytical and Applied Pyrolysis

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Simitzis, J. and Sfyrakis, J. (1993), Pyrolysis of lignin biomass: Novolac resin for the production of polymeric carbon adsorbents. *Journal of Analytical and Applied Pyrolysis*, **26** (1), 37-52.

Full Text: [J\J Ana App Pyr26, 37.pdf](J/J%20Ana%20App%20Pyr26,%2037.pdf)

Abstract: Carbonaceous adsorbents, based on Klason lignin isolated from olive stone biomass and novolac resin, were prepared. Four groups of materials were used as raw materials and were then cured, pyrolyzed (in an N2 stream up to 1000°C) and in some cases activated (with a water vapour at 930°C): (1) Klason lignin hydroxymethylated and phenolated (KLHP); (2) Klason lignin hydroxymethylated and phenolated combined with pressed olive stones (KLHP—OS); (3) Klason lignin hydroxymethylated and phenolated combined with novolac resin (KLHP—N); (4) 93% w/w of novolac prepared in presence of 7% wt/wt of Klason lignin (N—KL) and then mixed with pressed olive stones (N—KL—OS).

The weight losses and shrinkages of raw materials during pyrolysis, the FT-IR spectra of raw materials and of end-products, and the specific surface area of end-products and their discolouring ability using aqueous solution of Methylene blue, were determined. The combination of such materials can improve the characteristics of end-products (e.g. higher specific surface area and discolouring ability) or the processing characteristics (e.g. lower weight losses and shrinkages of materials during pyrolysis). Also, the participation of lignin in reactions with phenol was determined. Such materials, especially KLHP—N with an excess of novolac and secondarily KLHP—OS with an excess of olive stones, show interesting potential as raw materials for the production of polymeric carbon adsorbents.

Keywords: Carbon Adsorbents, Klason Lignin, Novolac Resin, Olive Stone Biomass, Pyrolysis

Helleur, R., Popovic, N., Ikura, M., Stanciulescu, M. and Liu, D. (2001), Characterization and potential applications of pyrolytic char from ablative pyrolysis of used tires. *Journal of Analytical and Applied Pyrolysis*, **58-59** (1), 813-824.

Full Text: [J\J Ana App Pyr58-59, 813.pdf](J/J%20Ana%20App%20Pyr58-59,%20813.pdf)

Abstract: Pyrolysis has the potential of transforming used tires into useful recyclable products. Pyrolytic char is one of the most important products of tire pyrolysis. The process economy depends strongly on its commercial value. A 2-year study was undertaken to examine the chemistry and commercial applications of pyrolytic char obtained from the commercialized process called Continuous Ablative Regenerator (CAR) system (Enervision Inc., Halifax, Canada). The pyrolysis temperature was 550°C, residence time 0.6 s, under N2 flow and using ~1 cm tire shreds. A small-scale unit, 0.25 ton day−1, was used in the study. The process is unique in design and features several operating parameters, which favor optimum tire pyrolysis (e.g. no heat transfer medium, fast pyrolysis and rapid product quenching). The physical properties (porosity, particle and aggregate size, surface area), chemical properties (elemental analysis, ash content and composition) and aqueous adsorption properties (for metals, phenols and Methylene blue) of the pyrolytic char were examined. As well, laboratory-scale production of activated carbon from tire pyrolysis char was examined as a means of upgrading. The activated carbon was characterized in the same manner as the char. Results revealed that the char must be post- carbonized (600°C) to remove unwanted odor and trace oils. The resulting carbonized char has excellent adsorption capacity for phenol and metals (i.e. lead) from solution. It is believed that the high sulfur content in the char (2%) and the inherent composition of tire char is responsible for these properties. Activation using steam (900°C, 3 h) produced an activated carbon with good surface area (302 m2 g−1), excellent adsorption for phenol and Methylene blue, but showed no improvement for metal removal. Norit SA3 and commercial charcoal were used for comparison. Further studies will be conducted to examine the char performance for Hg removal from air and water and its use in wastewater treatment and as a stack gas scrubber medium.

Keywords: Ablative Pyrolysis, Activation, Aggregate Size, Aqueous Metal Adsorption, Aqueous phenol Adsorption, Carbonization, Char, Particle Size, Surface Area, Used Tires

Olivella, M.A., del Río, J.C., Palacios, J., Vairavamurthy, M.A. and de las Heras, F.X.C. (2002), Characterization of humic acid from leonardite coal: an integrated study of PY-GC-MS, XPS and XANES techniques. *Journal of Analytical and Applied Pyrolysis*, **63** (1), 59-68.

Full Text: [J\J Ana App Pyr63, 59.pdf](J/J%20Ana%20App%20Pyr63,%2059.pdf)

Abstract: We studied the humic-acid fraction isolated from a Spanish leonardite coal (Torrelapaja, Cretaceous basin belonging to the Utrillas facies) using a suite of chromatographic and spectroscopic techniques to characterize the structure of the carbon skeleton and the nature of the sulfur-containing compounds. In particular, analytical pyrolysis coupled to gas chromatography-mass spectrometry was used to gain detailed molecular information on the organic structures. Pyrolysis in the presence of a methylating agent (tetramethyl-ammonium hydroxide, TMAH) was used to characterize polar moieties. We employed non-destructive techniques, XANES and XPS, to investigate the composition of the sulfur functionalities (such as sulfide, polysulfide, thiophene, sulfoxide, sulfonate and sulfate). The combination of these different approaches allows a more complete understanding of the organic sulfur structures in the leonardite coal. In agreement with previous studies, our results show that oxidized sulfur functionalities, such as sulfonate and sulfate, represent the major forms of sulfur in leonardite coal.

Keywords: Humic Acid, Leonardite Coal, Pyrolysis GC-MS, XPS, XANES, Tetramethyl-Ammonium Hydroxide (TMAH)

Tsai, W.T., Chen, H.P., Hsieh, M.F., Sun, H.F. and Chien, S.F. (2002), Regeneration of spent bleaching earth by pyrolysis in a rotary furnace. *Journal of Analytical and Applied Pyrolysis*, **63** (1), 157-170.

Full Text: [J\J Ana App Pyr63, 157.pdf](J/J%20Ana%20App%20Pyr63,%20157.pdf)

Abstract: A spent bleaching earth (SBE) from an edible oil refinery has been thermally regenerated by a rotary furnace under inert atmosphere (i.e. N2). Under the experimental conditions investigated, pyrolysis temperature (500-660degreesC) is an important operating parameter. The effects of processing parameters such as pyrolysis temperature (>660degreesC) holding time and flowing gas (N2 vs. CO2) on the characterizations of the resulting solids are negligible compared to the fresh bleaching earth. Results showed that these samples are type IV with hysteresis loops corresponding to type H3 from nitrogen adsorption isotherms, indicating slit-shaped mesoporous characteristics. The regenerated clays have smaller surface areas (approximate to100 vs. 268 m2 g-1) and pore volumes (approximate to0.214 vs. 0.359 cm3 g-1) than the fresh bleaching earth. In addition, this study clearly demonstrated that the porosities created in the samples without acid-washing are lower than those with acid washing due to the residues left in the pores. Thus, smaller pores, accompanied by an increase in surface area, were also obtained for all samples after acid washing treatments. (C) 2002 Elsevier Science B.V. All rights reserved.

Keywords: Spent Bleaching Earths, Regeneration, Pyrolysis, Waste Treatment, Edible Oil Industry, Rotary Furnace, Low-Cost Adsorbent, Activation Procedure, Edible Oil, Surface, Carbon, Clay, Reuse

Tsai, W.T., Chen, H.P., Lai, C.W., Hsien, K.J., Lee, M.S. and Yang, J.M. (2003), Preparation of adsorbents from sugarcane manufacturing by-product filter-mud by thermal activation. *Journal of Analytical and Applied Pyrolysis*, **70** (2), 399-411.

Full Text: [J\J Ana App Pyr70, 399.pdf](J/J%20Ana%20App%20Pyr70,%20399.pdf)

Abstract: A series of experiments with thermal activation were carried out on filter-mud waste from the sugarcane refining process in a rotary reactor. The influence of activation parameters on the agro-industrial waste by varying the operation temperature of 600-800 degreesC was determined. The variations of pore properties as well as the change of chemical characteristics in the resulting solids (FM series) were also studied. The results show that the resulting samples are type IV with hysteresis loops corresponding to type H3 from nitrogen adsorption-desorption isotherms, indicating slit-shaped mesoporous characteristics (BET surface areas of 57-132 m2 g-1). The results also show that the surface areas of the unwashed products and water-washed products are lower than those of the washed products because of residues left in the crude products. The adsorption of paraquat on FM sample was preliminarily evaluated. The isotherm showed that the FM adsorbent had a high affinity for this herbicide and can be well fitted by Freundlich model. Thus, the agro-industrial waste is one resource for producing the mesoporous materials, and it may be applied to the water treatment for the removal of organic contaminants. (C) 2002 Elsevier Science B.V. All rights reserved.

Keywords: Filter-Mud Waste, Adsorbent, Thermal Activation, Paraquat, Adsorption, Physical Activation, Bleaching Earth, Temperature, Carbons

El-Sheikh, A.H., Newman, A.P., Al-Daffaee, H.K., pHull, S. and Cresswel, N. (2004), Characterization of activated carbon prepared from a single cultivar of Jordanian Olive stones by chemical and physicochemical techniques. *Journal of Analytical and Applied Pyrolysis*, **71** (1), 151-164.

Full Text: [J\J Ana App Pyr71, 151.pdf](J/J%20Ana%20App%20Pyr71,%20151.pdf)

Abstract: The yearly production of olives in Jordan is more than 100 kton of which a significant proportion is de-stoned prior to sale. In this work, olive stones from Jordan were used for the preparation of activated carbon with the aim of producing a water treatment product suitable for treatment of contaminated groundwater. The preparation conditions were varied to study their effects on the surface area, porosity, morphology, functionality and crystal structure. Variables studied included time of carbonization, time of activation, activating agent, particle size, sample pre-drying, hydrogen peroxide post treatment and the effect of the activation process itself. X-ray diffraction analysis showed that the prepared activated carbon is essentially amorphous and indicated the presence of traces of oxides of calcium and magnesium, while infrared spectroscopy showed peaks relating to hydroxyl, aliphatic, ether, aromatic and phenolic groups. These functional groups and crystals may have some effect(s), i.e. catalytic, if the products were to be used in any reaction for water treatment. Nitrogen adsorption was used for the determination of apparent surface area and pore size distribution. Results showed that the active carbon is of moderate surface area and micropore volume is over 80% of the total pore volume. Scanning electron microscopy showed the development of the pores during different treatments. The most noticeable effect on the texture was that when the sample was not pre-dried. The adsorption capacity and surface acidity/basicity of all the samples have been studied by Methylene blue (MB) adsorption method and partial Boehm titrations, respectively. Results showed that the surface is mainly of basic nature, and also indicated that MB was adsorbed following the pore filling mechanism. Hydrogen peroxide post-treatment produced reduced surface area measurements.

Keywords: Olive Stones, Agricultural By-Products, Solid Waste Disposal, Activated Carbon, Water Treatment, Pyrolysis, Surface Area, Carbonization, Activation, Adsorption

? Lua, A.C., Yang, T. and Guo, J. (2004), Effects of pyrolysis conditions on the properties of activated carbons prepared from pistachio-nut shells. *Journal of Analytical and Applied Pyrolysis*, **72** (2), 279-287.

Full Text: [2004\J Ana App Pyr72, 279.pdf](2004/J%20Ana%20App%20Pyr72,%20279.pdf)

Abstract: The feasibility of preparing effective adsorbents from pistachio-nut shell was studied. Optimisation of the pyrolysis conditions prior to activation was carried out to study the effects of pyrolysis temperature, hold time, nitrogen flow rate and heating rate on the properties of chars and activated carbons, whilst the CO2 activation conditions were fixed at a temperature of 900 degreesC, an activation time of 30 min, a heating rate of 10 degreesC/min, a CO2 flow rate of 100 cm3/min and a nitrogen flow rate of 150 cm3/min. The activated carbons were characterised by a thermo-gravimetric analyser for the proximate analysis, an ultra-pycnometer for the solid density and an accelerated surface area and porosimetry for the determination of the BET and micropore surface areas. The optimum pyrolysis conditions were found to be at a temperature of 500 degreesC for 2 hr hold time, a heating rate of 10 degreesC/min and a nitrogen flow rate of 150cm3/min. For these conditions, activated carbons with a maximum BET surface area of 778 m2/g were obtained. The experimental results show that activated carbons with a moderate BET surface area can be prepared from pistachio-nut shells. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorption, Characterisation, CO2, Pistachio-Nut Shell, Pyrolysis, Steam, Stones, Surface Areas

? Giraldo-Gutiérrez, L. and Moreno-Piraján, J.C. (2008), Pb(II) and Cr(VI) adsorption from aqueous solution on activated carbons obtained from sugar cane husk and sawdust. *Journal of Analytical and Applied Pyrolysis*, **81** (2), 278-284.

Full Text: [2008\J Ana App Pyr81, 278.pdf](2008/J%20Ana%20App%20Pyr81,%20278.pdf)

Abstract: Adsorption isotherms were measured for Pb(II) and Cr(VI) systems adsorption from aqueous solutions on activated carbon obtained from sugar cane bagasse (CAB) and eucalyptus sawdust (CAA) in a batch-type absorber. It was found that their adsorption capacity increases between 5 and 30% among the physical and chemical activated carbons. The investigated ions were mainly adsorbed on the carboxylic groups since the adsorption capacity on the studied activated carbons is proportional in a direct to such groups. The solution’s pH had an effect on the isotherms of the obtained carbons which was evaluated. It was observed that the adsorption capacity depends significantly on the solution’s pH; where the highest adsorption for lead and chromium occurs at pH 4 and 5, respectively. (C) 2008 Elsevier B.V. All fights reserved.

Keywords: Adsorption, Activated Carbons, Lead(II), Chromium(VI), Carboxylic Sites, Lignocellulosic Waste, Metal-Ions, Waste-Water, Surface-Chemistry, Removal, Kinetics, Oxidation, Sorption, Cadmium, Copper, Peat

? Aworn, A., Thiravetyan, P. and Nakbanpote, W. (2008), Preparation and characteristics of agricultural waste activated carbon by physical activation having micro- and mesopores. *Journal of Analytical and Applied Pyrolysis*, **82** (2), 279-285.

Full Text: [2008\J Ana App Pyr82, 279.pdf](2008/J%20Ana%20App%20Pyr82,%20279.pdf)

Abstract: Micro-mesoporous activated carbons were prepared from various agricultural wastes by physical activation. Agricultural wastes such as macadamia nut-shell, corncob, bagasse bottom ash, sawdust fly ash and rice husk fly ash, were optimized and processed to obtain the highest surface area. The effects of the amount of volatile matter in char, the activating agent, the activating temperature and kind of raw materials were investigated in terms of porosity development. It was found that the amount of volatile matter, 17-25% or 300-500 degrees C suitable for pore development depended on the type of raw material. In addition, the activating agents (CO2 and steam) can differentially improve the porosity of the materials. Corncob and sawdust fly ash activated by CO2 and macadamia nut-shell and bagasse bottom ash activated by steam obtained the same high surface area. Among these materials, bagasse bottom ash and sawdust fly ash had a mesopore volume than other materials including commercial activated carbon. Therefore, both of these materials can be alternative adsorbents to adsorb large molecule of organic compounds. (C) 2008 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorbents, Adsorption, Agricultural Waste, Agricultural Wastes, Carbon, Carbons, Char, CO2, CO2 Gasification, Coconut Shell, Commercial Activated Carbon, Compounds, Corncob, Development, Dyes, Fly Ash, Organic Compounds, Palm-Shell, Physical Activation, Pore, Pore Development, Porosity, Preparation, Removal, Rice, Rice Husk, Sawdust, Surface Area, Surface-Area, Temperature, Volatile Matter, Volume, Water, ZnCl2

? Jia, Q. and Lua, A.C. (2008), Effects of pyrolysis conditions on the physical characteristics of oil-palm-shell activated carbons used in aqueous phase phenol adsorption. *Journal of Analytical and Applied Pyrolysis*, **83** (2), 175-179.

Full Text: [2008\J Ana App Pyr83, 175.pdf](2008/J%20Ana%20App%20Pyr83,%20175.pdf)

Abstract: Oil-palm shells, a biomass by-product from palm-oil mills, were converted into activated carbons by vacuum or nitrogen pyrolysis, followed by steam activation. The effects of pyrolysis environment, temperature and hold time on the physical characteristics of the activated carbons were studied. The optimum pyrolysis conditions for preparing activated carbons for obtaining high pore Surface area are vacuum pyrolysis at a pyrolysis temperature of 675 degrees C and 2 h hold time. The activation conditions were fixed at a temperature of 900 degrees C and 1 h hold time. The activated carbons thus obtained possessed well-developed porosities, predominantly microporosities. For the pyrolysis atmosphere, it was found that significant improvement in the Surface characteristics of the activated carbons was obtained for those pyrolysed under vacuum. Adsorption capacities of activated carbons were determined using phenol solution. For the activated carbons pyrolysed under optimum vacuum conditions, a maximum phenol adsorption capacity of 166 mg/g of carbon was obtained. A linear relationship between the BET surface area and the adsorptive capacity was shown. (c) 2008 Elsevier B.V. All rights reserved.

Keywords: Activated Carbons, Activation, Adsorption, Adsorption Capacity, Aqueous Phase Adsorption, BET, BET Surface Area, Biomass, Capacity, Carbon, Carbons, Environment, Nitrogen, Oil Palm Shell, Oil-Palm Shells, Phenol, Phenol Adsorption, Pore, Pyrolysis, Steam Activation, Stones, Surface Area, Temperature

? Moreno-Piraján, J.C., Gómez-Cruz, R., García-Cuello, V.S. and Giraldo, L. (2010), Binary system Cu(II)/Pb(II) adsorption on activated carbon obtained by pyrolysis of cow bone study. *Journal of Analytical and Applied Pyrolysis*, **89** (1), 122-128.

Full Text: [2010\J Ana App Pyr89, 122.pdf](2010/J%20Ana%20App%20Pyr89,%20122.pdf)

Abstract: Activated carbons obtained by pyrolysis of cow bone are economical adsorbents whose adsorption properties have been recently studied for monocomponent solutions of metal ions. However, for the wastewater treatment with these materials, their performance in multicomponent solutions has to be determined. This work studies adsorption competition between Cu2+ and Pb2+ metal ions. First, adsorption equilibrium for monocomponent metal ion solutions is investigated and shows adsorption capacities dependence on the two synthesized adsorbents; one of these adsorbents was obtained in an inert atmosphere (CBN) and the other one in the presence of the oxygen (CBOX). Differences in their textural properties may influence their adsorption capacities. Ionic size and electronegativity may also contribute to their adsorption behaviour. The second part of the study focuses on adsorption competition between those metal ions (a decrease in adsorption capacities is observed, whose value is related to adsorption kinetics of metal ions). Finally calorimetric measurements show good agreement with the earlier results. (c) 2010 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Activated Carbons, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Equilibrium, Adsorption Kinetics, Adsorption Properties, Aqueous Isotherms, Aqueous-Solution, Atmosphere, Behaviour, Binary System, Bone, Cadmium, Carbon, Char, Competition, Competitive Adsorption, Copper, Cow, Cow Bone, Equilibrium, Heavy-Metals, Immersion Calorimetry, Ions, Kinetics, Metal, Metal Ions, Oxygen, Performance, Pyrolysis, Removal, Rights, Size, Solutions, Sorption, Treatment, Value, Waste-Water, Wastewater, Wastewater Treatment, Work

# Title: Journal of Analytical Atomic Spectrometry

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Subject Categories

Spectroscopy: Impact Factor 3.488, / (2000)

Romero-Gonzalez, M.E., Williams, C.J. and Gardiner, P.H.E. (2000), The application of dealginated seaweed as a cation exchanger for on-line preconcentration and chemical speciation of trace metals. *Journal of Analytical Atomic Spectrometry*, **15** (8), 1009-1013.

Full Text: [J\J Ana Ato Spe15, 1009.pdf](J/J%20Ana%20Ato%20Spe15,%201009.pdf)

Abstract: Methods for the on-line preconcentration of Cd2+, Cr3+, Cu2+ and Pb2+ and chemical speciation of Cr3+ and CrO42- using a microcolumn (50×7 mm id) packed with about 0.34 g dealginated seaweed biomass are described. Preliminary batch experiments showed that metal sorption by the biomass is rapid, about 90% of the metals in solution is taken up in less than 5 min, and occurs in a wide pH range, 2-7. Maximum binding was obtained between pH 6 and 7 and the effective binding capacities at pH 6, determined from column breakthrough measurements using a flow rate of 0.8 mL min-1, were 4.0, 8.7, 9.4 and 8.5 μmol g-1 for Cd, Cr Cu and Pb, respectively. Unretained CrO42- was separated from Cr3+ thus making it possible to determine the levels of both species in solution. The analytical procedures developed for metal preconcentration and chromium speciation were validated by analyses of two Lake Ontario water reference materials, TMDA 51.2 and TMDA 54.2, and a synthetic seawater sample. Comparison of the results obtained by the proposed methods with the certified total values using the Student t test at 95% confidence limit showed that the differences were not statistically significant. Independent confirmation of the accuracy of the chromium speciation results was obtained using the measurement of absorbance of the 1,5-diphenylcarbohydrazide-chromium complex, before and after treatment with nitric acid, to determine the levels of CrO42- and Cr3+ by difference. The results obtained with the proposed method for the analyses of TMDA 51.2 and TMDA 54.2 for Cr3+ and CrO42- were 20±0.2 and 39±0.3 μg L-1, and 162±1 and 299±1 μg L-1, compared with 12±5 and 54±31, and 132±12 and 313±16 μg L-1, respectively.

Keywords: Biosorption Column, Algae Cells, Spectrometry, Removal, Ions

Smichowski, P., Marrero, J., Ledesma, A., Polla, G. and Batistoni, D.A. (2000), Speciation of As(III) and As(V) in aqueous solutions using baker’s yeast and hydride generation inductively coupled plasma atomic emission spectrometric determination. *Journal of Analytical Atomic Spectrometry*, **15** (11), 1493-1497.

Full Text: [J\J Ana Ato Spe15, 1493.pdf](J/J%20Ana%20Ato%20Spe15,%201493.pdf)

Abstract: The use of Saccharomyces cerevisiae was evaluated as substrate for the biosorption of As(III) in the presence of As(V), for the determination of these species in aqueous solutions. Experiments were performed in batch to find a suitable and simple method to obtain information on arsenic uptake. The effect of chemical and physical variables affecting the biosorption of As were tested in order to select the optimal analytical conditions for the selective As retention by Saccharomyces cerevisiae. The parameters studied were: reaction media and pH, amount of biomass, analyte concentration and contact time. The influence of some concomitant ions up to a concentration of 50 mg l-1 was also tested. Quantitative determinations of As species in yeast and supernatant solution were carried out by means of inductively coupled plasma atomic emission spectrometry with hydride generation. During all the steps of the optimization process, As(V) remained in solution while As(III) was accumulated by the yeast cells. A preconcentration factor of 7 was achieved for As(III) when 35 ml of water were processed. The detection limits for As(III) and As(V) were 0.1 and 0.5 ng ml-1, respectively. The speciation of inorganic As in different kinds of natural waters was performed following the proposed method. Spiked water samples were also analyzed and the recoveries in each phase were in all cases between 92 and 106%.

Keywords: Absorption Spectrometry, Adsorption, Algae, Baker’s Yeast, Biosorption, Cells, Liquid-Chromatography, Organisms, Preconcentration, *Saccharomyces Cerevisiae*, *Saccharomyces-Cerevisiae*, Separation, Silica-Gel, Trace-Metal Preconcentration, Yeast

Korez, A., Eroglu, A.E., Volkan, M. and Ataman, O.Y. (2000), Speciation and preconcentration of inorganic tellurium from waters using a mercaptosilica microcolumn and determination by hydride generation atomic absorption spectrometry. *Journal of Analytical Atomic Spectrometry*, **15** (12), 1599-1605.

Full Text: [J\J Ana Ato Spe15, 1599.pdf](J/J%20Ana%20Ato%20Spe15,%201599.pdf)

Abstract: A separation-preconcentration method utilising a mercapto-modified silica microcolumn was developed for the determination of trace amounts of Te(rv) and Te(VI) in waters by hydride generation atomic absorption spectrometry. Bottled drinking water, tap water and sea-water samples were spiked with sub-ng ml-1 concentrations of Te(IV) and the spiked solutions were subjected to the mercapto-modified silica microcolumn separation and enrichment procedure. The spike recovery values varied between 86 and 114%. In addition to spike recovery experiments, accuracy was also verified via the analysis of a certified reference material. The limit of detection for Te(nt) in sea-water with a preconcentration factor of 50 was 0.037 ng ml-1. The capability of the microcolumn enrichment scheme for on-line sample processing via flow manifolds was demonstrated. A detailed interference study was performed.

Keywords: Plasma-Mass Spectrometry, Modified Silica-Gel, Graphite-Furnace, Emission-Spectrometry, Environmental-Samples, Reductive Coprecipitation, Selenium

? Ho, K.S. and Chan, W.T. (2010), Time-resolved ICP-MS measurement for single-cell analysis and on-line cytometry. *Journal of Analytical Atomic Spectrometry*, **25** (7), 1114-1122.

Full Text: [2010\J Ana Ato Spe25, 1114.pdf](2010/J%20Ana%20Ato%20Spe25,%201114.pdf)

Abstract: A method of simultaneous cell counting and determination of constituent metals in single cells using time-resolved inductively coupled plasma-mass spectrometry (ICP-MS) is reported. A unicellular alga, Chlorella vulgaris, was used as a model in this study. Algae suspensions of number density of 106/mL were converted into fine aerosols using conventional solution nebulization for sample introduction into the ICP. The metals in each cell are converted into a plume of gaseous analyte ions in the ICP. Each metal in the plume produces a current spike at the detector of the mass spectrometer. ICP-MS intensity spikes of major elements, such as Mg of 108 atoms/cell, and trace elements, such as Mn and Cu of 5×106 atoms/cell, were detected readily. The number density of the cells in an algae suspension can be determined by counting the number of the ICP-MS intensity spikes of the major element (Mg) over a fixed period of time. The uncertainty in cell counting was approximately 2% RSD, similar to that of hemacytometry. The ICP-MS spike intensity of an element is related to its quantity in the algal cell. Quantitative determination of the metal contents of the algal cells using metal oxide particles for calibration is feasible. Semi-quantitative measurement is also possible using aqueous standards for calibration. Rapid measurement of sorbed analyte ions on the biological cells without separation of the cells from the original suspension is demonstrated in kinetic study of the interactions of metal ions and algae in aqueous standards.

Keywords: Chlorella-Vulgaris, Colloid Analysis, Emission-Spectrometry, Heavy-Metal Biosorption, Individual Airborne Particles, Inductively-Coupled Plasma, Ions, Kinetic, Mass-Spectrometry, On Fluorescent Sensor, Waste-Water

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? Yashin, Y.I. (1993), Scientometric study of the state and developmental tendencies of chromatographic methods and apparatus. *Journal of Analytical Chemistry*, **48** (3), 290-298.

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Abstract: A scientometric study of main parameters of analytical procedures was carried out on the basis of articles published in 1994-1995 in Journal of High Resolution Chromatography in the field of open-tube chromatography, The following parameters were considered: the nature of the carrier gas, the length and the diameter of the open tubular column, and the polarity of the stationary liquid phase.

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Full Text: 1999\J Ana Che54, 519.pdf

Abstract: A scientometric study of state-of-the-art methods and instrumentation for liquid chromatography and trends in their development in 1991-1997 is performed based on the Bibliography Section of the Journal of Chromatography, Payers Guide of LC-GC International, and abstracts of papers of the annual Pittsburgh Conferences in the United States.

? Budnikov, G.K. (2000), Development of electrochemical methods in Kazan. *Journal of Analytical Chemistry*, **55** (3), 211-215.

Full Text: [1999\J Ana Che55, 211.pdf](1999/J%20Ana%20Che55,%20211.pdf)

Abstract: A sixty-year period of progress in the electrochemical methods of research and analysis in Kazan is surveyed. The importance of the interplay of ideas arising and developing in the cooperation of individual research groups working in the field of voltammetry is pointed out. This interplay facilitated the formation of scientific schools. The main avenues of inquiry in the held of electrochemical methods of analysis are outlined. Attention is drawn to the role of bibliometric and cognitive characteristics of scientific activity in the field of electrochemical methods of analysis.

Keywords: Analysis, Bibliometric, Research, Schools, Sensors

? Kabanova, O.L., Shirokova, V.I. and Markova, I.V. (2000), Electrochemical methods of analysis of inorganic substances. Publications for 1990-1999. *Journal of Analytical Chemistry*, **55** (11), 1008-1013.

Full Text: [2000\J Ana Che55, 1008.pdf](2000/J%20Ana%20Che55,%201008.pdf)

Abstract: The data of the scientometric study of publications in inorganic electrochemical analysis for 1990-1999 were presented. Most of the published papers (from 60 to 80%) deal with voltammetry and potentiometry. Since 1997, the number of papers on voltammetry has been higher or equal to the number of papers on potentiometry, which is due to the successive development of modified electrodes, the use of ultramicroelectrodes, and the development of stripping voltammetry, including adsorption voltammetry. The role of electrochemical analysis in the development and production of sensors was discussed. The most advantageous methods are potentiometry and conductometry, the role of amperometry is also significant. It was underlined that, although the number of papers on coulometry is low, this method is the most precise absolute method of analytical chemistry. The contribution of conferences on analytical chemistry to the publications on electrochemical methods and the elements leading in the number of publications are considered.

Yashin, Y.I. and Yashin, A.Y. (2001), Current trends in gas chromatography methods and instrumentation: A scientometric study. *Journal of Analytical Chemistry*, **56** (3), 200-213.

Full Text: [2001\J Ana Che56, 200.pdf](2001/J%20Ana%20Che56,%20200.pdf)

Abstract: Earlier analogous works deal with the period 1985-1991. Unlike previous works, in this work we additionally determined the fractions of publications on the most important compounds and mixtures within 1980-1998, Current trends in instrument snaking in gas chromatography are considered in more detail, references are given to the most important books and reviews published during this period. For the first time, the data is presented on the total number of publications on the main methods during the whole period of the development of chromatography. The total of obtained data made it possible to reveal topical directions of the development of the theory, fields of application, and instrumentation of gas chromatograph. This information will be useful for planning new theoretical and applied works and for the prediction of new developments in the field of gas-chromatographic instrument making. The distribution of publications over different chromatography methods was taken from bibliographic indices published in J. Chromatogr, Bibliography Section in 1981-1998. Table 1 for the first time presents the data on the total number of publications on main chromatography methods. The data on publications in 1944-1966 were taken from [3], the other were taken from bibliographic indices of articles published in 1966- 1998.

Keywords: Mass-Spectrometry, Liquid-Chromatography, Environmental- Analysis, Enantiomer Separation, Solid Chromatography, Retention Indexes, Fatty-Acids, GC, Principles, Quality

Arkhipov, D.B. and Berezkin, V.G. (2002), Development of analytical chemistry in the latter half of the 20th century (scientometric analysis). *Journal of Analytical Chemistry*, **57** (7), 581-585.

Full Text: [2002\J Ana Che57, 581.pdf](2002/J%20Ana%20Che57,%20581.pdf)

Abstract: Based on publications in Analytical Chemistry and Zhurnal Analiticheskoi Khimii and abstracts of Pittsburgh conferences, changes in analytical chemistry in the latter half of the 20th century are followed. It is noted that interest in the development of separation techniques and the analysis of environmental and biological samples has considerably increased. A direct scientometric analysis of the contents of publications is used in these scientometric studies.

? Zolotov, Y.A. (2003), Scientometric studies. *Journal of Analytical Chemistry*, **58** (10), 903-904.

? Hang, Y. and Qin, Y. (2003), Separation and preconcentration of trace heavy metal ions with nanometer-size titanium dioxide (anatase) and determination by fluorination assisted ETV-ICP-AES with slurry sampling. *Journal of Analytical Chemistry*, **58** (11), 1049-1053.

Full Text: [J\J Ana Che58, 1049.pdf](J/J%20Ana%20Che58,%201049.pdf)

Abstract: The adsorption and vaporization of Cu2+, Mn2+, Cd2+, and Ni2+ on nanometer-size titanium dioxide (NSTD) was investigated. The optimized temperature and time of ashing and vaporizing, the most suitable pH, the concentration factors, adsorption isotherms, and static adsorption capacities of the ions on NSTD are obtained. The ions adsorbed on NSTD can be on-site directly determined with fluorination assisted electrothermal vaporization inductively coupled plasma atomic emission spectrometry (FETV-ICP-AES) without elution through slurry sampling. The limits of detection of Cu2+, Mn2+, Cd2+, and Ni2+ are 0.08, 0.11, 0.24, and 0.32 ng, while the RSDs are 1.8, 2.6, 2.9, and 3.3%, respectively. The results are in agreement with those of reference samples.

Keywords: Inductively-Coupled Plasma, Atomic Emission-Spectrometry, Rare-Earth-Elements, Solid-Phase Extraction, Electrothermal Vaporization, Speciation Analysis, Mass-Spectrometry, Lanthanum, Impurities, Particles

? Budnikov, G.K. and Shirokova, V.I. (2006), Electroanalytical methods. Publications in 1999-2004. *Journal of Analytical Chemistry*, **61** (10), 973-984.

Full Text: [2006\J Ana Che61, 973.pdf](2006/J%20Ana%20Che61,%20973.pdf)

Abstract: The scientometric study of publications on electrochemical methods of analysis (EMA) in a number of journals and proceedings of some conferences for 1999-2004 has been carried out. The contribution of papers on EMA to the total number of publications on analytical chemistry and the contribution of papers on individual methods (amperometry, voltammetry, including stripping and cyclic voltammetry, polarography, etc., potentiometry, including potentiometry with ion-selective electrodes, conductometry, coulometry, and other methods) to the total number of publications on EMA are estimated. Significant changes in the subject of publications, as well as in methodology and terminology, are noted over the period under review and compared to those over the earlier period. This is due to going from traditional studies to studies in the field of micro-and nanosized samples. The contributions of amperometry, electrochemiluminescence, chronoamperometry, chronopotentiometry, impedance measurements, spectroelectrochemical methods, and electrochemical microscopy have increased. It is noted that voltammetry and potentiometry are less used, but they are applied to the study of micro-and nanosized samples. In Russian publications, traditional trends of studies are retained. The contribution of publications on EMA to the total number of publications in analytical chemistry for 1946-2004 is estimated. It is similar to 20% on the average in the last 25 years.

Keywords: Analysis, Changes, Chemistry, Conferences, Field, Journals, Methodology, Methods, Papers, Publications, Review, Scientometric, Stripping, Terminology, Trends

? Berezkin, V.G., Sidorenko, N.A. and Arkhipov, D.B. (2007), How we are cited: Russian analytical chemistry in the mirror of the Science Citation Index (1991-2004). *Journal of Analytical Chemistry*, **62** (1), 90-99.

Full Text: [2007\J Ana Che62, 90.pdf](2007/J%20Ana%20Che62,%2090.pdf)

Abstract: An analysis of citations of scientific papers written by Russian analysts in 1991-2004 is presented, including those by the members of the Scientific Council on Analytical Chemistry of the Russian Academy of Sciences. Publications by 55 analysts within the studied period were cited from 100 to 400 times, and publications by 31 researchers were cited more than 400 times. Russian journals publishing articles in analytical chemistry are almost wholly covered by the Science Citation Index. Works by Russian analysts are actively cited by foreign scientists. The highest citation indexes were found for B.V. L’vov (2624 citations), V.A. Davankov (1826), Yu.A. Zolotov (1670), Yu.G. Vlasov (1279), L.A. Gribov (1264), A.R. Timerbaev (1239), A.A. Karyakin (1220), Kh.Z. Brainina (1002), V.G. Berezkin (942), and S.B. Savvin (913). The high citation index of a researcher is an important criterion for his positive appraisal; however, a low citation index of a scientific worker is not indicative of his low scientific qualification.

# Title: Journal of Analytical Chemistry of the USSR

Full Journal Title: Journal of Analytical Chemistry of the USSR

ISO Abbreviated Title: J. Anal. Chem.

JCR Abbreviated Title:

ISSN: 0021-8766

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Berezkin, V.G. and Viktorova, E.N. (1988), Scientometric data on advances in capillary gas-chromatography. *Journal of Analytical Chemistry of the USSR*, **43** (11), 1706-1708.

? Kabanova, O.L., Bakanova, L.V., Markova, I.V. and Shirokova, V.I. (1991), A scientometric study on publications on electrochemical analysis-methods for inorganic substances 1974-1989. *Journal of Analytical Chemistry of the USSR*, **46** (5), 729-739.

Keywords: Analytical-Chemistry 1910-1970, Trends, Progress

? Stromberg, A.G. and Getmantseva, E.V. (1992), Development of electroanalytical chemistry in the period of 1979-1989: A scientometric investigation. *Journal of Analytical Chemistry of the USSR*, **47** (1), 62-69.

? Berezkin, V.G. and Koshevnik, M.A. (1992), Scientometric analysis of the current state in chromatography. *Journal of Analytical Chemistry of the USSR*, **47** (1), 55-61.

# Title: Journal of Analytical Toxicology

Full Journal Title: Journal of Analytical Toxicology

ISO Abbreviated Title: J. Anal. Toxicol.

JCR Abbreviated Title: J Anal Toxicol

ISSN: 0146-4760

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Preston Publications Inc

Publisher Address: 7800 Merrimac Ave PO Box 48312, Niles, IL 60648

Subject Categories:

Chemistry, Analytical: Impact Factor

Toxicology: Impact Factor

? Duffield, P., Bourne, D., Tan, K., Garruto, R.M. and Duncan, M.W. (1994), Analysis of the neurotoxic plasticizer n-butylbenzenesulfonamide by gas chromatography combined with accurate mass selected ion monitoring. *Journal of Analytical Toxicology*, **18** (7), 361-368.

Abstract: The plasticizer, n-butylbenzenesulfonamide (NBBS), is reported to be neurotoxic when inoculated intracisternally or intraperitoneally into rabbits. Because NBBS is commonly used in the production of polyamide (nylon) plastics and is soluble in water, the disposal of NBBS-containing plastics in landfill sites could result in NBBS appearing in the leachate. Further, NBBS could also be leached from packaging into their contents. To allow us to examine the risks posed by NBBS in the environment, we have developed a quantitative assay for this compound. The assay employs a one-step extraction into dichloromethane followed by gas chromatography with accurate mass selected ion recording. The assay incorporates [13C6]NBBS as an internal standard to allow precise quantitation, and four separate ion chromatograms are recorded. NBBS was found in some Australian domestic solidwaste landfill leachate (from less than 0.3 to 94.6 ng/mL), but ground water in the vicinity of a landfill had only trace quantities of NBBS. NBBS was also quantitated in some bottled and cask wines, and levels varied from not detected to 2.17 ng/mL (n = 14). Additional studies are required to assess the public health risks associated with the use of NBBS as a plasticizer.

Keywords: Risk-Factors, PVC Films, Migration, Foods, Disease, Di-(2-ethylhexyl)Adipate, pHthalate, Blood

? Jones, A.W. (2008), Hirsch-index for winners of TIAFT’s mid-career achievement award. *Journal of Analytical Toxicology*, **32** (4), 327-328.

Keywords: Achievement, Authors, Forensic-Science, h-Index, Highly Cited Articles, Hirsch Index, Impact Factor, Journals, Numbers, Reflections, Scientists

# Title: Journal of Anatomy and Physiology

Full Journal Title: Journal of Anatomy and Physiology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Moseley, H.N. and Lankester, E.R. (1868), On the nomenclature of mammalian teeth and on the dentition of the Mole, (*Talpa eurqpoea*) and the Badger (*Melts taxus*). *Journal of Anatomy and Physiology*, **3** (1), 73-80.

Full Text: [-1959\J Ana Phy3, 73.pdf](-1959/J%20Ana%20Phy3,%2073.pdf)

Abstract: Meles taxus. Messrs. Moseley and Bay Lankester describe a small pre-molar in the upper jaw, which does not appear to be represented in the milk-dentition. Journ. Anat. & Phys. iii. p. 79.

# Title: Journal of Anesthesia

Full Journal Title: Journal of Anesthesia

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Li, Z., Qiu, L.X., Wu, F.X., Yang, L.Q., Sun, Y.M. and Yu, W.F. (2011), Scientific publications in anesthesiology journals from East Asia: A 10-year survey of the literature. *Journal of Anesthesia*, **25** (2), 257-262.

Full Text: [2011\J Ane5, 257.pdf](2011/J%20Ane5,%20257.pdf)

Abstract: The scientific publications in anesthesiology research from East Asian authors have not been reported yet. The present study was designed to analyze the contribution of articles from East Asia to anesthesiology research. Articles published in 17 journals in anesthesiology originating from Japan, China, and South Korea from 2000 to 2009 were retrieved from the PubMed database and Web of Science. From 2000 to 2009, there were 3,076 articles published from East Asia. During this period, there were a notable decrease in publications from Japan and modest increases in publications from both China and South Korea. The average 5-year impact factor of the published articles was similar among the three regions, and China had the highest average number of citations to each article. Anesthesia & Analgesia published more articles than any other journal from all three regions. Our analysis showed that Japan was the most productive region in East Asia, but there was a notable decrease in publications from Japan in 2000-2009. The impact factor of the articles suggests similar levels of scholarship. Anesthesia & Analgesia was the most popular journal in East Asia.

Keywords: Analysis, Anesthesia, Anesthesiology, Articles, Asia, Asian, Authors, Bibliometric Analysis, China, China, Citations, Database, Impact, Impact Factor, Japan, Journal, Journals, Korea, Language, Literature, Publications, Pubmed, Region, Research, Scholarship, Science, Scientific Publications, South Korea, Survey, Web of Science

# Title: Journal of Animal Production Research

Full Journal Title: Journal of Animal Production Research

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0189-0514

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ibeun, M.O. (1987), Bibliometric analysis of sheep and goat literature in Nigeria 1933-1984. *Journal of Animal Production Research*, 87-102.

Abstract: The bibliography of sheep and goat production in Nigeria compiled by the Small Ruminant Research Group in Nigeria edited by I.F. Adu was subjected to Bradford’s law. The result shows that five hundred and eighty seven publications were contained in the bibliography. Journals carried 72.1% while books, proceedings, theses, technical reports, annual reports and newsletters collectively formed 27.9%. Journal analysis further showed a pattern of scattering reported for subjects in physical, biological and applied sciences. Nine titles out of ninety four produced 57% of the total periodical articles. Four of the nine titles are produced in Nigeria, while two are set up to publish articles from the tropics. Twenty seven authors who produced 35% of the total articles were identified as the ‘core’ authors. It is further observed small that ruminant scientists should concentrate effort in the areas of management, breeding and milk production.

# Title: Journal of Animal and Veterinary Advances

Full Journal Title: [Journal of Animal and Veterinary Advances](http://medwelljournals.com/current.php?jid=1680-5593)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Han, W.D., Yu, Q. and Wang, Y.L. (2010), Comparative analysis between impact factor and h-index for reproduction biology journals. *Journal of Animal and Veterinary Advances*, **9** (11), 1552-1555.

Full Text: J Ani Vet Adv9, 1552.pdf

Abstract: The Journal Impact Factors (JIF) has become nowadays one of the most frequently used scientometric indictor, the Hirsch’s index (h-index) has also got positive reception in the scientometric literature. In this study, the journals of reproduction biology were compared with JIF and h-indices computed from the ISI Web of Science. This h-index (2001-2008) exhibited a high correlation with the 5 years JIF (2004-2008) (r = 0,64, p = 0.001), the relative h-index showed a weak correlation with the JIF (r = 0.42, p = 0.049). A ranking of 25 reproduction journals is presented on the basis of this JIF or h-index.

Keywords: Journal, Reproduction, Ranking, Hirsch Index, Impact Factor, China, Hirsch-Index

# Title: Journal of Antimicrobial Chemotherapy

Full Journal Title: Journal of Antimicrobial Chemotherapy

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Fung-Tomc, J., Minassian, B., Kolek, B., Washo, T., Huczko, E. and Bonner, D. (2000), In vitro antibacterial spectrum of a new broad-spectrum 8- methoxy fluoroquinolone, gatifloxacin. *Journal of Antimicrobial Chemotherapy*, **45** (4), 437-446.

Abstract: The in vitro antibacterial spectrum of gatifloxacin was compared with those of ciprofloxacin and ofloxacin. Gatifloxacin was two- to four-fold more potent than comparator quinolones against staphylococci, streptococci, pneumococci and enterococci (gatifloxacin MIC(90)s, less than or equal to 1 mg, L, except 4 mg, L against methicillin-resistant Staphylococcus aureus and Enterococcus faecium). Gatifloxacin was two-fold less potent than ciprofloxacin, and the same as or two-fold more potent than ofloxacin against Enterobacteriaceae (MIC(90)s, 0.06-0.5 mg, L against most members of the Enterobacteriaceae and less than or equal to 1 mg, L against Proteus, Morganella spp.). Relative to the comparator quinolones, gatifloxacin was two- to four-fold more potent against Providencia spp., and had good potency against Acinetobacter spp. (MIC(90)s, 0.25-1 mg, L). Gatifloxacin and ofloxacin had similar anti-pseudomonal potency, with corresponding MIC(90)s of 4, 8 and 0.25 mg, L for Pseudomonas aeruginosa, Pseudomonas fluorescens and Pseudomonas stutzeri, while ciprofloxacin had two- to eight-fold more potency. The three quinolones were equipotent against Burkholderia cepacia (MIC(90)s, 8 mg, L), but gatifloxacin was two-fold more potent against Stenotrophomonas maltophilia (MIC90, 4 mg, L). Gatifloxacin was highly potent (MIC(90)s, 0.03-0.06 mg, L) against Haemophilus influenzae, Legionella spp., Helicobacter pylori and had at least eight-fold better anti-chlamydial and anti-mycoplasma potency (gatifloxacin MIC(90)s, 0.13 mg, L). The higher quinolone MICs for ureaplasma (MIC(90)s, 4-8 mg, L) may be due to the acidic pH of the ureaplasma test medium, which antagonizes quinolones. Like other quinolones, gatifloxacin had poor potency against Mycobacterium avium-intracellulare, though it was eight- to 16-fold more potent against *Mycobacterium tuberculosis* (MIC90, 0.25 mg, L). Of the three quinolones, only gatifloxacin had activity against Bacteroides fragilis and Clostridium difficile. In summary, gatifloxacin is a broad- spectrum 8-methoxy fluoroquinolone that is more potent than ciprofloxacin and ofloxacin against Gram-positive bacteria, chlamydia, mycoplasma, mycobacteria and anaerobes

Keywords: Cells, Gatifloxacin, *Mycobacterium tuberculosis*, Quinolones, Staphylococcus-Aureus, Tuberculosis

? Martin, A., Portaels, F. and Palomino, J.C. (2007), Colorimetric redox-indicator methods for the rapid detection of multidrug resistance in Mycobacterium tuberculosis: A systematic review and meta-analysis. *Journal of Antimicrobial Chemotherapy*, **59** (2), 175-183.

Abstract: Objectives: With the spread of multidrug-resistant tuberculosis (MDR-TB) there is increasing demand for new accurate and cost-effective tools for rapid drug susceptibility testing (DST), particularly for developing countries. The reference standard method used today for DST is very slow and cumbersome. Colorimetric assays using redox indicators have been proposed to be used in low-resource countries as rapid alternative culture methods for the detection of resistance especially to rifampicin and isoniazid. These methods appear as promising new tools but their accuracy has not been systematically evaluated. Methods: We did a meta-analysis to evaluate the accuracy of the colorimetric assays for the detection of rifampicin and isoniazid-resistant tuberculosis among clinical isolates. We searched MEDLINE, PUBMED (NCBI), Global health-CAB, EJS-E (EbscoHost), ISI Web, Web of Science and IFCC databases and contacted authors it additional information was needed. Results: Eighteen studies met our inclusion criteria for rifampicin resistance detection and 16 for isoniazid. We used a summary receiver operating characteristic (SROC) curve to perform meta-analysis and summarize diagnostic accuracy. For both drugs, all studies had a sensitivity and specificity that ranged between 89% and 100%. Conclusions: There is evidence that colorimetric methods are highly sensitive and specific for the rapid detection of MDR-TB. These new tools could offer affordable technologies for TB laboratories especially in places where resources are limited and where the prevalence of MDR-TB is important and make TB control efforts more effective. Additional studies are needed in high MDR prevalence countries and cost-effectiveness analysis to have more evidence on the utility of these methods. Future developments to detect resistance directly from smear-positive sputum specimens should be taken into consideration to speed up the process.

Keywords: 3-(4,5-Dimethylthiazol-2-Yl)-2,5-Diphenyl Tetrazolium Bromide, Accuracy, Alamar Blue, Alamar-Blue Assay, Analysis, Authors, Control, Cost-Effectiveness, Culture, Databases, Developing Countries, Diagnostic-Test, Drug, Drug Susceptibility, Drug Susceptibility Testing, Dst, Information, ISI, Mdr-Tb, Meta-Analysis, Methods, Mic Determination, Microscopic Observation, Mtt, Prevalence, Pubmed, Resazurin, Resazurin Microtitre Assay, Resistance, Review, Rifampicin Resistance, Science, Sensitivity And Specificity, Sputum, Susceptibility, Systematic, Systematic Review, Tb, Testing Susceptibility, Tuberculosis, Web of Science

? Martin, A., Panaiotov, S., Portaels, F., Hoffner, S., Palomino, J.C. and Angeby, K. (2008), The nitrate reductase assay for the rapid detection of isoniazid and rifampicin resistance in Mycobacterium tuberculosis: A systematic review and meta-analysis. *Journal of Antimicrobial Chemotherapy*, **62** (1), 56-64.

Abstract: Objectives: The reference standard methods for drug susceptibility testing (DST) of M. tuberculosis are very slow to give results, and due to the emergence of multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis, there is an urgent demand for new, rapid and accurate DST methods, particularly in low-income countries. The nitrate reductase assay (NRA) has been proposed as a rapid method for the detection of resistance to rifampicin and isoniazid, but its accuracy has not been systematically evaluated. Methods: We performed a systematic review and meta-analysis to evaluate the accuracy of the NRA for the detection of rifampicin- and isoniazid-resistant tuberculosis. We searched MEDLINE PUBMED (NCBI), Global Health-CAB, EJS-E (EbscoHost), ISI Web, Web of Science and IFCC and contacted authors if additional information was required. Fifteen studies met our inclusion criteria for rifampicin resistance detection and 13 for isoniazid. of these, the majority of the studies used culture isolates on solid medium, four used culture isolates on liquid medium and three used sputum samples. We applied the summary receiver operating characteristic (SROC) curve to perform meta-analysis and to summarize diagnostic accuracy. Results: For rifampicin, the majority of the studies that applied NRA to isolates had a sensitivity and specificity > 94% and for isoniazid, > 92%. The three studies that applied NRA directly on sputum samples had a sensitivity and specificity that ranged between 88% and 100%. The SROC curve had an area of > 0.99 for both drugs. Conclusions: There is evidence that NRA is highly sensitive and specific for the rapid detection of rifampicin and isoniazid resistance in culture isolates. More evidence is required for the NRA applied directly on sputum samples, but preliminary results appear promising and show a good sensitivity and specificity. Additional studies are required in countries with a high prevalence of MDR-TB and also cost-effectiveness analysis in order to obtain a complete picture on the utility of this method for rapid drug resistance detection in tuberculosis.

Keywords: Accuracy, Alternative Methods, Analysis, Authors, Bias, Cost-Effectiveness, Culture, Curve, Drug, Drug Resistance, Drug Susceptibility, Drug Susceptibility Testing, DST, Information, ISI, M.Tuberculosis, MDR-TB, Meta-Analysis, Methods, MIC Determination, Nitrate, Prevalence, Pubmed, Resistance, Review, Science, Sensitivity, Sensitivity and Specificity, Sputum, Sputum Samples, Susceptibility, Systematic, Systematic Review, Tuberculosis, Web of Science

# Title: Journal of Anyang Teachers College

Full Journal Title: [Journal of Anyang Teachers College](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=AYSF&NaviLink=%e5%ae%89%e9%98%b3%e5%b8%88%e8%8c%83%e5%ad%a6%e9%99%a2%e5%ad%a6%e6%8a%a5)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1671-5330

Issues/Year:

Journal Country/Territory:

Language:

Publisher: Kluwer

Publisher Address:

Subject Categories:

: Impact Factor

? Gao, L.H. and Wu, Q.A. (2005), A statistical analysis of the patterns of publications, authors and citations in the environmental science, 2004. *Journal of Anyang Teachers College*, **2**, 154-156.

Full Text: [2005\J Any Tea Col2, 154.pdf](2005/J%20Any%20Tea%20Col2,%20154.pdf)

Abstract: From the aspect of the relation between human and environment, the author analized the affection to the development of interior design.

Keywords: Environmental Science, Bibliographic Analysis, Citation Analysis, Bibliometric Methods

# Title: Journal of AOAC International

Full Journal Title: Journal of AOAC International

ISO Abbreviated Title: J. AOAC Int.

JCR Abbreviated Title: J AOAC Int

ISSN: 1060-3271

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: AOAC International

Publisher Address: 481 North Fredrick Ave, Ste 500, Gaithersburg, MD 20877-2504

Subject Categories:

Chemistry, Analytical: Impact Factor 1.330, / (2001)

Food Science & Technology: Impact Factor 1.330, / (2001)

? Dabeka, R.W., Conacher, H.B.S., Salminen, J., Nixon, G.R., Riedel, G., Crocker, R. and Dube, G. (1992), Survey of bottled drinking-water sold in Canada. 1. Lead, cadmium, arsenic, aluminum, and fluoride. *Journal of AOAC International*, **75** (6), 949-953.

Abstract: Samples of bottled water (n = 172) offered for sale in Canada were analyzed for lead, cadmium, arsenic, aluminum, and fluoride: means and ranges (µg/g) found were, respectively, 0.0026 (<0.0010-0.074), 0.00018 (<0.0001-0.0004), 0.0030 (<0.001-0.048), 0.027 (<0.010-0.568), and 0.543 (<0.050-5.85). Comparison of levels among mineral waters (n = 64), spring waters (n = 77), and miscellaneous waters (n = 31) indicated appreciable differences only in the case of fluoride. For fluoride, the means and medians (µg/g) for mineral, spring, and miscellaneous waters were 1.179 and 0.455, 0.152 and 0.090, and 0.201 and <0.050, respectively. No samples were found in violation of the tolerances in the Canadian Food and Drug Regulations; however, 1 sample (in a lead-soldered can) contained lead and 15 samples contained fluoride at levels above the limits recommended by the Guidelines for Canadian Drinking Water (tap-water) Quality.

? Page, B.D., Conacher, H.B.S., Salminen, J., Nixon, G.R., Riedel, G., Mori, B., Gagnon, J. and Brousseau, R. (1993), Survey of bottled drinking-water sold in Canada. 2. Selected volatile organic-compounds. *Journal of AOAC International*, **76** (1), 26-31.

Abstract: Selected volatile organic compound (VOC) contaminants were determined in 182 samples of retail bottled waters purchased in Canada. Samples included spring water (86) packaged in containers of polyethylene or in smaller containers of transparent plastic or glass, mineral water (61) packaged only in transparent plastic or glass, and miscellaneous bottled waters (35). Analyses were performed by 3 laboratories, each using headspace sampling and capillary gas chromatography with either mass spectrometric (1 laboratory) or flame ionization detection with mass spectrometric confirmation, if required (2 laboratories). Benzene, the contaminant of primary interest, was detected in only 1 of the 182 samples at 2 µg/kg. Other VOC contaminants detected (number of positive samples, average, and range of positives in µg/kg) included toluene (20, 6.92, 0.5-63), cyclohexane (23, 39.2,3-108), chloroform (12, 25.8, 3.7-70), and dichloromethane (4, 59, 22-97). Cyclohexane was found in the plastic and as a migrant from the plastic in 20 samples of spring water, but it was found in only 1 of 61 mineral water samples analyzed at only 3 µg/kg. Chloroform was found almost exclusively in samples that could have been obtained from public water supplies. It was not found in mineral water samples, but it was found in 1 spring water sample at 3.7 µg/kg. The source of the toluene contamination was not known. Other VOCs detected include ethanol and limonene, associated with added flavoring; pentane, as a migrant from a foamed polystyrene cap liner; and 1,1,2,2-tetrachloroethylene in a sample of demineralized water.

? Edgell, K.W., Longbottom, J.E., Pfaff, J.D., Altman, R., Arar, E., Baker, M., Bennett, T., Bolyard, M., Cassat, R., Head, D., Joyce, R., Kersey, D., Latsh, R., Lawrence, R., Meyer, J., Paterson, H., Peden, M., Potts, R., Raia, J., Rhodes, H., Rodriquez, L., Sorbet, E., Vickers, J., Walton, P. and Warden, B. (1994), Determination of inorganic anions in water by ion chromatography: Collaborative study. *Journal of AOAC International*, **77** (5), 1253-1263.

Abstract: The U.S. Environmental Protection Agency (U.S. EPA) and the American Society for Testing and Materials (ASTM) conducted a joint collaborative study validating an ion chromatographic method for determination of inorganic anions (U.S. EPA method 300.0A and the equivalent proposed revision to ASTM method D4327). This study was conducted to determine the mean recovery and precision of analyses for bromide, chloride, fluoride, nitrate, nitrite, orthophosphate, and sulfate in reagent water, drinking water, and wastewater. The study design was based on Youden’s nonreplicate plan for collaborative tests of analytical methods. The test waters were spiked with the anions at 6 concentration levels, prepared as 3 Youden pairs. The 22 volunteer laboratories were instructed to dilute 10 mL sample concentrate to 100 mL test water. A measured volume of sample (20-200 µL) was injected into an ion chromatograph equipped with a guard column, anion exchange column, and a chemical micromembrane suppression device. The anions were then separated using 1.7 mM sodium bicarbonate and 1.8 mM sodium carbonate, and measured by a conductivity detector. Submitted data were evaluated using U.S. EPA’s IMVS computer program, which follows ASTM D2777-86 statistical guidance. U.S. EPA method 300.0A and ASTM method D4327 were judged acceptable for measurement of the above anions (except sulfate) at concentrations ranging from 0.3 to 25 mg/L and sulfate concentrations from 2.9 to 95 mg/L. Mean recoveries for the 7 anions from all matrixes, as estimated from the linear regression equations, ranged from 95 to 104%. At concentrations above 2-6 mg/L for bromide, fluoride, nitrate, nitrite, and orthophosphate, and above 24 mg/L for sulfate, the overall and single-analyst relative standard deviations were less than 10 and 6%, respectively. As concentrations decreased, precision became more variable. The relative standard deviations of results for chloride were slightly higher than the other anions, especially in matrixes with high chloride back ground. Analysis of Variance (ANOVA) tests at the 95% confidence interval indicated a statistically significant matrix effect for chloride, nitrite, and nitrate analyses in drinking water compared to analyses in reagent water. Because these matrix effects were caused by the spiking process and not the drinking water itself, the ANOVA determination was not considered to be of practical significance.

? Van Hoof, F., Van Wiele, P., Bruchet, A., Schmitz, I., Bobeldiji, I., Sacher, F., Ventura, F., Marti, I., Do Monte, M.H.M. and Da Costa, M.S. (2001), Multiresidue determination of pesticides in drinking and related waters by gas chromatography/mass spectrometry after solid-phase extraction: Interlaboratory study. *Journal of AOAC International*, **84** (5), 1420-1429.

Abstract: As part of a project funded by the European Commission (EC) for the development and evaluation of multiresidue methods for analysis of drinking and related waters, 15 European laboratories evaluated a method using styrene-divinylbenzene copolymer solid-phase extraction followed by gas chromatography/mass spectrometry. The main aim of the study was to evaluate whether the method meets the requirements of EC Directive 98/83 in terms of accuracy, precision, and detection limit for 22 pesticides according to the following requirements: limit of detection, less than or equal to0.025 µg/L; accuracy, expressed as recovery between 75 and 125%; and precision, expressed as repeatability relative standard deviation of the method of < 12.5% and as reproducibility relative standard deviation of the method of < 25%. Analyses for unknown concentrations were performed with fortified commercial bottled and tap waters. All laboratories were able to achieve detection limits of 0.01 µg/L for all pesticides except dimethoate and desisopropylatrazine (0.02 µg/L). The criteria for repeatability were met for all compounds except trifluralin, dimethoate, and lindane in bottled water and chlorpyrifos, dimethoate, and lindane in tap water. The criteria for reproducibility were met for all compounds except trifluralin, dimethoate, and lindane in bottled water and pendimethalin, chlorpyrifos, dimethoate, terbutryn, and lindane in tap water. In terms of accuracy, the method meets the requirements for all pesticides in both matrixes, except for lindane in bottled water and lindane and chlorpyrifos in tap water.

Keywords: Mass-Spectrometry, Surface

? Zhang, D., Vu, P. and He, X. (2011), Preparation and characterization of porous calcium titanate-based coated glass fiber filter material and its application in determination of lead and cadmium ion concentrations in water. *Journal of AOAC International*, **94** (6), 1925-1933.

Full Text: [2011\J Aoa Int94, 1925.pdf](2011/J%20Aoa%20Int94,%201925.pdf)

Abstract: Glass fiber filter coated with a porous block adsorption agent of calcium titanate (GPCTO) was prepared by the citric acid sol-gel method, and characterized by X-ray diffraction, scanning electron microscopy, and FTIR spectrophotometry. Its Pb2+ and Cd2+ adsorption properties from water were studied. Adsorption and elution were investigated under different conditions, as were the thermodynamics and kinetics of adsorption, using Cd ion as representative. Calcium titanate may react with glass fiber, forming Si-O-Ti and B-O-Ti bonds and becoming a composite adsorbent. The Pb and Cd ions were quantitatively retained at pH 4-9; their adsorption capacities by the GPCTO were 199.72 and 19.68 mg/g, respectively. The isothermal data were described by the Langmuir equation. The dynamic data followed the pseudo-second-order kinetic model well. The enthalpy change (Δ*H*) of the adsorption process was 37.160 kJ/mol. At various temperatures, Gibbs free energy changes (Δ*G*) were negative, and entropy changes (Δ*S*) were positive. The activation energy (E(a)) was 38.127 kJ/mol for the adsorption. Cd ion adsorption by the GPCTO was endothermic and spontaneous. The adsorbed Pb and Cd ions were completely recovered by elution with 2 M HNO3. The Pb2+ and Cd2+ concentration factors were up to 200. The method has been applied to the preconcentration for flame atomic absorption spectrometric determinations of trace Pb and Cd ions in water samples. The recoveries were 95.2 to 102.4% for Pb and 92.2 to 98.0% for Cd.

Keywords: Activation, Adsorbent, Adsorption, Adsorption Behavior, Adsorption Properties, Atomic-Absorption-Spectrometry, Barium-Strontium Titanate, Cadmium, Cd2+, Citric Acid, Concentration, Elution, Emission-Spectrometry, Enthalpy, Entropy, Environmental-Samples, FTIR, Kinetic, Kinetics, Langmuir, Lead, Packed Micro-Column, pH, Preconcentration, Preparation, Silica-Gel, Simultaneous Online Preconcentration, Solid-Phase Extraction, Thermodynamics, Trace-Metals, X-Ray Diffraction

# Title: Journal of Applied Bacteriology

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? Fiksdal, L. and Berg, J.D. (1987), Evaluation of a fluorescent antibody technique for the rapid enumeration of Bacteroides fragilis group of organisms in water. *Journal of Applied Bacteriology*, **62** (4), 377-383.

Abstract: The Bacteroides fragilis group has been evaluated as a prospective rapid indicator of faecal contamination of water. Fluorescent antibody (FA) stained B. fragilis group bacteria were enumerated microscopically and compared with faecal coliform or *Escherichia coli* counts as indicators of faecal contamination. Environmental samples included surface waters (raw drinking water and known contaminated water). Laboratory disinfection experiments with ozone, chlorine and u.v. radiation were also performed. Bacteroides FA counts specifically detected recent human faecal contamination in field samples in 2-3 h. Samples with a high content of particulates or debris limited the sensitivity to about 10 FA counts/ml. Viable counts showed that the sensitivity to all three disinfection agents was essentially the same for Bacteroides and E. coli. Fluorescent antibody counts of Bacteroides, conversely, were not altered by any of the agents. Therefore, the Bacteroides FA method is not recommended for routine monitoring but may be useful for cases where extensive human faecal contamination is suspected (e.g. pipeline rupture or pollution of recreational water) and where rapid remedial action must be taken to protect the public health.

? Owen, R.J., Costas, M., Sloss, L. and Bolton, F.J. (1988), Numerical analysis of electrophoretic protein patterns of *Campylobacter* laridis and allied thermophilic *Campylobacter*s from the natural environment. *Journal of Applied Bacteriology*, **65** (1), 69-78.

Abstract: Twenty-one strains comprising *Campylobacter* laridis (nine), nalidixic acid sensitive *Campylobacter*s (NASC) (four), and urease-positive thermophilic *Campylobacter*s (UPTC) (eight) were characterized by one-dimensional SDS-PAGE of cellular proteins. The UPTC and NASC strains included six from river water, two from mussels and four from sea water. The type strains of three other *Campylobacter* species were included for reference. The protein patterns, which contained 45-50 discrete bands, were highly reproducible and were used as the basis for two numerical analyses. In the first, which included all the protein bands, the 21 strains formed nine clusters at the 80% similarity (S) level. The typical C. laridis strains were restricted to two phenons (2 and 5); the atypical strains being distributed among the remaining phenons. In the second analysis, which excluded the principal protein bands (40-48.5 kD range), the 21 strains formed five clusters at the 80% S level. The typical C. laridis strains were relatively homogeneous and fell into a single phenon (2) within which two subgroups were discernable. The atypical strains were more heterogeneous with respect to background protein pattern, with representatives appearing in all five phenons. An electropherotyping scheme comprising six electropherotypes, and based on both analyses is proposed. The high within-group S level and separation from reference strains of *Campylobacter* in the second analysis, suggested that UPTC and NASC strains belonged within C. laridis possibly as biovars.

? Fortney, S.M., Vroman, N.B., Beckett, W.S., Permutt, S. and La France, N.D. (1988), Effect of exercise hemoconcentration and hyperosmolality on exercise responses. *Journal of Applied Bacteriology*, **65** (2), 519-524.

Abstract: We investigated the effects of a decrease in plasma volume (PV) and an increase in plasma osmolality during exercise on circulatory and thermoregulatory responses. Six subjects cycled at approximately 65% of their maximum O2 uptake in a warm environment (30°C, 40% relative humidity). After 30 min of control (C) exercise (no infusion), PV decreased 13.0%, or 419±106 (SD) ml, heart rate (HR) increased to 167±3 beats/min, and esophageal temperature (Tes) rose to 38.19±0.09°C (SE). During infusion studies (INF), infusates were started after 10 min of exercise. The infusates contained 5% albumin suspended in 0.45, 0.9, or 3.0% saline. The volume of each infusate was adjusted so that during the last 10 min of exercise PV was maintained at the preexercise level and osmolality was allowed to differ. HR was significantly lower (10-16 beats/min) during INF than during C. Tes was reduced significantly during INF, with trends for increased skin blood flow and decreased sweating rates. No significant differences in HR, Tes, or sweating rate occurred between the three infusion conditions. We conclude that the decrease in PV, which normally accompanies moderate cycle exercise, compromises circulatory and thermal regulations. Increases in osmolality appear to have small if any effects during such short-term exercise.

? Stenstrom, T.A., Conway, P. and Kjelleberg, S. (1989), Inhibition by antibiotics of the bacterial response to long-term starvation of salmonella-typhimurium and the colon microbiota of mice. *Journal of Applied Bacteriology*, **67** (1), 53-59.

? Jiménez, L., Muñiz, I., Toranzos, G.A. and Hazen, T.C. (1989), Survival and activity of Salmonella typhimurium and *Escherichia coli* in tropical freshwater. *Journal of Applied Bacteriology*, **67** (1), 61-69.

Abstract: The survival of Salmonella typhimurium LT2 and *Escherichia coli* was studied in situ in a tropical rain forest watershed using membrane diffusion chambers. Numbers were determined by acridine orange staining and a Coulter counter. Population activity was determined by microautoradiography, cell respiration, frequency of dividing cells, and by nucleic acid composition. Numbers of Salm, typhimurium and E. coli decreased less than 1 log unit after 105 h as measured by direct count methods. Activity as measured by respiration, acridine orange activity, frequency of dividing cells, and microautoradiography indicated that both bacteria remained moderately active during the entire study. After 24 h, E. coli was more active than Salm. typhimurium, as measured by nucleic acid composition, and frequency of dividing cells. Both E. coli and Salm. typhimurium survived and remained active in this tropical rain forest watershed for more than 5, D., suggesting that Salm. typhimurium may be of prolonged public health significance once it is introduced into tropical surface waters. As E. coli was active and survived for a long time in this natural environment, it would seem to be unsuitable as an indicator of recent faecal contamination in tropical waters.

? Lee, J.V. and West, A.A. (1991), Survival and growth of *Legionella* species in the environment. *Journal of Applied Bacteriology*, **70**, S121-S129.

Keywords: Green-Algae Cyanobacteria, Legionnaires-Disease, Water-Supplies, *Pneumophila* Serogroup-1, Monoclonal-Antibodies, Cooling-Tower, Potable Water, Multiplication, Amebas, Aerosols

? Korhonen, L.K. and Martikainen, P.J. (1991), Survival of *Escherichia coli* and *Campylobacter* jejuni in untreated and filtered lake water. *Journal of Applied Bacteriology*, **71** (4), 379-382.

Abstract: The survival of *Campylobacter* jejuni and *Escherichia coli* in lake water was studied using viable counts. *Escherichia coli* survived better than C. jejuni in all the test conditions studied. Both the species survived better in filtered than in untreated water. This suggests that predation and/or competition for nutrients affect the survival of both the species in an aquatic environment. *Campylobacter* jejuni survived less well in filtered autoclaved water and in 0.9% NaCl than in filtered water without autoclaving. The lack of some essential nutrients, which may be degraded by autoclaving, might explain these results.

? Havelaar, A.H., Schets, F.M., van Silfhout, A., Jansen, W.H., Wieten, G., van der Kooij, D. (1992), Typing of Aeromonas strains from patients with diarrhoea and from drinking water. *Journal of Applied Bacteriology*, **72** (5), 435-444.

Abstract: Aeromonas strains (187) from human diarrhoeal stools and from drinking water (263) in The Netherlands were typed by three different methods. Biotyping alone was found to be of little value for epidemiological studies because 84% of all strains belonged to only 10 biotypes. Common biotypes could be further differentiated by serotyping. Gas-liquid chromatography of cell wall fatty acid methyl esters (FAME) was useful for species identification as well as for typing: 86% of all strains could be identified to the species level, and within this group 92% of all identifications corresponded with the biotype. Cluster analysis and principal component analysis of FAME profiles could be used for comparison of strains from different sources and gave the same general conclusions as bio-and serotyping. There was little overall similarity between Aeromonas strains from human (diarrhoeal) faeces and from drinking water, differences being most pronounced for Aeromonas caviae and least for A. sobria.

? Kusnetsov, J.M., Jousimies Somer, H.R., Nevalainen, A.I. and Martikainen, P.J. (1994), Isolation of *Legionella* from water samples using various culture methods. *Journal of Applied Bacteriology*, **76** (2), 155-162.

Abstract: The efficacy of a non-selective medium and two selective media were compared for the isolation of *Legionella*s from water samples. The effect of acid wash treatment for decontamination of the water samples on the isolation frequency of *Legionella*s was also studied. The 236 samples were taken from cooling, humidifying and drinking water systems; 21% were *Legionella*-positive when inoculated directly on modified Wadowsky-Yee (MWY) medium and 26% were positive when concentrated (x 200) before cultivation on MWY or CCVC media. Inoculation on MWY medium after concentration followed by decontamination by the acid-wash technique gave the highest isolation frequency (31%). The lowest frequency (8%) was found with the non-selective BCYE alpha medium. An isolation frequency of 28% was achieved with the BCYE alpha medium after concentration and acid-wash treatment of the samples. Forty per cent of the samples were positive for *Legionella*s when the results from all the culture methods were combined. Not all the *Legionella*-positive samples were identified by a single culture method. Ninety-three of the 95 positive samples were detected with the two best combinations of three culture methods. The best culture method for detecting *Legionella*s depended on the source of the water sample. Some water quality characteristics, like temperature and organic matter content, affected the isolation frequency of *Legionella* spp.

? Moreira, L., Agostinho, P., Morais, P.V. and Dacosta, M.S. (1994), Survival of allochthonous bacteria in still mineral-water bottled in polyvinyl-chloride (PVC) and glass. *Journal of Applied Bacteriology*, **77** (3), 334-339.

Abstract: The mortality of *Escherichia coli*, Enterobacter cloacae, Klebsiella pneumoniae and *Pseudomonas aeruginosa*, based on the culturability of these bacteria, was assessed in non-carbonated mineral water, bottled in polyvinyl chloride (PVC) containing the indigenous flora, sterile mineral water bottled in PVC, sterile mineral water in glass containers, and sterile tap water in glass containers. There was a general decrease in the culturability of these organisms in the four test waters, except that Ps. aeruginosa grew in sterile tap water. *Escherichia* roll and Kl. pneumoniae had the highest mortality rates under the conditions tested, while Ent. cloacae had a very low and constant mortality rate that would have resulted in the persistence of this organism in mineral water for a long period of time. After a sharp initial decrease in culturability, Ps. aeruginosa also had a very low mortality rate in mineral water bottled in PVC.

Keywords: *Escherichia*-Coli, Drinking-Water, Starvation-Survival, Growth, Environment, Surfaces, Supplies, Systems

? Kersters, I., Huys, G., van Duffel, H., Vancanneyt, M., Kersters, K. and Verstraete, W. (1996), Survival potential of Aeromonas hydrophila in freshwaters and nutrient-poor waters in comparison with other bacteria. *Journal of Applied Bacteriology*, **80** (3), 266-276.

Abstract: The survival of a genetically-marked Aeromonas hydrophila strain was studied in water microcosms using viable counts. Aeromonas hydrophila AWWX1 was shown to survive without decline in viable counts for at least 10 d in three of four filtered-autoclaved freshwaters (surface water and groundwater) and in all examined filtered-autoclaved nutrient-poor waters (bottled spring water, Milli-Q and tap water), However, in the unfiltered waters, a rapid decrease in viable counts of Aer. hydrophila AWWX1 was observed after 1-5 d. The survival of Aer. hydrophila AWWX1 in nutrient-poor waters was compared with that of *Pseudomonas* fluorescens P17 and Spirillum strain NOX. Survival characteristics were organism-and water-dependent. In the filtered-autoclaved waters, viable counts of Spirillum strain NOX were ca 1 log-unit higher than for Aer. hydrophila AWWX1 and Ps. fluorescens P17. The tested strains Aer. hydrophila AWWX1 and Ps. fluorescens P17 survived 3 to 20, respectively 2 to 4 times better in the filtered-autoclaved waters compared to the unfiltered waters. Apparently, any inherent capability of these micro-organisms to adapt to low-nutrient environments was undone by the presence of the autochthonous microbiota. The present findings that Aer. hydrophila survives very poorly in several drinking waters is of utmost importance towards public health and arises questions: about the mechanisms involved.

? in t Veld, P.H., van Strijp Lockefeer, N.G., Havelaar, A.H. and Maier, E.A. (1996), The certification of a reference material for the evaluation of theISO method for the detection of Salmonella. *Journal of Applied Bacteriology*, **80** (5), 496-504.

Abstract: A reference material (RM) containing Salmonella typhimurium was certified as CRM 507 by the Standards, Measurements and Testing Programme of the European Commission. The material consists of a gelatin capsule filled with artificially contaminated milk powder. The material is certified for the evaluation of presence/absence methods based on theISO 6579 procedure for the detection of Salmonella. In the certification study 11 laboratories determined the presence/absence of Salmonella from each of 50 capsules. They also determined the mean number of colony-forming particles (cfp) and the homogeneity of the batch of RM according to an enumeration procedure. Certified values were calculated for both procedures separately. Based on the presence/absence procedure a fraction of capsules in which no Salmonella could be detected of 2.7% (one-sided 95% confidence upper limit 4.4%) was certified, for the enumeration procedure this fraction was 0.61% (one-sided 95% confidence upper limit 1.6%). The certified mean number of Salmonella cfp in one capsule is 5.9 (two-sided 95% confidence interval 5.3-6.4). Data on the preparation, identification, stability (at storage and higher temperatures) and homogeneity of the material are presented.

# Title: Journal of Applied Behavior Analysis

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? Poling, A., Alling, K. and Fuqua, R.W. (1994), Self- and Cross-Citations in the *Journal of Applied Behavior Analysis* and the *Journal of the Experimental Analysis of Behavior* - 1983-1992. *Journal of Applied Behavior Analysis*, **27** (4), 729-731.

Full Text: [1994\J App Beh Ana27, 729.pdf](1994/J%20App%20Beh%20Ana27,%20729.pdf)

Abstract: We examined self- and cross-citation practices in JABA and JEAB from 1983 through 1992. Mean levels of self-citation for JABA and for JEAB were 22.6% and 36.1%, respectively. Overall, 2.4% of JABA citations were JEAB articles, and 0.6% of JEAB citations were JABA articles, which suggests limited integration of basic and applied research.

Keywords: Applied Behavior Analysis, Basic Research, Citations, Research, Self-Citation

? Critchfield, T.S. (2002), Evaluating the function of applied behavior analysis: A bibliometric analysis. *Journal of Applied Behavior Analysis*, **35** (4), 423-426.

Full Text: [2002\J App Beh Ana35, 423.pdf](2002/J%20App%20Beh%20Ana35,%20423.pdf)

Abstract: Analysis of scholarly citations involving behavioral journals reveals that, consistent with its mission, applied behavior analysis research frequently references the basic behavioral literature but, as some have suspected, exerts narrow scholarly influence.

Keywords: Analysis, Applied Behavior Analysis, Bibliometric, Bibliometric Analysis, Citation Analysis, Citations, Journals, Literature, Psychology, Research

? Carr, J.E. and Britton, L.N. (2003), Citation trends of applied journals in behavioral psychology: 1981-2000. *Journal of Applied Behavior Analysis*, **36** (1), 113-117.

Full Text: [2003\J App Beh Ana36, 113.pdf](2003/J%20App%20Beh%20Ana36,%20113.pdf)

Abstract: One variable with which to evaluate scientific journals is how often their articles are cited in the literature. Such data are amenable to longitudinal analysis and can be used as a measure of a journal’s impact on research within a discipline. We evaluated multiple citation measures for a number of applied journals in behavioral psychology from 1981 to 2000. The results indicate a relatively consistent impact across these journals, with some evidence of growth.

Keywords: Analysis, Citation, Data, Evidence, Growth, Impact, Journals, Literature, Longitudinal, Longitudinal Analysis, Psychology, Research, Scientific Journals, Trends

? Elliott, A.J., Morgan, K., Fuqua, R.W., Ehrhardt, K. and Poling, A. (2005), Self- and cross-citations in the *Journal of Applied Behavior Analysis* and the *Journal of the Experimental Analysis of Behavior*: 1993-2003. *Journal of Applied Behavior Analysis*, **38** (4), 559-563.

Full Text: [2005\J App Beh Ana38, 559.pdf](2005/J%20App%20Beh%20Ana38,%20559.pdf)

Abstract: Self- and cross-citations in JABA and JEAB from 1993 through 2003 were examined. Yearly mean levels of self-citation for JABA and JEAB were 34.9% and 33.2%, respectively. Overall, 7.8% of JABA citations were JEAB articles, and 0.6% of JEAB citations were JABA articles. The former value, but not the latter, is substantially higher than the cross-citation level reported for earlier years. The two JEAB articles most often cited in JABA were published over 20 years ago and are concerned with establishing operations and the matching law.

Keywords: Applied Behavior Analysis, Basic Research, Citations, Psychology, Self-Citation

# Title: Journal of Applied Botany-Angewandte Botanik

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Plant Sciences: Impact Factor 0.423, 102/137 (2000)

? Fuchs, B., Track, C., Lang, S. and Gimmler, H. (1997), Salt effects of processed municipal solid waste incinerator bottom ash on vegetation and underground water. *Journal of Applied Botany-Angewandte Botanik*, **71** (5-6), 154-163.

Abstract: The environmental compatibility of municipal solid waste incinerator bottom ash (used as building material for the construction of roads) on underground water and vegetation was investigated under worst case conditions with special emphasis on the salt burden of the ash. Leaching tests in the laboratory and under field conditions demonstrate that approximately a threefold water volume is required for complete extraction of the soluble portions of Na+, K+, Mg2+, Ca2+, Cl-, and sulfate from a volume unity of ash. The pH of extracts remained constantly in the alkaline region. If ash is not protected by waterproof layers, natural rainfalls would need at least 1-2 gears for complete extraction of these fractions, which corresponds to about 10-15 g of salt kg-1 ash, if launched under waterproof protection layers, as required by German law, the time required for complete extraction is predicted to be for decades longer. Therefore the potential burden of underground water by salt extracted from bottom ash launched under conditions required by the LAGA instructions, is considered to be low. Plants grown on bottom ash in simplex or duplex cultures grow surprisingly well if one considers the multiple stress caused by this soil substrate (heavy metals, alkaline pH, salt burden, nutrient limitation, etc.). During the transient salt gush caused by irrigation and rainfall plants accumulate significant amounts of Na+ and Ca2+, but not Mg2+ and K+. Resulting internal salt concentrations cause an increase of the stress hormone abscisic acid (ABA) in leaves, but do nor reach levels which are inhibitory for enzymes. When the salt gush is over, internal Na+ concentrations of young leaves decrease to levels of control plants. Thereafter plants have to overcome the persisting stress of alkaline pH, heavy metals and nutrient deficiency.

Keywords: Halophytes, Tolerance, Soil

? Track, C., Fuchs, B., Lang, S. and Gimmler, H. (1998), Environmental compatibility of municipal solid waste incinerator bottom slag: Evidence from long time lysimeter experiments with Vitis vinifera. *Journal of Applied Botany-Angewandte Botanik*, **72** (1-2), 14-24.

Abstract: In a field experiment with Vitis vinifera grown up in lysimeter pods with Keuper or Loess as soil substrates, the effect of a top layer of municipal solid waste incinerator slag on the chemical composition of the lysimeter effluent and uptake of solutes from the effluent into vine leaves and grapes was investigated over a period of two years. Experimental results of this worst case study demonstrate that the washout of heavy metals from the slag layer by natural rainfall and irrigation water is low. After an initial peak heavy metal concentration approach after 500 days concentrations of the control lysimeters. Throughout the time of the experiment heavy metal concentrations remained far below the standards for drinking water as given by the TVO. No significant accumulation of heavy metals in leaves and grapes of vines growing with a top layer of slag could be detected in comparison to the control plants. This indicates only a minor uptake of these elements from the slag effluent percolating the rhizosphere of the sublayer or Keuper or Loess. Measured contents were always orders of magnitudes below phytotoxic values. Data confirm earlier results that heavy metals in slag are largely immobile due to the alkaline pH of its soil solution and no hazardous contamination of the ground water takes place. Therefore the application of processed incinerator slag as construction material according to the roles of LAGA (1994) is sustainable to the environment. Boron in the slag plays an exceptional role in so far as its concentration in the effluents of slag lysimeters increased throughout the experiments and that leaves and grapes exhibited a continuous accumulation of this element. No alarming contamination of the ground water was detected so far and maximal boron levels in the plants remained under phytotoxic levels. Data require a close follow up of boron leaching from slag over even longer time periods as investigated in this study.

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? Giles, C.H. and Nakhwa, S.N. (1962), ??. *Journal of Applied Chemistry*, **12**, 266-??.

# Title: Journal of Applied Chemistry and Biotechnology

Full Journal Title: Journal of Applied Chemistry and Biotechnology

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JCR Abbreviated Title:

ISSN: 0375-9210

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Journal Country/Territory:

Language:

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Subject Categories:

: Impact Factor

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# Title: Journal of Applied Chemistry of the USSR

Full Journal Title: Journal of Applied Chemistry of the USSR

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Subject Categories:

: Impact Factor

? Giles, C.H. and Tolia, A.H. (1964), Studies in adsorption. 19. Measurement of external specific surface of fibres by solution adsorption. *Journal of Applied Chemistry of the USSR*, **14** (5), 186-??.

Keywords: Adsorption

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? Weber, W.J. (1964), Competitive interactions in adsorption from dilute aqueous bi-solute solutions. *Journal of Applied Chemistry of the USSR*, **14** (12), 565-??.

? Anokhin, V.N., Efremov, A.N. and Mukhlenov, I.P. (1975), Derivation of an equation for multimolecular-adsorption isotherm. *Journal of Applied Chemistry of the USSR*, **48** (5), 1093-1096.

? Akbaev, A. (1975), Solubility isotherm of system dibasic copper phosphate glycine-water at 30 degreesc. *Journal of Applied Chemistry of the USSR*, **48** (5), 1213-1215

? Fisher, R.Y. and Kisarov, V.M. (1975), Calculation of adsorption-kinetics on basis of solution of inverse problem. *Journal of Applied Chemistry of the USSR*, **48** (9), 2052-2054.

? Rudobashta, S.P. and Planovskii, A.N. (1976), Kinetics of grain heating during adsorption. *Journal of Applied Chemistry of the USSR*, **49** (6), 1283-1286.

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? Rudobashta, S.P. and Planovskii, A.N. (1977), Calculation of kinetics of isothermal and nonisothermal adsorption. *Journal of Applied Chemistry of the USSR*, **50** (4), 767-770.

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? Grisyuk, A.V., Lukin, V.D., Petrovich, I.I. and Astakhov, V.A. (1978), Influence of the dispersion medium on the kinetics of liquid- phase adsorption of normal-paraffins. *Journal of Applied Chemistry of the USSR*, **51** (9), 1951-1953.

? Kisarov, V.M., Fisher, R.Y. and Begun, L.B. (1978), Investigation of the dynamics of adsorption in the case of mixed kinetics and a non-linear isotherm. *Journal of Applied Chemistry of the USSR*, **51** (11), 2370-2374.

Keywords: Adsorption, Dynamics, Isotherm, Kinetics

? Gorshtein, A.E. and Baron, N.Y. (1979), Kinetics of adsorption of phenol on schungite. *Journal of Applied Chemistry of the USSR*, **52** (6), 1211-1214.

? Grisyuk, A.V., Astakhov, V.A. and Lukin, V.D. (1979), Kinetics of adsorption of n-alkanes from the liquid-phase by granulated CaA zeolite. *Journal of Applied Chemistry of the USSR*, **52** (9), 2012-2014.

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? Legenchenko, I.A., Sinkova, L.A. and Kovrik, E.A. (1981), Mechanism of the process of flotation separation of zinc ions from aqueous-solutions by means of potassium caprate. *Journal of Applied Chemistry of the USSR*, **54** (10), 1944-1947.

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? Smirnov, N.N. and Chemerisova, A.M. (1992), Kinetic-models of sorption on ion-exchangers accompanied by chemical-reactions (analytical review). *Journal of Applied Chemistry of the USSR*, **65** (5), 836-842.

Abstract: The paper gives an analytical review of the kinetic models of sorption on ion-exchangers accompanied by chemical reactions. The classification, comparison, and selection of the models and prospective directions for the development of a kinetic description of the process are discussed.

? Lisitskaya, I.G., Lazareva, L.P., Khabalov, V.V. and Makovetskaya, G.D. (1992), Effect of pH on adsorption of anionic dyes by a carbon sorbent. *Journal of Applied Chemistry of the USSR*, **65** (11), 2132-2135.

Abstract: A study has been made of the effect of pH on the adsorption of the dyes - Active Brilliant Red SKh-5, Acid Brilliant Blue, and Direct Red - by a carbon sorbent. It has been shown that the dependence of the adsorption on the pH is determined by two main factors: the state of the dye in solution and its capacity to form micelles. The more strongly associated the dye, the weaker the effect of pH on its adsorption.

# Title: Journal of Applied Electrochemistry

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Publisher: Kluwer Academic Publ

Publisher Address: Spuiboulevard 50, PO Box 17, 3300 AA Dordrecht, Netherlands

Subject Categories:

Electrochemistry: Impact Factor

? Beck, F. and Dahlhaus, M. (1993), Anodic formation of polypyrrole tungsten trioxide composites. *Journal of Applied Electrochemistry*, **23** (8), 781-789.

Full Text: [1993\J App Ele23, 781.pdf](1993/J%20App%20Ele23,%20781.pdf)

Abstract: The anodic codeposition of WO3 and polypyrrole at constant current densities was studied. The powdery solid was dispersed in the electrolyte (0.1 M pyrrole, 0.1 M LiClO4) under strong convection at c(E) = 0.01-30 g dm-3. Water or wet acetonitrile were employed as solvents. Various modes of convection were developed. The resulting WO3 Concentrations in the PPy/WO3 composites were up to c(C) = 53 wt %. c(C) was found to increase with increasing convection intensity and with decreasing current density. Quantitative evaluation leads to a relationship c(C) = K log c(E)/c(E, 0’) where K is a constant and c(E.0) is a threshold concentration. This equation was derived from a model assuming a Temkin type adsorption of the impinging particles and their field enhanced final incorporation into the polypyrrole matrix. K is proportional to j-1. The new model complements the older theory of Guglielmi, originally developed for systems with metal matrices, and it also holds for these very well known composites. The homogeneous distribution of WO3 in PPy is demonstrated by the linear increase of the WO3 mass with the thickness of the composite in combination with SEM techniques.

Keywords: Electrocatalytic Deposition, Electrochemical Synthesis, Particles, Films, Codeposition, Metal, TiO2

? Rajeshwar, K., Ibanez, J.G. and Swain, G.M. (1994), Electrochemistry and the environment. *Journal of Applied Electrochemistry*, **24** (11), 1077-1091.

Full Text: [1994\J App Ele24, 1077.pdf](1994/J%20App%20Ele24,%201077.pdf)

Abstract: Advances in electrochemical methods for pollutant remediation, recycling and sensing are reviewed. Additionally, applications of these methods in the drinking water industry, and for disinfection scenarios are discussed. Lastly, new electrode materials for environmental applications are described. In a companion review, photoelectrochemical methods will be discussed.

Keywords: Reticulated Vitreous Carbon, Flow-Injection Analysis, Waste-Water Treatment, Metal-Ion Removal, Potentiometric Stripping Analysis, Performance Liquid-Chromatography, Differential Pulse Polarography, Mercury Drop Electrode, Packed-Bed Electrode, Voltammetric Determination

El-Sayed, A. (1997), Phenothiazine as inhibitor of the corrosion of cadmium in acidic solutions. *Journal of Applied Electrochemistry*, **27** (2), 193-200.

Full Text: [J\J App Ele27, 193.pdf](J/J%20App%20Ele27,%20193.pdf)

Abstract: The corrosion of cadmium in 0.5 M HClO4, CH3COOH or 0.25 M H2SO4 in the absence and presence of small amounts of phenothiazine (10-6-10-4 M) as an inhibitor has been studied using both electrochemical impedance spectroscopy (EIS) and Tafel-plot techniques. Measurements were carried out at cathodic, open circuit and anodic potentials at different temperatures. In HClO4 and H2SO4 solutions the inhibition efficiency increases as both the concentration of phenothiazine and the temperature are increased. The effect of temperature in CH3COOH solution gives an opposite effect, that is, a decrease in the inhibition efficiency with increasing temperature. This behaviour is attributed to competitive adsorption between the inhibitor molecules and the acetate ions at the metal-solution interface. pHenothiazine can be considered as an inhibitor of mixed type with more pronounced effects in the anodic direction. The thermodynamic parameters in HClO4 containing the inhibitor were evaluated using the Bockris-Swinkels adsorption isotherm with n = 4 as the configurational function. These parameters reveal that phenothiazine is adsorbed on the cadmium surface in molecular form with a strong interaction between the metal and the inhibitor.

Keywords: Copper

Bán, A., Schäfer, A. and Wendt, H. (1998), Fundamentals of electrosorption on activated carbon for wastewater treatment of industrial effluents. *Journal of Applied Electrochemistry*, **28** (3), 227-236.

Full Text: [J\J App Ele28, 227.pdf](J/J%20App%20Ele28,%20227.pdf)

Abstract: The potential of electroadsorption/desorption on activated carbon for waste water treatment of industrial effluents is studied. Adsorption isotherms of hydrophobic differently charged model substances on activated carbon were measured in order to obtain specific information about the influence of the charge (+1, -1 and 0) on the adsorbability of comparable, aromatic species and the influence of the bed potential on the adsorption equilibria. In all these cases the adsorption equilibria show a dependence on applied potential in electrolyte of approximately 1 M ionic strength. With electrosorption from aqueous solution, a fivefold enhancement of the concentration in one potential controlled adsorption/desorption cycle is achievable. The use of the solvent methanol instead of water for desorption allows for a concentration enhancement by a factor of hundred in the desorptive step. The adsorption capacity of the activated carbon changes only slightly with cycle number. Two cell designs for the performance of potential controlled adsorption/desorption cycles on the large scale are discussed.

Keywords: Graphite Particles, Organic-Compounds, Double-Layer, Adsorption, Electrodes, Separation, phenol, Wastewater Treatment, Electrosorption, Activated Carbon, Electrochemical Process, Adsorber Bed, Regeneration

Martinet, S., Bouteillon, J. and Caire, J.P. (1998), Modelling of cyclic voltammograms for two-step metal depositionon an inert electrode with adsorption. *Journal of Applied Electrochemistry*, **28** (8), 819-825.

Full Text: [J\J App Ele28, 819.pdf](J/J%20App%20Ele28,%20819.pdf)

Abstract: Chromium deposition on an inert electrode is a complex process. To gain a better understanding of phenomena involved in multistep reactions we have studied such a mechanism and developed Voltasim, a new software that simulates cyclic voltammograms for a two-step metal deposition with adsorption. In addition, Voltasim is suitable for either reversible or quasi-reversible or irreversible reactions. The software was validated with experimental results obtained for the chromium deposition case. Data fitting was achieved using a screening design of experiments involving 12 parameters.

Zheng, G., Haran, B.S., Popov, B.N. and White, R.E. (1999), Studies on metal hydride electrodes with different weights and binder contents. *Journal of Applied Electrochemistry*, **29** (3), 361-369.

Full Text: [J\J App Ele29, 361.pdf](J/J%20App%20Ele29,%20361.pdf)

Abstract: LaNi4.27Sn0.24 electrodes were characterized using electrochemical techniques at different alloy weights and binder contents. For a given alloy weight, the polarization resistance (R-p) increases with the state of charge (SOC). This arises due to changes from alpha to beta phase at the alloy surface. The electroactive surface area for the hydrogen adsorption/desorption reaction changes with SOC and this also contributes to the variation of R-p. Since the interfacial area increases with alloy content, the polarization resistance decreases with increase in the alloy weight. An increase in the alloy weight reduces R-p and lowers the total resistance. The electrode utilization decreases by increasing the binder content and the electrode weight. A theoretical model is presented to study the effect of alloy weight and particle size on the electrode performance. The model simulations predict lowering of the utilization with increase in the electrode weight. The effect of particle size on the energy and power density of the electrode was also studied.

Keywords: Metal-Hydrides, Alloy Weight, Binder Content, Electrochemical Impedance Spectroscopy, Model Simulations, Electrochemical Kinetic-Parameters, Alkaline-Solution, Impedance, Transport

Bastidas, J.M., Polo, J.L. and Cano, E. (2000), Substitutional inhibition mechanism of mild steel hydrochloric acid corrosion by hexylamine and dodecylamine. *Journal of Applied Electrochemistry*, **30** (10), 1173-1177.

Full Text: [J\J App Ele30, 1173.pdf](J/J%20App%20Ele30,%201173.pdf)

Abstract: Hexylamine and dodecylamine were investigated as inhibitors of mild steel hydrochloric acid corrosion, in concentrations from 1×10-6 to 1.0 M, at a temperature of 298 K. For a given inhibitor concentration, dodecylamine showed higher effectiveness than hexylamine. The inhibitor mechanism was treated as a substitutional adsorption process according to Flory-Huggins (FH), Dhar-Flory-Huggins (DFH) and Bockris-Swinkels (BS) isotherms. The best approach was obtained using FH and DFH isotherms, with one molecule of inhibitor replacing three molecules of water. A structural parameter, the projected molecular area of these two inhibitors, was calculated to elucidate inhibitor orientation in the adsorption process.

Keywords: Adsorption Isotherm, Dodecylamine, Hexylamine, Mild Steel Corrosion, Projected Molecular Area, Adsorption, Imidazolines, Interface

? Bozzini, B., Busson, B., Mele, C. and Tadjeddine, A. (2008), SFG and DFG investigation of Au(111), Au(210), polycrystalline Au, Au-Cu and Au-Ag-Cu electrodes in contact with aqueous solutions containing KCN and 4-cyanopyridine. *Journal of Applied Electrochemistry*, **38** (7), 897-906.

Full Text: [2008\J App Ele38, 897.pdf](2008/J%20App%20Ele38,%20897.pdf)

Abstract: We report on potential-dependent in situ SFG and DFG spectroscopy carried out at Au(111), Au(210), polycrystalline Au, Au-Cu and Au-Ag-Cu electrodes in contact with aqueous solutions containing CN- and 4- cyanopyridine (4CP). Spectroelectrochemical work was complemented by cyclic voltammetry. The chief stress has been placed on systematising and quantifying the interaction between 4CP and CN- and the attending effects on the vibrational and electronic structures of the interface. The voltammetric behaviour of the investigated electrodes, modified by the addition of 4CP to the CN- electrolyte, denote changes in the CN- adsorption characteristics and effects of the adsorbed CN- layer on the electrodic reactivity of 4CP. The differences among the investigated electrodes can be explained in terms of their respective degrees of atomic packing or with alloying effects on the stability of adsorbed CN-. The potential-dependent spectra have been analysed quantitatively with a model for the second order non linear susceptibility accounting for vibrational and electronic effects. The spectral changes induced by addition of 4CP denote interaction of the aromatic with the electrode through the CN- monolayer. The non-resonant contribution yields information on the effects of 4CP on the fine structure of the bound electron density of states.

Keywords: 4-Cyanopyridine, Adsorption, Amino-Acids, Aqueous Solutions, Au(111), Au(210), Au-Ag-Cu, Au-Cu, Behaviour, Cetylpyridinium Chloride, Changes, Cyanide, DFG, Electrochemical-Behavior, Gold, In-Situ Ftir, Information, Interaction, Investigation, Model, Monolayer, Pt(111), Pt(H,K,L), Second Order, Second-Order, SFG, Spectroscopy, Stability, Stress, Structure, Sum-Frequency Generation, Surface, Work

? Foletto, E.L., Jahn, S.L. and Moreira, R.D.P.M. (2010), Hydrothermal preparation of Zn2SnO4 nanocrystals and photocatalytic degradation of a leather dye. *Journal of Applied Electrochemistry*, **40** (1), 59-63.

Full Text: [2010\J App Ele40, 59.pdf](2010/J%20App%20Ele40,%2059.pdf)

Abstract: Zinc stannate (Zn2SnO4) powder was prepared by a hydrothermal process at 200°C for 12 h. The material was characterized by X-ray-diffraction (XRD) and N-2 adsorption-desorption isotherms. The synthesized sample presented a pure phase, an average nanocrystal size of about 19 nm, a surface area (BET) of about 41.8 m2 g-1 and total pore volume of about 0.19 cm3 g-1. Its photocatalytic activity was tested by the degradation of the leather azo-dye, Direct Black 38, in aqueous solution under UV irradiation. Adsorption kinetic data showed that the pseudo-second-order model was the most appropriate for the dye studied. Adsorption onto the Zn2SnO4 surface followed the Langmuir isotherm. The catalyst showed highly photocatalytic activity towards degradation of the dye, almost equal to that of the TiO2-P25 Degussa photocatalyst. The results indicate that Zn2SnO4 could be employed for the removal of dyes from wastewaters.

Keywords: Adsorption, Adsorption Kinetic, Adsorption-Desorption, Aqueous Solution, Azo Dye, BET, Catalyst, Data, Decolorization, Degradation, Dye, Dyes, Irradiation, Isotherm, Isotherms, Kinetic, Langmuir, Langmuir Isotherm, Model, N-2, N2, Nanocrystal, Nanocrystals, Oxide, Photocatalysis, Photocatalytic, Photocatalytic Activity, Pore Volume, Preparation, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Reactive Dyes, Removal, Removal of Dyes, Size, Solution, Surface, Surface Area, Synthesis, TiO2, UV, Volume, Waste-Water, Wastewaters, XRD, Zinc, Zn2SnO4, ZnO

# Title: Journal of Applied Entomology-Zeitschrift fur Angewandte Entomologie

Full Journal Title: Journal of Applied Entomology-Zeitschrift fur Angewandte Entomologie

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Language: Multi-Language

Publisher: Blackwell Wissenschafts-Verlag GmbH

Publisher Address: Kurfurstendamm 57, D-10707 Berlin, Germany

Subject Categories:

Entomology: Impact Factor

? Abate, T. (1991), The bean fly, Ophiomyia-phaseoli (Tryon) (dipt, agromyzidae), and its parasitoids in ethiopia. *Journal of Applied Entomology-Zeitschrift fur Angewandte Entomologie*, **111** (3), 278-285.

Abstract: Surveys carried out during two seasons showed that the bean fly (BF), Ophiomyia phaseoli (Tryon), is widely distributed in Ethiopa. It was found on haricot beant (Phaseolus vulgaris L.), cowpea (Vigna unguiculata L.) and soybean (Glycine max [L.] Merr.) but caused economic damage only on haricot bean. The leguminous bush Crotalaria laburnifolia L. was the only wild host plant supporting BF and its parasitoids throughout the year in some parts of Ethiopia. These surveys confirmed that Ophiomyia phaseoli is the only species of bean fly found in this country. Bean fly incidence on the wild host was highest during the dry season, between December and March. Seventeen species of parasitoids were recorded. of these, the pteromalids Sphegigaster stepicola Bouc. and S. brunneicornis (Ferr.) were the most common species on the wild plant host, accounting for up to 44.5 % (xBAR = 26.2±3.1 %; xBAR±se) of BF parasitism. Parasitism by the braconid Opius phaseoli Fischer was low, ranging from 0 % to 23.2 % (xBAR = 5.6±1.3 %). However, on haricot bean, it was the major parasitoid, with over 87 % of BF parasitism. This fact suggests the possibility that the host plant plays an important role in BF dynamics.

Hernández-Sánchez, G., Sanz-Berzosa, I., Casaña-Giner, V. and Primo-Yúfera, E. (2001), Attractiveness for *Ceratitis capitata* (Wiedemann) (Dipt., Tephritidae) of mango (Mangifera indica, cv. Tommy Atkins) airborne terpenes. *Journal of Applied Entomology-Zeitschrift fur Angewandte Entomologie*, **125** (4), 189-192.

Full Text: [J\J App Ent-Zei Ang Ent125, 189.pdf](J/J%20App%20Ent-Zei%20Ang%20Ent125,%20189.pdf)

Abstract: The airborne volatiles of the Tommy Atkins cultivar of mango (Mangifera indica L.), a fruit frequently damaged by Ceratitis capitata, were analysed by aeration of fresh fruits, adsorption and thermal desorption coupled to gas chromatography-mass spectrometry. Ethanol and acetic acid were identified as the major components, together with longifolene, which has not been described before in the mango aroma and other terpenes (alpha -pinene, 3-carene, p-cymene, limonene and alpha -terpinolene). The attractiveness of the identified terpenes for C. capitata was tested in laboratory cages and the results showed that p-cymene and limonene were the best terpene attractants for both males and females.

Keywords: Mediterranean Fruit-Fly, Electroantennogram Responses, Coffee Fruit, Volatile, Components, Flies, Odor

# Title: Journal of Applied Gerontology

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Subject Categories

: Impact Factor

? Deletter, M.C., Tully, C.L., Wilson, J.F. and Rich, E.C. (1995), Nursing staff perceptions of quality-of-life of cognitively impaired elders-Instrumental development. *Journal of Applied Gerontology*, **14** (4), 426-443.

Abstract: This article describes the development and testing of the Cognitively Impaired Life Quality (CILQ) Scale to quantify differences in quality of life of severely cognitively impaired elderly patients as perceived by nursing caregivers. Two studies are reported. in study 1, focus groups with long-term care nurses were conducted using a vignette to elicit items most relevant to qualify of life in cognitively impaired elders. These data were used to generate a 29-item version of the CILQ Scale. An exploratory factor analysis revealed a four-factor structure that included items related to social interaction, basic physical care, appearance of patient to others, and nutrition. In study 2, 67 nursing caregivers completed a shortened 14-item CILQ Scale using two actual patients as their reference. With these patients, the factor structure best resembled a three-factor solution including items related to social interaction, nutrition/comfort and basic physical care.

Keywords: Health-Status, Institutions, Satisfaction, Proxies, Adults, Care

# Title: Journal of Applied Meteorological Science

Full Journal Title: [Journal of Applied Meteorological Science](http://e48.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=YYQX&NaviLink=%e5%ba%94%e7%94%a8%e6%b0%94%e8%b1%a1%e5%ad%a6%e6%8a%a5)

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Subject Categories:

: Impact Factor

? Xu, X.F., Hu, X., Wang, W.D., Zhang, Z., Zhang, H.G., Wang, X.C., Li, C.G. and Li, H.C. (2007), The atmospheric science development situation in China and the analysis on the priority areas. *Chinese Journal of Evidence-Based Medicine*, **17** (6), 657-664.

Full Text: [2007\Chi J Evi-Bas Med17, 657.pdf](2007/Chi%20J%20Evi-Bas%20Med17,%20657.pdf)

Abstract: Based on the survey of the domestic organizations in atmospheric science and the related areas, an overview of China atmospheric science development situation is made, with the emphases on human resources, scientific research projects and science papers. The study shows that since 1990s the atmospheric science in China has continually developed and the merging of the atmospheric science and other disciplines has enhanced. The total number of personnel is big and the employees are broadly distributed. But the high...

Keywords: Atmospheric Science, Talent, Priority Area

# Title: Journal of Applied Microbiology

Full Journal Title: [Journal of Applied Microbiology](http://www.blackwell-synergy.com/Journals/member/institutions/issuelist.asp?journal=jam)

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Subject Categories:

Biotechnology & Applied Microbiology Microbiology: Impact Factor

Edberg, S.C., Kops, S., Kontnick, C. and Escarzaga, M. (1997), Analysis of cytotoxicity and invasiveness of heterotrophic plate count bacteria (HPC) isolated from drinking water on blood media. *Journal of Applied Microbiology*, **82** (4), 455-461.

Full Text: [J\J App Mic82, 455.pdf](J/J%20App%20Mic82,%20455.pdf)

Abstract: Heterotrophic plate count (HPC) bacteria are naturally present in all aqueous environments. These bacteria undergo multiplication cycles in drinking water, especially in closed containers (bottled water) or in tap water when chlorine levels are dissipated, such as in dead ends in water mains or household plumbing. A study was undertaken to estimate health risk from these naturally occurring bacteria by the determination of cytotoxicity and invasiveness in a human enterocyte cell line. HPC bacteria were isolated from bottled and tap water samples by enumerating them under physical and chemical conditions analogous to human physiology. All HPC bacteria were examined at both log and lag phase of their growth cycles. Bacterial broth supernatant fluids were also tested to serve as critical negative controls. Naturally occurring HPC bacteria demonstrated low invasiveness and cytotoxicity with more than 95% of isolates showing equivalency to broth supernatant fluid. When showing either invasiveness or cytotoxicity, only a small number of cells from the culture were positive. of those that were positive, log phase HPC bacteria were significantly more cytotoxic and invasive than those from stationary phase. Bacterial broth controls demonstrated varied, but often marked, cytotoxicity.

Keywords: Natural Mineral Waters, CaCO3 Cells, Quality, Enumeration, Adhesion

Legnani, P., Leoni, E., Soppelsa, F. and Burigo, R. (1998), The occurrence of Aeromonas species in drinking water supplies of an area of the Dolomite Mountains, Italy. *Journal of Applied Microbiology*, **85** (2), 271-276.

Full Text: [J\J App Mic85, 271.pdf](J/J%20App%20Mic85,%20271.pdf)

Abstract: A study was made of the occurrence of Aeromonas spp. in drinking water supplies in a mountain area in northeast Italy (the Dolomites). On account of its location, the water in question is exposed to a low level of pollution and systematic chemical disinfection is not necessary. Out of 7395 water samples analysed over a 3 year period, 1623 (21×95%) were found to be positive for Aeromonas, with levels ranging from 1 to 240 cfu 100 ml-1; 72×4% of the strains were identified as Aer. hydrophila, 14×7% as Aer. caviae and 12×9% as Aer. sobria. The percentage of recovery from surface water (approximately 40%) was found to be higher than that of ground water (springs: 24×9%; wells: 28×6%). Aeromonas spp. were isolated from 21×7% of samples from the distribution network and showed no significant variations compared with water from reservoirs. There was no evidence, therefore, of after-growth in the distribution system. No correlation was found between the concentration of Aeromonas spp. and faecal indicator organisms. As the distribution of Aeromonas spp. was unrelated to anthropic pollution, it is believed that the search for these micro-organisms should be adopted as a further indicator of drinking water quality, especially in waters such as those in the present investigation not undergoing systematic purification treatment.

Waage, A.S., Vardund, T., Lund, V. and Kapperud, G. (1999), Detection of low numbers of Salmonella in environmental water, sewage and food samples by a nested polymerase chain reaction assay. *Journal of Applied Microbiology*, **87** (3), 418-428.

Full Text: [J\J App Mic87, 418.pdf](J/J%20App%20Mic87,%20418.pdf)

Abstract: A polymerase chain reaction (PCR) assay with two nested pairs of primers selected from conserved sequences within a 2.3 kb randomly cloned DNA fragment from the Salmonella typhimurium chromosome was developed. The nested PCR assay correctly identified 128 of a total of 129 Salmonella strains belonging to subspecies I, II, IIIb and IV. One strain of Salm. arizona (ssp. IIIa) tested negative. No PCR products were obtained from any of the 31 non-Salmonella strains examined. The sensitivity of the assay was 2 cfu, as determined by analysis of proteinase K-treated boiled lysates of Salm. typhimurium. The performance of the assay was evaluated for environmental water, sewage and food samples spiked with Salm. typhimurium. Water and sewage samples were filtered and filters were enriched overnight in a non-selective medium. Prior to PCR, the broth cultures were subjected to a rapid and simple preparation procedure consisting of centrifugation, proteinase K treatment and boiling. This assay enabled detection of 10 cfu 100 ml-1 water with background levels of up to 8700 heterotrophic organisms ml-1 and 10000 cfu of coliform organisms 100 ml-1 water. Spiked food samples were analysed with and without overnight enrichment in a non-selective medium using the same assay as above. Nested PCR performed on enriched broths enabled detection of <10 cfu g-1 food. Variable results were obtained for food samples examined without prior enrichment and most results were negative. This rapid and simple assay provides a sensitive and specific means of screening drinking water or environmental water samples, as well as food samples, for the presence of Salmonella spp.

Musa, H.A., Shears, P., Kafi, S. and Elsabag, S.K. (1999), Water quality and public health in northern Sudan: A study of rural and peri-urban communities. *Journal of Applied Microbiology*, **87** (5), 676-682.

Full Text: [J\J App Mic87, 676.pdf](J/J%20App%20Mic87,%20676.pdf)

Abstract: Access to adequate supplies of good quality drinking water continues to be limited, among many rural and peri-urban communities in Africa, despite several decades of water improvement programmes. The present study investigated water quality at the source and point of consumption among rural and peri-urban communities in northern Sudan. Faecal coliform counts were determined by the membrane filtration technique and geometric mean counts compared in different seasons and, among the different communities. Among nomadic pastoralists and riverine villages, both water sources and water stored for consumption had faecal coliform counts grossly in excess of WHO standards, with higher counts at the end of the rainy season. In the peri-urban community on the outskirts of Omdurman, while water quality from the distribution system had faecal coliform counts generally below 10 dl-1, after storage, water was of considerably lower quality, with faecal coliform counts up to 1000 d1-1. The highest counts again occurred in the rainy season. Rates of diarrhoeal disease for Khartoum province were also greatest towards the end of the rainy season. The study has shown that poor quality water continues to be a major risk factor for public health in these communities.

Leoni, E., Legnani, P., Mucci, M.T. and Pirani, R. (1999), Prevalence of mycobacteria in a swimming pool environment. *Journal of Applied Microbiology*, **87** (5), 683-688.

Full Text: [J\J App Mic87, 683.pdf](J/J%20App%20Mic87,%20683.pdf)

Abstract: A study was performed to evaluate the prevalence of non-tubercular mycobacteria in swimming pool environments. The bacteria in question were found in 88.2% of pool water samples. The most frequent species were Mycobacterium gordonae (73.5% of samples; range 1-840 cfu 100 ml-1), M. chelonei (38.2% 2-360 cfu 100 ml-1) and M. fortuitum (35.3% 2-250 cfu 100 ml-1). The same species were also recovered from the water at the different phases of the treatment cycle, with relative percentages similar to those of the pool water. Shower floors and pool edges also presented high concentrations of the mycobacteria (100% of samples) and M. marinum was isolated from the surfaces of pool edges on two occasions (4.5% of samples). The swimming pool environment provides a suitable habitat for the survival and reproduction of mycobacteria. Although mycobacteria are common in swimming pools, human mycobacterial disease associated with their use is rare. Apart from superficial infections with M. marinum, the risk of more serious diseases in subjects with weakened immune systems should not be underestimated, given the widespread presence of mycobacteria that are possible opportunistic pathogens and the direct contact bathers have with the water and aerosol.

Waage, A.S., Vardund, T., Lund, V. and Kapperud, G. (1999), Detection of low numbers of pathogenic Yersinia enterocolitica in environmental water and sewage samples by nested polymerase chain reaction. *Journal of Applied Microbiology*, **87** (6), 814-821.

Full Text: [J\J App Mic87, 814.pdf](J/J%20App%20Mic87,%20814.pdf)

Abstract: Isolation of pathogenic Yersinia enterocolitica from water and sewage bg traditional culture techniques is time-consuming and subsequent differentiation between pathogenic and non-pathogenic strains can be difficult and unreliable. A nested polymerase chain reaction (PCR) procedure was used for the detection of low numbers of Y. enterocolitica in spiked samples fi om natural surface sources with variable background flora ranging from oligotrophic water to sewage. Water and sewage samples were filtered and filters enriched overnight in a non-selective medium. Nested PCR conducted on enriched broth, prepared by use of a rapid and simple preparation step consisting of centrifugation, proteinase K treatment and boiling, enabled the detection of 8-17 cfu 100 ml-1 water with background levels of up to 8700 heterotrophic organisms ml-1 and 10 000 cfu coliform organisms 100 ml-1 water. The analysis can be completed within 2-3 d and should be a significant tool in monitoring environmental waters and drinking water sources for the presence of pathogenic Y. enterocolitica.

Keywords: Gene Probe Detection, *Escherichia*-Coli, Immunomagnetic Separation, *Campylobacter*-Jejuni, PCR Amplification, Food, Identification, Survival, Bacteria, Strains

Leclerc, H., Edberg, S., Pierzo, V. and Delattre, J.M. (2000), Bacteriophages as indicators of enteric viruses and public health risk in groundwaters. *Journal of Applied Microbiology*, **88** (1), 5-21.

Full Text: [J\J App Mic88, 5.pdf](J/J%20App%20Mic88,%205.pdf)

Abstract: Low concentrations of all types of bacteriophages in groundwater limit their power to predict the presence of enteric viruses. There is little concordance in the literature regarding phage detection methods, thus making comparisons extremely difficult. Different authors have used different hosts, phage concentration methods, and end-point determinations. Also, markedly different volumes of sample have been employed, varying from 1 litre to 400 l. Bacteriophage concentration methods are not reproducible. There has been marked variability among groups in the natural substrates used (for example, beef extract), the type of adsorbing filter used, centrifugation instruments and conditions, and the delivery of the concentrate to the host cells. There is no consensus on the best bacterial host strain. Currently, several are employed with each showing differential sensitivities and specificities. In particular, host stability must be considered. Host stability has two components: the ability of the host to continue to be receptive to the bacteriophage after continued sub-culture, and the lack of lysogenic or temperate bacteriophage in the host cell line which may be randomly and unpredictably activated. There is a lack of consistent recovery of bacteriophages from individual faecal specimens. In particular, only approximately 3% of individual humans carry the FRNA phages. While there is some evidence to indicate that the phages multiply in sewage, it is not clear how they do so since the host pili should not be produced at lower temperatures. These ecological factors need to be understood. of all the phages thus far studied, Bacteroides fragilis HSP40 has the highest recovery rate from individual people. However, Bacteroides, being an anaerobe, is a difficult host for routine laboratory analysis. Methods for the enumeration of F (+)-specific phages and Bacteroides phages are complex, time-consuming, costly and not reproducible. Conversely, somatic coliphage methods are simpler and results can be available in 4-6 h. The occurrence of phages and viruses in groundwater depends on physicochemical characteristics that control their fate and transport in the groundwater/aquifer environment. There are very little actual data taken from the field that allow an understanding of the ecology and life span of phages in their natural environment. Moreover, the ability of phages to serve as a source of food for other microbes needs to be understood. There has been a lack of association of bacteriophage recovery with gastroenteritis outbreaks due to enteric viruses. There is only a small epidemiological database concerning the occurrence of enteric viruses in groundwater.

# Title: Journal of Applied Oral Science

Full Journal Title: [Journal of Applied Oral Science](http://www.scielo.br/scielo.php?script=sci_issues&pid=1678-7757&lng=en&nrm=iso)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ferraz, V.C.T., Amadei, J.R.P. and Santos, C.F. (2008), The evolution of the *Journal of Applied Oral Science*: A bibliometric analysis. *Journal of Applied Oral Science*, **16** (6), 420-427.

Full Text: [2008\J App Ora Sci16, 420.pdf](2008/J%20App%20Ora%20Sci16,%20420.pdf)

Abstract: The purpose of this study was to make a brief diagnosis of the evolution of the Journal of Applied Oral Science (JAOS) between 2005 and 2007, by reviewing quantitative and qualitative aspects of the articles published in the JAOS within this period. All articles published in the JAOS in the time span established for this survey were analyzed retrospectively and a discussion was undertaken on the data referring to the main bibliometric indexes of production, authorship, bibliographic sources of the published articles, and the most frequently cited scientific journals in the main dental research fields. A total of 247 papers authored and coauthored by 1,139 contributors were reviewed, most of them being original research articles. The number of authors per article was 4.61 on the average. Regarding the geographic distribution, the authors represented almost all of the Brazilian States. Most published articles belonged to the following dental research fields: Endodontics, Restorative Dentistry, Dental Materials and Prosthodontics. The ranking of the most frequently cited scientific journals included the most reputable publications in these dental research fields. In conclusion, between 2005 and 2007, the JAOS either maintained or improved considerably its bibliometric indexes. The analysis of the data retrieved in this study allowed evaluating the journal’s current management strategies, and identifying important issues that will help outlining the future directions for the internationalization of this journal.

Keywords: Analysis, Authors, Authorship, Bibliometric, Bibliometric Analysis, Bibliometric Indexes, Bibliometrics, Dentistry, Diagnosis, Indexes, Internationalization, Journal of Applied Oral Science, Journals, Management, Papers, Publications, Ranking, Research, Science, Scientific Journal, Scientific Journals, Survey

# Title: Journal of Applied Oral Science

Full Journal Title: [Journal of Applied Oral Science](http://www.scielo.br/scielo.php?script=sci_issues&pid=1678-7757&lng=en&nrm=iso)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Santhi, T., Manonmani, S., Smitha, T., Sugirtha, D. and Mahalakshmi, K. (2009). Uptake of cationic dyes from aqueous solution by bioadsorption onto granular *Cucumis sativa*. *Journal of Applied Sciences in Environmental Sanitation*, **4** (1), 29-35.

Full Text: [2009\J App Sci Env San4, 29.pdf](2009/J%20App%20Sci%20Env%20San4,%2029.pdf)

Abstract: A new, low cost, locally available biomaterial was tested for its ability to remove cationic dyes from aqueous solution. A granule prepared from a fruit peel of Cucumis sativa had been utilized as a adsorbent for uptake of three cationic dyes, methylene blue (MB), methyl red (MR) and malachite green (MG). The effects of various experimental parameters (e.g., contact time, dye concentration, adsorbent dose, particle size and pH) were investigated and optimal experimental conditions were ascertained. Above the value of initial pH 6, three dyes studied could be removed effectively. The sorption isotherms of MR followed the Langmuir and Freundlich models, but the sorption isotherms of MB and MG only fitted the Freundlich model of adsorption. The bioadsorption processes followed the Pseudo –first order rate kinetics. The results in this study indicated that fruit peel of Cucumis sativa was an attractive candidate for removing cationic dyes from the dye wastewater.

Keywords: Bioadsorption, Cucumis Sativa, Malachite Green, Methylene Blue, Methyl Red

# Title: Journal of Applied Social Psychology

Full Journal Title: Journal of Applied Social Psychology

ISO Abbreviated Title: J. Appl. Soc. Psychol.

JCR Abbreviated Title: J Appl Soc Psychol

ISSN: 0021-9029

Issues/Year: 24

Journal Country/Territory: United States

Language: English

Publisher: V H Winston & Son Inc

Publisher Address: 360 South Ocean Blvd, PH-B, Palm Beach, FL 33480

Subject Categories:

Psychology, Social: Impact Factor 0.657, / (2001) SSCI

? Dooley, D., Catalano, R., Mishra, S. and Serxner, S. (1992), Earthquake preparedness: Predictors in a community survey. *Journal of Applied Social Psychology*, **22** (6), 451-470.

Abstract: We measured the relationship between earthquake concern and preparation in a community with high seismic risk. Five samples of approximately 800 people were interviewed by telephone about their earthquake concern, but this study focuses on the last two samples in which respondents reported their preparatory behaviors. The findings were consistent in showing greater likelihood of concern for those who had experienced an earthquake, were female, younger, and non-Anglo and a greater likelihood of preparation for those who had more concern, were married, and had lived longer at their present address. In a nonrecursive causal model, no evidence was found for a reciprocal effect of preparation on concern. These results were discussed in terms of health belief models including the self-efficacy and-stages of change’ perspectives. Implications were drawn for interventions to increase preparation in ready-to-change groups and compensate for the resistance of those less willing or able to prepare.

# Title: Journal of Applied Statistics

Full Journal Title: Journal of Applied Statistics

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher: Kluwer

Publisher Address:

Subject Categories:

: Impact Factor

? Causey, B.D. (2002), Parametric estimation of the number of classes in a population. *Journal of Applied Statistics*, **29** (6), 925-934.

Full Text: [J\J App Sta29, 925.pdf](J/J%20App%20Sta29,%20925.pdf)

Abstract: This paper deals with the well-studied problem of how best to estimate the number of mutually exclusive and exhaustive classes in a population, based on a sample from it. Haas & Stokes review and provide non-parametric approaches, but there are associated difficulties especially for small sampling fractions and/or widely varying population class sizes. Sichel provided ‘GIGP’ methodology, for this problem and for other purposes; this paper utilizes the three-parameter GIGP distribution for this problem, and also for the estimation of the number of classes of size 1, as an alternative to the non-parametric approaches. Methodological and computational issues are considered, and examples indicate the potential for GIGP.

? Ryan, T.P. and Woodall, W.H. (2005), The most-cited statistical papers. *Journal of Applied Statistics*, **32** (5), 461-474.

Full Text: [2005\J App Sta32, 461.pdf](2005/J%20App%20Sta32,%20461.pdf)

Abstract: We attempt to identify the 25 most-cited statistical papers, providing some brief commentary on each paper on our list. This list consists, to a great extent, of papers that are on non-parametric methods, have applications in the life sciences, or deal with the multiple comparisons problem. We also list the most-cited papers published in 1993 or later. In contrast to the overall most-cited papers, these are predominately papers on Bayesian methods and wavelets. We briefly discuss some of the issues involved in the use of citation counts.

Keywords: Algorithm, Bootstrap, Citation, Citation Counts, Citations, Commentary, Conversation, History of Statistics, Incomplete Data, Journals, Kaplan-Meier, Maximum Likelihood, Multiple Comparisons, Nonparametric, Papers, Populations, Probability, Sciences, Statistical, Tests

# Title: Journal of Applied Phycology

Full Journal Title: [Journal of Applied Phycology](http://www.ingentaconnect.com/content/klu/japh); [Journal of Applied Phycology](http://www.springerlink.com/content/1573-5176/)

ISO Abbreviated Title: J. Appl. Phycol.

JCR Abbreviated Title: J Appl Phycol

ISSN: 0921-8971

Issues/Year: 6

Journal Country/Territory: Netherlands

Language: English

Publisher: Kluwer Academic Publ

Publisher Address: Spuiboulevard 50, PO Box 17, 3300 AA Dordrecht, Netherlands

Subject Categories:

Biotechnology & Applied Microbiology: Impact Factor

Marine & Freshwater Biology: Impact Factor

? Winter, C., Winter, M. and Pohl, P. (1994), Cadmium adsorption by nonliving biomass of the semi-macroscopic brown alga, ectocarpus-siliculosus, grown in axenic mass-culture and localization of the adsorbed Cd by transmission electron-microscopy. *Journal of Applied Phycology*, **6** (5-6), 479-487.

Full Text: [1994\J App Phy6, 479.pdf](1994/J%20App%20pHy6,%20479.pdf)

Abstract: Non-living, freeze-dried material of the brown alga Ectocarpus siliculosus (Phaeophyceae) demonstrated high equilibrium uptake of Cd from aqueous solutions (Fehrmann and Pohl, 1993). The alga was grown in 250-L photobioreactors under various growth conditions (light, salinity and nutrient concentrations) in order to obtain larger quantities of biomass and to improve its Cd adsorption capacity. To derive further knowledge on the biosorbant phenomenon different adsorption parameters such as pH for the sorption process and kinetics of Cd adsorption were tested. The maximum adsorption capacity of the freeze-dried biomass exceeded 41 mg Cd per g biomass. After repeated addition of low Cd concentrations the maximum adsorption capacity was lower (31.4 mg Cd per g biomass). In comparison with other adsorbing materials (activated carbon, silica gel, siliceous earth) E. siliculosus showed significantly higher adsorption capacity. Desorption of deposited Cd with 0.1 M HCl resulted in no changes of the adsorption capacity through five subsequent adsorption-/desorption-cycles. Hence, dried E. siliculosus appears to be an efficient material for the elimination of Cd from industrial waste water. Transmission electron microscopic investigations showed an electron dense area in the outer surface layers of the cell wall after Cd adsorption indicating the most likely location of Cd fixation.

Keywords: Adsorption, Adsorption Parameters, Alga, Biomass, Biosorbents, Biosorption, Cadmium Adsorption, Chlorella-Vulgaris, Ectocarpus Siliculosus, Electron Microscopy, Equilibrium, Growth Conditions, Recovery, Regeneration, Sorption

? Winter, C., Winter, M. and Pohl, P. (1995), Cadmium adsorption by nonliving biomass of the semi-macroscopic brown alga, ectocarpus-siliculosus, grown in axenic mass-culture and localization of the adsorbed Cd by transmission electron-microscopy (Vol 6, Pg 479, 1994). *Journal of Applied Phycology*, **7** (2), 227-237.

Abstract: Non-living, freeze-dried material of the brown alga Ectocarpus siliculosus (Phaeophyceae) demonstrated high equilibrium uptake of Cd from aqueous solutions (Fehrmann and Pohl, 1993). The alga was grown in 250-L photobioreactors under various growth conditions (light, salinity and nutrient concentrations) in order to obtain larger quantities of biomass and to improve its Cd adsorption capacity. To derive further knowledge on the biosorbant phenomenon different adsorption parameters such as pH for the sorption process and kinetics of Cd adsorption were tested. The maximum adsorption capacity of the freeze-dried biomass exceeded 41 mg Cd per g biomass. After repeated addition of low Cd concentrations the maximum adsorption capacity was lower (31.4 mg Cd per g biomass). In comparison with other adsorbing materials (activated carbon, silica gel, siliceous earth) E. siliculosus showed significantly higher adsorption capacity. Desorption of deposited Cd with 0.1 M HCl resulted in no changes of the adsorption capacity through five subsequent adsorption-/desorption-cycles. Hence, dried E. silicubosus appears to be an efficient material for the elimination of Cd from industrial waste water. Transmission electron microscopic investigations showed an electron dense area in the outer surface layers of the cell wall after Cd adsorption indicating the most likely location of Cd fixation.

Keywords: Adsorption, Alga, Biomass, Biosorbents, Biosorption, Chlorella-Vulgaris, Equilibrium, Recovery, Sorption

Zhang, X.Z., Luo, S.G., Yang, Q., Zhang, H.L. and Li, J.Y. (1997), Accumulation of uranium at low concentration by the green alga *Scenedesmus obliquus* 34. *Journal of Applied Phycology*, **9** (1), 65-71.

Full Text: [J\J App Phy9, 65.pdf](J/J%20App%20Phy9,%2065.pdf)

Abstract: Accumulation of UO22+ by Scenedesmus obliquus 34 was rapid and energy-independent and the biosorption of UO22+ could be described by the Freundlich adsorption isotherm below the maximum adsorption capacity (75 mgg-1 dry wt). The optimum pH for uranium uptake was between 5.0 similar to 8.5. 0.1 similar to 2.0 M NaCl enhanced uranyl, while Cu2+, Ni2+, Zn2+, Cd2+ and Mn2+ competed slightly with uranyl. Pretreatment had an unexpected effect on biosorption. After being killed by 0.1 M HCl, S. Obliquus 34 showed 45% of the uptake capacity of the control in which fresh cells were suspended directly in uranyl solution, while the pretreatment of cells by 0.1 M NaOH, 2.0 M NaCl, ethanol or heating decreased uptake slightly. Fresh S. obliquus 34 at 1.2 similar to 2.4 mgdry wt mL-1 was able to decrease U from 5.0 to 0.05 mgL-1 after 4 similar to 6 equilibrium stages with batch adsorption. Deposited U could be desorbed by pH 4.0 buffer. It is suggested that U was captured by effective groups or by capillary action in the cell wall in the form of [UO2OH]+.

Keywords: Heavy-Metal Elements, Biological-Systems, Biosorption, Biomass, Localization, Adsorption, Pollution, Emersonii, Recovery, *Arrhizus*, *Scenedesmus Obliquus* 34, Uranyl, Biosorption, Cell Pretreatment, Simulated Wastewater, Batch Experiment

? Schiewer, S. (1999), Modelling complexation and electrostatic attraction in heavy metal biosorption by *Sargassum* biomass. *Journal of Applied Phycology*, **11** (1), 79-87.

Full Text: [1999\J App Phy12, 79.pdf](1999/J%20App%20pHy12,%2079.pdf)

Abstract: Biosorption, the passive accumulation of metal ions by biomass, can be used for purifying metal bearing wastewater. Seaweeds represent a readily available source of biosorbent material that possesses a high metal binding capacity. For example, Sargassum can accumulate 2 mequiv of Cd per gram of biomass i.e. 10% of its dry weight. Binding of Cd and Cu by Sargassum is an ion exchange process involving both covalent and ionic bonds. The amount of cations bound covalently or by complexation can be predicted using multi-component sorption isotherms involving 2 types of binding sites, carboxyl and sulphate. A Donnan model was used to account for the effect of ionic strength and electrostatic attraction. The use of a multi-component isotherm that included one term for Na binding was less appropriate than the Donnan model for modelling ionic strength effects. It was possible to predict metal and proton binding as a function of the pH value, metal concentration and ionic strength of the solution.

Keywords: Biosorption, Seaweeds, Ion Exchange, pH, Ionic Strength, Heavy Metals, Humic Substances, Ion-Exchange, Binding, Algae, Acid, Alginate, Protons

Parker, D.L., Mihalick, J.E., Plude, J.L., Plude, M.J., Clark, T.P., Egan, L., Flom, J.J., Rai, L.C. and Kumar, H.D. (2000), Sorption of metals by extracellular polymers from the cyanobacterium *Microcystis aeruginosa* f. *flos-aquae* strain C3-40. *Journal of Applied Phycology*, **12** (3-5), 219-224.

Full Text: [J\J App Phy12, 219.pdf](J/J%20App%20Phy12,%20219.pdf)

Abstract: The sorption of cadmium(II), copper(II), lead(II), manganese(II), and zinc(II) by purified capsular polysaccharide from the cyanobacterium Microcystis aeruginosa fo. flos-aquae strain C3-40 was examined by four methods: equilibrium dialysis, metal removal from solution as detected by voltammetry, metal accumulation by capsule-containing alginate beads, and calorimetry. The polysaccharide’s saturation binding capacities for these metals ranged from 1.2 to 4 mmol of metal g-1 of capsule, which corresponds to 1 metal equivalent per 2 to 4 saccharide subunits of the polymer. Competition between paired metals was tested with simultaneous and sequential additions of metal. Cadmium(II) and lead(II), as well as lead(II) and zinc(II), competed relatively equally and reciprocally for polymer binding sites. In contrast, manganese(II) strongly inhibited the binding of cadmium(II) and lead(II), but itself was not substantially inhibited by either the prior or simultaneous adsorption of cadmium(II) or lead(II).

The data are interpreted with respect to overlap of binding sites and possibilities of altered polymer conformation or solvation. Calorimetric studies of lead(II) and cadmium(II) association reactions with the polysaccharide suggest that the enthalpies are small and that the reactions may be driven by entropy.

Keywords: Cyanobacterium, Cyanophyta, Microcystis, Capsule, Slime Layer, Metal, Adsorption, Polysaccharide, Equilibrium Dialysis, Voltammetry, Polysaccharide, Slime

Radway, J.C., Wilde, E.W., Whitaker, M.J. and Weissman, J.C. (2001), Screening of algal strains for metal removal capabilities. *Journal of Applied Phycology*, **13** (5), 451-455.

Full Text: [J\J App Phy13, 289.pdf](J/J%20App%20Phy13,%20289.pdf)

Abstract: Eight algal species were tested for their ability to remove five toxic metals during 30-min exposures to single-metal (1 mg L-1) solutions at pH 7. Efficacy of metal bioremoval varied according to algal species and metal. Al+3 was best removed by the thermophilic blue-green alga (cyanobacterium) Mastigocladus laminosus, Hg+2 and Zn+2 by the thermophilic and acidophilic red alga Cyanidium caldarium, and Cd+2 by C. caldarium and the green alga Scenedesmus quadricauda. All of these alga/metal combinations resulted in >90% metal removal. However, none of the eight algal species removed more than 10% of Cr+6. Results indicate that some toxic metals are more readily removed than others are by algae and that selection of appropriate strains could potentially enhance bioremoval of specific metals from wastewater at neutral pH.

Keywords: Aluminum, Bioremoval, Blue-Green Alga, Cyanidium, Green Algae, Heavy Metals, Mastigocladus, Mercury, Scenedesmus, Thermophiles, Water Pollution, Zinc, Biosorption, Temperature, Microalgae, Alginate, pH

Radway, J.C., Wilde, E.W., Whitaker, M.J. and Weissman, J.C. (2001), Screening of algal strains for metal removal capabilities. *Journal of Applied Phycology*, **13** (5), 451-455.

Full Text: [J\J App Phy13, 451.pdf](J/J%20App%20Phy13,%20451.pdf)

Abstract: Eight algal species were tested for their ability to remove five toxic metals during 30-min exposures to single-metal (1 mg L-1) solutions at pH 7. Efficacy of metal bioremoval varied according to algal species and metal. Al+3 was best removed by the thermophilic blue-green alga (cyanobacterium) Mastigocladus laminosus, Hg+2 and Zn+2 by the thermophilic and acidophilic red alga Cyanidium caldarium, and Cd+2 by C. caldarium and the green alga Scenedesmus quadricauda. All of these alga/metal combinations resulted in > 90% metal removal. However, none of the eight algal species removed more than 10% of Cr+6. Results indicate that some toxic metals are more readily removed than others are by algae and that selection of appropriate strains could potentially enhance bioremoval of specific metals from wastewater at neutral pH.

Keywords: Aluminum, Bioremoval, Blue-Green Alga, Cyanidium, Green Algae, Heavy Metals, Mastigocladus, Mercury, Scenedesmus, Thermophiles, Water Pollution, Zinc, Biosorption, Temperature, Microalgae, Alginate, pH

Mehta, S.K., Tripathi, B.N. and Gaur, J.P. (2002), Enhanced sorption of Cu2+ and Ni2+ by acid-pretreated *Chlorella vulgaris* from single and binary metal solutions. *Journal of Applied Phycology*, **14** (4), 267-273.

Full Text: [J\J App Phy14, 267.pdf](J/J%20App%20Phy14,%20267.pdf)

Abstract: The influence of HCl pretreatment (0.1 mM) on sorption of Cu2+ and Ni2+ by *Chlorella vulgaris* was tested using single and binary metal solutions. The optimal initial pH for sorption was 3.5 for Cu2+ and 5.5 for Ni2+. Second order rate kinetics described well sorption by untreated and acid-pretreated cells. The kinetic constant q(e) (metal sorption at equilibrium) for sorption of test metals from single and binary metal solutions was increased after pretreatment of the biomass with HCl. The Langmuir adsorption isotherm was developed for describing the various results for metal sorption. In single metal solution, acid pretreatment enhanced q(max) for Cu2+ and Ni2+ sorption by approximately 70% and 65%, respectively. Cu2+ and Ni2+ mutually interfered with sorption of the other metal in the binary system. The combined presence of Cu2+ and Ni2+ led to their decreased sorption by untreated biomass by 19% and 88%, respectively. However, acid-pretreated biomass decreased Cu2+ and Ni2+ sorption by 15 and 22%, respectively, when both the metals were present in the solution. The results suggest a reduced mutual interference in sorption of Cu2+ and Ni2+ from the binary metal system due to the acid pretreatment. Acid-pretreated cells sorbed twice the amount of Cu2+ and ten times that of Ni2+ than the untreated biomass from the binary metal system. Acid pretreatment more effectively enhanced the sorption of Ni2+ form the binary metal solution. The total metal sorption by untreated and acid-pretreated biomass depended on the Cu2+: Ni2+ ratio in the binary metal system. Acid pretreatment of *C. vulgaris* could be an effective and inexpensive strategy for enhancing Cu2+ and Ni2+ sorption from single and binary metal solutions.

Keywords: Chlorella, Copper, Isotherm Model, Metal Biosorption, Nickel, Heavy-Metals, Biosorption, Equilibria, Biomass

Chan, H.W., Lau, T.C., Ang, P.O., Wu, M. and Wong, P.K. (2004), Biosorption of di(2-ethylhexyl)phthalate by seaweed biomass. *Journal of Applied Phycology*, **16** (4), 263-274.

Full Text: [J\J App Phy14, 263.pdf](J/J%20App%20Phy14,%20263.pdf)

Abstract: Samples of various *Sargassum* species were collected in the Hong Kong marine environment and used for studies on biosorption of di(2-ethylhexyl)phthalate (DEHP). Batch adsorption experiments were carried out to determine the removal capacity and removal efficiency of the biosorbents. The DEHP removal ability was similar among beached seaweed and three freshly collected *Sargassum* species. Different physico-chemical factors were evaluated in order to enhance the performance of the biosorbents. Under optimized conditions (25 mg biomass, initial pH 4, 25 °C, 40 mg L-1 DEHP), the mean removal capacity of beached seaweed and *Sargassum siliquastrum* was 5.68 and 6.54 mg g-1, respectively. Examination of the Langmuir and Freundlich adsorption isotherms showed that the biosorption phenomenon by these biosorbents could well be described by these models. Desorption of DEHP was also assessed with methanol, which showed the most satisfactory desorbing ability. Further study in multiple adsorption–desorption of DEHP by the biosorbents demonstrated the reusability of both beached seaweed and *S. siliquastrum* for biosorption of DEHP.

Keywords: Biosorption, Di(2-Ethylhexyl)pHthalate (DEHP), Sargassum, Seaweed

# Title: Journal of Applied Physics

Full Journal Title: [Journal of Applied Physics](http://ojps.aip.org/japo/)

ISO Abbreviated Title: J. Appl. Phys.

JCR Abbreviated Title: J Appl Phys

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Journal Country/Territory: United States

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Publisher Address: Circulation & Fulfillment Div, 2 Huntington Quadrangle, Ste 1 N O 1, Melville, NY 11747-4501

Subject Categories:

Physics, Applied: Impact Factor 2.128, / (2001)

? Pauleve, J. (1958), Magnetic resonance of ferrites with a compensation temperature. *Journal of Applied Physics*, **29** (3), 259-263.

Full Text: [-1959\J App Phy29, 259.pdf](-1959/J%20App%20Phy29,%20259.pdf)

Abstract: Calculations of the resonance fields as a function of temperature and of resonance frequency as a function of field for temperatures near the compensation temperature for lithium-chromium ferrite and gadolinium garnet are given. For the latter case, a comparison is made between the assumption of zero anisotropy and an assumed negative anisotropy.

? Chang, J.T., Dillon, Jr., J.F. and Gianola, U.F. (1965), Magneto-optical variable memory based upon properties of a transparent ferrimagnetic garnet at its compensation temperature. *Journal of Applied Physics*, **36** (3), 1110-1111.

Full Text: [1960-80\J App Phy36, 1110.pdf](1960-80/J%20App%20Phy36,%201110.pdf)

Abstract: The requirements to be met by a changeable memory medium for flying spot variable memory system are discussed. Although simple reversible photochromic materials satisfy most of these requirements, their lack of a writing threshold limits their applicability. The application of a transparent ferrimagnetic garnet near its compensation temperature is discussed. At the compensation temperature the net magnetization of the garnet is zero so that the remanent magnetization of the sublattices normal to the surface of a thin crystal is not subject to demagnetization fields. The magnetization of the iron sublattice of the garnet produces a large magneto-optical rotation of the polarization of a transmitted light beam in opposite senses for the two directions of the remanent magnetization, which can, therefore, be interrogated non-destructively. In passing through the compensation temperature, the coercive field for a magnetization reversal passes through a sharp maximum. Thus, the direction of remanent magnetization can be changed by applying a magnetic field in coincidence with a high-intensity pulsed light beam which produces a transient temperature excursion of ~3°C from the compensation temperature. This provides a writing-threshold making it possible to change the remanent magnetization of a selected crystal in an array without disturbing the magnetization of the remainder. Practical aspects of this approach are discussed. ©1965 The American Institute of Physics

? Smith, D.L. and Huchital, D.A. (1972), Adsorption kinetics of Cs on GaAs. *Journal of Applied Physics*, **43** (6), 2624-2628.

Full Text: [1960-80\J App Phy43, 2624.pdf](1960-80/J%20App%20Phy43,%202624.pdf)

Abstract: Cesiumadsorption on vacuum-cleaved *p*-GaAs (110) was monitored at 10–10 Torrconcurrently by photoemission and x-ray photoelectron spectroscopy (ESCA). Cesium wassupplied at *R* = 6.9×1012 atoms/cm2 sec by a calibratedvalved room-temperature Knudsen effusion cell. ESCA results showed that thefirst monolayer of Cs contains *N* = 6.2×1014 atoms/cm2, thatit adsorbs irreversibly, and that fractional coverage is θ =1–exp(– *Rt/N*). Maximum photoyield (hence minimum work function) corresponds toθ = 1. The second layer of Cs decreases photoyield, but is desorbed with a time constant of less than1 min. ©1972 *The American Institute of Physics*

? Voorhoev, R.J., Carides, J.N. and Wagner, R.S. (1972), Kinetics and thermodynamics of thin-film deposition by molecular-beam methods. 1. Adsorption and clustering of cadmium on germanium single-crystals. *Journal of Applied Physics*, **43** (12), 4876-4885.

Full Text: J App Phy43, 4876

Abstract: Theuse of mass-spectrometric molecular beam techniques allowed a detailed studyto be made of the kinetics and thermodynamics of thin-filmdeposition. Thermal accommodation, adsorption, nucleation, growth, and evaporation were measuredfor a single system. The deposits were characterized by theircoverage-dependent steady-state evaporation rate, which is directly related to thethermodynamic potential of the evaporant in the film. The methodsused and results obtained are exemplified by the present studyof all stages of the ultrahigh-vacuum (UHV) deposition of cadmiumon the (100), (110), (111), (211), and (331) faces ofgermanium. In this paper, the initial stages of adsorption andclustering are described. The thermal accommodation coefficient was found tobe between 0.8 and 1.0. On (111) substrates, adsorption ofone monolayer of immobile cadmium atoms precedes nucleation of bulkcadmium. On the other substrates, 40% to 70% of amonolayer is adsorbed prior to nucleation. The extent of thisadsorption is predictable from the structure of the germanium surfaces.Adsorption energies range from 25 to 32 kcal/g atom, comparedwith a heat of sublimation of 26.7 kcal/g atom. Thekinetics of the desorption of cadmium during deposition is inagreement with an evaporation mechanism in which desorption of mobilesingle cadmium adatoms is the rate-determining step. The desorption energyof mobile adatoms is approximately 12 kcal/g atom in thenucleation stage. It is shown that the stability of thecadmium deposit increases only slowly after nucleation. Electrically active dopantsin the germanium increase the extent of cadmium adsorption whichprecedes nucleation. ©1972 *The American Institute of Physics*

Lawson, M.F.F., Spooner, T. and Ficalora, P.J. (1992), Excess noise induced in metal resistors as a result of dynamic processes. *Journal of Applied Physics*, **71** (7), 3623-3625.

Full Text: [J\J App Phy71, 3623.pdf](J/J%20App%20Phy71,%203623.pdf)

Abstract: Excess noise is induced in thin gold films when the film is put in contact with an electrolytic solution. The magnitude of the noise changes as a function of the concentration of the ions in solution and follows a Temkin adsorption isotherm. Excess noise is also observed in a platinum wire exposed to water undergoing solidification. All measurements are made in the absence of an external applied bias. This implies that a dynamic process moving towards or at equilibrium can induce excess noise in a metal resistor.

Keywords: 1/F Noise, 1-F Noise

Eriksson, M., Lundstrom, I. and Ekedahl, L.G. (1997), A model of the Temkin isotherm behavior for hydrogen adsorption at Pd-SiO2 interfaces. *Journal of Applied Physics*, **82** (6), 3143-3146.

Full Text: [J\J App Phy82, 3143.pdf](J/J%20App%20Phy82,%203143.pdf)

Abstract: A simple electrostatic model of the adsorbate-adsorbate interaction of hydrogen atoms at a Pd-SiO2 interface is presented. The model predicts a hydrogen adsorption isotherm of the Temkin type. It is found that, in practice, an upper limit for the hydrogen response of a Pd-metal-oxide-semiconductor device exists. The value (in V) is equal to the difference of the initial heats of adsorption (in eV) of the interface and the Pd bulk, respectively. Furthermore, a corresponding maximum hydrogen concentration, at the interface, of 1×1018 m-2 is predicted. The predictions are in good agreement with previously observed experimental data. (C) 1997 American Institute of Physics.

Keywords: H2O2 Reaction, Pressure Range, Palladium, Pd, Sensors

# Title: Journal of Applied Polymer Science

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Allingham, M.M., Cullen, J.M., Giles, C.H., Jain, S.K. and Woods, J.S. (1958), Adsorption at inorganic surfaces. II. Adsorption of dyes and related compounds by silica. *Journal of Applied Polymer Science*, **8**, 108-116.

Freidman, M., Harrison, C.S., Ward, W.H. and Lundgren, H.P. (1973), Sorption behavior of mercuric and methylmercuric salts on wool. *Journal of Applied Polymer Science*, **17**, 377-390.

Full Text: [1960-80\J App Pol Sci18, 377.pdf](1960-80/J%20App%20Pol%20Sci18,%20377.pdf)

Abstract: Sorption by wool of mercuric nitrate, mercuric chloride, and methylmercuric chloride was measured by atomic absorption spectroscopy. Both inorganic mercury compounds are efficiently taken up at low concentrations from acid solution. The rate of binding from the nitrate is appreciably slower than from the chloride. Methylmercuric chloride is bound slowly at low pH, rapidly at pH 6. The extent of its binding is roughly 10% to 20% of that of the inorganic salts. The wool-bound mercury can be recovered by serial extraction with aqueous citrate or ethylenediaminetetraacetate at pH 6. The residual, firmly bound mercury is roughly equivalent to the sulfhydryl sulfur. Sorption of inorganic mercury compounds at low pH roughly follows a Freundlich isotherm in the concentration range 5×10-6 to 10-l M. Sorption of methylmercuric chloride at pH 6 follows a roughly parallel isotherm in the range 5×10-6 to 10-3 M. These datasuggest the potential value of wool and other animal keratins to remove and recover mercury from contaminated water. Wool may also serve as an instructive model for mercury binding and release in the body.

? Masri, M.S., Reuter, F.W. and Friedman, M. (1974), Binding of metal cations by natural substances. *Journal of Applied Polymer Science*, **18**, 675-681.

Full Text: [1960-80\J App Pol Sci18, 675.pdf](1960-80/J%20App%20Pol%20Sci18,%20675.pdf)

Abstract: The binding of mercuric chloride and other metal salts to bark, activated sludge (Milorganite), chitosan, poly(p-aminostyrene), and other natural and synthetic materials was investigated by specific atomic absorption and x-ray fluorescence spectroscopy. The synthetic poly(amin0styrene) was included for comparison with the natural polyamine chitosan. Our results show that a wide range of natural materials are potentially useful for the removal of toxic and precious metals that may be present in industrial effluents, mine waters, or other water supply. Such metal salts include those of mercury, lead, zinc, cadmium, copper, nickel, cobalt, iron, manganese, silver, platinum, palladium, and gold.

? Rhee, C.K. and Ferry, J.D. (1977), Diffusion of radioactively tagged penetrants through rubbery polymers. 1. Penetrants with very low solubility. *Journal of Applied Polymer Science*, **21** (3), 773-781.

Full Text: [1960-80\J App Pol Sci21, 773.pdf](1960-80/J%20App%20Pol%20Sci21,%20773.pdf)

Abstract: The diffusion of radioactively tagged *n*-hexadecane, 1,7-heptanediol, and ethylene glycol has been studied in one polar and six nonpolar rubbery polymers. The penetrant-polymer pairs included some in which the two components were miscible in all proportions and some in which they were nearly incompatible (solubility of penetrant in polymer of the order of 1%). The theory for the thin smear method for measuring the diffusion coefficient was evaluated for incompatible pairs with two cases: case 2, when the rate-limiting step is diffusion through the polymer; and case 3, when the rate-limiting step is entry into the polymer across the penetrant-polymer interface. They are easily distinguished experimentally from each other and from case 1, which refers to completely miscible pairs. In examples of case 3, e.g., ethylene glycol with butadiene or styrene-butadiene rubbers, the half-time for saturating the polymer surface in contact with the penetrant was found to be several days at 25°C. The diffusion coefficients, when compared in four hydrocarbon rubbers, of *n*-hexadecane and 1,7-heptanediol were similar in magnitude even though in each rubber the hexadecane was soluble in all proportions and the diol only very slightly. The diffusion coefficient of ethylene glycol, despite its extreme thermodynamic incompatibility, appeared to be somewhat larger than those of the other penetrants.

Keywords: New-York, SCI

Randall, J.M., Hautala, E. and McDonald G. (1978), Binding of heavy metal ions by formaldehyde-polymerized peanut skins. *Journal of Applied Polymer Science*, **22**, 379-387.

Full Text: [1960-80\J App Pol Sci18, 379.pdf](1960-80/J%20App%20Pol%20Sci18,%20379.pdf)

Abstract: Peanut skin, when treated with formaldehyde to polymerize tannins, is a highly efficient substrate for removal of many heavy metal ions from aqueous waste solutions. The ions Ag+, Cd2+, Cr6+, Cu2+, Hg2+, Ni2+, Pb2+, Zn2+, as well as Ca2+ and Mg2+, were contacted with formaldehyde-treated peanut skin. Quantitative removal could be achieved with Ag+, Cd2+, Cu2+, Hg2+, Pb2+, and Zn2+. Capacity of the substrate for ions was promising for Pb2+ (2.1 meq/g substrate), Cu2+ (3.0 meq/g), and Cd2+ (1.3 meq/g). Sorption from a solution containing Cd2+, Cu2+, Hg2+, Ni2+, Pb2+, Zn2+ on a packed column of formaldehyde-treated peanut skin indicated that Hg2+, Pb2+, and Cu2+ were rapidly and completely bound to the packing, while Cd2+, Ni2+, and Zn2+ were poorly bound until the preferred ions had been removed from solution.

Poots, V.J.P. and McKay, G. (1979), The specific surfaces of peat and wood. *Journal of Applied Polymer Science*, **23**, 1117-1129.

Full Text: [1960-80\J App Pol Sci23, 1117.pdf](1960-80/J%20App%20Pol%20Sci23,%201117.pdf)

Abstract: The specific surface areas of various particle size ranges of wood and peat were determined. The methods employed are mercury porosimetry, nitrogen adsorption, and solution isotherms. The results indicate that dye solution isotherms offer an accurate means of surface area measurement, however, the values obtained are dependent on (a) the chemical nature of the solute and adsorbent and (b) the molecular dimensions of the solute. Nitrogen isotherms indicate specific surfaces of (21×103)-(27×103) m2 kg-1 for wood depending on the particle size, while an area of 26.5×103 m2 kg-1 was obtained for peat independent of particle size. Acid dye isotherms yield specific surfaces considerably lower than nitrogen isotherm values; for wood (7.3×103)-(9.6×103) m2 kg-1 and for peat, (5.2×103)-(11.8×103) m2 kg-1. Basic dye studies, using wood, indicate surface areas similar in magnitude to those obtained from nitrogen isotherms. For peat, however, very large apparent surface areas are obtained (-100×103 m2 kg-1) and are attributed to chemical interaction between dye molecules and adsorbent and stacking of dye molecules.

Notes: highly cited

McKay, G., Blair, H.S. and Gardner, J.R. (1982), Adsorption of dyes on chitin. I. Equilibrium studies. *Journal of Applied Polymer Science*, **27** (8), 3043-3057.

Full Text: [1982\J App Pol Sci23, 3043.pdf](1982/J%20App%20Pol%20Sci23,%203043.pdf)

Abstract: Equilibrium isotherms have been studied for the adsorption of four dyestuffs, namely, Acid Blue 25, Acid Blue 158, Mordant Yellow 5, and Direct Red 84, onto chitin. Langmuir and Freundlich constants have been determined and the effects of chitin particle size and solution temperature have been investigated. Theoretical isotherms have been compared with experimental data and good agreement was obtained using a composite isotherm of the general form: *Ye* = *iCe*/(1 + *jCem*), where *i*,*j*, and *m* are constants.

McKay, G., Blair, H.S. and Gardner, J.R. (1982), Adsorption of dyestuffs onto chitin: External mass transfer processes. *Journal of Applied Polymer Science*, **27**, 4251-4261.

Full Text: [1982\J App Pol Sci23, 4251.pdf](1982/J%20App%20Pol%20Sci23,%204251.pdf)

Abstract: The effect of several variables on the adsorption rate of four dyestuffs onto chitin was studied. A model is proposed enabling the film mass transfer coefficients to be determined. The coefficients were independent of initial dye concentration, chitin mass, chitin particle size, and temperature; a slight dependence with agitation was obtained. The film mass transfer coefficients at 400 rpm were 2.8×10-3, 2.9×10-3, 3.9×10-3 and 0.9×10-3 cm/s for Acid Blue 25, Acid Blue 158, Mordant Yellow 5, and Direct Red 85, respectively.

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Full Text: [1983\J App Pol Sci28, 625.pdf](1983/J%20App%20Pol%20Sci28,%20625.pdf)

Abstract: Moisture desorption characteristics in coir fibers have been studied at several temperatures (53°C, 68°C, 86°C, and 105°C) as a function of time. Moisture absorption at room temperature after heating to 53°C, 68°C, 86°C, and 105°C are also reported. The results indicate that the relation between percentage moisture loss (A) (moisture loss is the ratio of the difference between initial moisture and final moisture to initial moisture) and temperature (TOK) is of the type A = AoeWBIT in the range of intervals studied. The constants A0 and B are dependent on time, and they decrease with time. The fraction moisture loss/gain (w) is related to time (t) by the equation w = m/t + bo at all temperatures investigated. The constant m decreases with temperature while bo increases with temperature. The equilibrium moisture content (the condition reached by the sample when it no longer takes up moisture from or gives up moisture to the surrounding atmosphere) increases with increase in relative pressure an& decrease in temperatures. As the moisture content in the fiber increases, the tensile strength (tenacity) decreases and the %elongation increases. The observed results are explained on the basis of structural rearrangement on heatinghooling of lignocellulosic material.

McKay, G., Blair, H.S. and Gardner, J.R. (1983), The adsorption of dyes in chitin. III. Intraparticle diffusion processes. *Journal of Applied Polymer Science*, **28**, 1767-1778.

Full Text: [1983\J App Pol Sci28, 1767.pdf](1983/J%20App%20Pol%20Sci28,%201767.pdf)

Abstract: Intraparticle diffusion processes for the adsorption of dyestuffs onto chitin have been studied. The amount of dye adsorbed per gram of chitin has been plotted against the square root of time. The slope of this plot is linear and has been defined as a rate parameter k. This rate parameter has been determined for a number of process variables, including initial dye concentration, agitation, chitin particle size, chitin mass, temperature, and solution pH. However, sometimes two and even three linear regions are apparent on the root time plots indicating a possible branched pore mechanism. The controlling mechanisms are due to macropores and micropores in the chitin particle creating rapidly and slowly diffusing regions.

? Antal, M., Ebringerová, A. and Šimkovic, I. (1984), New aspects in cationization of lignocellulose materials. II. Distribution of functional-groups in lignin, hemicellulose, and cellulose components. *Journal of Applied Polymer Science*, **29** (2), 643-650.

Full Text: [1984\J App Pol Sci29, 643.pdf](1984/J%20App%20Pol%20Sci29,%20643.pdf)

Abstract: The distribution of functional groups in the three main components of beech after alkylation with 3-chlor-2-hydroxypropyltrimethylammoniumchloride (CHMAC) was studied. By fractional extraction of hemicellulose combined with delignification it was found that the three components were substituted to various extents. The exchanging capacity decreased in the following order: hemicellulose, lignin, and cellulose. The obtained degree of substitution is related to the accessibility and reactivity of the individual components in the wood. Hemicellulose, which is substituted the most, can be extracted from modified sawdust with water. This represents a new method of hemicellulose isolation from native plant materials.

McKay, G., Blair, H.S. and Gardner, J.R. (1984), The adsorption of dyes onto chitin in fixed bed columns and batch adsorbers. *Journal of Applied Polymer Science*, **29**, 1499-1514.

Full Text: [1984\J App Pol Sci29, 1499.pdf](1984/J%20App%20Pol%20Sci29,%201499.pdf)

Abstract: Chitin has the ability to adsorb substantial quantities of dyestuffs from aqueous solutions. Consequently, it may be a useful adsorbent for effluent treatment from textile mills. The design procedures for batch and continuous fixed bed adsorption columns have been investigated for four dyestuffs, namely, CI Acid Blue 25 (Telon Blue ANL, Bayer), CI Acid Blue 158 (Neolan Blue 29, Ciba Geigy) CI Mordant Yellow 5 (Eriochrome Flavine A, Ciba Geigy), and CI Dirert Red 84 (Solophenyl Brown 3RL, Ciba Geigy). The main fixed bed system variables studied are bed height, dye flow rate, and chitin particle size, and these effects have been incorporated into a simplified design model.

McKay, G., Blair, H.S., Gardner, J.R. and McConvey, I.F. (1985), Two resistance mass transfer model for the adsorption of various dyestuffs onto chitin. *Journal of Applied Polymer Science*, **30** (11), 4325-4335.

Full Text: [1985\J App Pol Sci30, 4325.pdf](1985/J%20App%20Pol%20Sci30,%204325.pdf)

Abstract: The kinetics of the adsorption of various dyestuffs onto chitin have been studied. The dyestuffs used are Neoland Blue 2G, Eriochrome Flavine A, and Solophenyl Brown 3RL and a number of process variables were considered, such as adsorbent mass and dye concentration. The mass transfer model is based on the assumption of a pseudoirreversible isotherm and two resistances to mass transfer. These are external mass transfer and internal pore diffusion mass transfer. The rate of adsorption of dyestuffs onto chitin can thus be described by an external mass transfer coefficient and a pore diffusion coefficient. The external mass transfer coefficients are 5.0×10-5, 5.0×10-5 and 1.0×10-5 ms-1 and the pore diffusivities are 3.0×10-10 and 4.0×10-11 ms-1 for Neolan Blue 2G, Eriochrome Flavine A, and Solophenyl Brown 3RL, respectively.

Suemitsu, R., Uenishi, R., Akashi, I. and Nakano, M. (1986), The use of dyestuff-treated rice hulls for removal of heavy metals from waste water. *Journal of Applied Polymer Science*, **31**, 75-83.

Full Text: [1986\J App Pol Sci31, 75.pdf](1986/J%20App%20Pol%20Sci31,%2075.pdf)

Abstract: Rice hulls, when coated with the reactive dye of Procion Red or Procion Yellow, was found to be highly effective for removal of many metal ions from aqueous solutions both in batch and column method. When 120-130 ppm solutions were used, quantitative removal could be achieved with Pb2+, Cd2+, and Hg2+. After the adsorption of metal ions, the substrate could be recovered almost completely by treating with dilute hydrochloric or nitric acid solution, and used repeatedly.

? Koyama, Y. and Taniguchi, A. (1986), Studies on chitin X. Homogeneous cross-linking of chitosan for enhanced cupric ion adsorption. *Journal of Applied Polymer Science*, **31** (6), 1951-1954.

Full Text: [1986\J App Pol Sci31, 1951.pdf](1986/J%20App%20Pol%20Sci31,%201951.pdf)

McKay, G., Blair, H.S. and Gardner, J.R. (1987), Two resistance mass transport model for the adsorption of acid dye onto chitin in fixed beds. *Journal of Applied Polymer Science*, **33** (4), 1249-1257.

Full Text: [1987\J App Pol Sci33, 1249.pdf](1987/J%20App%20Pol%20Sci33,%201249.pdf)

Abstract: A mass transport model has been developed to predict theoretical breakthrough curves in fixed bed adsorbers. The model has been tested using experimental data obtained for the adsorption of Acid Blue 25 on chitin. The effective diffusivity can be determined for the adsorption process by best fitting experimental and theoretical breakthrough curves and was found to be 5.5×10-6 cm2 s-1.

McKay, G., El-Geundi, M.S. and Mansour, I.S. (1988), Adsorption of dyes onto bagasse pith using a solid diffusion model. *Journal of Applied Polymer Science*, **36**, 43-54.

Full Text: [1988\J App Pol Sci36, 43.pdf](1988/J%20App%20Pol%20Sci36,%2043.pdf)

Abstract: The adsorption of four dyes (Basic Blue 69, Basic Red 22, Acid Blue 25, and Acid Red 114) onto bagasse pith has been studied using an agitated batch adsorber. The variables studied were initial dye concentration and pith mass. A mathematical model has been developed based on external mass transfer and solid-phase diffusion. The model has been used to generate theoretical concentration-time decay curves, and these results were adjusted to experimental data by a best fit approach. The external mass transfer coefficients are 2.0×10-3, 1.5×10-3, 8.0×10-4 cm s-1 and the solid diffusivities are 1.1×10-8, 1.0×10-8, 6.0×10-9 and 3.0×10-9 cm s-1 for Basic Blue 69, Basic Red 22, Acid Blue 25, and Acid Red 114.

Shukla, S.R. and Sakhardande, V.D. (1991), Metal ion removal by dyed cellulosic materials. *Journal of Applied Polymer Science*, **42** (3), 829-835.

Full Text: [1991\J App Pol Sci42, 829.pdf](1991/J%20App%20Pol%20Sci42,%20829.pdf)

Abstract: Further studies on adsorption of different metal ions by the four dyed and undyed cellulosic substrates namely cotton fibers, bleached bamboo pulp, jute fibers, and sawdust were carried out. Different metal ions adsorbed were Fe2+, Fe3+, and Hg2+. The equilibrium metal adsorption was studied by EDTA method. The control and dyed substrates adsorbed these metal ions to a significant extent, thus providing an effective and cheap method for adsorption of costly but polluting and toxic metals like Pb2+ and Hg2+. The adsorption levels varied up to 95% for various substrate-dye-metal ion combinations.

Keywords: Adsorption, Binding, EDTA, Metal Ions, Peanut Skins, Sawdust

Shukla, S.R. and Sakhardande, V.D. (1992), Column studies on metal ion removal by dyed cellulosic materials. *Journal of Applied Polymer Science*, **44** (5), 903-910.

Full Text: [1992\J App Pol Sci44, 903.pdf](1992/J%20App%20Pol%20Sci44,%20903.pdf)

Abstract: Cellulosic materials, namely bleached bamboo pulp, jute fibers, and sawdust dyed with a reactive dye of monochlorotriazine type were used in the column studies for removal of different metal ions. The use of an adsorption column makes the process continuous, so that it is economically viable on an industrial scale. After the adsorption of metal ions such as Cu2+, Pb2+, Hg2+, Fe2+, Fe3+, Zn2+ and Ni2+, the adsorbents were successfully regenerated by using dilute acids. These columns were then used repeatedly for adsorption either of the same salt for more than ten times or of different salts in succession. No loss in adsorption power was observed.

Keywords: Adsorption, Binding, Metal Ions, Process, Reactive Dye, Scale, Succession

? Vázquez-Torres, H., Canché-Escamilla, G. and Cruz-Ramos, C.A. (1992), Coconut husk lignin. I. Extraction and characterization. *Journal of Applied Polymer Science*, **45** (4), 633-644.

Full Text: [1992\J App Poy Sci45, 633.pdf](1992/J%20App%20Poy%20Sci45,%20633.pdf)

Abstract: Recently lignin has been the object of a renewed interest because of the need to use raw materials from renewable resources. One such resource is coconut husk, a material usually discarded during the copra extraction process. Due to its high lignin content, coconut husk has been recognized as having a variety of applications. Therefore, it is important to know the approximate structure of coconut husk lignin and those variations introduced by different isolation methods. This work reports a general characterization of coconut husk lignin. Results are given of the contents of hydroxyl and noncondensed guaiacyl units, the extractability of the lignin in alkaline and “organosolv” media along with thermal properties of the extracted lignins. The extraction system of NaOH-anthraquinone at 150-degrees-C was most conveniently based on the relatively low amount of condensed lignin generated.

? Vázquez-Torres, H., Canché-Escamilla, G. and Cruz-Ramos, C.A. (1992), Coconut husk lignin. II. Characterization by infrared and nuclear-magnetic-resonance spectroscopy. *Journal of Applied Polymer Science*, **45** (4), 645-653.

Full Text: [1992\J App Poy Sci45, 645.pdf](1992/J%20App%20Poy%20Sci45,%20645.pdf)

Abstract: Results of the characterization of coconut husk lignin by infrared (IR) and proton nuclear magnetic resonance (H-NMR) spectroscopy are presented. Lignin was extracted with both alkaline and organosolv liquors. The IR spectra of dioxane lignin were very similar to those reported for hardwood lignins. Furthermore, these results combined with those obtained from the H-NMR studies suggest that coconut husk lignin can be classified into the Lm-type lignins. These lignins are characteristic of the monocotyledon class, of which the coconut palm is a member. The H-NMR studies showed that anthraquinone significantly inhibited the occurrence of lignin condensation during the alkaline extraction with sodium hydroxide solutions. This inhibition was more intense in the lignin extracted at 150°C than in that extracted at 100°C.

? Mcgregor, R. and Iijima, T. (1992), Dimensionless groups for the sorption of dye and other ions by polymers. II. Hydrochloric-acid, CI Acid Blue 25, and polyamides with an excess of basic groups. *Journal of Applied Polymer Science*, **45** (6), 1011-1021.

Full Text: [1992\J App Poy Sci45, 1011.pdf](1992/J%20App%20Poy%20Sci45,%201011.pdf)

Abstract: The equations of a generalized Donnan model have been used in dimensionless form to describe and analyze the sorption of hydrochloric acid and of C.I. Acid Blue 25 by polyamide fibers containing an excess of basic groups. The method is applicable to a wide variety of ionic sorption systems, and removes some of the restrictions of earlier treatments of the problem. Acid-base reactions, ion exchange processes, electrolyte sorption, and both ion binding and zwitterion formation have been considered.

? Peniche-Covas, C., Alvarez, L.W. and Argüelles-Monal, W. (1992), The adsorption of mercuric ions by chitosan. *Journal of Applied Polymer Science*, **46** (7), 1147-1150.

Full Text: [1992\J App Poy Sci46, 1147.pdf](1992/J%20App%20Poy%20Sci46,%201147.pdf)

Abstract: The adsorption of mercuric ions by chitosan was investigated. The study of the adsorption kinetics shows that the rate of adsorption of mercuric ions on chitosan can be interpreted in terms of intraparticle diffusion as the rate-limiting step. The experimental data of adsorption equilibrium from mercuric chloride solutions correlate well with the Langmuir isotherm equation, although at high-solute concentrations, a multilayer type of adsorption with the subsequent increase in the uptake is observed. Column experiment confirms the ability of chitosan for the removal of mercuric ions from solutions in the absence of a high concentration of chlorides.

? Vázquez-Torres, H., Canché-Escamilla, G. and Cruz-Ramos, C.A. (1993), Coconut husk lignin. III. Reactivity of alkaline extracts with formaldehyde. *Journal of Applied Polymer Science*, **47** (1), 37-44.

Full Text: [1993\J App Poy Sci47, 37.pdf](1993/J%20App%20Poy%20Sci47,%2037.pdf)

Abstract: In this article we report results of the evaluation of the reactivity of polyphenolic extracts of coconut husk with formaldehyde in both acidic and alkaline media. The objective of this evaluation was to determine if the extracts could be used in the preparation of phenol-formaldehyde-type resins. Extracts were obtained using aqueous solutions of NaOH (with and without anthraquinone) and NH4OH. Because of their low Stiasny’s Number values, these extracts are not suitable for phenol-formaldehyde resin preparation in acidic conditions unless they are mixed with phenol or phenolic derivatives. Nevertheless, extracts obtained with NaOH, especially at 100 and 120-degrees-C, showed sufficient reactivity with formaldehyde in basic conditions and may therefore be considered suitable for resin preparation in an alkaline medium. The resins were characterized using infrared spectroscopy (IR), differential scanning calorimetry (DSC), and thermal gravimetric analysis (TGA). A transition temperature prior to decomposition was not detected; their thermal stability was similar to phenol-formaldehyde-type resins.

? Hassan, R.M., Abdalla, M.A. and Elzohry, M.F. (1993), Alginate polyelectrolyte ionotropic gels. VI. Novel synthesis of diketoalginates as biopolymer precursors. *Journal of Applied Polymer Science*, **47** (9), 1649-1652.

Full Text: [1993\J App Poy Sci47, 1649.pdf](1993/J%20App%20Poy%20Sci47,%201649.pdf)

Abstract: Sodium 2,3-diketoalginate was quantitatively prepared by the oxidation of sodium alginate with potassium permanganate in alkaline solution at pH’s > 12. The yield was 96.5%. The structure of the diketone was elucidated by microanalysis and spectroscopic data. It was found that the diketoalginate caused no gelation or precipitation with copper(II), nickel(II), or cobalt(II) divalent metal ions.

Keywords: Poly-Electrolytes, Transformation, Mechanism, Membranes, Kinetics

? Hwang, M.C. and Chen, K.M. (1993), The removal of color from effluents using polyamide-epichlorohydrin-cellulose polymer. I. Preparation and use in direct dye removal. *Journal of Applied Polymer Science*, **48** (2), 299-311.

Full Text: [1993\J App Poy Sci48, 299.pdf](1993/J%20App%20Poy%20Sci48,%20299.pdf)

Abstract: A novel series of adsorbents have been prepared by reacting adipic acid, diethylenetriamine, epichlorohydrin, and cellulose. The structural features of these polyamide- epichlorohydrin-cellulose (PAE-Cell) polymers have been confirmed by IR analysis. The ability of PAE-Cell polymers to adsorb direct dyes from aqueous solution has been evaluated in a fixed bed column system. These PAE-Cell polymers have been found to exhibit a better capacities for direct dye removal than some commercial activated carbons.

Keywords: Acid Dye, Activated Carbons, Adsorbents, Cellulose, Column, Dye, Equilibrium Adsorption, Fixed Bed, Fixed Bed Column, Fixed-Bed, Heavy-Metal Removal, Mass-Transfer, Natural Adsorbents, Removal, Solid Diffusion-Model, Starch Xanthate, Synthetic Adsorbents, Water- Treatment

Kim, J.P. and Burkinshaw, S.M. (1993), The effect of *o*-phenyl phenol on the dyeing of an acrylic fiber with basic dyes. *Journal of Applied Polymer Science*, **49** (9), 1647-1652.

Full Text: [1993\J App Poy Sci49, 1647.pdf](1993/J%20App%20Poy%20Sci49,%201647.pdf)

Abstract: The equilibrium uptake of o-phenyl phenol onto Courtelle S at 98-degrees-C was found to follow a Nernst adsorption mechanism, indicating that uptake arises by virtue of hydrophobic interaction as well as ion-dipole, dipole-dipole, and dipole-induced dipole forces operating between the fiber and the nonionic carrier. Differential scanning calorimetry was used to demonstrate the plasticizing action of the carrier on Courtelle S yarn. A linear relationship was obtained between the extent of plasticization, as measured by reduction in T(g) of the fiber, and concentration of carrier applied to the fiber with the maximum extent of plasticization, showing a close correspondence to the aqueous solubility of o-phenyl phenol at 98-degrees-C, the temperature at which the fiber was treated with the carrier. The relationship between the extent of enhancement of uptake of C. I. Basic Green 4 and C. I. Basic Red 13 onto Courtelle S yarn at 98-degrees-C and concentration of the carrier in the dyebath was also examined: The concentration of o-phenyl phenol that gave maximum enhancement of dye uptake coincided with the aqueous solubility of the carrier at 98-degrees-C. (C) 1993 John Wiley & Sons, Inc.

Keywords: Benzyl Alcohol

Lu, Y., Wu, C.X., Lin, W.P., Tang, L.Y. and Zeng, H.M. (1994), Preparation and adsorption properties of the chelating fibers containing amino-groups. *Journal of Applied Polymer Science*, **53** (11), 1461-1468.

Full Text: [1994\J App Poy Sci53, 1461.pdf](1994/J%20App%20Poy%20Sci53,%201461.pdf)

Abstract: Four kinds of amino-group-containing chelating fibers were prepared by reacting diethylenetriamine, diethanolamine, diethylamine, and aminopyridine, respectively, with a grafted fiber PVA-g-GMA containing epoxy groups. The gamma-ray preirradiation initiated graft copolymerization of GMA onto PVA fiber, the functionalization of the grafted fiber PVA-g-GMA with amino compounds, and the adsorption properties of the obtained chelating fibers were systematically investigated. It is concluded that with increasing monomer concentration, reaction time, and temperature, the grafting percentage increases significantly. In the functionalization of the grafted fiber, reaction time, temperature, solvent, and amount of amine used greatly influence the reaction. 1,4-Dioxane is a reasonable solvent for the reaction. The chelating fibers present great adsorption amounts and high adsorption rates for Cu2+ ion and Au3+ ion. Among the chelating fibers, the fiber with diethylenetriamine group is the most reasonable chelating fiber for the adsorption of C2+ and Au3+. The chelating fibers present good selectivities for Cu2+ in the solution with Cu2+, Mn2+, Ni2+, Co2+, and Zn2+, while presenting quite high selectivities for Au3+ ion in the solution with Cu2+, Au3+, Zn2+, and Cr3+ ions. The chelating fiber with diethanolamine or diethylamine can reduce the adsorbed Au3+ into metallic gold. (C) 1994 John Wiley & Sons, Inc.

? Simitzis, J. and Sfyrakis, J. (1994), Activated carbon from lignocellulosic biomass-phenolic resin. *Journal of Applied Polymer Science*, **54** (13), 2091-2099.

Full Text: [1994\J App Poy Sci54, 2091.pdf](1994/J%20App%20Poy%20Sci54,%202091.pdf)

Abstract: Lignocellulosic biomass of agricultural/industrial by-products residues was taken after the pressing and extraction of olive-oil and lignin Klason and a-cellulose were isolated. Also, phenol-formaldehyde was polymerized by using an acid catalyst. Various mixtures of lignocellulosic materials and novolac resin were cured with hexaMethylene tetramine and then pyrolyzed up to 1000°C. The IR-Spectrum of the cured material consisted of 20% novolac and 80% cellulose is practically similar to that of 100% cellulose. The corresponding material with lignin Klason instead of cellulose has different IR-Spectrum compared to that of 100% lignin, because of additional reactions taken place between lignin and novolac under curing conditions. The weight losses, the shrinkages at the end of the pyrolysis, the specific surface area of the carbonaceous materials produced and their adsorption abilities of Methylene blue and alizarin yellow from aqueous solutions were determined. The material consisted of 20% novolac and 80% cellulose or 80% lignin, appears as optimum characteristics of production process. The experimental results are also discussed under the aspect of sample shapes that influence the adsorption as well as the electron donor-acceptor (EDA) interactions between the functional groups of dyes and the carbonaceous materials. (C) 1994 John Wiley and Sons, Inc.

Keywords: Adsorbents, Adsorption, Epoxy Lignin Polyblends, Olive Stones, Polymer

Weltrowski, M., Martel, B. and Morcellet, M. (1996), Chitosan *N*-benzyl sulfonate derivatives as sorbents for removal of metal ions in an acidic medium. *Journal of Applied Polymer Science*, **59** (4), 647-654.

Full Text: [J\J App Poy Sci59, 647.pdf](J/J%20App%20Poy%20Sci59,%20647.pdf)

Abstract: We synthesized chitosan-based sorbents for the uptake of metal cations in acidic solutions. Chitosan was reacted with 2-formylbenzene sodium sulfonate and 4-formyl-1,3-benzene sodium disulfonate in the presence of NaCNBH3 to yield N-benzyl mono- and disulfonate derivatives of chitosan. IR and NMR spectra confirmed the presence of benzyl sulfonate groups. The degrees of substitution of the monosulfonate chitosan derivatives were in the range of 80%, while those of disulfonate derivatives were about 50%. These sulfonate derivatives of chitosan were tested on the sorption of heavy metals Cd2+, Zn2+, Ni2+, Pb2+, Cu2+, Fe3+, and Cr3+. The sorption capacities for disulfonate compounds were better than for monosulfonate compounds. This phenomenon was attributed to the amphoteric character of the monosulfonate derivatives. To improve the capacity of adsorption of monosulfonate compounds, the amino groups of these compounds were protected by the benzyloxycarbonyl groups. The protection of amino groups of disulfonate derivatives by benzyloxycarbonyl also improved their sorption capacity. The resulting protected polymers were tested for sorption of heavy metals. Both protected polymers were more efficient than are the parent nonprotected polymers. The synthesized sulfonate derivatives of chitosan are especially adapted to the sorption of heavy metals from the acidic industrial effluents. (C) 1996 John Wiley & Sons, Inc.

Keywords: Chelating Resins, Adsorption

Salih, B., Denizli, A., Engin, B., Tuncel, A. and Piskin, E. (1996), Congo Red attached poly (EGDMA-HEMA) microspheres as specific sorbents for removal of cadmium ions. *Journal of Applied Polymer Science*, **60** (6), 871-877.

Full Text: [J\J App Poy Sci60, 871.pdf](J/J%20App%20Poy%20Sci60,%20871.pdf)

Abstract: Poly[ethyleneglycoldimethacrylate (EGDMA)-hydroxyethylmethacrylate (HEMA)] microspheres (150-200 μm in diameter) were produced by suspension copolymerization of EGDMA and HEMA in an aqueous medium. Toluene was included in the formulations in order to produce water-swellable microspheres. Poly (vinyl alcohol) and benzoyl peroxide were used as stabilizer and initiator, respectively. Congo Red was chemically attached to the microspheres as a metal chelating ligand for specific adsorption of heavy metal ions. These sorbents were characterized by an optical microscopy and a FTIR. Adsorption/desorption of cadmium (Cd2+) ions from aqueous solutions on these sorbents were investigated in batch equilibrium experiments by using an atomic absorption spectroscopy with a graphite furnace atomizer. The maximum cadmium adsorption on to the dye-attached microspheres (i.e., by complex formation) was about 18.3 mgCd2+ ions/g polymer, which was observed at pH 6.8. While adsorption onto the plain poly (EGDMA-HEMA) microspheres (i.e., nonspecific adsorption) was about 0.93 mgCd2+ ions/g polymer at the same conditions. More than 90% of the adsorbed cadmium was desorbed in 1 h by using 2M NaCl as an eluant. The resorption capacity of the sorbent did not significantly decrease during repeated sorption-desorption cycling.

Ruckenstein, E. and Sun, Y. (1996), Preparation and characteristics of polymer-based large adsorbent particles. *Journal of Applied Polymer Science*, **61** (11), 1949-1956.

Full Text: [J\J App Poy Sci63, 1949.pdf](J/J%20App%20Poy%20Sci63,%201949.pdf)

Abstract: Using polyvinyl alcohol (PVA) crosslinked with glutaric dialdehyde (*c*-PVA) as matrix and activated carbon (AC) or crosslinked polyacrylic acid (PAA) as the adsorptive constituent, large beads of *c*-PVA-AC and *c*-PVA-PAA composites were prepared via the sedimentation polymerization method. In this method, an aqueous solution of PVA, glutaric dialdehyde and a catalyst for crosslinking (hydrochloric acid), containing activated carbon or the precursors of the crosslinked polyacrylic acid was injected dropwise with a syringe into hot mineral oil about 80-90°C) located in a cylindrical reactor fit with a stirrer near its bottom. Partial gelation took place during the sedimentation process. This ensured that the particles arrived at the bottom of the column, where they were kept about 30-60 min to complete their polymerization, maintained their individuality without aggregation. The particle size was as large as about 3 mm. The adsorption characteristics of the two types of adsorbents were dependent on their AC or PAA content. Their adsorption capacity for four dyes was investigated. The *c*-PVA-AC and *c*-PVA-PAA had, at room temperature, saturation adsorption capacities as large as 84 and 104 mg/g for the basic Chrysoidin dye and 70 and 72 mg/g for the basic Bismarck brown Y dye.

Kim, C.Y., Choi, H.M. and Cho, H.T. (1997), Effect of deacetylation on sorption of dyes and chromium on chitin. *Journal of Applied Polymer Science*, **63** (6), 725-736.

Full Text: [J\J App Poy Sci63, 725.pdf](J/J%20App%20Poy%20Sci63,%20725.pdf)

Abstract: Deacetylated chitins (10.7-67.2%) were prepared by alkaline hydrolysis to determine an optimal degree of deacetylation (DD) which can effectively remove four dyes and chromium ions from textile effluent. Sorption isotherms were carried by varying the treatment time, pH, and initial concentration of dyes or chromium ions. Experimental results were analyzed in three ways: (1) equilibrium sorption capacity and sorption rate constant, (2) Langmuir isotherms, and (3) separation factor. Results indicated that except for the chitin with a 67.2% DD, rate and capacity of the dye sorption on the chitin increased with the increase of the DD in chitin for each pH but decreased with the increase of pH for each deacetylated chitin. This was mainly due to the increase of-NH3+ groups in chitin with a high DD and the low pH of the system. On the contrary, dye desorption from the deacetylated chitin was highly effective at 80°C and pH greater than or equal to 10, which could facilitate the reduction of-NH3+ ions and the increase of electrostatic repulsion. The number of chromium ions sorbed on the chitin also increased with the increase of the DD at a specific time. Therefore, by controlling the DD of the deacetylated chitin maximum efficiency can be achieved in the removal of dyes and metal ions from textile effluent.

Keywords: Adsorption, Chitosan, Chitin, Sorbent, Sorption, Dye, Chromium

Leblanc, J.L. and Stragliati, B. (1997), An extraction kinetics method to study the morphology of carbon black filled rubber compounds. *Journal of Applied Polymer Science*, **63** (8), 959-970.

Full Text: [J\J App Poy Sci63, 959.pdf](J/J%20App%20Poy%20Sci63,%20959.pdf)

Abstract: A method was developed to investigate the kinetics of extraction of the unbound fraction of rubber compounds and to assess the macromolecular characteristics of extracted species. The results obtained show that the extraction kinetics can be modeled with a simple law. For full compounds a correction for nonrubber extractable ingredients must be applied; but it is demonstrated that compounding ingredients do not affect the bound rubber level of a given formulation, providing that the optimum mixing energy level has been achieved during the preparation procedure and that the compound maturation processes have been completed. Macromolecular characteristics of labile rubber species were analyzed versus extraction; and a simple equation, implicitly referring to a Fickean process, is offered to model the observed effects. It is so demonstrated that the polydispersity of labile species varies during the extraction process and that the largest molecular weight fractions are involved in the rubber-filler interaction, as predicted by theory. Experiments on model compounds allow the effect of both the mixing energy and storage maturation to be studied in detail and a model that takes both effects into account was developed.

Šimkovic, I. and Laszlo, J.A. (1997), Preparation of ion exchangers from bagasse by crosslinking with epichlorohydrin-NH4OH or epichlorohydrin-imidazole. *Journal of Applied Polymer Science*, **64** (13), 2561-2566.

Full Text: [J\J App Poy Sci64, 2561.pdf](J/J%20App%20Poy%20Sci64,%202561.pdf)

Abstract: Sugar cane bagasse was crosslinked with epichlorohydrin in the presence of NH4OH or imidazole. The obtained water-insoluble products were characterized in terms of yield, anion-exchange capacity, packed volume, and dye-binding properties. Yields were highest using a 3 : 1 epichlorohydrin to NH4OH molar ratio, producing weak anion exchangers. The weak anion exchangers had low dye-binding capacities compared to their total anion-exchange capacities. A 2 : 1 epichlorohydrin-to-imidazole molar ratio proved best for making strong anion exchangers from bagasse. The strong anion exchangers had dye-binding capacities comparable to their anion-exchange capacities, indicating that they might be useful for removing anionic dyes from wastewater. (C) 1997 John Wiley & Sons, Inc.

Keywords: Lignocellulose, Chemical Modification, Anion Exchange, Crosslinking, Dye Binding, Ammonium Groups, Dye-Binding, Meal

Gao, F. and Xu, Y.W. (1997), Polymeric pseudocrown ether resins containing azacrown and azathiacrown ethers: Synthesis and adsorption for metal lions. *Journal of Applied Polymer Science*, **65** (5), 931-938.

Full Text: [J\J App Poy Sci65, 931.pdf](J/J%20App%20Poy%20Sci65,%20931.pdf)

Abstract: Eight novel polymeric pseudocrown ether (PPCE) resins containing azacrown and azathiacrown ethers were prepared by chemical reactions of the precursor of 1-chloro-2,3-epoxypropane, 1-(2-chloroethoxy)-2,3-epoxypropane, 1-chloro-2,3-epithiopropane, and 1-(8-chloroethoxy)-2,3-epithiopropane with triethylolamine or diethylolamine in the presence of NaH. The maximum adsorption capacities of PPCE resins for noble metals are 4.67 mmol Au/g-resin, 2.2 mmol Pd/g-resin, 0.7 mmol Pt/g-resin, and 7.3 mmol Ag/g-resin. The structure of PPCE resins were characterized by IR spectra and element analysis. The adsorption of PPCE resins for noble metals is jointly conducted by PPCE polymer backbone and the azacrown or azathiacrown cavity. The XPS study shows that there are strong complexion interactions between PPCE and Au(III) or Pd(II).

Mccomb, M.E. and Gesser, H.D. (1997), Preparation of polyacryloamidoxime chelating cloth for the extraction of heavy metals from water. *Journal of Applied Polymer Science*, **65** (6), 1175-1192.

Full Text: [J\J App Poy Sci65, 1175.pdf](J/J%20App%20Poy%20Sci65,%201175.pdf)

Abstract: Woven polyacryloamidoxime cloth was prepared from the polyacrylonitrile precursor via reaction in methanolic hydroxylamine. Preparation was controllable and reproducible and the reaction conditions were optimized with respect to the time of conversion, the concentration of NH2OH . HCl, and the temperature of conversion. The cloth produced had a large capacity for Cu(II) and Pb(II) of 71.2 and 450 mg g-1 (1.12 and 2.17 mmol g-1)respectively, and adequate physical properties suitable for rigorous use. Sorption profiles of Pb(II) and Cu(II) were similar to those of chelate ion exchange resins and fibers containing the amidoxime group. The rate of uptake of metals by the cloth was found to be dependent on the percent surface area converted to amidoxime groups, the concentration and type of metal being tested for, and the time of exposure. Anomalous kinetics of sorption for Pb(II) and Cu(II)by cloth of increasing amidoxime group content were explained by a two-part sorption mechanism. Distribution coefficients of 3.5×106 and 1.5×106 for Cu(II) and Pb(II) were observed, and the average rates of uptake for Cu(II) and Pb(II) were 600 and 200 μg g-1 day-1 (9.4 and 0.96 μmol g-1 day-1), respectively, from dilute solution ([Cu] = 5.9 μg L-1, [Pb] = 2.8 μg L-1). Treatment of the cloth with aqueous NaOH did not improve the capacities for Pb(II) and Cu(II). (C) 1997 John Wiley & Sons, Inc

Keywords: Adsorption, Amidoxime, Amidoxime-Fiber Adsorbents, Chelating Adsorbent, Gold, Ions, Polyacrylonitrile, Polymer, Recovery, Resin, Sea-Water, Seawater, Trace Metal, Uranium, Water Analysis

Aly, A.S., Jeon, B.D. and Park, Y.H. (1997), Preparation and evaluation of the chitin derivatives for wastewater treatments. *Journal of Applied Polymer Science*, **65** (10), 1939-1946.

Full Text: [J\J App Poy Sci65, 1939.pdf](J/J%20App%20Poy%20Sci65,%201939.pdf)

Abstract: The chitin thiocarbonate-Fe(II)-H2O2 redox system was investigated as the initiator for the graft copolymerization of acrylonitrile and acrylic acid monomers onto chitin powder. The reaction with vinyl monomers onto chitin was carried out under various parameters of the graft copolymerization reaction to elucidate the polymerization behavior in terms of graft yield. Reactions of chitin-acrylonitrile graft copolymer with hydroxyl amine hydrochloride, as well as, sodium hydroxide were conducted in order to obtain chitin-(amidoxime-co-acrylonitrile) and chitin-(acrylate-co-acrylamide) graft copolymers, respectively. The reaction efficiency depends upon the alkali concentration, time, temperature, and on the reactant concentrations. The prepared chitin derivatives were evaluated for use in the wastewater treatments for adsorption and desorption of heavy metal ions as well as acid and basic dyes.

Keywords: Graft-Copolymers, Acid, Chitin, Wastewater Treatment, Graft Copolymerization, Heavy Metals Removal, Dye Removal

Samantaroy, S., Mohanty, A.K. and Misra, M. (1997), Removal of hexavalent chromium by Kendu fruit gum dust. *Journal of Applied Polymer Science*, **66** (8), 1485-1494.

Full Text: [J\J App Poy Sci66, 1485.pdf](J/J%20App%20Poy%20Sci66,%201485.pdf)

Abstract: The ability of a low cost adsorbent material, Kendu fruit gum dust (KGD), for removal of hexavalent chromium, Cr(VI), from aqueous solutions of both a synthetic and industrial (effluent) sample is successfully investigated through batch type experiments. The effects of contact time, Cr(VI) concentration, pH, adsorbent amount, and temperature on the extent of Cr(VI) removal are reported. At a lower initial concentration of Cr(VI) and a lower solution pH, the percent removal is found to be increased. A removal efficiency of 100% has been achieved. In the presence of cyanide ion the adsorption efficiency of KGD decreases. Recycling studies suggest that even after the sixth cycle, only similar to 20% loss of efficiency of KGD occurs. The adsorption process follows the Freundlich adsorption isotherm model. Another important feature of the investigation includes the studies on the characteristics and analysis of various constituents present in the newly developed absorbent material (KGD). From the thermogravimetric analysis curves of the original KGD and Cr(VI) absorbed KGD, it is observed that the thermal stability of KGD increases due to metal ion adsorption.

Keywords: Heavy-Metal Ions, Aqueous-Solutions, Peanut Skins, Binding, Adsorption, Carbon, Wool, Hexavalent Chromium, Kendu Fruit Gum Dust, Batch Experiments, Thermogravimetric Analysis

Wan Ngah, W.S. and Isa, I.M. (1998), Comparison study of copper ion adsorption on chitosan, Dowex A-1, and Zerolit 225. *Journal of Applied Polymer Science*, **67** (6), 1067-1070.

Full Text: [J\J App Poy Sci69, 1067.pdf](J/J%20App%20Poy%20Sci69,%201067.pdf)

Abstract: The adsorption of copper ions by chitosan, Dowex A-1, and Zerolit 225 has been investigated. The uptake of copper was determined from changes in concentration as measured by atomic absorption spectrometry. A preliminary investigation on the adsorption was conducted by batch-wise examining the effects on pH and the initial copper ion concentration. It was found that chitosan has an excellent loading capacity of copper, compared with Dowex A-1 and Zerolit 225. (C) 1998 John Wiley & Sons, Inc.

Keywords: Comparison Study, Copper Ion, Adsorption, Chitosan, Dowex A-1, Zerolit 225, Trace-Metals, Sea-Water, Resins

Denizli, A., Salih, B., Senel, S. and Arıca, M.Y. (1998), New metal chelate sorbent for albumin adsorption: Cibacron blue F3GA-Zn(II) attached microporous poly (HEMA) membranes. *Journal of Applied Polymer Science*, **68** (4), 657-664.

Full Text: [J\J App Poy Sci68, 657.pdf](J/J%20App%20Poy%20Sci68,%20657.pdf)

Abstract: Poly (2-hydroxyethyl methacrylate) [poly (HEMA)] membranes were prepared by UV-initiated photopolymerization of HEMA in the presence of an initiator (alpha-alpha’-azobis-isobutyronitrile, AIBN). The triazine dye Cibacron Blue F3GA was attached as an affinity ligand to poly (HEMA) membranes, covalently. These affinity membranes with a swelling ratio of 58% and containing 10.7 mmol Cibacron Blue F3GA/m2 were used in the albumin adsorption studies. After dye-attachment, Zn(II) ions were chelated within the membranes via attached-dye molecules. Different amounts of Zn(II) ions [650-1440 mgZn(II)/m2] were loaded on the membranes by changing the initial concentration of Zn(II) ions and pH. Bovine serum albumin (BSA) adsorption on these membranes from aqueous solutions containing different amounts of BSA at different pH was investigated in batch reactors. The nonspecific adsorption of BSA on the poly (HEMA) membranes was negligible. Cibacron Blue F3GA attachment significantly increased the BSA adsorption up to 92.1 mgBSA/m2. Adsorption capacity was further increased when Zn(II) ions were attached (up to 114.8 mgBSA m2). More than 90% of the adsorbed BSA was desorbed in 1 h in the desorption medium containing 0.5M NaSCN at pH 8.0 and 0.025M EDTA at pH 4.9.

Wan Ngah, W.S. and Musa, A. (1998), Adsorption of humic acid onto chitin and chitosan. *Journal of Applied Polymer Science*, **69** (12), 2305-2310.

Full Text: [J\J App Poy Sci69, 2305.pdf](J/J%20App%20Poy%20Sci69,%202305.pdf)

Abstract: The adsorption of humic acid onto chitin and chitosan has been investigated. The uptake of humic acid from aqueous solution was determined from changes in concentration, as measured by ultraviolet-visible spectroscopy. The decrease in humic acid removal was observed with the increase in pH. A significant uptake of humic acid on both chitin and chitosan was observed. The uptake of humic acid on chitosan was greater than that on chitin. Adsorption isothermal data could be interpreted by the Langmuir and Freundlich equation. Langmuir and Freundlich constants have been determined. The experimental data of the adsorption equilibrium from humic acid solutions correlate well with the Langmuir isotherm equation, as compared to the Freundlich isotherm equation. (C) 1998 John Wiley & Sons, Inc.

Keywords: Substances, Ions, Dyes

Liu, R.X., Zhang, B.W. and Tang, H.X. (1998), Adsorption properties of poly (acrylaminophosphonic-carboxyl-hydrazide) type chelating fiber for heavy metal ions. *Journal of Applied Polymer Science*, **70** (1), 7-14.

Full Text: [J\J App Poy Sci70, 7.pdf](J/J%20App%20Poy%20Sci70,%207.pdf)

Abstract: In this article, the adsorption properties of poly (acrylaminophosphonic-carboxyl-hydrazide) chelating fibers for Cu(II), Cd(II), Co(II), Mn(II), Pb(II), Zn(II), Ni(II), and Cr(III) are investigated by a batch technique. Based on the research results of binding capacity, adsorption isotherm, effect of pH value on sorption, and adsorption kinetics experiments, it is shown that the poly (acrylaminophosphonic-carboxyl-hydrazide) chelating fibers have higher binding capacities and good adsorption kinetic properties for heavy metal ions. The sorption of the metal ions on the chelating fibers is strongly dependent on the equilibrium pH value of the solution. The adsorption isotherms of Cu(II) and Cd(II) on the chelating fiber exhibit a Langmuir-type equation. The adsorbed Cu(II), Cd(II), Zn(II), and Pb(II) could be eluted by diluted nitric acid.

Choi, S.H., Nho, Y.C. and Kim, G.T. (1999), Adsorption of Pb2+ and Pd2+ on polyethylene membrane with amino group modified by radiation-induced graft copolymerization. *Journal of Applied Polymer Science*, **71** (4), 643-650.

Full Text: [J\J App Poy Sci71, 643.pdf](J/J%20App%20Poy%20Sci71,%20643.pdf)

Abstract: Six chelating hollow fiber membranes were prepared by radiation-induced grafting of glycidyl methacrylate onto a polyethylene hollow fiber membrane and its subsequent amination. The adsorption characteristics of Pb2+ and Pd2+ for the chelating hollow fiber membranes were presented when the solution of Pb2+ and Pd2+ permeates across the chelating membrane, respectively. The degree of grafting for glycidyl methacrylate increases with increasing monomer concentration, reaction temperature, and preirradiation dose. The adsorption of Pd2+ by chelating hollow fiber membranes modified with five kinds of amines was in the following order: diethylene triamine > hexamethyl diamine > ethylene diamine > dimethyl amine > trimethyl amine. The chelating hollow fiber membrane modified with iminodiacetic acid adsorbed Pb2+ ions much more than Pd2+. (C) 1999 John Wiley & Sons, Inc.

Keywords: Radiation-Induced Graft Copolymerization, Chelating Hollow Fiber Membrane, Glycidyl Methacrylate, Amination, Iminodiacetic Acid, Porous Membrane, Acrylic-Acid, Hollow Fiber, Exchange, Polypropylene, Adsorbent, Recovery, Lysozyme, Uranium

Su, Z.X., Lu, X. and Chang, X.J. (1999), Study of polymer-metal ions triple complex as materials for adsorption and separation. *Journal of Applied Polymer Science*, **71** (5), 819-821.

Full Text: [J\J App Poy Sci71, 819.pdf](J/J%20App%20Poy%20Sci71,%20819.pdf)

Abstract: Diethylenetriamine and a copolymer of sodium acrylate and maleic anhydride were used for the adsorption and separation of Au3+, Ru3+, Bi3+, and Hg2+ ions by forming polymer-metal lolls triple complex. The acidity, temperature, capacity, and interference on the adsorption of these ions on the complex, as well as the conditions of desorption of these ions from the complex, were investigated by means of inductively coupled plasma optical emission spectrometry. The results were satisfactory.

Choi, S.H. and Nho, Y.C. (1999), Adsorption of Co2+ and Cs+ by polyethylene membrane with iminodiacetic acid and sulfonic acid modified by radiation-induced graft copolymerization. *Journal of Applied Polymer Science*, **71** (6), 999-1006.

Full Text: [J\J App Poy Sci71, 999.pdf](J/J%20App%20Poy%20Sci71,%20999.pdf)

Abstract: Two modified hollow fiber membranes, the chelating hollow fiber membrane with iminodiacetic acid and the cation-exchange hollow fiber membrane with sulfonic acid group (-SO3H), were prepared by radiation-induced grafting of glycidyl methacrylate onto polyethylene hollow fiber membrane and its subsequent iminodiacetation and sulfonation. The adsorption characteristics of Co2+ and Cs+ for the 2 hollow fiber membranes were examined when the solutions of Co2+ and Cs+ permeate across the 2 membranes, respectively. Without regard to the chelating membrane with iminodiacetic acid group and the cation-exchange membrane with sulfonic acid group (-SO3H), 2 membranes were observed to adsorb Co2+ higher than Cs+. The adsorption curves of Co2+ by IDA group-chelating fiber membrane in the presence of Na+ and Ca2+ showed that the chelating hollow was found to have a very high selectivity for Co2+, even though there is a high concentration of Na+ and Ca2+ in the inlet solution. (C) 1999 John Wiley & Sons, Inc.

Keywords: Chelating Hallow Fiber Membrane, Cation-Exchange Hollow Fiber Membrane, Radiation-Induced Graft Copolymerization, Iminodiacetic Acid, Sodium Sulfite, Adsorption Characteristics, Hollow Fiber, Ion-Exchange, Flux

Shi, W.X., Xu, X.J. and Sun, G. (1999), Chemically modified sunflower stalks as adsorbents for color removal from textile wastewater. *Journal of Applied Polymer Science*, **71** (11), 1841-1850.

Full Text: [J\J App Poy Sci71, 1841.pdf](J/J%20App%20Poy%20Sci71,%201841.pdf)

Abstract: Quaternary ammonium groups were chemically grafted onto sunflower stalks in order to improve their adsorption performance to anionic species in wastewater. The chemically modified sunflower stalks were evaluated as adsorbents for two basic dyes (Methylene Blue and Basic Red 9) and two direct dyes (Congo Red and Direct Blue 71) in aqueous solutions by using equilibrium isotherms and kinetic adsorption. Before the modification, sunflower stalks exhibited relatively low adsorption to the direct dyes but very high adsorption to the basic dyes. The modified sunflower stalks showed increased adsorption to the anionic dyes, but slightly reduced adsorption to the cationic dyes, due to the existence of quaternary ammonium ions on the surface of the residues. The maximum adsorption capacities of two direct dyes on the modified sunflower stalks are 191.0 and 216.0 mg g for Congo Red and Direct Blue 71 at 50°C, respectively, which were at least four times higher than that of the unmodified residues. The adsorption rates of two direct dyestuffs are much higher on the modified residues than on the unmodified ones. Within 30 min, about 80% of direct dyes were removed from the solutions by the residues. (C) 1999 John Wiley & Sons, Inc.

Keywords: Color Removal, Sunflower Stalks, Adsorption, Quaternized Cellulose, Textile Wastewater Treatment, Exchange Materials, Reactive Dye, Epichlorohydrin, Effluents, Cellulose, Residues, Bagasse, Water

Tan, S.Y., Wang, Y.T., Peng, C.H. and Tang, Y.R. (1999), Synthesis and adsorption properties for metal ions of crosslinked chitosan acetate crown ethers. *Journal of Applied Polymer Science*, **71** (12), 2069-2074.

Full Text: [J\J App Poy Sci71, 2069.pdf](J/J%20App%20Poy%20Sci71,%202069.pdf)

Abstract: Two novel chitosan derivatives-crosslinked chitosan dibenzo-16-c-5 acetate crown ether (CCTS-1) and crosslinked chitosan 3, 5-di-tert-butyl dibenzo-14-c-4 diacetate crown ether (CCTS-2)-were synthesized by the reaction of crosslinked chitosan with dibenzo-16-c-5 chloracetate crown ether and 3, 5-di-tert-butyl dibenzo-14-c-4 dichloracetate crown ether with the intentof forming polymers that could be used in hazardous waste remediation as toxic metal-binding agents in aqueous environments. Their structures were confirmed with elemental analysis, infrared spectral analysis, and X-ray diffraction analysis. In the infrared spectra of CCTS-1 and CCTS-2, the characteristic peaks of aromatic backbone vibration appeared at 1595 cm-1 and 1500 cm-1; the intensity of the N-H and O-H stretching vibration in the region of 3150-3200 cm-1 decreased greatly. The X-ray diffraction analysis showed that the peak at 2 theta = 20 degrees decreased greatly in CCTS-1 and CCTS-2. The adsorption and selectivity properties of CCTS-1 and CCTS-2 for Pb2+, Cu2+, Cr3+, and Ni2+ were studied. Experimental results showed that the two crosslinked chitosan derivatives had not only good adsorption capacities for Pb2+, Cu2+, but also high selectivity for Pb2+ Cu2+ in the coexistence of Ni2+. For aqueous systems containing Pb2+, Ni2+, or Cu2+ Ni2+, CCTS-1 only adsorbed Pb2+ or Cu2+. For aqueous systems containing Pb2+, Cr2+ and Ni2+, CCTS-2 had high adsorption and selectivity properties for Pb2+.

Choi, S.H. and Nho, Y.C. (1999), Adsorption of Co2+ by stylene-g-polyethylene membrane bearing sulfonic acid groups modified by radiation-induced graft copolymerization. *Journal of Applied Polymer Science*, **71** (13), 2227-2235.

Full Text: [J\J App Poy Sci71, 2227.pdf](J/J%20App%20Poy%20Sci71,%202227.pdf)

Abstract: Cation-exchange hollow fiber membrane was prepared by radiation-induced grafting polymerization of styrene onto polyethylene hollow fiber membrane and its sulfonation. Adsorption characteristics for the cation-exchange membranes are examined when the solution of Co2+ permeates across the cation-exchange fiber membrane. The maximum grafting peak was obtained from 70% styrene concentration at 50°C. The degree of grafting (%) was enhanced with additives such as H2SO4 and divinylbenzene. The content of -SO3H groups ranged from 2 to 5 mmol g-1 with chlorosulfonic acid (ClSO3H) in dichloroethane, from 0.5 to 6 mmol g-1 with ClSO3H in H2SO4, respectively. The adsorption of Co2+ by the cation-exchange membranes increased with increasing -SO3H content. (C) 1999 John Wiley & Sons, Inc.

Keywords: Cation-Exchange Hollow Fiber Membrane, Radiation-Induced Graft Copolymerization, Styrene, Cobalt, Adsorption Characteristics, Flux

Chan, W.C. and Ferng, J.C. (1999), Mass transport process for the adsorption of Cr(VI) onto water-insoluble cationic starch synthetic polymers in aqueous systems. *Journal of Applied Polymer Science*, **71** (14), 2409-2418.

Full Text: [J\J App Poy Sci71, 2409.pdf](J/J%20App%20Poy%20Sci71,%202409.pdf)

Abstract: Dynamic adsorption behaviors between Cr(VI) ion and water-insoluble amphoteric starches was investigated. It was found that the HCrO4-ion predominates over the initial pH similar to 2-4, the CrO4-2 ion predominates over the initial pH similar to 10-12, and both ions coexist over the initial pH similar to 6-8. The sorption process occurs in two stages: the external mass transport process occurs in the early stage and the intraparticle diffusion process occurs in the long-term stage. The diffusion coefficient of the early stage (D1) is larger than that of the long-term stage (D2) for the initial pH 4 and pH 10. The diffusion rate of HCrO4-ion is faster than that of CrO4-2 ion for both processes. The D1 and D2 values are similar to 1.38×10-7-10.1×10-7 and similar to 0.41×10-7-1.60×10-7 cm2 s-1, respectively. The ion diffusion rate in both processes is concentration dependent and decreases with increasing initial concentration. The diffusion rate of HCrO4-ion is more concentration dependent than that of CrO4-2 ion for the external mass transport process. In the intraparticle diffusion process, the concentration dependence of the diffusion rate of HCrO4-and CrO4-2 ions is about the same. The external mass transport and intraparticle diffusion processes are endothermic and exothermic, respectively, for the initial pH 4 and pH 10. The k (d) values of the external mass transport and intraparticle diffusion processes are similar to 15.20-30.45 and similar to -3.53 to -12.67 kJ mol-1, respectively. The diffusion rate of HCrO4-ion is more temperature dependent than that of CrO4-2 ion for both processes.

Keywords: Heavy-Metal Ions, Amphoteric Starches, Peanut Skins, Removal, Recovery, Binding, Water-Insoluble Cationic Starch, Dynamic Adsorption, Diffusion Coefficient, Mass Transport Process

Rivas, B.L., Maturana, H.A. and Hauser, P. (1999), Adsorption behavior and separation of vanadium(V), molybdenum(VI), and rhenium(VII) ions on crosslinked polymers containing acrylic acid derivative moieties. *Journal of Applied Polymer Science*, **73** (3), 369-376.

Full Text: [J\J App Poy Sci73, 369.pdf](J/J%20App%20Poy%20Sci73,%20369.pdf)

Abstract: The radical polymerization of [2-(acryloyloxy)ethyl] trimethylammonium methyl sulfate and [3- (methacryloylamino)propyl] trimethylammonium chloride by using ammonium peroxydisulfate as initiator and N, N’-Methylene -bis- acrylamide as crosslinker agent at 70°C for 17 h was carried out. The crosslinker agent in the feed ranged between 2 and 6 mol %. The resins were completely insoluble in water and characterized by elemental analysis and FTIR spectroscopy. The metal ion binding capacity of these resins with V(V), Mo(VI), and Re(VII) were investigated using the batch equilibrium type. The pH, but not the crosslinking percentage in the feed, influenced the retention capacity of the resin, particularly for V(V) and Re(VII). Thus, at pH 1 only < 15% of V(V) was retained, but at pH 3 higher than 97% of V(V) was adsorbed. The resin-ion equilibrium was achieved between 15 min and 2 h depending on the resin, ion, and crosslinking degree. According to the pH, it is possible separate Re(VII) and Mo(VI) from V(V) at pH 1.0. To reuse the resins, the ions were stripped by using HCl, H2SO4, and Na2CO3 at different concentrations. (C) 1999 John Wiley & Sons, Inc

Keywords: Batch Equilibrium, Chelating Resin, Extraction Kinetics, Hollow-Fiber, Membrane Extractor, Metal Ion Chelating Resin, Molybdenum, Mono-2-Ethylhexyl Ester, Retention Properties, Rhenium, Vanadium

Coşkun, R., Yiğitoğlu, M. and Saçak, N. (2000), Adsorption behavior of copper(II) ion from aqueous solution on methacrylic acid-crafted poly(ethylene terephthalate) fibers. *Journal of Applied Polymer Science*, **75** (6), 766-772.

Full Text: [J\J App Poy Sci75, 766.pdf](J/J%20App%20Poy%20Sci75,%20766.pdf)

Abstract: The adsorption behavior of methacrylic acid-grafted poly(ethylene terephthalate) fibers was studied toward the copper(II) ion in aqueous solutions by a batch equilibriation technique. The influence of treatment time, temperature, pH of the solution, metal ion concentration, and graft yield were considered. One hour of adsorption time was found sufficient to reach adsorption equilibrium for the copper(II) ion. It was found that the adsorption isotherm of Cu(II)fits Langmuir-type isotherms. The adsorption process is not affected by the temperature when treated with low ion concentration, but is remarkably decreased at a high ion concentration. The heat of adsorption value was calculated as 0.71 kcal/mol. It was found that the reactive fibers are stable and regenerable by acid without losing their activity. (C) 2000 John Wiley & Sons.

Keywords: Adsorption, Metal Ions, Fibrous Adsorbent, Methacrylic Acid-Grafted Polyester Fibers, Initiated Graft-Copolymerization, Poly(Ethylene-Terephthalate) Fibers, Metal-Ions, Acrylamide, Extraction, Water

Sreedhar, M.K. and Anirudhan, T.S. (2000), Preparation of an adsorbent by craft polymerization of acrylamide onto coconut husk for mercury(II) removal from aqueous solution and chloralkali industry wastewater. *Journal of Applied Polymer Science*, **75** (10), 1261-1269.

Full Text: [J\J App Poy Sci75, 1261.pdf](J/J%20App%20Poy%20Sci75,%201261.pdf)

Abstract: Graft copolymerization of acrylamide onto coconut husk (CH), initiated by the ferrous ammonium sulfate/H2O2 redox initiator system, was studied. To determine the optimum conditions of grafting, the effect of the concentrations of ferrous ammonium sulfate, the monomer, and H2O2 and the time and temperature on percentage of the graft yield was studied. A new adsorbent media having a carboxylate functional group was synthesized by the surface modification of polymer-grafted coconut husk (PGCH-COOH). The mechanism of graft polymerization and surface functionalization is proposed. The material exhibits a very high adsorption potential for Hg(II). The sorption of Hg(II) was found to be dependent on the contact time, concentration, pH, and temperature. Maximum removal of 99.4% with 2 g/L of the sorbent was observed at 125 µmolL-1 Hg(II) concentration at pH 6.0. The slow step which determines the rate of exchange of Hg(II) ions is diffusion through the adsorbent particles. The diffusion coefficients, energy of activation, and entropy of activation were calculated and used to determine the theoretical behavior of the sorption process. The applicability of the Langmuir isotherm established the endothermic character of the adsorption. Acid regeneration was tried for several cycles with a view to recover the adsorbed metal ions and also to restore the sorbent to its original state. The adsorbent efficiency toward Hg(II) removal was tested using synthetic and chloralkali industry wastewaters.

Keywords: Oxide Gel, Adsorption, Sorption, Kinetics, Pb(II), Graft Polymerization, Coconut Husk, Adsorption, Mercury Removal, Wastewater

Saliba, R., Gauthier, H., Gauthier, R. and Petit Ramel, M. (2000), Adsorption of copper(II) and chromium(III) ions onto amidoximated cellulose. *Journal of Applied Polymer Science*, **75** (13), 1624-1631.

Full Text: [J\J App Poy Sci75, 1624.pdf](J/J%20App%20Poy%20Sci75,%201624.pdf)

Abstract: Chemical modification of cellulose powder is performed by successive reactions with acrylonitrile in an alkaline medium followed by aqueous hydroxylamine to prepare amidoximated cellulose. Due to complexation, the amidoxime groups immobilize heavy cations from buffered solutions at various pH values. The capacity of adsorption for Cu(II) and Cr(III) ions is related to the amount of amidoxime groups in the support and to the metal concentration of the polluted solution. The formation of a 1/1 complex is proved by the adsorption limit values. Desorption of the cations is possible by treatment with a stronger complexing agent such as ethylenediaminetetracetic acid.

Keywords: Heavy-Metal Ions, Removal, Binding, Complexes, Water, Cellulose, Amidoxime, Heavy Metals, Depollution

Yang, Y.M. and Shao, J. (2000), Synthesis of sulfhydryl chitin and its adsorption properties for heavy metal ions. *Journal of Applied Polymer Science*, **77** (1), 151-155.

Full Text: [J\J App Poy Sci77, 151.pdf](J/J%20App%20Poy%20Sci77,%20151.pdf)

Abstract: This article discusses the preparation of the water-insoluble adsorbent sulfhydryl chitin (s-chitin), by treatment of the chitin with sulfhydryl acetic acid in the presence of sulfuric acid as a catalyst. Its structure was confirmed by elemental analysis, FTIR spectra analysis and near-IR spectra analysis. We also investigated the adsorption properties of sulfhydryl chitin for Cu-II, Cd-II, Pb-II, Cr-III, and Ni-II. Based on the research results of adsorption capacity, the effect of pH value on adsorption, adsorption kinetics experiments, and selective adsorption experiments were observed. It has been shown that the s-chitin has much better adsorption for Pb-II, CuII, and CdII than chitin itself. The adsorption capacities of s-chitin for Pb-II, Cu-II, and Cd-II were 108.3, 94.7, and 57.1 mg/g, respectively. It also had good adsorption properties for heavy metal ions. The adsorption capacities were also affected by the acidity of medium. The adsorbed Cu-II, Cd-II, and Pb-II could be eluted by diluted chlorhydric acid.

Keywords: Sulfhydryl Chitin, Adsorption Property, Heavy Metal Ions

Baouab, M.H.V., Gauthier, R., Gauthier, H., Chabert, B. and Rammah, M.E. (2000), Immobilization of residual dyes onto ion-exchanger cellulosic materials. *Journal of Applied Polymer Science*, **77** (1), 171-183.

Full Text: [J\J App Poy Sci77, 171.pdf](J/J%20App%20Poy%20Sci77,%20171.pdf)

Abstract: This article reports on the preparation of cationized cotton fiber by treating alkali cellulose cotton fibers with epoxy propyltrimethylammonium chloride (EPTMAC) in a nonaqueous medium and its use as support for the immobilization of pollutant dyes. Evidence of attaching quaternary ammonium groups onto cellulose is provided by IR analysis, nitrogen determination, and weight uptake. Four EPTMAC-Cotton fiber samples with different nitrogen content (0.5-1.85) are tested for the adsorption of four acid dyes (Acid Blue 25, Acid Yellow 99, Reactive Yellow 23, and Acid Blue 74). Adsorption is followed spectrometrically, the capacity of adsorption depending on the nitrogen content; and on the number of anionic groups in the dye. The Langmuir and Freundlich isotherms constants are evaluated from the experimental data, but better agreement is obtained by using a composite isotherm of the general form Y-e = iC(e)/(1 + jC(e)(m)), where i, j, and m are constants. (C) 2000 John Wiley & Sons, Inc.

Keywords: Cationized Cotton, Acid Dyes, Adsorption Isotherm, Exchange Capacity, External Mass-Transfer, Solute Adsorption-Isotherm, Acid Dye, Activated Carbon, Aqueous-Solutions, Natural Adsorbents, General

Rout, J., Tripathy, S.S., Nayak, S.K., Misra, M. and Mohanty, A.K. (2001), Scanning electron microscopy study of chemically modified coir fibers. *Journal of Applied Polymer Science*, **79** (7), 1169-1177.

Full Text: [J\J App Poy Sci79, 1169.pdf](J/J%20App%20Poy%20Sci79,%201169.pdf)

Abstract: Chemical-surface modification of coir fibers was done by dewaxing, using an alkali treatment (5% and 10% NaOH), vinyl grafting with methyl methacrylate (MMA) and cyanoethylation. The chemically modified fibers were characterized by Fourier transform infrared (FTIR) spectroscopy. In addition, the surface features of untreated, dewaxed, alkali-treated, grafted, and cyanoethylated coir fibers were studied using scanning electron microscopy (SEM). Progressive changes in surface morphology were observed. SEM observations showed the removal of tyloses from the surface of coir as a result of alkali treatment (5%), resulting in a rough fiber surface with regularly spaced pits. At a lower percentage of grafting (PMMA), the surfaces became more or less uniform, while the surfaces of the coir fibers with a higher percentage of grafting were increasingly covered with grafted materials, resulting in canal-like cavities between the overgrowths of the grafted materials on the unit cells. Cyanoethylated coir-fiber surfaces showed an insufficient deposit of cyanoethyl groups. SEM analysis of the samples was corroborated by measurements of a mechanical property (maximum stress at break). (C) 2000 John Wiley & Sons, Inc.

Keywords: Acrylonitrile, Alkali Treatment, Behavior, Coir Fiber, Composites, Electron Microscopy, FTIR, Graft-Copolymerization, Pineapple Leaf Fibers, Tensile Strength, Tyloses, Unit Cell

Ray, D. and Sarkar, B.K. (2001), Characterization of alkali-treated jute fibers for physical and mechanical properties. *Journal of Applied Polymer Science*, **80** (7), 1013-1020.

Full Text: [J\J App Poy Sci80, 1013.pdf](J/J%20App%20Poy%20Sci80,%201013.pdf)

Abstract: Changes occurring in jute fibers when treated with a 5% concentration of a NaOH solution for 0, 2, 4, 6, and 8 h were characterized by weight loss, linear density, tenacity, modulus, FTIR, and X-ray measurements. A 9.63% weight loss was measured during 2 h of treatment with a drop of hemicellulose content from 22 to 12.90%. The linear density value showed no change until 2 h of treatment followed by a decrease from 33.0 to 14.5 denier by 56% after 6 h of treatment. The tenacity and modulus of the fibers improved by 45 and 79%, respectively, and the percent breaking strain was reduced by 23% after 8 h of treatment. X-ray diffractograms showed increase in crystallinity of the fibers only after 6 h of treatment, while FTIR measurements showed much of the changes occurring by 2 h of treatment with an increased amount of OH groups. By measuring the rate of change of the modulus, tenacity, and percent breaking strain with the time of treatment, a clear transition was apparent at 4 h of treatment with the dissolution of hemicellulose, causing a weight loss and drop in the linear density before and development of crystallinity with an improvement in the properties after the transition time. (C) 2001 John Wiley & Sons, Inc.

Keywords: Alkali Treatment, Behavior, Chemical Modification, Coir Fibers, Denier, Epoxy Composites, Fine-Structure, FTIR, Ftir-Spectra, Hemicellulose, Jute Fiber, Lignin, Mechanical Properties, Polyester Composites, Removal

Choi, S.H., Lee, K.P. and Nho, Y.C. (2001), Adsorption of urokinase by polypropylene films with various amine groups. *Journal of Applied Polymer Science*, **80** (14), 2851-2858.

Full Text: [J\J App Poy Sci80, 2851.pdf](J/J%20App%20Poy%20Sci80,%202851.pdf)

Abstract: Polypropylene films with various amine groups were prepared by radiation-induced grafting of glycidyl methacrylate (GMA) onto polypropylene (PP) films and the subsequent amination of poly-GMA graft chains were examined. The physical and chemical properties of the GMA-grafted PP film and the aminated PP film were investigated by IR, SEM, XPS, and TGA. The adsorption of urokinase for the PP films modified with various amine groups was examined under various conditions of different amine group contents and pH values. The adsorption of urokinase increased by increasing the amine group content. In the range of amine group content from 1.0 to 2.7 mmol/g, the adsorption of urokinase by the PP films modified with six kinds of amines was in the following order: trimethylamine > diethylenetriamine > triethylenetetraamine > ethylenediamine > dimethylamine > diethyleneamine. The adsorption amounts of urokinase by the PP film with the trimethylamine and triethylenetetraamine groups at pH 7.4 were higher than those at pH 9. (C) 2001 John Wiley & Sons, Inc.

Keywords: Polypropylene Films, Urokinase, Radiation-Induced Graft Copolymerization, Glycidyl Methacrylate, Amination, Adsorption Characterization, Induced Graft-Copolymerization, Polyethylene Membrane, Iminodiacetic Acid, Radiation, Co2+

Ruiz, M., Sastre, A.M., Zikan, M.C. and Guibal, E. (2001), Palladium sorption on glutaraldehyde-crosslinked chitosan in fixed-bed systems. *Journal of Applied Polymer Science*, **81** (1), 153-165.

Full Text: [J\J App Poy Sci81, 153.pdf](J/J%20App%20Poy%20Sci81,%20153.pdf)

Abstract: Palladium sorption on glutaraldehyde-crosslinked chitosan was studied in fixed-bed column systems. Sorption performances were controlled mainly by the presence of competitor anions in the solution: The presence of sulfate, chloride, or nitrate (to a lesser extent) significantly decrease sorption properties.,Although the influence of other operating conditions such as particle size, column depth, and flow velocity on sorption breakthrough cannot be completely neglected, palladium sorption is less significantly controlled by these parameters than for the sorption of other metal ions, owing to fast mass transfer and weak intraparticle diffusion control. (C) 2001 John Wiley & Sons, Inc. J Appl Polym Sci 81: 153-165, 2001.

Keywords: Adsorption, Beads, Chitosan, Chromatography, Column Depth, Cross-Linked Chitosan, Diffusion, Equilibrium, Fixed-Bed Column, Flow Velocity, Kinetics, Liquid Membrane, Mercury(II), Metal-Ions, Molybdate Sorption, Palladium, Particle Size, Sorption

Baouab, M.H.V., Gauthier, R., Gauthier, H. and Rammah, M.E.B. (2001), Cationized sawdust as ion exchanger for anionic residual dyes. *Journal of Applied Polymer Science*, **82** (1), 31-37.

Full Text: [J\J App Poy Sci82, 31.pdf](J/J%20App%20Poy%20Sci82,%2031.pdf)

Abstract: Using the same procedure as recently described for cotton fiber, the preparation of cationized wood sawdust was performed by treating alkali sawdust with epoxy propyl trimethyl ammonium chloride (EPTMAC) in a nonaqueous medium (dimethylformamide, DMF). The fixation of ammonium groups onto sawdust, was monitored by weight: uptake, nitrogen content determination, and infrared spectroscopy. EPT-MAC-sawdust with a 0.5 wt % nitrogen content is then used as adsorbent for acid dyes (Acid Blue 25, Acid Yellow 99, Reactive Yellow 23, and Acid Blue 74). The adsorption capacity, determined by spectrometric measurement of the residual dye in the treated solution, decreases with increasing temperature. The modeling of the adsorption isotherms using Langmuir, Freundlich, and General relations allows the determination of isotherm constants. Globally, EPTMAC-sawdust has a behavior similar to EPTMAC-cotton, and its use for depollution of waste waters from dyeing industries presents advantages over cotton, such as a larger availability and a lower price. (C) 2001 John Wiley & Sons, Inc.

Keywords: Acid, Acid Dyes, Adsorbent, Adsorption, Adsorption Isotherm, Adsorption Isotherms, Cationized Sawdust, Color Removal, Dyes, Exchange Capacity, Fly-Ash, Infrared Spectroscopy, Langmuir, Metal, Sawdust, Sorption, Waste, Waste-Water, Wood

Low, K.S., Lee, C.K. and Low, C.H. (2001), Sorption of chromium(VI) by spent grain under batch conditions. *Journal of Applied Polymer Science*, **82** (9), 2128-2134.

Full Text: [J\J App Poy Sci82, 2128.pdf](J/J%20App%20Poy%20Sci82,%202128.pdf)

Abstract: Batch experiments were performed to evaluate the ability of spent grain to remove chromium (VI) from aqueous solution. Parameters investigated include pH, contact time, sorbent dosage, agitation rate, and the presence of other anions. Application of the Langmuir isotherm to the Cr(VI)-spent grain system provided a maximum sorption capacity of 18.94 mg/g. This value compares favorably with other reported values for low-cost materials. Anions such as phosphate, arsenate, nitrate, and sulfate were antagonistic toward the uptake of Cr(VI) by spent grain. It was successful in removing Cr(VI) from a sample of electroplating waste. (C) 2001 John Wiley & Sons, Inc.

Keywords: Low-Cost Material, Spent Grain, Sorption, Chromium, Hexavalent Chromium, Removal, Ions

Wang, G.H., Song, Z.Q., Lin, Z.F. and Wang, L.S. (2002), Preparation for graft copolymers of sawdust, vinyl monomers and their application for removal of dye. *Journal of Applied Polymer Science*, **83** (13), 2390-2396.

Full Text: [J\J App Poy Sci83, 2390.pdf](J/J%20App%20Poy%20Sci83,%202390.pdf)

Abstract: A kind of cationic exchanging resin of carboxyl sawdust (CSD) was fabricated through the hydrolysis of graft copolymers of sawdust with acrylonitrile (SAN) and sawdust with acrylamide (SAA) that were made by initiator Fe2+, H2O2. A study of the graft copolymerization was conducted for initiator usage, vinyl monomer usage, and reaction temperature. The hydrolysis under basic, acid conditions was also studied for the yield and acid value of CSD followed to adsorb Basic Pink dye (BPD). Our results show the following: (1) graft copolymers (SAN and SAA) with a high rate of graft copolymerization are readily prepared by suitable usages of initiator and vinyl monomer under a certain temperature; (2) adsorption capacity of CSD is relative to pH of BPD solution and reaches the most adsorption capacity at pH approximate to 6; (3) adsorption capacity of CSD increases along with the augment of its acid value; and (4) the adsorption capacity of the CSD toward BPD increases along with augment of initial concentration of the adsorbate and reaches about 500 mg, g. (C) 2002 John Wiley Sons, Inc

Keywords: Acrylamide, Acrylonitrile, Adsorption, Dye, Graft Copolymerization, Hydrolysis, Ion, Removal, Sawdust, Yield

Burke, A., Yilmaz, E., Hasirci, N. and Yilmaz, O. (2002), Iron(III) ion removal from solution through adsorption on chitosan. *Journal of Applied Polymer Science*, **84** (6), 1185-1192.

Full Text: [J\J App Poy Sci84, 1185.pdf](J/J%20App%20Poy%20Sci84,%201185.pdf)

Abstract: The potential of different forms of chitosan to adsorb iron(III) ion from a Jectofer [an iron(III)-sorbitol-citric acid complex] solution was investigated. The working solution was chosen as Jectofer, to mimic the composition of excess iron(III) as may be found in biological systems. The equilibrium studies showed that chitosan powder has the highest sorption capacity for the iron(III) ion when compared to chitosan flakes and microspheres. The amount of iron(III) adsorbed onto chitosan was found to increase with the contact time to reach equilibrium within 3 h at 37°C. A higher initial concentration of a Jectofer solution resulted in a higher amount of iron(III) adsorbed. Higher pH values, in the range 2-7, also resulted in an increase in iron(III) uptake from the solution. The data of adsorption from the Jectofer solution were found to correlate well with the Freundlich isotherm equation. *In vitro* adsorption experiments showed that chitosan is capable of adsorbing excess iron, measured in terms of the ferritin level, in human blood. © 2002 Wiley Periodicals, Inc. J Appl Polym Sci 84: 1185-1192, 2002; DOI 10.1002/app.10416

Keywords: Chitosan, Chelation, Iron(III), Jectofer, Thalassemia, Adsorption, Biopolymers, Metal-Polymer Complexes, Polysaccharides

Unnithan, M.R., Vinod, V.P. and Anirudhan, T.S. (2002), Ability of iron(III)-loaded carboxylated polyacrylamide-grafted sawdust to remove phosphate ions from aqueous solution and fertilizer industry wastewater: Adsorption kinetics and isotherm studies. *Journal of Applied Polymer Science*, **84** (13), 2541-2553.

Full Text: [J\J App Pol Sci84, 2541.pdf](J/J%20App%20Pol%20Sci84,%202541.pdf)

Abstract: Iron(III)-loaded carboxylated polyacrylamide-grafted sawdust was investigated as an adsorbent for the removal of phosphate from water and wastewater. The carboxylated polyacrylamide-grafted sawdust was prepared by graft copolymerization of acrylamide and N, N’-Methylene bisacrylamide onto sawdust in the presence of an initiator, potassium peroxydisulfate. Iron(III) was strongly attached to the carboxylic acid moiety of the adsorbent. The adsorbent material exhibits a very high adsorption potential for phosphate ions. The coordinated unsaturated sites of the iron(III) complex of polymerized sawdust were considered to be the adsorption sites for phosphate ions, the predominating species being H2PO4- ions. Maximum removal of 97.6 and 90.3% with 2 g L-1 of the adsorbent was observed at pH 2.5 for an initial phosphate concentration of 100 and 250 μmol L-1, respectively. The adsorption process follows second-order kinetics. Adsorption rate constants as a function of concentration and temperature and kinetic parameters, such as DeltaG(±), DeltaH(±), and DeltaS(±), were calculated to predict the nature of adsorption. The L-type adsorption isotherm obtained in the sorbent indicated a favorable process and fitted the Langmuir equation model well. The adsorption capacity calculated by the Langmuir adsorption isotherm gave 3.03×10-4 mol g-1 of phosphate removal at 30degreesC and pH 2.5. The isosteric heat of adsorption was also determined at various surface loadings of the adsorbent. The adsorption efficiency toward phosphate removal was tested using industrial wastewater. Different reagents were tested for extracting phosphate ions from the spent adsorbent. About 98.2% of phosphate can be recovered from the adsorbent using 0.1M NaOH. Alkali regeneration was tried for several cycles with a view to recover the adsorbed phosphate and also to restore the adsorbent to its original state. (C) 2002 Wiley Periodicals, Inc.

Keywords: Graft Copolymer, Iron(III)-Loaded Polymer, Sawdust, Thermogravimetric Analysis, pHosphate Removal, Adsorption, Wastewater, pHosphorus Removal, Functional-Group, Sorption, Alumina, Anions, Oxide

Acemioğlu, B. and Alma, M.H. (2002), Kinetics of wood phenolysis in the presence of HCl as catalyst. *Journal of Applied Polymer Science*, **85** (5), 1098-1103.

Full Text: [J\J App Pol Sci85, 1098.pdf](J/J%20App%20Pol%20Sci85,%201098.pdf)

Abstract: Monarch birch wood (Betula maximowiczina Regel) wastes were phenolated in the presence of HCl as a catalyst at 60-150degreesC for various reaction times. Typical kinetic parameters along with percent reacted wood and phenol were determined by using kinetic models. In addition, according to the transition-state theory the activation parameters of wood phenolysis was determined. The percent reacted wood wastes depicted that about 90% of the wood could be liquefied into phenol at a temperature of 150degreesC. However, about 30% of phenol was found to react with wood components. The kinetic studies showed that wood phenolysis with HCl catalyst at 60-150degreesC obviously followed a bimolecular type of second-order reaction. Activation energy was found to be 13.438 kJ mol-1 from an Arrhenius plot. Furthermore, the findings related with activation enthalpy showed that the wood phenolysis had dominantly endothermic reaction nature. (C) 2002 Wiley Periodicals, Inc.

Keywords: Kinetics, Catalysts, Wood phenolysis, phenolated Wood, Acid

? Hong, L.W. and Yu, J. (2003), Environmental factors and kinetics of microbial degradation of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) in an aqueous medium. *Journal of Applied Polymer Science*, **87** (2), 205-213.

Full Text: [2003\J App Pol Sci87, 205.pdf](2003/J%20App%20Pol%20Sci87,%20205.pdf)

Abstract: Environmental factors such as oxygen, temperature, and microbial species may have significant effects on decomposition of biodegradable polymers. A representative biodegradable, thermoplastic polymer, poly(3-hydroxybutyrate-co-hydroxyvalerate) (PHBV), was decomposed in an aqueous medium under controlled laboratory conditions by soil microbes for the intrinsic degradation kinetics and the effects of the environmental factors on polymer biodegradation. The amount of proteins, including the PHBV depolymerases, that attached to the polymer surfaces was quite constant during the period of significant mass loss of the polymer specimens. The microbial polymer degradation followed a zero-order rate model, so the residual mass fraction of PHBV films declined linearly with time. The mixed aerobic microbial organisms from fertile soil showed a higher activity of polymer degradation than an aerobic PHBV-producing bacterium and the mixed anaerobes in the same soil. The mixed anaerobic microorganisms from barren soil decomposed the polymer at a slower rate than the anaerobes from fertile soil, and this was attributed to fewer microbial cells in the barren soil instead of the difference in the microbial species. The temperature effect on PHBV degradation can be described with an Arrhenius equation, and the activation energy is around 16 kcal/mol. (C) 2002 Wiley Periodicals, Inc.

Keywords: Activation, Activation Energy, Activity, Aerobic, Anaerobic, Aqueous Medium, Bacterial, Biodegradable, Biodegradable Polymers, Biodegradation, Biopolymers, Blends, Cells, Decomposition, Degradation, Degradation Kinetics, Effects, Energy, Environmental, Environmental Factors, Enzymatic Degradation, Films, Kinetics, Microbes, Microbial, Microbial Degradation, Microorganisms, Model, Organisms, Oxygen, Poly(3-Hydroxybutyrate), Polyesters, Polyethylene, Polymer, Polymer Degradation, Polymers, Proteins, Rate Model, Soil, Species, Surfaces, Temperature, Temperature Effect

Karakişla, M. (2003), The adsorption of Cu(II) ion from aqueous solution upon acrylic acid grafted poly(ethylene terephthalate) fibers. *Journal of Applied Polymer Science*, **87** (8), 1216-1220.

Full Text: [J\J App Pol Sci87, 1216.pdf](J/J%20App%20Pol%20Sci87,%201216.pdf)

Abstract: This study is concerned with the investigation of the adsorption properties of acrylic acid grafted poly(ethylene terephthalate) fibers by the use of Cu(II) ions in aqueous solutions. Influence of pH, graft yield, contact time, concentration of the ion, and reaction temperature on the amount of ion adsorbed upon reactive fiber were investigated. The time in which the adsorption reached to the equilibrium value was determined as 1 h. The adsorption isotherm of Cu(II) ion was found to be a Langmuir type and the heat of adsorption was calculated as -10.1 kJ mol-1. It was observed that the adsorbed Cu(II) ion upon acrylic acid grafted poly(ethylene terephthalate) fibers could be recovered in acidic media. The fiber could also readsorb Cu(II) ions without losing its activity. (C) 2002 Wiley Periodicals, Inc.

Keywords: Adsorption, Metal Ions, Acrylic Acid Grafted Poly(Ethylene Terephthalate), Fibrous Adsorbant, Heavy-Metal Ions, Poly(Ethylene-Terephthalate) Fibers, Chelating Fibers, Behavior, Dithiocarbamate, Copper(II), Sorption, Removal, Gold

Zghida, H., Baouab, M.H.V. and Gauthier, R. (2003), Sorption of chromium oxy-anions onto cationized ligno- cellulosic material. *Journal of Applied Polymer Science*, **87** (10), 1660-1665.

Full Text: [J\J App Pol Sci87, 1660.pdf](J/J%20App%20Pol%20Sci87,%201660.pdf)

Abstract: Quaternary ammonium groups were grafted onto ligno-cellulosic material (cotton, wood sawdust, and maize-cob flour) to obtain a support able to adsorb oxy-anions containing chromium atoms (chromate and dichromate). For both anions in aqueous solutions, adsorption proceeded very quickly and reached a limit value dependent on the rate of ammonium grafting; at saturation, the Cr, N+ ratio was always close to 1, 1 for chromate anions, but two ammonium sites were needed to link a dichromate anion in a stable structure, resulting in the same 1, 1 Cr, N+ ratio. Tentatives for modeling the adsorption process were performed with the Langmuir, Freundlich, and Jossen equations. A nearly total desorption occurred only when these saturated supports were treated with solutions of high ionic strength (4M potassium chloride). (C) 2002 Wiley Periodicals, Inc

Keywords: Adsorption, Chromium, Complexes, Copper(II), Derivatives, Ion-Exchanger, Removal, Residual Dyes, Sawdust

Boynard, C.A., Monteiro, S.N. and d’Almeida, J.R.M. (2003), Aspects of alkali treatment of sponge gourd (*Luffa cylindrica*) fibers on the flexural properties of polyester matrix composites. *Journal of Applied Polymer Science*, **87** (12), 1927-1932.

Full Text: [J\J App Pol Sci87, 1927.pdf](J/J%20App%20Pol%20Sci87,%201927.pdf)

Abstract: Sponge gourd (*Luffa cylindrica*) forms a natural mat that deviates the crack path in brittle thermoset resin matrix composites, leading to a controlled fracture mode and increasing the toughness of the composite. The use of luffa as reinforcement is, however, restricted by a very weak fiber- matrix interface. In this work, luffa fibers were alkali- treated at two temperatures, with varying alkali concentrations. Although the surface analysis shows that the treatments promote a clear removal of the outer surface layer of the fibers with the exposition of the inner fibrillar structure and the consequent increase of the fiber surface area, only a secondary increase on the mechanical properties was obtained. The slight increase observed was attributed only to mechanical interlock. Long pullout lengths and neat fiber beads were the main features observed at the fracture surface of the treated and untreated fiber composites. (C) 2003 Wiley Periodicals, Inc.

Keywords: Biofibers, Coir Fibers, Composites, Fractography, Mechanical Properties, Mechanical-Properties, Sisal

Bayramoğlu, G. (2003), Poly(2-hydroxyethylmethacrylate)/chitosan dye and different metal-ion-immobilized interpenetrating network membranes: Preparation and application in metal affinity chromatography. *Journal of Applied Polymer Science*, **88** (7), 1843-1853.

Full Text: [J\J App Pol Sci88, 1843.pdf](J/J%20App%20Pol%20Sci88,%201843.pdf)

Abstract: Composite membranes were synthesized with 2-hydroxyethylmethacrylate and chitosan (pHEMA/chitosan) via an ultraviolet-initiated photopolymerization technique in the presence of an initiator (alpha, alpha’-azobisisobutyronitrile). The interpenetrating network (IPN) membranes were improved by the immobilization of dye molecules via hydroxyl and amino groups on the membrane surfaces from the IPNs. A triazidine dye (Procion Green H-4G) was covalently immobilized as a ligand onto the IPN membranes. The protein showed various affinities to different chelated metal ions on the membrane surfaces that best matched its own distribution of functional sites, resulting in a distribution of binding energies. In support of this interpretation, two different metal ions, Zn(II) and Fe(III), were chelated with the immobilized dye molecules. The adsorption and binding characteristics of the different metal-ion-chelated dye-immobilized IPN membranes for the lysozyme were investigated with aqueous solutions in magnetically stirred cells. The experimental data were analyzed with two adsorption kinetic models, pseudo-first-order and pseudo-second-order, to determine the best fit equation for the adsorption of lysozyme onto IPN membranes. The second-order equation for the lysozyme-dye-metal-chelated IPN membrane systems was the most appropriate equation for predicting the adsorption capacity for all the tested adsorbents. The reversible lysozyme adsorption on the dye-immobilized and metal-ion-chelated membranes obeyed the Temkin isotherm. The lysozyme adsorption capacity of the pHEMA/chitosan dye, pHEMA/chitosan dye-Zn(II), and pHEMA/chitosan dye-Fe(III) membranes were 2.54, 2.85, and 3.64 mg cm-2, respectively. The nonspecific adsorption of the lysozyme on the plain pHEMA/chitosan membrane was about 0.18 mg cm-2. (C) 2003 Wiley Periodicals, Inc.

Keywords: Interpenetrating Networks (IPN), Membranes, Adsorption, Cibacron-Blue F3GA, Lysozyme Separation, Protein Separation, Serum-Proteins, Adsorption, Performance, Adsorbents, Methacrylate), Purification, Matrices

Acemioğlu, B., Samil, A., Alma, M.H. and Gündoğan, R. (2003), Copper(II) removal from aqueous solution by organosolv lignin and its recovery. *Journal of Applied Polymer Science*, **89** (6), 1537-1541.

Full Text: [J\J App Pol Sci89, 1537.pdf](J/J%20App%20Pol%20Sci89,%201537.pdf)

Abstract: In this study the removal of Cu(II) ions from aqueous solution was performed at different concentrations, temperatures, and pHs using ethanol-based organosolv lignin as the adsorbent. The results indicated that the amount of Cu(II) ions adsorbed onto the lignin increased with increasing concentration and pH; however, it decreased with an increase in temperature. It was possible to remove 40.74% (maximum removal) of Cu(II) ions from aqueous solution by using organosolv lignin within 10 min under certain conditions (3×10-4 M and 20degreesC). The adsorption process was determined to be consistent with the Freundlich isotherm. Furthermore, it was found that 40% (maximum recovery) of the Cu(II) ions adsorbed on the organosolv lignin could be recovered using HCl with an initial concentration of 3×10-4 M and a contact time of 10 min. (C) 2003 Wiley Periodicals, Inc.

Keywords: Organosolv Lignin, Ethanol, Adsorption, Cu(II) Ions, Isotherm, Metal Recovery, Activated Carbon, Adsorption, Cu(II)

Martins, M.A. and Joekes, I. (2003), Tire rubber-sisal composites: Effect of mercerization and acetylation on reinforcement. *Journal of Applied Polymer Science*, **89** (9), 2507-2515.

Full Text: [J\J App Pol Sci89, 2507.pdf](J/J%20App%20Pol%20Sci89,%202507.pdf)

Abstract: Tire rubber particles were mixed randomly with short sisal fibers and hot pressed. Sisal fibers were used as received, mercerized, and mercerized, acetylated. The fibers were characterized by scanning electron microscopy (SEM), thermal gravimetry analysis (TGA), infrared spectroscopy (FTIR), water sorption, and mechanical properties. Thermal stability of the mercerized, acetylated fibers improves (from 200 to 300degreesC) with respect to the raw fibers, and water sorption is similar to20% smaller than for the raw and the mercerized fibers. Tensile strength is unchanged after the chemical treatments. Water sorption, mechanical properties, and SEM evaluated the performance of the tire rubber composites. All composites showed enhanced elastic modulus; increase is dependent on fiber load. Smallest water sorption was obtained in composites with the mercerized, acetylated fibers. With these fibers at 10% load, the best results were obtained with the smaller tire rubber particles (320 μm) and at 5% load with the bigger (740 μm) tire rubber particles. Both composites showed similar to50% increase in tensile strength when compared to similar composites with raw fibers. SEM of the surface of fracture showed that the adhesion between fiber and rubber was enhanced after both chemical treatments. (C) 2003 Wiley Periodicals, Inc.

Keywords: Behavior, Cement Paste, Coir, Composites, Degradation, Fiber Modification, Mechanical-Properties, Orientation, Renewable Resources, Sisal Fibers, Surface, Tire Rubber, Wood Fiber

Gibbs, G., Tobin, J.M. and Guibal, E. (2003), Sorption of Acid Green 25 on chitosan: Influence of experimental parameters on uptake kinetics and sorption isotherms. *Journal of Applied Polymer Science*, **90** (4), 1073-1080.

Full Text: [J\J App Pol Sci90, 1073.pdf](J/J%20App%20Pol%20Sci90,%201073.pdf)

Abstract: Acid Green 25, which is a diazoic dye bearing two sulfonic groups, is efficiently sorbed on chitosan. The protonation of chitosan may explain the electrostatic attraction of this anionic dye and that its optimum pH is close to 3. Preliminary protonation of amine groups (obtained by contact with a sulfuric acid solution) reduced the variation of solution pH following sorbent addition but significantly reduced sorption performance: the maximum sorption capacity of raw chitosan, 525 mg dye/g (0.84 mmol dye/g), was halved by acidic preconditioning. The acidic conditioning also reduced the kinetic rate-the time necessary to reach equilibrium increased up to threefold depending on the experimental conditions. The size of sorbent particles influenced sorption kinetics and equilibrium because of resistance to intraparticle diffusion, but the sorption appeared to occur not only at the surface of the sorbent but also in the intraparticle network of the polymer. (C) Wiley Periodicals, Inc.

Keywords: Acid Green 25, Chitosan, Sorption Isotherm, Uptake Kinetics, Influence of pH, Influence of Particle Size, Metal-Anion Sorption, Aqueous-Solution, Reactive Dyes, *Rhizopus-arrhizus*, Soluble Chitosans, Activated Carbon, Diffusion-Model, Color Removal, Waste-Water, Adsorption

Eboatu, A.N., Akpuaka, M.U., Ezenweke, L.O. and Afiukwa, J.N. (2003), Use of some plant wastes as fillers for polypropylene. *Journal of Applied Polymer Science*, **90** (6), 1447-1452.

Full Text: [J\J App Pol Sci90, 1447.pdf](J/J%20App%20Pol%20Sci90,%201447.pdf)

Abstract: Palm kernel shell and the palm fruit pulp fiber were used as additives for polypropylene. The mechanical properties of the polymer, namely, tensile strength, impact strength, surface hardness, and flexural modulus were remarkably enhanced. This was attributed to the fact that these solid wastes functioned as reinforcing fillers through bonding interactions and stress-sharing mechanisms. (C) 2003 Wiley Periodicals, Inc.

Keywords: Fillers, Poly(propylene)

? Baouab, M.H.V., Zghida, H., Gauthier, R. and Gauthier, N. (2004), Cationized nylon as adsorbent for anionic residual dyes. *Journal of Applied Polymer Science*, **91** (4), 2513-2522.

Full Text: [2004\J App Pol Sci91, 2513.pdf](2004/J%20App%20Pol%20Sci91,%202513.pdf)

Abstract: For use as an ion exchanger, a cationized nylon (EPTMAC-nylon) was prepared by reacting nylon-6,6 with epoxy propyl trimethyl ammonium chloride (EPTMAC), using anhydrous tin chloride (SnCl2) as catalyst in a nonaqueous medium. Evidence of grafting was provided by atomic force microscopy and the exchange capacity of EPTMAC-nylon was evaluated by potentiometric titration. The adsorption of four dyes (Acid Blue 25, Acid Yellow 99, Reactive Yellow 23, and Acid Blue 74) from aqueous solutions using a batch process was studied according to the adsorption capacity of the cationized support. The effect of experimental parameters such as dye concentration and adsorption temperature were analyzed. The adsorption isotherms were determined at different temperatures and modeled using Langmuir, Freundlich, and Jossens equations. (C) 2003 Wiley Periodicals, Inc.

Keywords: Adsorption, Affinity Membranes, Classification, Dye, Dyes, Pigments, Gamma-Globulin, General Treatment, Ion Exchangers, Ion-Exchanger, Isotherms, Nylon, Pore, Solute Adsorption-Isotherm

Filho, J.A.R., Bach, E.E., Vargas, R.R., Soares, D.A.W. and de Queiroz, A.A.A. (2004), An investigation of cadmium(II) and nickel(II) adsorption by chitin graft covolymer. *Journal of Applied Polymer Science*, **92** (2), 1310-1318.

Full Text: [J\J App Pol Sci92, 1310.pdf](J/J%20App%20Pol%20Sci92,%201310.pdf)

Abstract: Chitin hydrogels of poly(vinylpyrrolidone) (VP) were prepared by means of the hydrogen peroxide graft copolymerization process. The effect of the VP grafted chain on water diffusion through the biopolymer was studied. Fourier transform infrared spectra of the VP-g-Ch showed an increase in the intensities of the hydroxyl and carbonyl stretching bands indicating a reduction in the hydrogen bonding of chitin. An investigation was undertaken regarding the adsorption of nickel(II) and cadmium(II) ions from aqueous solutions by the VP grafted chitin and the effects of the grafting degree on the Cd2+ and Ni2+ sorption were studied. The Cd2+ and Ni2+ adsorption equilibrium data correlate well with the Freundlich equation. The results indicate that the Ch-g-VP graft copolymer under investigation is a potentially powerful chelating material that can be employed for Ni2+ and Cd2+ ion removal from wastewater effluents. (C) 2004 Wiley Periodicals, Inc.

Keywords: Graft Copolymers, Hydrogels, Chitin, Metal-Polymer Complexes, Cadmium(II) and Nickel(II) Sorption, Ion-Exchangers, Metal-Ions, Chitosan, Derivatives, Soils, Lead, Depolymerization, Pollution, Removal, Growth

Wong, Y.C., Szeto, Y.S., Cheung, W.H. and McKay, G. (2004), Pseudo-first-order kinetic studies of the sorption of acid dyes onto chitosan. *Journal of Applied Polymer Science*, **92** (3), 1633-1645.

Full Text: [J\J App Pol Sci92, 1633.pdf](J/J%20App%20Pol%20Sci92,%201633.pdf)

Abstract: The adsorption of five acid dyes onto chitosan, derived through the deacetylation of crab-shell chitin, from aqueous solutions was studied. The equilibrium isotherms were measured and analyzed with the Langmuir, Freundlich, and Redlich-Peterson equations; the results correlated well with the Langmuir equation. Kinetic studies were also performed in an agitated batch adsorber to study the effect of the initial dye concentration and the mass of chitosan. The kinetics were analyzed with the pseudo-first-order rate equation, and the rate constants were determined. The first-order kinetic model correlated the experimental concentration and time data at short times and even up to 60% of the total adsorption period in a number of systems. (C) 2004 Wiley Periodicals, Inc.

Keywords: Adsorption, Biopolymers, Dyes/Pigments, Kinetics (Polym.), Agricultural By-Products, Color Removal, Metal-Ions, Textile Effluents, Aqueous-Solutions, Waste-Water, Equilibrium, Adsorbents, Adsorption, Dyestuffs

Tshabalala, M.A., Karthikeyan, K.G. and Wang, D. (2004), Cationized milled pine bark as an adsorbent for orthophosphate anions. *Journal of Applied Polymer Science*, **93** (4), 1577-1583.

Full Text: [J\J App Pol Sci93, 1577.pdf](J/J%20App%20Pol%20Sci93,%201577.pdf)

Abstract: More efficient adsorption media are needed for removing dissolved phosphorus in surface water runoff. We studied the use of cationized pine bark as a sorbent for dissolved phosphorus in water. Cationized pine bark was prepared by treating extracted milled pine bark with polyallylamine hydrochloride (PAA HCl) and epichlorohydrin (ECH) in aqueous medium. Attachment of PAA HCl to the bark was monitored by percentage of weight gain and nitrogen content. Changes in bark surface chemistry were characterized by zeta potential and inverse gas chromatography measurements. Energy dispersive x-ray analysis and scanning electron microscopy were used to determine changes in chemical composition and morphology of the cationized bark. The cationized bark showed a decrease in the dispersive component of the surface energy and a barely measurable change in the surface acid-base properties. In the pH range 2.5 to 7.9, the cationized bark showed a positive zeta potential, which changed to negative at pH 7.9 or higher. By comparison, the zeta potential of control extracted bark remained negative throughout the pH range of 2.5 to 9. We propose that the reaction of bark with PAA HCl results in a surface network of fixed cationic sites of quaternary ammonium that have mobile chloride ions as counter anions. Preliminary results from batch adsorption experiments indicate that cationized milled bark has an estimated maximum adsorption capacity of approximately 12.65 mg phosphate, g, which compares favorably with that of other well-known phosphorus sorbents. (C) 2004 Wiley Periodicals, Inc.

Keywords: Adsorption, Adsorption, Dyes, Fibers, Heavy-Metal Ions, Inverse Gas-Chromatography, Morphology, pHosphate, Polyelectrolytes, Recovery, Removal, Renewable Resources, Surfaces, Waste-Water

Dao, Z., Zhang, L.N., Zhou, J.P. and Guo, S.L. (2004), Development of a fixed-bed column with cellulose, chitin beads to remove heavy-metal ions. *Journal of Applied Polymer Science*, **94** (2), 684-691.

Full Text: [J\J App Pol Sci94, 684.pdf](J/J%20App%20Pol%20Sci94,%20684.pdf)

Abstract: Environmental friendly cellulose, chitin beads, having relatively high mechanical properties, were successfully prepared from a blend of cellulose and chitin in 6 wt % NaOH, 5 wt % thiourea aqueous solution by coagulating with 5% H2SO4 aqueous solution. The ability of the beads to adsorb Pb2+ in an aqueous solution was measured with a fixed-bed column. The effects of important parameters, to design an adsorption column of the cellulose, chitin beads for fixed-bed columns, were investigated. The breakthrough curves for the adsorption behavior indicated that the column performance was improved with decreasing initial lead concentration, ionic strength, flow velocity or bead size, as well as increasing pH dependence and bed height. Column studies showed that constants, calculated from the experimental data, and the Bed Depth Service Time (BDST) model had a good correlation. The columns were easily regenerated by treating with 0.1 mol, L HCl aqueous solution after the adsorption of metals, providing a simple and economical method for removal and recovery of heavy metals. After four adsorption-desorption cycles, the efficiency of column for the removal of lead was not significantly reduced (not more than 5%). It is shown that heavy-metal biosorption processes in fixed-bed columns could give a broad range of potential industrial applications. (C) 2004 Wiley Periodicals, Inc.

Keywords: Adsorption, Adsorption, Bead, Biomass, Biosorption, Cellulose, Chitin, Chitin, Chitosan, Column, Copper, Fixed-Bed Column, Lead, NAOH, Thiourea Aqueous-Solution, Recovery, Sorbents, Spectrophotometric Determination

? Can, H.K. and Guner, A. (2006), Investigation of adsorption-desorption dynamism of bovine serum albumin on crosslinked N,N’-diethylaminoethyl dextran microbeads: Solution phase. *Journal of Applied Polymer Science*, **99** (5), 2288-2299.

Full Text: [2006\J App Pol Sci99, 2288.pdf](2006/J%20App%20Pol%20Sci99,%202288.pdf)

Abstract: New hydrogel microspheres based on crosslinked dextran containing N,N’-diethylaminoethyl (DEAE) groups with different chemical structures have been used in adsorption-desorption studies. Bovine serum albumin (BSA) is frequently used in biophysical and biochemical studies. BSA has a well-known primary structure that has been associated with binding of many different categories of small molecules. Both adsorption kinetics and equilibrium isotherms for the adsorption of BSA on crosslinked DEAE dextran have been determined experimentally. These were only slightly dependent on the initial concentration of BSA but were considerably affected by the pH of the medium. The results fitted the Freundlich-Langmuir isotherm model for pH 6.9. The adsorption capacity factor and the adsorption equilibrium constant were obtained and mathematical modeling of adsorption, adsorption rate constants, and maximum adsorption were determined. Swelling kinetics of crosslinked DEAE dextran and optimum ionic strength, pH, and mass of hydrogel were also investigated. Desorption studies were finally determined under optimum medium conditions. (c) 2005 Wiley Periodicals, Inc. J Appl Polym Sci 99: 2288-2299, 2006

Keywords: Deae Dextran Microbeads, Adsorption, Proteins, UV-Vis Spectroscopy, Polysaccharicles, Protein Adsorption; Ion-Exchange; Microspheres, Chromatography, Prediction, Hydrogels, Behavior, Poly(N-Vinyl-2-Pyrrolidone), Performance, Adsorbents

? O’Connell, D.W., Birkinshaw, C. and O’Dwyer, T.F. (2006), A chelating cellulose adsorbent for the removal of Cu(II) from aoueous solutions. *Journal of Applied Polymer Science*, **99** (6), 2888-2897.

Full Text: [2006\J App Pol Sci99, 2888.pdf](2006/J%20App%20Pol%20Sci99,%202888.pdf)

Abstract: Regenerated cellulose wood pulp was grafted with the vinyl monomer glycidyl methacrylate (GMA) using ceric ammonium nitrate as initiator and was further fuctionalised with imidazole to produce a novel adsorbent material, cellulose-g-GMA-imidazole. All cellulose, grafted cellulose and functionalized cellulose grafts were physically and chemically characterized using a number of analytical techniques, including elemental analysis, Fourier transform infrared spectroscopy, thermogravimetric analysis, differential thermal analysis, and scanning electron microscopy. The cellulose-g-GMA material was found to contain 1.75 mmol g-1 epoxy groups. These epoxy groups permitted introduction of metal binding functionality to produce the cellulose-g-GMA-imidazole final product. Following characterization, a series of adsorption studies were carried out on the cellulose-g-GMA-imidazole to assess its capacity in the removal of Cu2+ ions from solution. Cellulose-g-GMA-imidazole sorbent showed an uptake of similar to 70 mg g-1 of copper from aqueous solution. The adsorption process is best described by the Langmuir model of adsorption, and the thermodynamics of the process suggest that the binding process is mildly exothermic. The kinetics of the adsorption process indicated that copper uptake occurred within 30 min and that pseudo-second-order kinetics best describe the overall process. (c) 2005 Wiley Periodicals, Inc.

Keywords: Fibers, Functionalization Of Polymers, Adsorption, Copper, Wastewater, Waste-Water Treatment, Heavy-Metal Removal, Aqueous-Solution, Thermodynamic Parameters, Natural Zeolites, Copper(II) Ions, Industry Waste, Fly-Ash, Adsorption, Chitosan

? Namasivayam, C. and Sureshkumar, M.V. (2006), Anionic dye adsorption characteristics of surfactant-modified coir pith, a ‘waste’ lignocellulosic polymer. *Journal of Applied Polymer Science*, **100** (2), 1538-1546.

Full Text: [2006\J App Pol Sci100, 1538.pdf](2006/J%20App%20Pol%20Sci100,%201538.pdf)

Abstract: The surface of coir pith, an agricultural solid waste, was modified using a catior c surfactant hexadecyltrimethylammonium bromide. Adsorption of anionic dyes on surfactant-modified coir pith was investigated in a series of batch adsorption experiments. Two anionic dyes, acid brilliant blue (acid dye) and procion orange (reactive dye), were used in the adsorption studies. The effect of process variables such as contact time, concentration of the dyes, adsorbent dose, temperature, and pH were studied in order to understand the kinetic and thermodynamic parameters of the process. The kinetics of adsorption obeyed the second-order rate equation. The equilibrium adsorption data were fitted into the Langmuir and Freundlich isotherms. It was found that modified coir pith yielded adsorption capacities of 159 and 89 mg/g for acid brilliant blue and procion orange, respectively. Mechanisms involving ion exchange and chemisorption might be responsible for the uptake of dyes. (c) 2006 Wiley Periodicals, Inc.

Keywords: Adsorption, Dyes, Pigments, Surfactant, Macroporous Polymers, Waste, Agricultural Solid-Waste, Aqueous-Solution, Color Removal, Activated Carbon, Banana Pith, Congo Red, Sorption, Water, Slurry, Blue

? Akgöl, S., Kuşvuran, E., Kara, A., Şenel, S. and Denizli, A. (2006), Porous dye affinity beads for nickel adsorption from aqueous solutions: A kinetic study. *Journal of Applied Polymer Science*, **100** (6), 5056-5065.

Full Text: [2006\J App Pol Sci100, 5056.pdf](2006/J%20App%20Pol%20Sci100,%205056.pdf)

Abstract: We investigated a new adsorbent system, Reactive Red 120 attached poly(2-hydroxyethyl methacrylate ethylene dimethacrylate) [poly(HEMA-EDMA)] beads, for the removal of Ni2+ ions from aqueous solutions. Poly(HEMA-EDMA) beads were prepared by the modified suspension copolymerization of 2-hydroxyethyl methacrylate and ethylene dimethacrylate. Reactive Red 120 molecules were covalently attached to the beads. The beads (150-250 mu m), having a swelling ratio of 55% and carrying 25.5 μmol of Reactive Red 1.20/g of polymer, were used in the removal of Ni2+ ions. The adsorption rate and capacity of the Reactive Red 120 attached poly(HEMA-EDMA) beads for Ni2+ ions was investigated in aqueous media containing different amounts of Ni2+ ions (5-35 mg/L) and having different pH values (2.0-7.0). Very high adsorption rates were observed at the beginning, and adsorption equilibria were then gradually achieved in about 60 min. The maximum adsorption of Ni2+ ions onto the Reactive Red 120 attached poly(HEMA-EDMA) beads was 2.83 mg/g at pH 6.0. The nonspecific adsorption of Ni2+ ions onto poly(HEMA-EDMA) beads was negligible (0.1 mg/g). The desorption of Ni2+ ions was studied with 0.1M HNO3. High desorption ratios (> 90%) were achieved. The intraparticle diffusion rate constants at various temperatures were calculated as k(20°C) = 0.565 mg/g min(0.5), k(30°C) = 0.560 mg/g min(0.5), and k(40°C) = 0.385 mg/g min(0.5). Adsorption-desorption cycles showed the feasibility of repeated use of this novel adsorbent system. The equilibrium data fitted very well both Langmuir and Freundlich adsorption models. The pseudo-first-order kinetic model was used to describe the kinetic data. (c) 2006 Wiley Periodicals, Inc.

Keywords: Acid, Adsorption, Carcinogenesis, Chitosan, Chromatography, Copper Adsorption, Dyes, Pigments, Equilibrium, Heavy-Metal Ions, Lead Ions, Mechanisms, Microbeads, Removal

? Kara, A., Acemioğlu, B., Alma, M.H. and Cebe, M. (2006), Adsorption of Cr(III), Ni(II), Zn(II), Co(II) ions onto phenolated wood resin. *Journal of Applied Polymer Science*, **101** (5), 2838-2846.

Full Text: [2006\J App Pol Sci101, 2838.pdf](2006/J%20App%20Pol%20Sci101,%202838.pdf)

Abstract: In this study, phenolated wood resin was used an adsorbent for the removal of Cr(III), Ni(II), Zn(II), Co(II) ions by adsorption from aqueous solution. The adsorption of metal ions from solution was carried at different contact times, concentrations and pHs at room temperature (25°C). For individual metal ion, the amount of metal ions adsorbed per unit weight of phenolated wood resin at equilibrium time increased with increasing concentration and pH. Also, when the amounts of metal ions adsorbed are compared to each other, it was seen that this increase was order of Cr(III) > Ni(II) > Zn(II) > Co(II). This increase was order of Cr(III) > Ni(II) > Co(II) > Zn(II) for commercial phenol-formaldehyde resin. Kinetic studies showed that the adsorption process obeyed the intraparticle diffusion model. It was also determined that adsorption isotherm followed Langmuir and Freundlich models. Adsorption isotherm obtained for commercial phenol-formaldehyde resin was consistent with Freundlich model well. Adsorption capacities from Langmuir isotherm for commercial phenol-formaldehyde resin were higher than those of phenolated wood resin, in the case of individual metal ions. Original adsorption isotherm demonstrated the monolayer coverage of the surface of phenolated wood resin. Adsorption kinetic followed the intraparticle diffusion model. The positive values of ΔG° determined using the equilibrium constants showed that the adsorption was not of spontaneous nature. It was seen that values of distribution coefficient (K-D) decreasing with metal ion concentration in solution at equilibrium (C-e) indicated that the occupation of active surface sites of adsorbent increased with metal ions. (c) 2006 Wiley Periodicals, Inc.

Keywords: Adsorption, Heavy Metal Ions, Adsorption Isotherm, Kinetics, Resin, Phenolated Wood Resin, Commerical Phenol Formaldehyde Resin, Aqueous-Solution, Sorption, Equilibrium, Removal, Cu(II), Metals, Acid, Red, Dye

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Full Text: [2006\J App Pol Sci102, 786.pdf](2006/J%20App%20Pol%20Sci102,%20786.pdf)

Abstract: A few thermosetting wood adhesive tannin resin system from formaldehyde reaction with both condensed and hydrolysable tannin has been developed. Polymerization of formaldehyde with mimosa tannin and valonia tannin was carried out at optimal conditions obtained from literature to establish the adhesive resin formulation. Formed reaction products were characterized by FTIR spectroscopy. The possible adsorption mechanisms for the adsorption of various metal ions onto tannin-formaldehyde resins were proposed. Also, thermal analysis were studied and discussed by differential scanning calorimetry and thermogravimetry. (c) 2006 Wiley Periodicals, Inc.

Keywords: Mimosa and Valonia Tannin, Formaldehyde Reaction, Adsorption Mechanism, FTIR Spectroscopy, Thermal Analysis, Differential Scanning Calorimetry, Waste-Water, Condensed Tannins, Aqueous-Solutions, Coagulant AID, Resol Resins, Adhesives, Mechanism, Removal, Spectroscopy

? Kusuktham, B. (2006), Preparation of interpenetrating polymer network gel beads for dye absorption. *Journal of Applied Polymer Science*, **102** (2), 1585-1591.

Full Text: [2006\J App Pol Sci102, 1585.pdf](2006/J%20App%20Pol%20Sci102,%201585.pdf)

Abstract: Preparation of interpenetrating polymer network (IPN) gel beads for dye absorption was carried out by using simultaneous crosslinking method. First, sodium alginate (SA), 3-(methacrylamido) propyl trimethyl ammonium chloride (MAPTAC), and/or acrylarnide (AM), K2S2O8, and N,N’-Methylene bisacrylamide (MBAM) were mixed in aqueous solution. The beads were prepared using K2S2O8 and MBAM as the initiator and crosslinking agent, respectively. Then, the solution was dropped into CaCl2 solution mixed with N,N,N’,N’-tetramethylethylenediamine (TMEDA). The former was used as the crosslinking agent of alginate and the latter was used as the accelerator for the polymerization of monomer in the alginate solution. The gel bead composed of only alginate was also prepared to compare the properties with IPN gel bead. The components in IPN gel bead were examined by FTIR analysis. The factors effecting the particle size of alginate and IPN gel beads were investigated. In alginate gel bead, the concentration of solution affected the particle size, whereas type of monomer affected the particle size of IPN gel bead. The IPN gel bead had smooth surface (from SEM results), different from the alginate bead. Alginate content caused the swelling behavior of dried IPN beads. Cationic dye was absorbed by crosslinked alginate gel bead. The absorption of reactive dye by IPN gel bead was a result of its cationic charge. The absorption density of lPN gel beads was the reciprocal of the absorbent dosage. (c) 2006 Wiley Periodicals, Inc.

Keywords: Interpenetrating Polymer Network, Gel Bead, Dye Absorption, Absorbent, Cationic Charge, Wastewater, Swelling Properties, Aqueous-Solution, Anionic Dyes, Removal, Acrylamide, Adsorption, Hydrogels, Biosorption, Copolymers, Alginate

? Uzun, L., Kara, A., Tuzmen, N., Karabakan, A., Besirli, N. and Denizli, A. (2006), Synthesis and characterization of poly(ethylene glycol dimethacrylate-1-vinyl-1,2,4-triazole) copolymer beads for heavy-metal removal. *Journal of Applied Polymer Science*, **102** (5), 4276-4283.

Full Text: [2006\J App Pol Sci102, 4276.pdf](2006/J%20App%20Pol%20Sci102,%204276.pdf)

Abstract: We prepared poly(ethylene glycol dimethacrylate-l-vinyl-1,2,4-triazole) [poly(EGDMA-VTAZ)] beads (average diameter = 150-200 μm) by copolymerizing ethylene glycol dimethacrylate (EGDMA) with 1-vinyl-1,2,4-triazole (VTAZ). The copolymer composition was characterized by elemental analysis and found to contain five EGDMA monomer units for each VTAZ monomer unit. The poly(EGDMA-VTAZ) beads had a specific surface area of 65.8 m2/g. Poly(EGDMA-VTAZ) beads were characterized by Fourier transform infrared spectroscopy, elemental analysis, surface area measurements, swelling studies, and scanning electron microscopy. Poly(EGDMAVTAZ) beads with a swelling ratio of 84% were used for the heavy-metal removal studies. The adsorption capacities of the beads for Cd(II), Hg(II), and Pb(II) were investigated in aqueous media containing different amounts of these ions (5-750 mg/L) and at different pH values (3.0-7.0). The maximum adsorption capacities of the poly(EGDMA-VTAZ) beads were 85.7 mg/g (0.76 mmol/g) for Cd(II), 134.9 mg/g (0.65 mmol/g) for Pb(II), and 186.5 mg/g (0.93 mmol/g) for Hg(II). The affinity order toward triazole groups on a molar basis was observed as follows: Hg(II) > Cd(II) > Pb(II). pH significantly affected the adsorption capacity of the VTAZ-incorporated beads. The equilibrium data were well fitted to the Redlich-Peterson isotherm. Consideration of the kinetic data suggested that chemisorption processes could have been the rate-limiting step in the adsorption process. Regeneration of the chelating-beads was easily performed with 0.1M HNO3. (c) 2006 Wiley Periodicals, Inc.

Keywords: Adsorption, Chromatography, Hydrogels, Aqueous-Solutions, Complexing-Ligand, Methacrylate) Beads, Lead(II) Ions, Mercury Ions, Waste-Water, Adsorption, Composite, Polystyrene, Biosorption

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Full Text: [2006\J App Pol Sci102, 4652.pdf](2006/J%20App%20Pol%20Sci102,%204652.pdf)

Abstract: To investigate the effects of multiple weak interactions on the binding of phenolic compounds by polymeric adsorbents, macroporous polystyrene (PS) resin and PS-based adsorbents with different hydrogen-bond acceptor atoms (PS-CH2 (-OCH2CH2) -OCH3, n = 0, 1, 2, and 3, denoted as PS-EG(0), PS-EG(1), PS-EG(2), and PS-EG(3)) were prepared. The phenol adsorption strength order on these adsorbents was PS/PS-EG(0) < PS-EG(1) < PS-EG2 < PS-EG3, indicating that the adsorption on PS and PS-EGO was driven by hydrophobic and pi-pi interactions, and the adsorption on PS-EG(1), PS-EG(2), and PS-EG(3) was driven by a hydrogen bond in addition to hydrophobic and pi-pi interactions. PS-EG(2) may adsorb a second phenol molecule on each binding site and PS-EG(3) may adsorb second and third ones. The adsorption strength of resorcinol increased in the order of PS, PS-EG(1), and PS-EG(2), indicating that the adsorption was driven by 0, 1, and 2 hydrogen bonds in addition to hydrophobic and pi-pi interactions. Similarly, the adsorption of phloroglucinol on PS, PS-EG(1), PS-EG(2), and PS-EG(3) was driven by 0, 1, 2, and 3 hydrogen bonds in addition to hydrophobic and pi-pi interactions because the adsorption strength increased in this order. (c) 2006 Wiley Periodicals, Inc.

Keywords: Adsorption, Macroporous Polymer, Separation Technique, Polymeric Adsorbent, Phenols, Aqueous-Solution, Adsorption, Resins, Separation, Sorbents, Sorption, Anthocyanins, Chromatography, Purification, Selectivity

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Full Text: [2006\J App Pol Sci102, 5934.pdf](2006/J%20App%20Pol%20Sci102,%205934.pdf)

Abstract: A series of novel hydrogel polysucrose microspheres with the mean size ranging from 200 to 500 pm were prepared via two-step method. First, soluble polysucrose was synthesized by solution polymerization between sucrose and epichlorohydrin; second, a reversed phase suspension crosslinking reaction was performed to prepare polysucrose microspheres. The SEM images indicated that these spherical beads had smooth surface and hydrogel interior structure. FTIR was used to characterize the chemical structure of the beads. The hydrated and dry densities, equilibrium water content, and hydroxyl content of polysucrose microspheres were also investigated. The characteristic of high hydroxyl content (15.48-19.04 mmol/g) make these microspheres suitable for protein adsorption. Meanwhile, bovine serum albumin was used to examine the adsorption capacity of the microspheres. These microspheres had a capacity as high as 49.28 mg/g. The adsorption kinetics and recycling of the beads were also investigated. (c) 2006 Wiley Periodicals, Inc.

Keywords: Polysucrose, Microspheres, Reversed Suspension Polymerization, Epichlorohydrin, Protein Adsorption, Sugar, Methacrylate

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Full Text: [2007\J App Pol Sci103, 1215.pdf](2007/J%20App%20Pol%20Sci103,%201215.pdf)

Abstract: The aim of this work is to improve the retention capacity already noticed for the raw Posidonia towards basic dyes and notably for basic blue 41 (BB41). To improve the fixation rate of these cationic entities, we have undertaken the introduction of carboxymethylate groups on the raw Posidonia. Thus, we have obtained materials with various carboxymethylate groups contents (from 10 to 30%). We have then studied the fixation capacities of BB41 on the different materials. We have noticed that the retention capacity of modified Posidonia was improved compared to the raw one. We have studied the effect of different parameters influencing the fixation capacities such as initial dye concentration, support dose, contact time, pH, carboxymethylate groups content, and temperature. This phenomenon of retention is compared to classic models of Langmuir and Freundlich. Some thermodynamic parameters such as free energy (Delta G(0)), enthalpy (Delta H-0), and entropy (Delta S-0) changes have been studied. (c) 2006 Wiley Periodicals, Inc.

Keywords: Posidonia, Chemical Modification, Carboxymethylate Groups, Basic Dye, Retention, Carboxymethylcellulose, White-Rot Fungi, Textile Effluents, Methylene-Blue, Color Removal, Dyes, Adsorption, Equilibrium, Adsorbents, Cellulose, Cost

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Full Text: [2007\J App Pol Sci104, 672.pdf](2007/J%20App%20Pol%20Sci104,%20672.pdf)

Abstract: This work presents data on human imrnunoglobulin G (HlgG) adsorption onto L-arginine ligand attached poly(GMA/MMA/EGDMA)-based affinity beads which were synthesized from methyl methacrylate (NUVIA) and glycidiyl methacrylate (GMA) in the presence of a crosslinker (i.e., ethylene glycol dimethacrylate; EGDMA) by suspension polymerization. The epoxy groups of the poly(GMA/NMA/ EGDMA) beads were converted into amino groups after reaction with ammonia or 1,6-diaminohexane (i.e., spacer-arm). With L-arginine as a ligand, it was covalently immobilized on the an-dnated (poly(GMA/MMA/EGDMA)AA) and/or the spacer-arm attached (poly(GMA/NMA/ EGDM.A)-SA) beads, using glutaric dialdehyde as a coupling agent. Both affinity poly(GMA/MMA/EGDMA)-based beads were used in HlgG adsorption/desorption studies under defined pH, ionic strength, or temperature conditions in a batch reactor, using acid-treated poly(GMA/MMA/EGDMA) beads as a control system. The poly(GMA/MMA/EGDMA)-SA affinity beads resulted in an increase in the adsorption capacity to HlgG compared with the aminated counterpart (i.e., poly(GMA/MMA/EGDMA)-AA). The maximum adsorption capacities of the poly(GMA/MMA/EGDMA)-AA and poly(GMA/MNA/EGDMA)-SA affinity beads were found to be 112.36 and 142 mg g-1, and the affinity constants (K-d), evaluated by the Langmuir model, were 2.48×10-7 and 6.98×10-7 M, respectively. Adsorption capacities of the poly(GMA/MMA/EGDMA)-AA and poly(GMA/MMA/EGDMA)-SA were decreased with HIgG by increasing the ionic strength adjusted with NaCl. Adsorption kinetic of HIgG onto both affinity adsorbents was analyzed with first- and second-order kinetic equations. The first-order equation fitted well with the experimental data. (c) 2007 Wiley Periodicals, Inc.

Keywords: Adsorbents, Adsorption, Adsorption Capacity, Affinity Adsorbents, Affinity Beads, Affinity Chromatography, Affinity-Chromatography, Amino Acid, Ammonia, Beads, Capacity, Control, Coupling, Elovich Equation, Ethylene, Groups, Human, Human Serum-Albumin, IGG, Immobilized Phema, Immunoglobulin-G, Ionic Strength, Kinetic, L-Histidine, Langmuir, Lysozyme Adsorption, Membranes, Methyl Methacrylate, Model, pH, Poly-Hydroxyethylmethacrylate, Polymerization, Purification, Reaction, Reactor, Spacer-ARM, Suspension, Suspension Polymerization, Temperature, Thermodynamics

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Full Text: [2007\J App Pol Sci104, 2896.pdf](2007/J%20App%20Pol%20Sci104,%202896.pdf)

Abstract: Glutaraldehyde-crosslinked alginate gel containing chitosan (AGCC) used for the removal of Hg2+ ions from aqueous solutions. Three bead sizes were obtained and performed to study the uptake equilibrium and kinetics of Hg2+ by AGCC (ca. an hour). The adsorption capacity was found to be independent of adsorbent particle size indicating that sorption occurs in the whole AGCC bead. A high initial rate of Hg2+ uptake was followed by a slower uptake rate suggesting intraparticle diffusion as the rate-limiting step. The rate of Hg2+ uptake increases with decreasing AGCC bead size. AGCC also enhanced the rate and the capacity of Hg2+ adsorption. The maximum Hg2+ adsorption capacity of AGCC was found 667 mg/g, which is over 20 times higher than that of alginate bead. Our results reveal the well-distributed chitosan powders in the alginate gel bead and Hg2+ ions can reach inside the chitosan bead. It indicates the feasibility of using AGCC as metal adsorbent at low pH values, and allows the regeneration of adsorbent. Hg2+ ions adsorbed on AGCC bead were desorbed effectively about 95% by H2SO4 at the third cycle. The use of AGCC for the removal of Hg2+ ions from the waste streams appears to be promising. (c) 2007 Wiley Periodicals, Inc.

Keywords: Biomaterials, Gels, Metal-Polymer Complexes, Chitosan, Mercury, Cross-Linked Chitosan, Heavy-Metals Uptake, Palladium Sorption, Phanerochaete-Chrysosporium, Immobilized Live, Mercuric Ions, Waste-Water, Beads, Adsorption, Equilibrium

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Full Text: [2007\J App Pol Sci104, 3670.pdf](2007/J%20App%20Pol%20Sci104,%203670.pdf)

Abstract: The present investigation was undertaken to evaluate the effectiveness of a new adsorbent prepared from coconut coir pith (CP), a coir industry-based lignocellulosic residue in removing metal ions from aqueous solutions. The adsorbent (PGCP-COOH) having a carboxylate functional group at the chain end was prepared by grafting polyacrylamide onto CP using potassium peroxydisulphate as an initiator and in the presence of N,N’-Methylene bisacrylamide as a crosslinking agent. The adsorbent was characterized by infrared (IR) spectroscopy, thermogravimetry (TG), X-ray diffraction (XRD) patterns, scanning electron microscopy (SEM), and potentiometric titration. The adsorbent exhibits very high adsorption potential for the removal of Pb(II), Hg(II), and Cd(II) ions from aqueous solutions. The optimum pH range for metal ion removal was found to be 6.0-8.0. The adsorption process follows a pseudo-second-order kinetic model. The adsorption capacities for Hg(II), Pb(II), and Cd(II) calculated using the Langmuir isotherm equation were 254.52, 189.49, and 63.72 mg g-1, respectively. Adsorption isotherm experiments were also conducted for comparison with a commercial carboxylate form cation exchanger. Different industry wastewater samples were treated by the PGCP-COOH to demonstrate its efficiency in removing heavy metals from wastewater. The reusability of the PGCP-COOH was also demonstrated using 0.2M HCl (c) 2007 Wiley Periodicals, Inc.

Keywords: Adsorbent, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Adsorption Process, Aqueous-Solution, Carboxylate, Cation Exchanger, Cd(II), Cd(II) Ions, Chain, Characterization, Chromium(VI), Coconut Coir, Coir, Coir Pith, CP, Crosslinking, Desorption, Effectiveness, Efficiency, Electron Microscopy, Equilibrium, Exchangers, Functional, Grafting, Group, HCl, Heavy Metal, Heavy Metal Ions, Heavy Metals, Hg(II), Industry Waste-Water, Investigation, Ion, IR, Isotherm, Kinetic, Kinetic Model, Langmuir, Langmuir Isotherm, Mercury(II), Metal, Metal Ions, Metals, Microscopy, Model, Pb(II), pH, Pith, Polyacrylamide, Potassium, Potentiometric, Potentiometric Titration, Process, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Secondorder, Range, Removal, Residue, Sawdust, Scanning Electron Microscopy, SEM, Sorption, Spectroscopy, Thermodynamic Parameters, Titration, Tree Fern, Wastewater, X-Ray Diffraction, XRD

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Full Text: [2007\J App Pol Sci105, 1808.pdf](2007/J%20App%20Pol%20Sci105,%201808.pdf)

Abstract: Poly(acrylamide-allyl glycidyl ether) [poly(AAm-AGE)] cryogel was prepared by bulk polymerization which proceeds in an aqueous solution of monomers frozen inside a glass column (cryo-polymerization). After thawing, the monolithic cryogel contains a continuous polymeric matrix having interconnected pores of 10-100 μm size. Cibacron Blue F3GA was immobilized by covalent binding onto poly(AAm-AGE) cryogel via epoxy groups. Poly(AAm-AGE) cryogel was characterized by swelling studies, FTIR, scanning electron microscopy, and elemental analysis. The equilibrium swelling degree of the poly(AAm-AGE) monolithic cryogel was 6.84 g H2O/9 cryogel. Poly(AAm-AGE) cryogel containing 68.9 μmol Cibacron Blue F3GA/g was used in the adsorption/desorption of human serum albumin (HSA) from aqueous solutions and human plasma. The nonspecific adsorption of HSA was very low (0.2 mg/g). The maximum amount of HSA adsorption from aqueous solution in acetate buffer was 27 mg/g at pH 5.0. Higher HSA adsorption value was obtained from human plasma (up to 74.2 mg/g). Desorption of HSA with a purity of 92% from Cibacron Blue F3GA attached poly(AAm-AGE) cryogel was achieved using 0.110 Tris/HCl buffer containing 0.5M NaCl. It was observed that HSA could be repeatedly adsorbed and desorbed with poly(AAm-AGE) cryogel without significant loss in the adsorption capacity. (c) 2007 Wiley Periodicals, Inc.

Keywords: Dye-Affinity Chromatography, Cryogels, Protein Purification, Albumin, Human Serum-Albumin, Human Plasma, Column Chromatography, Protein Adsorption, Polymeric Cryogels, Purification, Microspheres, Beads, Performance, Separation

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Full Text: [2007\J App Pol Sci105, 1964.pdf](2007/J%20App%20Pol%20Sci105,%201964.pdf)

Abstract: The kinetics and equilibrium of cobalt ion adsorption on crosslinked polyethylenimine (PEI) membrane were studied by the spectroscopic method in terms of time, cobalt ion concentration, and temperature. It was found that the adsorption of cobalt ion on crosslinked PEI membrane obeyed the pseudofirst-order kinetic model and the equilibrium adsorption amount of cobalt ion on crosslinked PEI membrane was closely related to the initial cobalt ion concentration. The equilibrium adsorption amount increased with the decrease of temperature and obeyed a Langmuir isotherm to give the equilibrium constant for the adsorption of cobalt ion on crosslinked PEI membrane under various temperatures. Based on Van’t Hoff equation the enthalpy and entropy of the adsorption of cobalt ion on crosslinked PEI membrane were determined to be -12.9 kJ mol-1 and -107 J mol-1K-1, respectively. (c) 2007 Wiley Periodicals, Inc.

Keywords: Polyethylenimine, Cobalt Ion, Adsorption, Kinetics, Thermodynamics, PEI

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Full Text: [2007\J App Pol Sci105, 3418.pdf](2007/J%20App%20Pol%20Sci105,%203418.pdf)

Abstract: In this work, the pyromellitic dianhydride (PMDA)-grafted P-cyclodextrin (P-CD) microspheres have been prepared for the removal of lead and cadmium metal ions in aqueous solution by a batch-equilibration technique. The effects of the pH of the solution, contact time, and initial metal concentration were studied. The adsorption capacities for the two metal ions increase significantly as a large number of carboxyl groups are present on the microspheres surface. The equilibrium process is better described by the Langmuir isotherm than the Freundlich isotherm. The maximum adsorption capacities are 135.69 and 92.85 mg g-1 for Pb(II) and Cd(II), respectively. Kinetic studies show good correlation coefficients for a pseudosecond-order kinetic model, confirming that the sorption rate is controlled by chemical adsorption. The regeneration of the adsorbent can be carried out by treating the loaded microspheres with 0.2 (mol L-1) HCl obtaining high desorption rate for the two metal ions. (C) 2007 Wiley Periodicals, Inc.

Keywords: Beta-Cyclodextrin, Pyromellitic Dianhydride, Modification, Microspheres, Adsorption, Metal-Ions, Aqueous-Solutions, Heavy-Metals, Biosorption, Removal, Beads, Methacrylate), Extraction, Adsorbent, Kinetics

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Full Text: [2007\J App Pol Sci106, 169.pdf](2007/J%20App%20Pol%20Sci106,%20169.pdf)

Abstract: An interpenetration network (IPN) was synthesized from 2-hydroxyethyl methacrylate (HEMA) and chitosan, p(HEMA/chitosan) via UV-initiated photo-polymerization. The selectivity to different heavy metal ions viz Cd(II), Pb(II), and Hg(II) to the IPN membrane has been investigated from aqueous solution using bare pHEMA membrane as a control system. Removal efficiency of metal ions from aqueous solution using the IPN membranes increased with increasing chitosan content and initial metal ions concentrations, and the equilibrium time was reached within 60 min. Adsorption of all the tested heavy metal ions on the IPN membranes was found to be pH dependent and maximum adsorption was obtained at pH 5.0. The maximum adsorption capacities of the IPN membrane for Cd(II), Pb(II), and Hg(II) were 0.063, 0.179, and 0.197 mmol/g membrane, respectively. The adsorption of the Cd(II), Hg(II), and Pb(II) metal ions on the bare pHEMA membrane was not significant. When the heavy metal ions were in competition, the amounts of adsorbed metal ions were found to be 0.035 mmol/g for Cd(II), 0.074 mmol/g for Hg(II), and 0.153 mmol/g for Pb(II), the IPN membrane is significantly selective for Pb(II) ions. The stability constants of IPN membrane-metal ions complexes were calculated by the method of Ruzic. The results obtained from the kinetics and isotherm studies showed that the experimental data for the removal of heavy metal ions were well described with the second-order kinetic equations and the Langmuir isotherm model. (c) 2007 Wiley Periodicals, Inc.

Keywords: Adsorption, Adsorption Capacities, Adsorption Properties, Aqueous Solution, Biosorption, Ca-Alginate, Cd(II), Chelating-Resin, Chitosan, Chitosan, Competition, Complexes, Concentrations, Constants, Control, Cu(II) Ions, Efficiency, Equations, Equilibrium, Equilibrium Time, Experimental, Experimental Data, Extraction Algal Waste, Heavy Metal, Heavy Metal Ions, Heavy-Metal, Heavy-Metal Ions, Hema, Hg(II), Ipn, Isotherm, Isotherm Model, Kinetic, Kinetic Equations, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Langmuir-Isotherm, Lysozyme, Membrane, Membranes, Metal, Metal Ions, Methacrylate, Model, Pb(II), Pb(II) Ions, pH, Phema, Phema Membrane, Polymer, Removal, Second Order, Selective, Selectivity, Stability, Time

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Full Text: [2007\J App Pol Sci106, 1606.pdf](2007/J%20App%20Pol%20Sci106,%201606.pdf)

Abstract: Poly(acrylic acid-co-acrylamide) (PAAAM) hydrogels have been prepared from partly neutralized acrylic acid (AA) and acrylamide (AM) by solution polymerization, and their absorbency and adsorption in both CuCl2 and FeCl3 solutions have been investigated. PAAAM hydrogels and their complexes with Cu2+ or Fe3+ have been characterized by FTIR. The absorbency of PAAAM in both CuCl2 and FeCl3 solutions increases initially and then decreases as the absorbing time increases. The adsorption of PAAAM in both CuCl2 and FeCl3 solutions can be described by the pseudo-second order chemisorption kinetics pro osed by Ho and McKay, and the equilibrium uptake of Cu2+ on PAAAM can well be fit with the Langmuir adsorption isotherm. However, the equilibrium uptake of Fe3+ on PAAAM increases as the initial Fe3+ concentration increases for Fe3+ concentration smaller than 5.625×10-3 mol/L, and then decreases with Fe3+ concentration. The largest uptakes for Cu2+ and Fe3+ are 247 and 173 mg/g, respectively. The results also show that the uptake Of Cu2+ and Fe3+ on PAAAM increases remarkably when pH of the solution is changed from 2.3 to 4.2 and from 1.0 and 2.1, respectively. (C) 2007 Wiley Periodicals, Inc.

Keywords: Absorbency, Acid, Acrylamide, Acrylic Acid, Acrylic-Based Superabsorbent, Adsorption, Adsorption Isotherm, Adsorption Modeling, Chemisorption, Complexes, Concentration, Copolymer, Cu2+, Equilibrium, Fe3+, FeCl3, FTIR, Heavy-Metal Ions, Hydrogel, Hydrogels, Ion Adsorption, Isotherm, Kinetics, Langmuir, Langmuir Adsorption, Langmuir Adsorption Isotherm, Order, pH, Poly(Acrylic Acid-Co-Acrylamide), Polymerization, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Solutions, Swelling Properties, Temperature, Time, Uptake

? Wang, J.W. and Kuo, Y.M. (2008), Preparation and adsorption properties of chitosan-poly(acrylic acid) nanoparticles for the removal of nickel ions. *Journal of Applied Polymer Science*, **107** (4), 2333-2342.

Full Text: [2008\J App Pol Sci107, 2333.pdf](2008/J%20App%20Pol%20Sci107,%202333.pdf)

Abstract: Chitosan (CS) nanoparticles with different mean sizes ranging from 100 to 195 nm were prepared by ionic gelation of CS and poly(acrylic acid) (PAA). Variations in the final solution pH value and CS : PAA volume ratio were examined systematically for their effects on nanoparticle size, intensity of surface charge, and tendency toward particle aggregation. The sorption capacity and sorption isotherms of the CS-PAA nanoparticles for nickel ions were evaluated. The parameters for the adsorption of nickel ions by the CS-PAA nanoparticles were also investigated. The CS-PAA nanoparticles could sorb nickel ions effectively. The sorption rate for nickel ions was affected significantly by the initial concentration of the solution, sorbent amount, particle size, and pH value of the solution. The samples of nanoparticles were well correlated with Langmuir’s isotherm model, and the adsorption kinetics of nickel correlated well with the pseudo-second-order model. The maximum capacity for nickel sorption deduced from the use of the Langmuir isotherm equation was 435 mg/g, which was significantly higher than that of the micrometer-sized CS. (c) 2007 Wiley Periodicals, Inc.

Keywords: Adsorption, Adsorption Kinetics, Aqueous-Solution, Behavior, Chitosan, Isotherm, Isotherms, Kinetics, Langmuir, Langmuir Isotherm, Linked Chitosan Beads, Nanoparticle, Nanoparticles, Nanotechnology, Nickel, Parameters, Particles, pH, Removal, Self-Assembly, Size, Sorption, Waste, Water

? Arıca, M.Y., Akyol, A.B. and Bayramoğlu, G. (2008), Adsorption of trypsin onto magnetic ion-exchange beads of poly(glycidylmethacrylate-co-ethyleneglycoldimethacrylate). *Journal of Applied Polymer Science*, **107** (5), 2810-2819.

Full Text: [2008\J App Pol Sci107, 2810.pdf](2008/J%20App%20Pol%20Sci107,%202810.pdf)

Abstract: Magnetic beads were prepared from glycidyl methacrylate (GMA), and ethyleneglycol dimethylmethacrylate (EGDMA) in the presence of Fe3O4 nanopowder via suspension polymerization. The magnetic beads were characterized by surface area measurement, electron spin resonance (ESR), and scanning electron microscopy (SEM). ESR data revealed that the beads were highly super-paramagnetic. The effects of contact time, pH, ionic strength, and temperature on the adsorption process have been studied. Adsorption equilibrium was established in about 120 min. The maximum adsorption of trypsin on the magnetic beads was obtained as 84.96 mg g-1 at around pH 7.0. At increased ionic strength, the contribution of the electrostatic component to the overall binding decreased, and so the adsorption capacity. The experimental equilibrium data obtained trypsin adsorption onto magnetic beads fitted well to the Langmuir isotherm model. The result of kinetic analyzed for trypsin adsorption onto magnetic ion-exchange beads showed that the second order rate equation was favorable. It was observed that after six adsorption-elution cycle, magnetic beads can be used without significant loss in trypsin adsorption capacity. Finally, the magnetic beads were used for separation of bovine serum albumin (BSA) and trypsin from binary solution in a batch system. (c) 2007 Wiley Periodicals, Inc.

Keywords: Adsorption, BSA, Dye, Equilibrium, Glycidyl Methacrylate, Hydrophobic Interaction, Ion Exchange, Ion-Exchange, Ion-Exchange Beads, Isotherm, Kinetic, Kinetic Characterization, Langmuir, Langmuir Isotherm, Ligand, Magnetic Beads, Measurement, Membranes, Metal Affinity-Chromatography, pH, Protein Adsorption, Purification, Scanning Electron Microscopy, SEM, Separation, Serum-Albumin, Solution, Spacer-ARM, Temperature, Thermodynamic Parameters, Trypsin

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Full Text: [2008\J App Pol Sci107, 2846.pdf](2008/J%20App%20Pol%20Sci107,%202846.pdf)

Abstract: In this study, a reactive fibrous adsorbent was prepared through the grafting of 4-vinyl pyridine monomer onto poly(ethylene terephthalate) (PET) fibers for the removal of Congo red (CR) dye from an aqueous solution with the batch adsorption method. Effects of various parameters such as the grafting yield, pH, treatment time, and initial dye concentration on the amount of adsorption of the dye onto the reactive fibers were investigated. The effective pH was 4.0 for adsorption on grafted PET fibers. The sufficient time to attain equilibrium was 150 min. The maximum adsorption capacity of the reactive fibers for CR was 17.3 mg/g of fiber. The rates of adsorption conformed to pseudo-second-order kinetics with good correlation. The adsorption isotherm of CR fit a Langmuir-type isotherm. The reactive fibers were stable and regenerable by acid and base without loss of activity. (c) 2007 Wiley Periodicals, Inc.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherm, Aqueous Solution, Azo-Dye, Basic-Dyes, Color Removal, Copper(II), Decolorization, Dye, Dyes, Pigments, Equilibrium, Fibers, Graft Copolymers, Grafted, Hexavalent Chromium, Isotherm, Kinetics, pH, Polyacrylonitrile Fibers, Polyesters, Pseudo-Second-Order Kinetics, Removal, Solution, Waste-Water

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Full Text: [2008\J App Pol Sci108, 456.pdf](2008/J%20App%20Pol%20Sci108,%20456.pdf)

Abstract: Poly(methacrylic acid)-grafted chitosan membranes (chito an-g-poly(MAA)) were prepared in two sequential steps: in the first step, chitosan membranes were prepared by phase-inversion technique and then epichlorohydrin was used as crosslinking agent to increase its chemical stability in acidic media; in the second step, the graft copolymerization of methacrylic acid onto the chitosan membranes was initiated by ammonium persulfate (APS) under nitrogen atmosphere. The chitosan-g-poly(MAA) membranes were first used as an ion-exchange support for adsorption of trypsin from aqueous solution. The influence of pH, equilibrium time, ionic strength, and initial trypsin concentration on the adsorption capacity of the chitosan-g-poly(MAA) membranes have been investigated in a batch system. Maximum trypsin adsorption onto chitosan-gpoly(MAA) membrane was found to be 92.86 mg mL-1 at pH 7.0. The experimental equilibrium data obtained for trypsin adsorption onto chitosan-g-poly(MAA) membranes fitted well to the Langmuir isotherm model. The adsorption data was analyzed using the first- and second-order kinetic models, and the experimental data was well described by the second-order equation. More than 97% of the adsorbed trypsin was desorbed using glutamic acid solution (0.5M, pH 4.0). In addition, the chitosan-gpoly(MAA) membrane prepared in this work showed promising potential for various biotechnological applications. (C) 2007 Wiley Periodicals, Inc.

Keywords: Adsorption, Aqueous Solution, Beads, Cellulose Fibers, Chitosan, Chitosan-G-Poly(MAA) Membrane, Copolymerization, Crosslinking, Dye, Equilibrium, Glutamic Acid, Graft, Ion Exchange, Ion-Exchange, Ion-Exchange Membrane, Isotherm, Kinetic, Kinetic Models, Langmuir, Langmuir Isotherm, Lysozyme, Metal Affinity-Chromatography, pH, Poly(Acrylic Acid), Polymer Brushes, Polymer Brushes, Protein-Binding, Purification, Separation, Solution, Thermodynamic Parameters, Trypsin

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Full Text: [2008\J App Pol Sci108, 1005.pdf](2008/J%20App%20Pol%20Sci108,%201005.pdf)

Abstract: To increase the performance of silk fabrics, especially their dyeability, a cationic modifying agent, 3-(trimethoxysilyl) propyl dodecyl dimethyl ammonium chloride (HSQA), was prepared in our laboratory. The dye behavior of the cationized silk was examined with five leveling-type acid dyes. Better color shades and good washing fastness were achieved after silk was cationized by HSQA, and it was possible to dye silk under neutral conditions at 70°C. The equilibrium adsorption isotherm and kinetic properties of the cationized silk dyed with CI Acid Orange 7 were investigated. The adsorption of Cl Acid Orange 7 onto the HSQA-cationized silk was also in good agreement with the Langmuir isotherm, with an enthalpy and an entropy of -20.13 kJ/mol and -30.06 J/mol K respectively. A pseudo-second-order kinetic model agreed well with the dynamic behaviors for the adsorption of Cl Acid Orange 7 onto the cationized silk under neutral conditions, with the activation energy decreasing from 61.87 to 53.32 kJ/mol. (c) 2008 Wiley Periodicals, Inc. J Appl Polym Sci 108: 1005-1012, 2008.

Keywords: Activation, Adsorption, Adsorption Isotherm, Behavior, Chloride, Dye, Entropy, Equilibrium, Isotherm, Kinetic, Langmuir, Langmuir Isotherm, Model

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Full Text: [2008\J App Pol Sci108, 3313.pdf](2008/J%20App%20Pol%20Sci108,%203313.pdf)

Abstract: In this study, novel affinity chromatographic fibers was prepared from methacrylamide grafted poly(ethylene terephthalate), PET-g-pMAA, using benzoyl-peroxide as an initiator. A dye ligand (i.e., Procion Brown) as a ligand was then covalently immobilized on the different amount of pMAAm grafted PET fibers, (PET-g-pMAAm-PB). The fibers were characterized by surface area measurement, infrared spectroscopy (FTIR), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM). Adsorptive properties of the composite fibers were tested using a model protein (i.e., lysozyme). To achieve these purposes, the influence of pH, ionic strength, initial lysozyme concentration, and temperature on adsorption system has been investigated and evaluated. A maximum lysozyme adsorption PET-g-pMAAm-PB fiber was obtained as 43.9 mg g-1 at pH 7.5. The experimental equilibrium data obtained for lysozyme adsorption onto PET-g-pMAAm-PB fibers fitted well to the Langmuir isotherm model. The result of kinetic analyzed for lysozyme adsorption onto affinity fibers showed that the second-order rate equation was favorable. The purity of the eluted lysozyme, as determined by HPLC, was 84% with recovery 73% for PET-g-pMAAm-PB fiber. Experiments on regeneration and dynamic adsorption were also performed. It appears that PET-g-pMAAm-PB fibers can be applied for lysozyme separation without causing any denaturation. (C) 2008 Wiley Periodicals, Inc.

Keywords: Adsorption, Analysis, Beads, Benzoyl-Peroxide, Collagen-Fiber, Composite, Dye, Dye Ligand, Egg-White, Electron Microscopy, Equilibrium, Experimental, Fibers, FTIR, Graft Copolymerization, Grafted, HPLC, Immobilized, Isotherm, Isotherm Model, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Ligand, Lysozyme, Measurement, Membranes, Metal Affinity-Chromatography, Methacrylamide, Model, PET, PET Fibers, pH, Poly(Ethylene-Terephthalate) Fibers, Protein, Protein Adsorption, Purification, Purity, Recovery, Scanning Electron Microscopy, SEM, Separation, Spectroscopy, Stationary Phases, Surface Area, Temperature

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Full Text: [2008\J App Pol Sci109, 2232.pdf](2008/J%20App%20Pol%20Sci109,%202232.pdf)

Abstract: The ability of chitosan, a biosorbent obtained by the processing of waste seafood shells, to remove five acid dyes from effluents has been studied. Chitosan is a deacetylated bio-polymer of chitin. The effect of varying initial dye concentration on the rate of adsorption has been investigated. The rate data have been analyzed using three kinetic models, namely, a pseudosecond order, the Ritchie modified second order, and the Elovich models. The sorption kinetics of Acid Green 25, Acid Orange 10, Acid Orange 12, Acid Red 18, and Acid Red 73 onto chitosan can be best correlated by the Elovich equation. The kinetic model was determined in accordance with the agreement between the rate equations and the differentiation of kinetic equations. The values of rate constants for the three models are in the range of 0.003-2.230, 0.004-0.237, and 0.0173-405 for the pseudosecond order, the Ritchie modified second order and the Elovich models, respectively. The sensitivity analysis, by plotting the reciprocal of the rate, Z(L) = (d(q)/d(t))-1 against time, is used to identify the true kinetic model. (c) 2008 Wiley Periodicals, Inc.

Keywords: Acid Dye, Acid Dyes, Acid Red 73, Adsorption, Adsorption, Analysis, Biosorbent, Carbon, Chemisorption, Chitin, Chitosan, Dye, Dyes, Dyestuffs, Elovich Equation, Elovich Model, Equilibrium, Kinetic, Kinetic Equations, Kinetic Model, Kinetic Modeling, Kinetic Models, Kinetics, Metal-Ions, Model, Models, Rate Constants, Removal, Removal of Dyes, Second Order, Second-Order, Solids, Sorption, Sorption Kinetics, Waste, Water

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Full Text: [2008\J App Pol Sci109, 2905.pdf](2008/J%20App%20Pol%20Sci109,%202905.pdf)

Abstract: Supermacroporous poly(2-hydroxyethyl methacrylate) [poly(HEMA)]-based monolithic cryogel column was prepared by radical cryocopolymerization of HEMA with N-methacryloyl-L-histidine methyl ester (MAH) as functional comonomer and N,N’-Methylene -bisacrylamide (MBAAm) as crosslinker directly in a plastic syringe for affinity purification of lysozyme from chicken egg white. The monolithic cryogel containing a continuous polymeric matrix having interconnected pores of 10-50 μm size was loaded with Zn2+ ions to form the metal chelate with poly(HEMA-MAH) cryogel. Poly(HEMA-MAH) cryogel was characterized by swelling studies, FTIR, scanning electron microscopy, and elemental analysis. The equilibrium swelling degree of the poly(HEMA-MAH) monolithic cryogel was 5.62 g H2O/g cryogel. Poly(HEMA-MAH) cryogel containing 45.8 μmol MAH/g was used in the adsorption/desorption of lysozyme from aqueous solutions. The nonspecific adsorption of lysozyme was very low (7.5 mg/g). The maximum amount of lysozyme adsorption from aqueous solution in phosphate buffer was 209 mg/g at pH 7.0. It was observed that lysozyme could be repeatedly adsorbed and desorbed with the poly (HEMA-MAH) cyogel without significant loss of adsorption capacity. (C) 2008 Wiley Periodicals, Inc.

Keywords: Affinity Chromatography, Protein Purification, Metal Chelate, Histidine, Cryogels, Human Plasma, Immunoglobulin-G, Chromatography, Adsorption, Separation, Beads, Ultrafiltration, Equilibrium, Adsorbent, Proteins

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Full Text: [2008\J App Pol Sci109, 4043.pdf](2008/J%20App%20Pol%20Sci109,%204043.pdf)

Abstract: In this article, adsorption modeling and sensitivity analysis were presented to describe the adsorption of textile dyes, Solophenyl Red 3BL (SR) and Pergasol Red 2B (PR), from colored wastewater onto the natural adsorbent (soy meal hull). The numerical model was used to solve the mathematical equations governing the adsorption procedure. The experimental results of SR and PR removal were compared with those results predicted by the numerical model. A sensitivity analysis of dye removal from solution phase has been carried out. The model predictions were compared to those results obtained from experimental tests for adsorption of dyes, and a close agreement was achieved. (c) 2008 Wiley Periodicals, Inc.

Keywords: Textile Dye Removal, Natural Adsorbent, Adsorption Modeling, Sensitivity Analysis, Photocatalytic Degradation, Activated Carbon, Aqueous-Solution, Immobilized Nanoparticles, Fundamental Properties, Organic Pollutants, Titanium-Dioxide, Wheat Shells, Congo Red, Removal

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Full Text: [2008\J App Pol Sci109, 4054.pdf](2008/J%20App%20Pol%20Sci109,%204054.pdf)

Abstract: The two-dimensional coordination polymer cadmium phosphate with the morphology of rectangle layers was prepared by solid-state template reaction at room temperature, and was characterized by XRD, FTIR, and TEM techniques. The as-synthesized sample is a layered cadmium phosphate material, in which the structure is poly (CdPO4-) anion framework with ammonium ions and water species residing in the space between the layers, and cadmium ions are coordinated by the phosphate oxygen atoms. This article also presents the adsorption of Pb(II) ions from aqueous solution on the as-synthesized coordination polymer cadmium phosphate, and the results showed that this inorganic polymer adsorbent had good adsorption capacity. It could reach to the saturation adsorption capacity within an hour, and its excellent adsorption capacity for Pb(II) was 5.50 mmol/g when the initial solution concentration was 1.68×103 μg/mL at T = 278K. Moreover, the adsorption kinetics and adsorption isotherms were studied, it revealed that the adsorption kinetics can be modeled by pseudo second-order rate equation wonderfully. The apparent activation energy (E-a), Delta G, Delta H, and Delta S were 3.16 kJ mol-1, -13.97 kJ mol-1, -11.84 kJ mol-1, and 7.66 J mol-1 K-1, respectively. And it was found that Langmuir equation could well interpret the adsorption of the as-synthesized coordination polymer cadmium phosphate for Pb(II) ions. (c) 2008 Wiley Periodicals, Inc.

Keywords: Activation, Activation Energy, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Isotherms, Adsorption Kinetics, Aqueous Solution, Aqueous Solutions, Cadmium, Cadmium Ions, Capacity, Coordination Polymer, Framework, FTIR, Hydrothermal Synthesis, Inorganic Polymer, Isotherms, Kinetics, Langmuir, Langmuir Equation, Morphology, Pb(II), Pb(II) Ions, Phosphate, Polymer, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Room Temperature, Saturation, Second Order, Second-Order, Solution, Structure, Techniques, Tem, Temperature, Template, Water, XRD

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Full Text: [2008\J App Pol Sci110, 30.pdf](2008/J%20App%20Pol%20Sci110,%2030.pdf)

Abstract: A reactive fibrous adsorbent was prepared through the grafting of a methacrylic acid monomer Onto poly(ethylene terephthalate) fibers for the removal of basic dyes such as Methylene blue and basic red 9 from aqueous solutions through a batch adsorption method. Effects of various parameters Such as the grafting yield, pH, treatment time, initial dye concentration, and adsorption temperature on the amount of dye adsorbed onto reactive fibers were investigated. The adsorption amounts of basic dyes increased with increases in the grafting yield, pH, treatment time, initial dye concentration, and adsorption temperature. The rates of adsorption conformed to pseudo-second-order kinetics with a good correlation. The equilibrium data for Methylene blue and basic red 9 adsorption fit the Langmuir equation, with maximum adsorption capacities of 200 and 250 mg/g, respectively. The adsorption rates of two basic dyes were much higher on the grafted poly(ethylene terephthalate) fiber than On the ungrafted poly(ethylene terephthalate) fiber. Within 45 min, about 99%, of the cationic dyes was removed from the solutions (400 mg/L) by methacrylic acid-graft-poly (ethylene terephthalate) fibers. The highest desorption amounts for Methylene blue and basic red 9 were 62 and 84%, respectively. (C) 2008 Wiley Periodicals, Inc.

Keywords: Activated Carbon, Adsorption, Adsorption Behavior, Color Removal, Congo Red, Dye, Dyes, Pigments, Equilibrium, Fibers, Graft Copolymers, Kinetics, Methylene Blue, Methylene-Blue, Polyesters, Reactive Dyes, Textile Waste-Water, Wastewaters

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Full Text: [2009\J App Pol Sci111, 3081.pdf](2009/J%20App%20Pol%20Sci111,%203081.pdf)

Abstract: This work was focused on the removal of phosphate ions using polypyrrole-coated sawdust as a nowel cost-effective sorbent. The phosphate uptake followed the Langmuir sorption isotherm, and the sorption capacity at 20, 35, and 50°C was found to be 17.33, 23.41, an (30.39 mg/g, respectively; this indicated favorable sorption at higher temperatures. The kinetic uptake data were modeled with the Lagergren equation, first-order and second-order kinetic models, and the simple Elovich model. The results indicated that the Lagergren model best described the uptake data. The intraparticle diffusion coeffieint, as determined for 250-211- and 630-600-μm sorbent particles at 20°C, was found to be 287.3×10-2 and 228.3×10-2 mg g-1 min-1, respectively. The intraparticle diffusion was also confirmed with the Bangham equation. The sorption mean free energy, calculated with the Dubinin-Radushkevich equation, was found to be 10.98 kJ/mol, thus confirming an ion-exchange regulated sorption process. The positive value of the enthalpy change (i.e., 4.23 kJ/mol) confirmed the endothermic nature of the sorption process. The negative values of the change in the standard free energy were indicative of the spontaneous nature of the sorption process. Finally, the activation energy of the sorption process for 250-212-μm particles, determined with the Arrhenius equation, was found to be 41.68 J/mol. (C) 2008 Wiley Periodicals, Inc. J Appl Polym Sci 111:3081-3088,2009.

Keywords: Activation, Adsorbent, Adsorption, Adsorptive Removal, Aluminum-Oxide, Capacity, Coatings, Diffusion, First Order, Ion Exchange, Ions, Iron, Isotherm, Kinetic, Kinetic Models, Lignocellulosic Material, Oxide Hydroxide, Particles, Phosphate, Phosphorus Removal, Removal, Sawdust, Second Order, Sorbent, Sorption, Sorption Isotherm, Waste-Water

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Full Text: [2009\J App Pol Sci112, 1114.pdf](2009/J%20App%20Pol%20Sci112,%201114.pdf)

Abstract: Chitosan beads (CB) possesses low defluoridation capacity (DC) have been Suitably modified by carboxylation followed by chelation with Ce(III) to enhance its DC. The carboxylated chitosan beads (CCB), which has a desirable DC of 1385 mgF(-)/kg, has been further chemically modified by incorporating Ce 31 ion into CCB (Ce-CCB) and its DC was found to be 4798 mgF-/kg, whereas raw chitosan beads (CB) possesses 52 mgF-/kg only. The maximum DC of Ce-CCB was observed at pH 7 and showed selectivity toward fluoride in presence of other coanions. The sorbent was characterized using FTIR and SEM with EDAX analysis. The sorption data was fitted with Freundlich and Langmuir isotherms and kinetic models. The calculated thermodynamic parameters, viz., ΔG°, ΔH° and ΔS° indicate the nature of fluoride sorption. A field trial was carried out with fluoride water collected from a nearby fluoride-endemic village to test the suitability of Ce-CCB at field conditions. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 112: 1114-1121, 2009.

Keywords: Adsorption, Adsorption, Beads, Chemistry, Chitosan, Equilibrium, Fluoride, Ions, Isotherms, Kinetics, Mechanisms, Removal, Sorption, Water

? Bârsănescu, A., Buhăceanu, R. and Dulman, V. (2009), Removal of basic blue 3 by sorption onto a weak acid acrylic resin. *Journal of Applied Polymer Science*, **113** (1), 607-614.

Full Text: [2009\J App Pol Sci113, 607.pdf](2009/J%20App%20Pol%20Sci113,%20607.pdf)

Abstract: A weak acid acrylic resin was used as an adsorbent for the investigation of Basic Blue 3 (BB3) adsorption kinetics, isotherms, and thermodynamic parameters. Batch adsorption studies were carried out to evaluate the effect of pH, contact time, initial concentration (28-100 mg/g), adsorbent dose (0.05-0.3 g), and temperature (290-323 K) on the removal of BB3. The adsorption equilibrium data were analyzed by the Langmuir, Temkin, and Freundlich isotherm models, with the best fitting being the first one. The adsorption capacity (Q(o)) increased with increasing initial dye concentration, adsorption dose, and temperature; the highest maximum Q(o) (59.53 mg/g) was obtained at 323 K. Psuedo-first order and pseudo-second-order kinetic models and intraparticle diffusion models were used to analyze the kinetic data; good agreement between the experimental and calculated amounts of dye adsorbed at equilibrium were obtained for the pseudo-second-order kinetic models for the entire investigated concentrations domain. Various thermodynamic parameters, such as standard enthalpy of adsorption (ΔH = 88.817 kJ/mol), standard entropy of adsorption (ΔS = 0.307 kJ mol-1 K-1), and Gibbs free energy (ΔG < 0, for all temperatures investigated), were evaluated and revealed that the adsorption process was endothermic and favorable. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113: 607-614, 2009.

Keywords: Activated Carbon, Adsorption, Agricultural Waste, Aqueous-Solutions, Batch, Caulerpa-Lentillifera, Coagulation, Cyclodextrin Polymer, Dye Adsorption, Dyes, Pigments, Effluents, Equilibrium, Resins, Thermodynamics, Waste

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Full Text: [2009\J App Pol Sci113, 615.pdf](2009/J%20App%20Pol%20Sci113,%20615.pdf)

Abstract: The aim of this work is to study the thermodynamic and kinetic studies with regard to the adsorption of Acid Green 9 (AG9) on the most efficient resin, namely, acrylic weak base anion exchange resin with ethylenediamine- functional groups (A1) selected from several anion exchange resins. The influence of the various experimental parameters such as, pH, initial dye concentration, contact time, temperature, and adsorbent dose was investigated by batch experiments. The extent of the dye adsorption increased with the decrease of the initial dye concentration and the increase of the contact time, temperature, and amount of the adsorbent. Adsorption process was quantitative and very fast at low concentrations of the dye. To investigate the mechanism of the adsorption and potential rate-controlling steps, pseudo first- and second-order, as well as intraparticle diffusion kinetic equations have been used. The adsorption kinetic of AG9 dye from aqueous solution onto A1 could be described by the pseudo second-order reaction model. The obtained results are in agreement with the Langmuir and Freundlich models. In the optimum conditions established, an adsorption capacity of 500 mg textile dye (72% purity)g-1 adsorbent (at 293 K) was reached. Desorption experiments by batch and dynamic methods were performed using a solution of 0.05 mol L-1 NaOH. A series of 13 adsorption-desorption cycles were carried out by the dynamic method with a quantitative adsorption and the desorption efficiency higher than 95%. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113: 615-627, 2009.

Keywords: Acid Green 9, Activated Carbon, Adsorption, Anion Exchange Resin, Batch, Desorption, Ion-Exchange, Kinetic Study, Low-Cost Adsorbents, Reactive Dyes, Removal, Resins, Sorbents, Sorption, Starch, Thermodynamic Study, Waste-Water

? Li, F., Bao, C.L., Zhang, J.H., Sun, Q., Kong, W.W., Han, X.Y. and Wang, Y. (2009), Synthesis of chemically modified chitosan with 2,5-Dimercapto-1,3,4-thiodiazole and its adsorption abilities for Au(III), Pd(II), and Pt(IV). *Journal of Applied Polymer Science*, **113** (3), 1604-1610.

Full Text: [2009\J App Pol Sci113, 1604.pdf](2009/J%20App%20Pol%20Sci113,%201604.pdf)

Abstract: A new chemically modified chitosan hydrogel with 2,5-dimercapto-1,3,4-thiodiazole (CTS-DMTD) has been synthesized. The structure of CTS-DMTD was confirmed by elemental analysis and FTIR. It was found that adsorption capacities were significantly affected by the pH of solution, with optimum pH values of 3.0 for Au(III), 2.0 for Pd(II) and Pt(IV). The saturated adsorption capacities were 198.5 mg/g for Au(III), 16.2 and 1.3.8 mg/g for Pd(II) and Pt(FV), respectively. Langmuir and Freundlich isotherm adsorption models were applied to analyze the experimental data. The results showed that adsorption isotherms of Pd(II) and Pt(IV) could be well described by the Langmuir equation. The adsorption kinetic investigations indicated that the kinetic data correlated well with the pseudo-second-order model. The recovery experimental data showed that CTS-DMTD had a higher affinity toward Au(III), Pd(II), and Pt(IV) in the coexistence system containing Cu(II), Fe(III), Cd(II), Ni(II), Mg(II), and Zn(II). The studies of desorption were carried out using various reagents and the optimum effect was obtained using thiourea. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113: 1604-1610, 2009.

Keywords: Adsorption, Chelating Resin, Chitin, Chitosan, Cross-Linked Chitosan, Deacetylation, Gold(III), Heteroatom-Containing Polymers, Metal-Ions, Palladium(II), Recovery, Sorption, Spectroscopic Determination, Synthesis

? Amoyaw, P., Ingram, C., Hsu, F.L. and Bu, X.R. (2009), Poly[4-(4-vinylbenzyloxy)-2-hydroxylbenzaldehyde] for Rapid Removal of Low Concentrations of Pb(II). *Journal of Applied Polymer Science*, **113** (4), 2096-2102.

Full Text: [2009\J App Pol Sci113, 2096.pdf](2009/J%20App%20Pol%20Sci113,%202096.pdf)

Abstract: Poly (4-(4-vinylbenzyloxy)-2-hydroxylbenzaldehyde] was evaluated for removing tow concentrations of lead(II) in ppb levels from aqueous media. The effects of the pH condition and the initial lead concentrations on removal were examined. It was found that the metal absorption is best described with the Langmuir model. The R-L values obtained between 0.01 and 0.23 indicate that favorable absorption occurs in the studied concentration ranges. The kinetic study revealed that the metal removal proceeds at a very fast pace-less than 30 s-to reach the maximum capacity. The data fit the description of pseudo-second-order rate. The dynamic column study for real-time practical absorption also was investigated. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113:2096-2102, 2009.

Keywords: Adsorption, Beads, Chelating Polymer, Heavy Metal Removal, Ions, Lead, Lead Complex, Mercury, Metals, Salicylaldehyde, Water

? El-Gammal, B., Ibrahim, G.M., Allan, K.F. and El-Naggar, I.M. (2009), Modeling the PAAC-AN-TV surface using 134Cs and 152+154Eu sorption. *Journal of Applied Polymer Science*, **113** (5), 3405-3416.

Full Text: [2009\J App Pol Sci113, 3405.pdf](2009/J%20App%20Pol%20Sci113,%203405.pdf)

Abstract: A novel composite, composed of poly (acrylic acid (AAc), acrylonitrile, and titanium vanadate, was prepared by induced gamma irradiation route at 20 kGy to be used as a hybrid organic-inorganic sorbent. 5-200 μm particle diameters of the composite were obtained. An average particle size of 75 μm of crystalline (17-20) composite was used; it was thermally stable to 486°C. The distribution coefficients of Cs+ and Eu3+ were studied as a function of pH; 2350 mL.g-1 and 645 mL.g-1 were obtained in case of 152+154Eu and 134Cs at pH 6. 1.55 mmol.g-1 and 1.85 mmol.g-1 maximum loadings were accommodated for the same ions at the same pH. Different models were used to scan the Surface of the exchanger, so that the topography of the surface was studied as a function of surface active site types, concentrations, and heterogeneity. Langmuir, Freundlich and D-R models were used. Also, different kinetic models, as Lagergren pseudo first-order, pseudo second-order and Morris-Weber intra-particle diffusion models were applied to study the possible mechanism of the sorption process; pseudo first-order was exempted to investigate the mechanism. They proved that chemisorption and ion exchange mechanism with controlled diffusion are predominant, with their characteristic mean energies (8.731 kJ.mol-1 and 9.310 kJ.mol-1 for Cs+ and Eu3+, respectively). Double Shell Model was finally adopted to explain the suggested mechanism. Negative values of Delta G degrees, -2.15 kJ.mol-1 to -7.92 kJ.mol-1 in case of Cs+ and -3.35 kJ.mol-1) to -9.67 kJ.mol-1 in case of Eu3+ adsorption at different temperatures, indicate the spontaneous nature of the reactions. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 113: 3405-3416, 2009.

Keywords: Acrylonitrile, Adsorption, Aqueous-Solutions, Biosorption, Chemisorption, Composite, Composites, Diffusion, Distribution, Double Shell Model and Thermodynamics, Equilibrium, First Order, Freundlich, Function, Gamma, Gamma-Irradiation, Heavy-Metals, Heterogeneity, Hybrid, Induced, Intra-Particle Diffusion, Intraparticle Diffusion, Ion Exchange, Ion-Exchange, Ions, Irradiation, Isotherms, Kinetic, Kinetic Models, Kinetics, Langmuir, Loadings, Mechanism, Model, Modeling, Models, Nanocomposites, PAAC-AN-TV, Particle Size, Particles, pH, Polyacrylic-Acid, Pseudo First Order, Pseudo First-Order, Pseudo Second Order, Pseudo Second-Order, Pseudo-First-Order, Pseudo-Second-Order, Route, Second Order, Second-Order, Single-Step Synthesis, Site, Size, Sorbent, Sorption, Sorption Process, Surface, Titanium

? Anirudhan, T.S., Rijith, S. and Suchithra, P.S. (2010), Preparation and characterization of Iron(III) Complex of an amino-functionalized polyacrylamide-grafted lignocellulosics and its application as adsorbent for Chromium(VI) removal from aqueous media. *Journal of Applied Polymer Science*, **115** (4), 2069-2083.

Full Text: [2010\J App Pol Sci115, 2069.pdf](2010/J%20App%20Pol%20Sci115,%202069.pdf)

Abstract: This study concerns with the development of a new adsorbent, iron(III) complex of an amino-functionalized polyacrylamide-grafted coconut coir pith (CP), a lignocellulosic residue, for Cr(VI) in water and industry effluents. The adsorbent (AM-Fe-PGCP) was characterized by FTIR, EDS, Mossbauer, surface area analyzer, TG/DTG, and potentiometric titration. The effects of contact time, initial sorbate concentration, pH, dose of adsorbent, and temperature on Cr(VI) adsorption were studied to optimize the conditions for maximum adsorption. The kinetics of sorption was investigated using pseudo-first-order and pseudo-second-order rate equations with the later giving a better fit to the experimental data. The mechanism of sorption was found to be film diffusion controlled. The Langmuir isotherm model yields a much better fit than the Freundlich and Dubinin-Radushkevich models with maximum adsorption capacity of 142.76 mg/g at 30ºC. Simulated industry wastewater sample was treated with AM-Fe-PGCP to demonstrate its efficiency in removing Cr(VI) from wastewater. The alkali treatment (0.1M NaOH) and re-introduction of Fe3+ lead to a reactivation of the spent adsorbent and can be reused through many cycles of water treatment and regeneration without any loss in the adsorption capacity. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 115: 2069-2083, 2010.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Capacity, Characterization, Chromium(VI), Chromium(VI) Adsorption, Coconut Coir Pith, Coir Pith, Concentration, Cr(VI), Cr(VI) Adsorption, Data, Desorption, Development, Diffusion, EDS, Efficiency, Effluents, Equilibrium, Experimental, Film Diffusion, Freundlich, FTIR, Graft Copolymerization, Isotherm, Isotherm Model, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Lead, Lignocellulosics, Low-Cost Adsorbents, Mechanism, Model, Models, Mossbauer-Spectroscopy, NaOH, pH, Pith, Potentiometric Titration, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Regeneration, Removal, Sorbate, Sorption, Surface, Surface Area, Temperature, Treatment, Waste-Water, Wastewater, Water, Water Treatment

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Full Text: [2010\J App Pol Sci115, 3013.pdf](2010/J%20App%20Pol%20Sci115,%203013.pdf)

Abstract: The chemical modification on chitosan (CTS) was carried out by cross-linking it with precursor compound 3,3’-dimethoxy-4,4’-dihydroxy-5,5’-bis(N,N’-piperazine-1-yl methyl benzaldehyde), (PC) in order to improve the metal ion adsorption capacities and selectivity of the product. The resulting crosslinked chitosan derivative (CCTSL) was characterized by elemental analysis, Fourier transform infrared spectrum (FTIR), Differential Scanning calorimetry (DSC), Scanning Electron Microscopy (SEM) and powder X-ray diffraction (XRD) studies. Adsorption experiments (pH dependency, kinetics, and equilibrium) of CCTSL towards various metal ions (Mn2+, Fe2+, Co2+, Cu2+, Ni2+, Cd2+ and Pb2+) were investigated. The adsorption was dependent on pH of the solution, with a maximum capacity between pH 6.5 and 8.5. The adsorption kinetics data were best fitted with pseudo second-order model, which gave a correlation coefficient of 0.999. The adsorption process could be described with Langmuir isotherm (R = 0.999), which revealed that the maximum capacity for monolayer saturation was 79 mg Cu(II) per gram of CCTSL (1.24 mmol g-1). From the studies, we also infer that the order of metal adsorption capacities in mmol g-1 for the derivative is Cu2+ > Ni2+ > Co2+ ≥ Fe2+ ≥ Cd2+ ≥ Mn2+ ≥ Pb2+. Hence this material can be used to extract Cu2+ ions from industrial effluents. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 115: 3013-3023, 2010.

Keywords: Adsorption, Adsorption Capacities, Adsorption Kinetics, Analysis, Aqueous-Solution, Behavior, Benzaldehyde, Biopolymers, Calorimetry, Capacity, Cd2+, Chemical, Chemical Modification, Chitosan, Co2+, Complexation, Copper(II) Adsorption, Correlation, Correlation Coefficient, Crosslinked Chitosan, Crosslinking, CT, Cu(II), Cu2+, Data, Dependency, Derivatives, Effluents, Equilibrium, Experiments, Ftir, Ions, Isotherm, Kinetics, Langmuir, Langmuir Isotherm, Mar, Metal, Metal Adsorption, Metal Ions, Metal-Polymer Complexes, Model, Modification, Modified, Monolayer, Ni2+, Parameters, Pb2+, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Removal, Saturation, Second Order, Second-Order, Second-Order Model, Selectivity, SEM, Solution, Synthesis, Transition Metal Chemistry, X-Ray, X-Ray Diffraction, XRD

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Full Text: [2010\J App Pol Sci116, 636.pdf](2010/J%20App%20Pol%20Sci116,%20636.pdf)

Abstract: The adsorption properties, including the adsorption kinetics, adsorption isotherms, and adsorption selectivity, of newly formed chelating resins that contained a heterocyclic functional group and a hydrophilic spacer arm of poly(ethylene glycol) [polystyrene-diethylene glycol-2-amino-5-methylthio-1,3,4-thiadizole (PS-DEG-AMTZ) and polystyrene-triethylene glycol-2-amino-5-methylthio-1,3,4-thiadizole (PS-TEG-AMTZ)] were studied in detail. The results show that the adsorption kinetics of PS-DEG-AMTZ and PS-TEG-AMTZ for Hg2+ and Ag+ could be described by a pseudo-second-order rate equation. The introduction of a spacer arm between the polymeric matrix and functional group was beneficial for increasing the adsorption rates. The apparent activation energies of the resins for Hg2+ and Ag+ were within 20.89-32.32 kJ/mol. The Langmuir model could describe the isothermal process of Hg2+ and Ag+. The competitive adsorption of the resins for Hg2+ and Ag+ in binary mixture systems was also investigated. The results show that Hg2+ and Ag+ were adsorbed before the other metal ions, such as Cu2+, Zn2+, Fe2+, Cd2+, and Pb2+, under competitive conditions. Five adsorption-desorption cycles were conducted for the reuse of the resins. The results indicate that these two resins were suitable for reuse without considerable changes in the adsorption capacity. (C) 2009 Wiley Periodicals, Inc. J Appl Polym Sci 116: 636-644, 2010.

Keywords: 2,5-Dimercapto-1,3,4-Thiodiazole, Activation, Adsorption, Adsorption Capacity, Adsorption Isotherms, Adsorption Kinetics, Adsorption Properties, Adsorption-Desorption, Capacity, Cd2+, Changes, Competitive, Competitive Adsorption, Cross-Linked Polystyrene, Cu2+, Formaldehyde, Functional Group, Gold(III), Heavy-Metal Ions, Heterocyclic Functional-Groups, Ion Exchangers, Ions, Isothermal, Isotherms, Kinetics, Langmuir, Langmuir Model, Matrix, Metal, Metal Ions, Model, Pb2+, Polymeric, Polymers, Polystyrene, Preconcentration, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Rates, Resins, Reuse, Selective Adsorption, Selectivity, Separation, Spacer-Arm, Systems, Zn2+

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Full Text: [2010\J App Pol Sci117, 953.pdf](2010/J%20App%20Pol%20Sci117,%20953.pdf)

Abstract: Two novel chelating resins are prepared by anchoring diethylenetriamine bis- and mono-furaldehyde Schiff bases onto the macroporous GMA-DVB copolymer beads and utilized for the adsorption towards Cu(II), Co(II), Ni(II), and Zn(II). FTIR spectra show that Schiff base groups have been successfully introduced into the polymer matrix and the chelating resins can form complexes with the metal ions. The chelating resins show a higher adsorption capacity toward Cu(II). The conductivity method can be used for determining the adsorption kinetics of the resins towards metal ions. The results show that the adsorption rates towards Cu(II) are much higher than those towards other ions and pseudo second-order and intraparticle diffusion models can be applied to treat the adsorption amount-time data. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sici 117: 953-959, 2010.

Keywords: Adsorption, Adsorption Capacity, Adsorption Kinetics, Aqueous-Solutions, Beads, Capacity, Co(II), Cobalt(II), Complexes, Conductivity, Copolymer, Copper(II), Cu(II), Data, Diffusion, Ethylene Dimethacrylate, Formaldehyde, FTIR, FTIR Spectra, Hydroxy Benzaldehydes, Intraparticle Diffusion, Ions, Kinetics, Macroporous, Macroporous Polymer, Matrix, Metal, Metal Ions, Metal-Polymer Complexes, Models, Modification, Ni(II), Nickel(II) Complexes, O-Hydroxyacetophenone, Polymer, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Rates, Reactive Polymers, Removal, Resins, Schiff Base, Second Order, Second-Order, Synthesis, Zn(II)

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Full Text: [2010\J App Pol Sci117, 3615.pdf](2010/J%20App%20Pol%20Sci117,%203615.pdf)

Abstract: This study describes dynamic uptake of antibiotic drug diclofenac sodium from aqueous solution using polyaniline as sorbent. The sorbent polyaniline was prepared by oxidative polymerization of aniline and characterized by FTIR spectrum analysis and TGA. The optimum sorbent/sorbate mg/mL ratio and pH range for maximum drug uptake have been found to be 2.0 and 5.5 to 10.5, respectively. Out of various kinetic models applied, the pseudo second-order kinetic equation has been found to fit well on the kinetic uptake data. The pseudo second-order rate constants for adsorption have been found to be 0.982×10-2, 7.24×10-2, and 18.09×10-2 min-1 mg-1 g for drug solutions with initial concentrations of 10, 20, and 30 mg respectively. The overall sorption process has been found to be governed by intraparticle diffusion The sorptive removal of drug from aqueous solution has also resulted in enhancement in bacterial growth of Escherichia coli. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 117: 3615-3622, 2010.

Keywords: Activated Carbon, Adsorption, Analysis, Antibiotics, Antibiotics, Aqueous Solution, Behavior, Biodegradability, Data, Diclofenac, Diffusion, Drug, Dynamic, Escherichia, Escherichia Coli, FTIR, Growth, Hormones, Intraparticle Diffusion, Kinetic, Kinetic Equation, Kinetic Models, Langmuir, Methylene-Blue, Models, pH, Polyaniline, Polymerization, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Rate Constants, Removal, Second Order, Second-Order, Sodium, Solution, Solutions, Sorbent, Sorption, Sorption Process, Spectrum Analysis, Sulfamethoxazole, TGA, Uptake, Waste-Water Bacteria

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Full Text: [2010\J App Pol Sci118, 2176.pdf](2010/J%20App%20Pol%20Sci118,%202176.pdf)

Abstract: A novel insoluble bimodal porous polymer containing β-cyclodextrin (β-CD) was prepared to adsorb aromatic amine compound. The process involved copolymerization of styrene and methyl methacrylate with a maleic acid derivative of β-CD, subsequently, above formed copolymer was foamed by supercritical CO2 The chemical properties and physical structure of obtained copolymer was analyzed using Fourier transform infrared spectra, Thermal gravimetric analysis, X-ray diffraction, scanning electron microscope, and N-2 adsorption techniques. The inclusion adsorption of aromatic amine compounds on β-CD copolymer was carried out in a batch system. The quantities of aromatic amine compounds adsorbed on β-CD copolymer reached equilibrium within 60 min. The adsorption kinetic could be fitted to a pseudo-second-order kinetic equation, and the linear correlation coefficients varied from 0.9828 to 0.9935. With the influence of molecular structure and hydrophobicity of the aromatic amine compound, the sequence of quantity of aromatic amine compounds adsorbed on β-CD copolymer is p-toluidine > aniline > benzidine > o-toluidine. The adsorption equilibrium data of aromatic amine compound adsorbed on β-CD copolymer were fitted to Freundlich and Langmuir models, respectively. The linear correlation coefficients of Langmuir model varied from 0.9516 to 0.9940, and the linear correlation coefficients of Freundlich varied from 0.9752 to 0.9976. It is concluded that Freundlich model fits better than Langmuir model, because the adsorption of aromatic amine compound on β-CD copolymer is a chemical process. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 118: 2176-2185, 2010.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Equilibrium, Adsorption Kinetic, Analysis, Aqueous-Solution, Aromatic-Amines, Batch, Batch System, β-Cyclodextrin, Bimodal Porous Copolymer, Chemical, CO2, Complexes, Copolymer, Copolymerization, Correlation, Data, Equilibrium, Foaming, Freundlich, Freundlich Model, Inclusion Adsorption, Kinetic, Kinetic Equation, Langmuir, Langmuir Model, Methyl Methacrylate, Model, Models, N-2, N2, N2 Adsorption, NOV, Physical, Physical Structure, Polymer, Preparation, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Equation, Removal, Structure, Styrene, Supercritical Carbon-Dioxide, Supercritical CO2, Techniques, Water Samples, X-Ray, X-Ray Diffraction

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Full Text: [2010\J App Pol Sci118, 3111.pdf](2010/J%20App%20Pol%20Sci118,%203111.pdf)

Abstract: A fundamental investigation of the removal of cadmium ions from aqueous solutions by synthesized sulfonated poly(glycidyl methacrylate) (SPGMA) was conducted under batch conditions. The kinetic and equilibrium results obtained for cadmium sorption with different initial cadmium concentrations onto synthesized SPGMA were analyzed. Kinetic modeling analysis with four different types of kinetic sorption models (pseudo-first-order, pseudo-second-order, simple Elovich, and intraparticle diffusion rate models) was applied to simulate the cadmium-sorption data. The analysis of the kinetic data indicated that the sorption was a second-order process and was pore-diffusion-controlled. An ion-exchange mechanism may have existed in the cadmium-sorption process with the synthesized SPGMA. The cadmium uptake by SPGMA was quantitatively evaluated with equilibrium sorption isotherms. To describe the isotherms mathematically, the experimental data of the removal equilibrium were correlated with the Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich (D-R) isotherm models, and the applicability of these isotherm equations to the sorption systems was compared on the basis of the correlation coefficients. The applicability of the equilibrium isotherm models followed this order: Freundlich > Langmuir > Temkin > D-R. The maximum sorption capacity, determined from the Langmuir isotherm, was 555.55 mg/g at 25ºC. Thermodynamic parameters, including changes in the enthalpy, Gibbs free energy, and entropy, were calculated. Positive values for the change in enthalpy and negative values for the change in the Gibbs free energy showed the endothermic and spontaneous nature of sorption, respectively. The relatively small value of the activation energy (32.12 kJ/mol) confirmed that the cadmium-sorption process was diffusion-controlled. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 118: 3111-3122, 2010.

Keywords: Activated Carbon, Activation, Activation Energy, Adsorbent, Adsorption, Adsorption Properties, Amine, Analysis, Aqueous Solutions, Basic Dye, Batch, Cadmium, Cadmium Ions, Capacity, Changes, Chelating Resin, Correlation, Cr(III) Ions, Data, Diffusion, Elovich, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Equilibrium Isotherm, Experimental, Freundlich, Functionalization of Polymers, Gibbs Free Energy, Heavy-Metal Ions, Intraparticle Diffusion, Investigation, Ion Exchange, Ion Exchangers, Ion-Exchange, Ionexchange, Ions, Isotherm, Isotherm Equations, Isotherm Models, Isotherms, Kinetic, Kinetic Modeling, Kinetic Sorption, Langmuir, Langmuir Isotherm, Mechanism, Modeling, Models, Nanotechnology, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Removal, Second Order, Second-Order, Separation Techniques, Small, Solutions, Sorption, Sorption Capacity, Sorption Isotherms, Sorption Models, Systems, Temkin, Thermodynamic, Thermodynamic Parameters, Uptake, Value, Waste-Water

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Full Text: [2011\J App Pol Sci119, 363.pdf](2011/J%20App%20Pol%20Sci119,%20363.pdf)

Abstract: Gelatin-based hydrogels were synthesized and characterized for use as Cu2+-ion sorbents. Gelatin was crosslinked in the presence of two different monomers, that is, acrylamide (AAm) and/or 2-hydroxypropyl methacrylate, with N,N-methylenebisacrylamide, ammonium persulfate, and sodium bicarbonate. The as-prepared hydrogels were further characterized by scanning electron microscopy, Fourier transform spectroscopy, and the study of their swelling behavior as a function of temperature, time, and pH to evaluate their structure-property relationships. The hydrogels were observed to be good sorbents of Cu2+, and a maximum uptake of 84.8% was observed within 2 h at 37 degrees C and with 10 ppm of the Cu2+-ion solution for the gelatin and polyacrylamide hydrogel, which also exhibited the maximum retention capacity at 14.9 mg/g after four feeds. All of the experimental data exhibited good matches with the Langmuir isotherm and followed pseudo-second-order kinetics. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 363-370, 2011.

Keywords: Acrylamide-Based Hydrogels, Activated Carbon, Adsorption, Albumin Adsorption, Aqueous-Solutions, Capacity, Cibacron Blue F3ga, Copper(II), Cu(II), Cu2+, Data, Gelatin, Grafted Cellulose, Hydrogel, Hydrogels, Isotherm, Kinetics, Langmuir, Langmuir Isotherm, Mechanism, Metal-Ions, Modified Cellulosics, pH, Pseudo Second Order, Pseudo-Second-Order, Retention, Sorption, Structure-Property Relations, Supports, Swelling, Temperature, Uptake

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Full Text: [2011\J App Pol Sci119, 662.pdf](2011/J%20App%20Pol%20Sci119,%20662.pdf)

Abstract: In situ adsorption of monomers on fibers plays a key role in fabricating highly conductive polyaniline (PANI)-based textiles by two-stage oxidation polymerization. Experiments were conducted in aniline monomer and hydrochloric acid solution with the variables such as contact time, initial concentration, and temperature, which can enhance the equilibrium adsorption capacity to aniline of poly(ethylene terephthalate) (PET) fibers. Equilibrium data were fit well by a Henry partition-type isotherm equation. It was found that the kinetics of the adsorption of aniline onto PET fibers at different operating conditions was best described by the pseudo-second-order model. The rate parameters of the intraparticle diffusion model for adsorption were also evaluated and compared to identify the adsorption mechanisms. The monomer exhaustion increased with increasing the temperature. The value of electrical surface resistance of conductive textiles about 3.2 k Omega was obtained when the padder squeeze step was introduced, and the molar ratio of 0.6 between the oxidant concentration and the exhausted concentration of monomers at the adsorption equilibrium was applied. Scanning electron micrographs of PANI/PET composite surfaces were observed, conforming that smooth films were produced by surface polymerization of aniline monomers adsorbed previously on fibers. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 662-669, 2011.

Keywords: Acid Dye Adsorption, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Ammonia Gas, Aniline, Capacity, Carbon, Composite, Conducting Polymers, Contact Time, Data, Diffusion, Equilibrium, Fabrics, Fibers, Film Formation, Hydrochloric Acid, Intraparticle Diffusion, Isotherm, Kinetics, Mechanisms, Model, Monomers, Operating Conditions, Oxidation, Polyaniline, Polyesters, Polymerization, Polymers, Pseudo Second Order, Pseudo-Second-Order, Surfaces, Temperature, Thermodynamics

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Full Text: [2011\J App Pol Sci119, 1435.pdf](2011/J%20App%20Pol%20Sci119,%201435.pdf)

Abstract: Chemical modification was performed for macroporous crosslinked chloromethylated polystyrene. The obtained HJ-K01 resin was used to remove phenol from aqueous solution, and its adsorption behaviors for phenol were compared with commercial Amberlite XAD-4. The results indicate that methylamino groups were successfully uploaded onto the surface of the HJ-K01 resin and the adsorption capacity of phenol onto the HJ-K01 resin was much larger than that onto XAD-4. Furthermore, the original phenol solution was suitable for the adsorption, the adsorption isotherms could be fitted by the Freundlich model, and its kinetic curves could be characterized by a pseudo-second-order rate equation. The fixed-bed column adsorption demonstrated that the HJ-K01 resin was an excellent resin for the removal of phenol. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 1435-1442, 2011.

Keywords: Acid Coated Alumina, Adsorption, Adsorption Behavior, Adsorption Capacity, Adsorption Isotherms, Amberlite Ira-420, Amberlite Xad-4, Amide Group, Capacity, Chemical Modification, Equilibrium, Freundlich, Freundlich Model, Isotherm Analysis, Isotherms, Kinetic, Macroporous Polymers, Model, Modification, Phenol, Polymeric Adsorbents, Polystyrene, Pseudo Second Order, Pseudo-Second-Order, Removal, Resin, Solid-Phase Extraction, Water, Xad-4 Resin

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Full Text: [2011\J App Pol Sci119, 2525.pdf](2011/J%20App%20Pol%20Sci119,%202525.pdf)

Abstract: In this study, a new sorbent, a poly(acryl-amide-co-itaconic acid) [P(AAm-co-IA)]/activated charcoal (AC) composite, was prepared by the aqueous polymerization of acrylamide and itaconic acid in the presence of AC with N,N’-methylene bisacrylamide as a crosslinker and potassium persulfate as an initiator. The P(AAm-co-IA)/AC composite sorbent showed a fair capacity to adsorb the cationic dye methylene blue. The maximum sorption capacity, as studied at 23, 37, and 50º C and determined with the Langmuir isotherm model, was found to be 909.0, 312.5, and 192.3 mg/g, respectively. For an initial concentration of 5 mg/L, the kinetic uptake data were studied with various kinetic models. The pseudo-second-order equation was found to fairly fit the uptake data with a regression value of 0.999. The dye uptake increased with the pH of the sorbate solution, and the optimum pH was found to be in the range of 7-10. Intraparticle diffusion was also observed to take place, and the coefficient of intraparticle diffusion was evaluated to be 26.51 x 10(-2) mg g(-1) min(-1/2). The various thermodynamic parameters were also determined to predict the nature of the uptake process. The sorption process was found to be spontaneous, as indicated by a negative standard free energy change. The negative standard enthalpy change suggested an exothermic nature for the uptake. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 2525-2532, 2011.

Keywords: Activated Carbon, Adsorption, Adsorption, Biosorption, Capacity, Cationic Dye, Composite, Composites, Concentration, Cr(VI), Data, Degradation, Diffusion, Dye, Dye Removal, Energy, Enthalpy, Equilibrium, Exothermic, Intraparticle Diffusion, Isotherm, Isotherm Model, Kinetic, Kinetic Models, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Leaves, Mar, Media, Methylene Blue, Model, Models, Part I, pH, Polymerization, Potassium, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Equation, Regression, Removal, Solution, Sorbate, Sorbent, Sorption, Sorption Capacity, Sorption Process, Standard, Thermodynamic, Thermodynamic Parameters, Uptake, UV-Visible Spectroscopy, Value

? Arslan, M. (2011), Preparation and application of glycidyl methacrylate and methacrylic acid monomer mixture-grafted poly(ethylene terephthalate) fibers for removal of methylene blue from aqueous solution. *Journal of Applied Polymer Science*, **119** (5), 3034-3042.

Full Text: [2011\J App Pol Sci119, 3034.pdf](2011/J%20App%20Pol%20Sci119,%203034.pdf)

Abstract: A novel fibrous adsorbent that grafts glycidyl methacrylate (GMA) and methacrylic acid (MAA) monomer mixture onto poly(ethylene terephthalate) (PET) fibers was used for removal of methylene blue (MB) in aqueous solutions by a batch equilibration technique. The operation parameters investigated included, pH of solution, removal time, graft yield, dye concentration, and reaction temperature. The adsorption rate of MB is much higher on the MAA/GMA-grafted PET fibers than on the ungrafted PET fibers. MB was removed 99% the initial dye concentration at 10 mg L-1 and 93% at 200 mg L-1 by monomers mixture-grafted PET fibers. Pseudofirst order and pseudosecond order kinetic equations were used to examine the experimental data of different graft yield. It was found that the pseudosecond order kinetic equation described the data of dye adsorption on fibrous adsorbent very well. The experimental isotherms data were analyzed using Langmuir and Freundlich isotherm models. The data was that Freundlich isotherm model fits the data very well for the dyes on the fibers adsorbent. The dye adsorbed was easily desorbed by treating with acetic acid/methanol mixture (50% V/V) at room temperature. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 3034-3042, 2011.

Keywords: 4-Vinyl Pyridine, Adsorbent, Adsorption, Adsorption Rate, Aqueous Solutions, Azo Dyes, Basic Dye Removal, Batch, Benzoyl Peroxide, Concentration, Data, Dye, Dye Adsorption, Dye Removal, Dyes, Equilibration, Experimental, Fibers, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Glycidyl Methacrylate, Graft, Graft Copolymerization, Heavy-Metal Ions, Isotherm, Isotherm Model, Isotherms, Kinetic, Kinetic Equation, Kinetic Equations, L1, Langmuir, Low-Cost Adsorbents, Mar, Mb, Methylene Blue, Model, Models, Monomer Mixture, Operation, PET, PET Fibers, pH, Poly(Ethylene Terephthalate) Fibers, Preparation, Removal, Rice Husk, Room Temperature, Solution, Solutions, Sorption, Temperature, Waste-Water

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Full Text: [2011\J App Pol Sci119, 3607.pdf](2011/J%20App%20Pol%20Sci119,%203607.pdf)

Abstract: In this article, a novel poly-(acrylic acid-acrylonitrile) (PAA-AN)/filter paper composite membrane with pH-sensitivity was developed. The membrane was composed of three layers. The top and bottom layers were made of PAA-AN copolymer, while the middle layer was filter paper. The filter paper was used to enhance the strength of the membrane. The PAA-AN/filter paper membrane showed evident pH sensitivity and pH reversibility as the pH value changed between 2.0 and 9.5. With the increase of the PAA-AN copolymer amount in the composite membrane, the pH sensitivity increased. The Cu (II) ion-exchange experiment indicated that the membrane could bind metal ions and could be used as ion-exchange membrane to purify water. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 3607-3614, 2011.

Keywords: Acrylonitrile-Acrylic-Acid, Characterization, Composite, Copolymer, Copolymer Membrane, Cu, Experiment, Filled Membranes, Filter Paper, Inversion Precipitation Technique, Ion Exchange, Ion-Exchange, Ion-Exchange Membrane, Ionexchange, Ions, Mar, Membrane, Metal, Metal Ions, Microspheres, Molecular Imprint Membranes, Pervaporation, pH, pH Value, Ph-Sensitive, Poly-(Acrylic Acid- Acrylonitrile), Polymeric Membranes, Preparation, Reversibility, Sensitivity, Separation, Strength, Value, Water

? Abdel-Aziz, H.M. (2011), γ-radiation-induced preparation of polyamidoxime resins and their adsorption of methyl violet. *Journal of Applied Polymer Science*, **120** (3), 1547-1554.

Full Text: [2011\J App Pol Sci120, 1547.pdf](2011/J%20App%20Pol%20Sci120,%201547.pdf)

Abstract: Poly(acrylic acid amidoxime) [P(AA-AO)] and poly(maleic acid amidoxime) [P(MA-AO)] resins were prepared by the gamma-radiation-induced copolymerization of acrylonitrile with acrylic acid and maleic acid, respectively. The obtained resins were amidoximated by reaction with hydroxylamine. The prepared resins were used for the removal of methyl violet (MV) dye from aqueous solutions. Batch adsorption studies were made by the measurement of the effects of pH, the amount of adsorbent, the contact time, and the adsorbate concentration. The adsorption isotherm of MV onto P(AA-AO) and P(MA-AO) was determined at 25 C with initial MV dye concentrations of 10-70 mg/L. The equilibrium data were analyzed with the Langmuir and Freundlich isotherm models. The equilibrium process was described well by the Langmuir isotherm model with maximum adsorption capacities of 398.4 and 396.8 mg/L for P(AA-AO) and P(MA-AO), respectively. The kinetics of adsorption of MV onto P(AA-AO) and P(MA-AO) are discussed. The pseudo-second-order kinetic model described the adsorption of MV onto P(AA-AO) and P(MA-AO) very well. (C) 2010 Wiley Periodicals, Inc. J Appl Polyrn Sci 120: 1547-1554, 2011.

Keywords: Acid Hydrogels, Adsorption, Adsorption Isotherm, Amidoxime Groups, Aqueous-Solutions, Cationic Dyes, Cellulose, Chelating Resin, Dye, Equilibrium, Freundlich, Freundlich Isotherm, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, pH, Polymerization, Radiation, Removal, Resins, Uranium, Waste-Water

? Kok, S., Osman, B., Kara, A. and Besirli, N. (2011), Vinyl triazole carrying metal-chelated beads for the reversible immobilization of glucoamylase. *Journal of Applied Polymer Science*, **120** (5), 2563-2570.

Full Text: [2011\J App Pol Sci120, 2563.pdf](2011/J%20App%20Pol%20Sci120,%202563.pdf)

Abstract: Poly(ethylene glycol dimethacrylate-1-vinyl1,2,4-triazole) [poly(EGDMA-VTAZ)] beads with an average diameter of 100-200 mu m were obtained by the copolymerization of ethylene glycol dimethacrylate (EGDMA) with 1-vinyl-1,2,4-triazole (VTAZ). The copolymer hydrogel bead composition was determined by elemental analysis and was found to contain 5 EGDMA monomer units for each VTAZ monomer unit. The poly-(EGDMA-VTAZ) beads were characterized by swelling studies and scanning electron microscopy (SEM). The specific surface area of the poly(EGDMA-VTAZ) beads was found 65.8 m(2)/g. Cu2+ ions were chelated on the poly-(EGDMA-VTAZ) beads. The Cu2+ loading was 82.6 mu mol/g of support. Cu2+-chelated poly(EGDMA-VTAZ) beads with a swelling ratio of 84% were used in the immobilization of Aspergillus niger glucoamylase in a batch system. The maximum glucoamylase adsorption capacity of the poly(EGDMA-VTAZ)-Cu2+ beads was 104 mg/g at pH 6.5. The adsorption isotherm of the poly(EGDMA-VTAZ)-Cu2+ beads fitted well with the Langmuir model. Adsorption kinetics data were tested with pseudo-first-and second-order models. The kinetic studies showed that the adsorption followed a pseudo-second-order reaction model. The Michaelis constant value for the immobilized glucoamylase (1.15 mg/mL) was higher than that for free glucoamylase (1.00 mg/mL). The maximum initial rate of the reaction values were 42.9 U/mg for the free enzyme and 33.3 U/mg for the immobilized enzyme. The optimum temperature for the immobilized preparation of poly-(EGDMA-VTAZ)-Cu2+-glucoamylase was 65ºC; this was 5ºC higher than that of the free enzyme at 60ºC. The glucoamylase adsorption capacity and adsorbed enzyme activity slightly decreased after 10 batch successive reactions; this demonstrated the usefulness of the enzyme-loaded beads in biocatalytic applications. The storage stability was found to increase with immobilization. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 120: 2563-2570, 2011.

Keywords: Adsorption, Adsorption Isotherm, Adsorption Kinetics, Affinity-Chromatography, Binding, Carrier, Catalase Adsorption, Electron Microscopy, Enzymes, Hollow-Fibers, Isotherm, Kinetic, Kinetics, Langmuir, Metal-Polymer Complexes, pH, Purification, Removal

? Mahmoodi, N.M., Arami, M., Bahrami, H. and Khorramfar, S. (2011), The effect of pH on the removal of anionic dyes from colored textile wastewater using a biosorbent. *Journal of Applied Polymer Science*, **120** (5), 2996-3003.

Full Text: [2011\J App Pol Sci120, 2996.pdf](2011/J%20App%20Pol%20Sci120,%202996.pdf)

Abstract: The effect of pH on equilibrium and kinetics of dye adsorption onto canola hull as a biosorbent was studied. Reactive Red 198 (RR198), Reactive Blue 19 (RB19), Direct Red 79 (DR79), and Direct Red 80 (DR80) were used as model textile dyes. Fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), and UV-vis spectroscopy were used. The presence of functional groups onto canola hull was investigated using FTIR spectroscopy. The pseudo first-order, pseudo second-order and intraparticle diffusion kinetics models were examined to evaluate the kinetics data. The Langmuir, Freundlich, and Tempkin adsorption isotherm models were applied to describe the equilibrium isotherms. The FTIR spectrum proved the presence of functional groups such as hydroxyl and amino groups in canola hull surface. The results showed that the adsorption of RR198, RB19, DR79, and DR80 onto canola hull followed Tempkin isotherm. Adsorption kinetic of dyes followed pseudo second-order kinetics. Desorption tests showed maximum dye releasing of 88% for RR198, 86% for RB19, 91% for DR79, and 95% for DR80 at pH 12. Data showed that canola hull could be used as a novel natural material for the removal of anionic dyes from wastewater. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 120: 2996-3003, 2011.

Keywords: Acid Dyes, Activated Carbon, Adsorption, Adsorption, Adsorption Isotherm, Adsorption Kinetic, Aqueous-Solutions, Azo-Dye, Basic-Dyes, Biosorbent, Degradation, Desorption, Dye, Dye Adsorption, Dyes, Dyes, Pigments, Electron Microscopy, Equilibrium, Equilibrium Isotherms, Freundlich, FTIR, Fundamental Properties, Immobilized Titania Nanophotocatalysis, Isotherm, Isotherms, Kinetic, Kinetics, Langmuir, pH, Removal, Sorption, Tempkin, UV-Vis Spectroscopy, Wastewater

? Vijaya, Y., Popuri, S.R., Reddy, A.S. and Krishnaiah, A. (2011), Synthesis and characterization of glutaraldehyde-crosslinked calcium alginate for fluoride removal from aqueous solutions. *Journal of Applied Polymer Science*, **120** (6), 3443-3452.

Full Text: [2011\J App Pol Sci120, 3443.pdf](2011/J%20App%20Pol%20Sci120,%203443.pdf)

Abstract: A novel biosorbent was developed by the crosslinking of an anionic biopolymer, calcium alginate, with glutaraldehyde. The glutaraldehyde-crosslinked calcium alginate (GCA) was characterized by Fourier transform infrared spectroscopy and porosity and surface area analysis. The batch equilibrium and column flow adsorption characteristics of fluoride onto the biosorbent were studied. The effects of the pH, agitation time, concentration of adsorbate, and amount of adsorbent on the extent of adsorption were investigated. The experimental data were fitted to the Langmuir and Freundlich adsorption isotherms. The data were analyzed on the basis of the Lagergren pseudo-first-order, pseudo-second-order, and Weber-Morris intraparticle diffusion models. The maximum monolayer adsorption capacity of the GCA sorbent as obtained from the Langmuir adsorption isotherm was found to be 73.5 mg/g for fluoride. The chi(2) and sum of squares of the error analysis were used to correlate the equilibrium isotherm models and kinetics. In addition, breakthrough curves were obtained from column flow experiments. The experimental results demonstrate that the GCA beads could be used for the defluoridation of drinking water through adsorption. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 120: 3443-3452, 2011.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Isotherm, Biopolymers, Biosorbent, Biosorption, Characterization, Defluoridation, Drinking-Water, Equilibrium, Fluoride, Freundlich, FT-IR, Ion-Exchanger, Isotherm, Isotherms, Kinetics, Kinetics (Polym.), Langmuir, Lead(II) Ions, Modeling, pH, Removal, Sorption, Waste-Water

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Full Text: [2011\J App Pol Sci121, 234.pdf](2011/J%20App%20Pol%20Sci121,%20234.pdf)

Abstract: Macroporous poly(glycidyl methacrylate-co-ethylene glycol dimethacrylate) (PGME) was synthesized by suspension copolymerization and functionalized with diethylene triamine (PGME-deta). The effect of pH, contact time, and sorbent mass on sorption efficiency of initial and functionalized copolymer sample for removal of Acid Orange 10 dye from aqueous solutions was studied. No dye was sorbed by nonfunctionalized copolymer, indicating that sorption of Acid Orange 10 by PGME-deta is specific, through amino groups. The isotherm data are best fitted by Langmuir model, indicating homogeneous distribution of active sites in PGME-deta as well as monolayer sorption. Sorption kinetics study showed that the sorption of Acid Orange 10 by PGME-deta obeys the pseudo-second-order kinetic model. It was shown that PGME-deta selectively sorbs Acid Orange 10 from binary solution with Bezaktiv Rot reactive dye. The comparison of sorption characteristics of PGME-deta with activated carbon showed that this functionalized copolymer might be used as an alternative sorbent for textile dyes. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 121: 234-242, 2011.

Keywords: Acid Dye, Activated Carbon, Adsorption, Agricultural Waste, Biological Treatment, Co-Ethylene Dimethacrylate), Dye, Dyes, Glycidyl Methacrylate, Glycidyl Methacrylate, Glycol Dimethacrylate Copolymers, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Macroporous Copolymer, pH, Porous Structure, Sorption, Sorption Kinetics, Surface Modification, Waste-Water

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Full Text: [2011\J App Pol Sci122, 657.pdf](2011/J%20App%20Pol%20Sci122,%20657.pdf)

Abstract: Parameters, such as pH, temperature, initial boron concentration, adsorbent dosage, and ionic strength, affecting boron adsorption onto chitosan beads were examined in this study. The following values were obtained as the optimum conditions in our studied ranges: pH 8.0, temperature = 308 K, amount of chitosan beads = 0.15 g, initial boron concentration = 4 mg L-1, and ionic strength = 0.1 M NaCl]. The adsorption kinetics were also examined in terms of three kinetic models: the pseudo-first-order, pseudo-second-order, and intraparticle diffusion models. The pseudo-second-order kinetic model showed very good agreement with the experimental data. Intraparticle plots seemed to have two steps and indicated multilinearity. Equilibrium data were evaluated with nonlinear and linear forms of the Langmuir and Freundlich equations. The experimental data conformed to the Freundlich equation on the basis of the formation of multilayer adsorption. To characterize the synthesized chitosan beads, we used Fourier transform infrared (FTIR) spectroscopy and scanning electron microscopy (SEM) analyses. As shown by FTIR analysis, the boron species may have interacted with the NH2 groups on chitosan. Microparticles of about 5 mu m appeared in the SEM micrographs of the chitosan beads. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 122: 657-665, 2011.

Keywords: Acid, Adsorbent, Adsorption, Adsorption Kinetics, Aqueous-Solutions, Batch, Boron, Chitosan, Diffusion, Electron Microscopy, Equilibrium, Freundlich, FT-IR, FTIR, FTIR Analysis, Full Factorial Design, Gels, Hydrogels, Hydrotalcite-Like, Ion-Exchange-Resin, Ionic Strength, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir, Nonlinear, pH, Removal, SEM, Sorption, Synthesis, Temperature, Water

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Full Text: [2011\J App Pol Sci122, 804.pdf](2011/J%20App%20Pol%20Sci122,%20804.pdf)

Abstract: In this research, the removal of carmoisine dye from aqueous solutions using polypyrrole coated onto sawdust (PPy/SD) has been investigated. The sorption experiments were performed using both batch and column systems. The effects of some important parameters such as pH, initial concentration, sorbent dosage, exposure time, and temperature on uptake of carmoisine dye were investigated. Based on the data obtained in batch system, it was found that maximum adsorption is occurred under acidic conditions. Complete removal was observed when a dye solution with the initial concentration of 100 mg L-1 was treated by 1.0 g of the used adsorbent (PPy/SD) at pH value of 4 and room temperature. However, higher sorption was observed at elevated temperature. According to the kinetics study, it was found that the experimental data fitted very well the pseudo-second-order kinetic model (k2 = 0.184 g mg-1 min-1). It was found that polypyrrole chemically coated on SD is an efficient system for the removal of carmoisine dye from aqueous solutions. Desorption of the dye-loaded column was also possible by using dilute NaOH solution with high efficiency (similar to 80%). (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 122: 804-812, 2011.

Keywords: Adsorbent, Adsorption, Azo-Dye, Carmoisine, Combination, Degradation, Derivative Spectrophotometry, Desorption, Dye, Future, Kinetic, Kinetic Model, Kinetics, Mechanism, Methylene-Blue, pH, Polymers, Polypyrrole, Removal, Sawdust, Sorbent, Sorption, Sorption, Temperature, Uptake

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Full Text: [2012\J App Pol Sci123, 2439.pdf](2012/J%20App%20Pol%20Sci123,%202439.pdf)

Abstract: The work presents the synthesis of nickel(II) complex of dithiocarbamate-modified starch (DTCSNi). It is characterized by elemental analysis, infrared spectrum, and thermogravimetry methods. A batch system was applied to study the adsorption of DTCSNi for four anionic dyes removals. The adsorption with respect to the pH was investigated. It is found that the capacity of DTCSNi for each dye is pH dependent, and the adsorption is governed by coordination. At the suitable pH 4, two kinetic models, that is, pseudo-first-and pseudo-second-order, were tested to investigate the adsorption process. The kinetic parameters of the models were calculated and discussed. The results suggest that the best fit model is the pseudo-second-order equation. The Langmuir-Freundlich model agrees very well with experimental data and the maximum adsorption capacity sequence is AO7 > AG25 > AR18 > AO10. The Fourier transform infrared spectra and thermogravimetric analysis verified the chelating molecular mechanism. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 123: 2439-2444, 2012.

Keywords: Acid Dyes, Activated Carbon, Adsorption, Adsorption Properties, Anionic Dyes, Azo, Complex, Cu(II), Derivatives, Dyes, Earth, Infrared Spectra, Kinetic, Kinetic Models, Mechanism, Modified Starch, Nickel, Nickel Complex, pH, Removal, Solutions, Waste-Water

# Title: Journal of Applied Sciences

Full Journal Title: [Journal of Applied Sciences](http://ansijournals.com/3/archive.php?id=1&theme=3&jid=jas)

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? Abia, A.A., Didi, O.B. and Asuquo, E.D. (2006), Modeling of Cd2+ sorption kinetics from aqueous solutions onto some thiolated agricultural waste adsorbents. *Journal of Applied Sciences*, **6** (12), 2549-2556.

Full Text: [2006\J App Sci6, 2549.pdf](2006/J%20App%20Sci6,%202549.pdf)

Abstract: Batch kinetic studies was conducted to determine the influence of contact time and chemical modification of adsorbent on sorption of Cd2+. Results indicate that maximum removal efficiencies of 54.66% and 58.66% was obtained for 0.5 and 1.0 MCF at the end of 30 min. Analysis of kinetic models applied to the sorption of Cd(II) ions on the adsorbents was evaluated for the pseudo-first order, pseudo-second order, Elovich, intraparticle diffusion, mass transfer and intra-particle diffusivity models, respectively. The results indicate that the pseudo-second order kinetic model was found to correlate best with the experimental data with rate constants of 2.34×10-1 and 4.64×10-1g mg-1 min-1 for 0.5 and 1.0 MCF, respectively. © 2006 Asian Network for Scientific Information.

Keywords: Adsorbent, Cadmium, Heavy Metals, Kinetics, Modeling, Sorption

? Hanafiah, M.A.K.M., Ngah, W.S.W., Ibrahim, S.C., Zakaria, H. and Ilias, W.A.H.W. (2006), Kinetics and thermodynamic study of lead adsorption from aqueous solution onto rubber (*Hevea brasiliensis*) leaf powder. *Journal of Applied Sciences*, **6** (13), 2762-2767.

Full Text: [2006\J App Sci6, 2762.pdf](2006/J%20App%20Sci6,%202762.pdf)

Abstract: The ability of rubber or *Hevea Brasiliensis* (HB) leaf powder to adsorb Pb2+ from aqueous solution has been investigated through batch experiments. The Pb2+ adsorption was found to be dependent on contact time, initial Pb2+ concentration and temperature. The kinetic processes of Pb2+ adsorption onto HB leaf powder were described by applying pseudo-first-order and pseudo-second-order rate equations. The kinetics data for the adsorption process obeyed pseudo-second-order equation. The equilibrium data were described well by the Langmuir and Freundlich isotherms. The maximum adsorption capacity determined from the Langmuir isotherm was found to be 46.73 mg g-1 at 303 K. Thermodynamic parameters such as ΔG°, ΔH° and ΔS° were also calculated. The adsorption process was found to be exothermic and spontaneous in nature. The studies showed that HB leaf powder could be used as a good adsorbent material for Pb2+ removal from aqueous solution.

? Salamatinia, B., Kamaruddin, A.H. and Abdullah, A.Z. (2007), Removal of Zn and Cu from wastewater by sorption on Oil Palm tree-derived biomasses. *Journal of Applied Sciences*, **7** (15), 2020-2027.

Full Text: J App Sci7, 2020

Abstract: In this study Oil Pahn Bark (OPB), Oil Palm Frond (OPF) and Empty Fruit Bunch (EFB) were evaluated as low-cost sorbent materials for removal of Cu and Zn from water in a batch mode. All the biomasses were used without any chemical modification to evaluate their initial sorption capacity. The sorption processes were performed in a batch mode with 250 mL Cu and Zn solutions at 100 mg L-1 using between 0.5 and 1.0 g of sorbent. The samples were tested every 24 h up to 168 h in normal room temperature. No diffusion limitation was observed in the sorption process. A Zn removal efficiency of 51.5 and 46.0% with 1.0 of OPF and EFB, respectively was observed while OPB showed the lowest removal efficiency. For Cu, the removal achieved was 54% for 1.0 g OPF and 56.5% using 1.0 g of EFB. Cu showed better sorption on the three biomasses. The OPB and EFB introduced excessive amounts of soluble organics into the water. The experimental data obtained with OPF sorbent could fit Freundlich isotherm model better with R2>0.99. This result suggested the heterogeneous binding sites in the biomass. © 2007 Asian Network for Scientific Information.

Keywords: Heavy Metal, Isotherms, Oil Palm Biomass, Sorption, Wastewater

# Title: Journal of Applied Sciences and Environmental Management

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Abia, A.A., Horsfall, M.J. and Didi, O. (2002), Studies on the use of agricultural by-product for the removal of trace metals from aqueous solutions. *Journal of Applied Sciences and Environmental Management*, **6** (2), 89-95.

Full Text: [J\J App Sci Env Man6, 89.pdf](J/J%20App%20Sci%20Env%20Man6,%2089.pdf)

Abstract: The use of pure activated and differentially thiolated cassava waste biomass as adsorbents for the removal of metal ions such as cadmium, copper, and zinc in aqueous solutions were studied by means of equilibrium sorption. The sorption rates of the three metals are 0.2303 min-1 (Cd2+), 0.0051 min-1 (Cu2+) and 0.0040 min-1 (Zn2+) for 0.5M thiolation level and 0.109 min-1 (Cd2+), 0.0069 min-1 (Cu2+) and 0.0367 min-1 (Zn2+) for 1.00M thiolation level respectively. The adsorption rates are quite rapid and within 60 minutes of mixing about 60 - 80 percent of these ions were removed from the solutions by the biomass. The results further showed that increased thiolation led to increased incorporation or availability of more binding groups into the cellulosic matrix, resulting in improved adsorptivity of the cassava waste biomass. The binding capacity study showed that the cassava waste, which is hitherto a serious environmental nuisance due to the fouling odour, released during decomposition has the ability to adsorb trace metals from solutions. @JASEM

Sayed, S.A., El Sayed, A.S., El Sayed, S.M. and Zayed, A.M. (2003), Treatment of liquid oil spill by untreated and treated aswanly clay from Egypt. *Journal of Applied Sciences and Environmental Management*, **7** (1), 25-35.

Full Text: [J\J App Sci Env Man7, 25.pdf](J/J%20App%20Sci%20Env%20Man7,%2025.pdf)

Abstract: The aim of this work is to use cheap, available and recyclable sorbents for oil spill clean - up. α -SiO2-Quartz, Na2Si2O5(OH)4, CaCO3, MgCO3, BaCO3, CaO, MgO, and Fe2O3 are used individually or mixed with Aswanly clay to identify the sorption activity of these materials and to show the effect of incorporation of these materials into the Aswanly clay. Results were 63, 75, 100, 93, 95,75, 92, 100, 80, 98, 90, 71, 90 and 97% on using 1.0 g α -SiO2-Quartz, 0.9 g Na2Si2O5 (OH)4, 0.07 g CaCO3, 0.05 g MgCO3, 0.08 g BaCO3, 0.05g CaO, 0.1 g MgO, and 0.08 g Fe2O3, 0.1 g clay mixture of 50% CaCO3, 0.1 g clay mixture of 10% MgCO3, 0.1 g clay mixture of 50% BaCO3, 0.1 g clay mixture of 50% CaO, 0.1 g clay mixture of 10% MgO, and 0.1 g clay mixture of 50% Fe2O3 respectively, to remove 14.07 mg crude oil, below which mechanical means for removing crude oil from oil contaminated water becomes less more effective, from oil contaminated water of volume 25 ml from oil contaminated water at pH 6 and temperature 30°C. All of these materials were treated by naphtha, a petroleum product of boiling range 30°C - 165°C, to remove sorbed crude oil from its surface for further reuse and contaminated naphtha are processed to be distilled for reuse. Characteristics of crude oil and Aswanly clay were investigated by FTIR, X - Ray Fluorescence, X - Ray Diffraction, pour point and centrifuge instruments. Determination of amount of crude oil in water was done by extraction the crude oil with 10 ml n-hexane and measuring absorbance by UV - VIS. Spectrometer. @JASEM

Sayed, S.A., El Sayed, A.S., El Sayed, S.M. and Zayed, A.M. (2003), Oil spill pollution treatment by sorption on natural *Cynanchum Acutum* L. plant. *Journal of Applied Sciences and Environmental Management*, **7** (2), 63-73.

Full Text: [J\J App Sci Env Man7, 63.pdf](J/J%20App%20Sci%20Env%20Man7,%2063.pdf)

Abstract: The aim of this work is to use cheap, available, biodegradable and recyclable natural organic sorbent for oil spill clean - up. White Silky Hairs (WSH) that is collected from the smooth seeds of Cynanchum Acutum L. plant is used before treatment and after thermal and chemical treatment, to remove crude oil; 0.6 g, below which mechanical means for removing crude oil becomes less more effective, from the surface of saline water of volume 750 mL at temperature 30°C. The plant was treated mechanically by squeezing and then chemically by naphtha, a petroleum product of boiling range 30°C - 165°C, to remove sorbed crude oil from its surface for further reuse and contaminated naphtha are processed to be distilled for reuse. WSH absorbs hydrocarbons quickly and encapsulates oil on contact. WSH absorbs, on average, three times its weight. De-waxed WSH absorbs four times its weight, in case of de-waxing by n-hexane and six times its weight in case of de-waxing by methanol. Dehydrated WSH at 120°C absorbs seven times its weight. WSH absorbs eleven times its weight when it is used after soaking in 10-4 M dodecyl benzenesulphonic acid. WSH absorbs twenty times its weight when it is soaked in dodecyl benzenesulphonic acid and dehydrated at 120°C. Characteristics of crude oil and Cynanchum Acutum L. plant were investigated by FTIR, X - Ray Fluorescence, pour point and centrifuge instruments. Determination of amount of crude oil in saline water was done by extraction the crude oil with tricholorotrifluoroethane and measuring absorbance by Infra Red Spectrometer. @ JASEM

Sayed, S.A., El Sayed, A.S., El Sayed, S.M. and Zayed, A.M. (2004), Removal of oil spills from salt water by magnesium, calcium carbonates and oxides. *Journal of Applied Sciences and Environmental Management*, **8** (1), 71-79.

Full Text: [J\J App Sci Env Man8, 71.pdf](J/J%20App%20Sci%20Env%20Man8,%2071.pdf)

Abstract: Magnesium, calcium carbonates and oxides that are widely used in cement industries were employed in studying sorption of petroleum oil spills from salt water at different condition parameters such as temperature, loading weight, degree of salinity. Treatment of magnesium, calcium carbonates and oxides by dodecyl benzene sulphonic acid alcohol was studied to enhance the sorption efficiency. Results obtained showed that treated MgCO3, CaCO3, MgO and CaO with dodecyl benzene sulphonic can sorb oil by 0.95, 1.25, 78, 0.56 times its weight respectively; untreated materials can sorb oil by 0.49, 0.76, 0.44, 0.32 its weight. Characteristics of crude oil and the used materials were investigated by FTIR, X – Ray Fluorescence, Inductive Coupled Plasma, Pour Point and Thermostatic Water Bath instruments. Determination of the amount of crude oil in water was done by extracting the crude oil in tricholorotrifluoroethane and measuring absorbance by FTIR spectrometer. @JASEM

# Title: Journal of Archaeological Method and Theory

Full Journal Title: Journal of Archaeological Method and Theory

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hutson, S.R. (2006), Self-citation in archaeology: Age, gender, prestige, and the self. *Journal of Archaeological Method and Theory*, **13** (1), 1-18.

Full Text: [2006\J Arc Met The13, 1.pdf](2006/J%20Arc%20Met%20The13,%201.pdf)

Abstract: Citation analyses in archaeology have detected prestige tactics, shifts in research agendas, and patterns of gender differentiation. This paper focuses on self-citation in archaeology and systematically analyzes the factors that affect rates of self-citation. Self-citation rates in archaeology are significantly higher than in socio-cultural anthropology but are average for a social science with interdisciplinary ties to the physical sciences. Self-citation correlates weakly with the gender of the citing author and the geographic and thematic focus of research, but correlates strongly with the age of the author. Additional analyses reveal partial evidence for the use of self-citation as a prestige tactic. The paper concludes with a discussion of citations to writers close to the author (mentors, friends).

Keywords: Author, Authorship, Citation, Citation Analysis, Citations, Prestige, Research, Science, Self-Citation, Socio-Politics of Archaeology

# Title: Journal of Archaeological Science

Full Journal Title: [Journal of Archaeological Science](http://www.sciencedirect.com/science/journal/03054403)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Marriner, N. (2009), Currents and trends in the archaeological sciences. *Journal of Archaeological Science*, **36** (12), 2811-2815.

Full Text: [2009\J Arc Sci36, 2811.pdf](2009/J%20Arc%20Sci36,%202811.pdf)

Abstract: Here I use ISI Web of Knowledge to build on a recent paper by Butzer (2009) and track current trends in the archaeological sciences. I researched eight thematic keywords replete in the title, abstract, keywords and main body of archaeological science literature for the period 1970-2008. For all keywords investigated a steady rise in archaeological science research is evidenced after 1980, with pronounced growth occurring after 2000. I attribute this pattern to the standardisation of research production and academic evaluation, in addition to the democratisation of new information technologies, notably the Internet. The evolution of 10 leading archaeological science journals was also tracked. Since the 1970s, the bibliometric data show that nine of the ten journals have successfully expanded on an annual basis. I found that the biggest growers (the Journal of Archaeological Science [JAS], the Journal of Human Evolution and the Journal of Anthropological Archaeology) are all published by Elsevier. In 2008, the JAS was ranked first for five of the eight thematic keywords by ISI, underlining the popularity and interdisciplinary scope of the journal. According to the 2008 journal Citation Reports, the JAS ranks second for total citations (4219) in archaeological science and third for its overall impact factor (1.779). (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Archaeological Science, Archaeology, Bibliometry, Impact, Research, Thematic Trends, Webometry

# Title: Journal of Arid Environments

Full Journal Title: [Journal of Arid Environments](http://www.sciencedirect.com/science/journal/01401963)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0140-1963

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Magid, H.M.A., Sabrah, R.E.A., Elnadi, A.R.H., Abdelaal, S.I. and Rabie, R.K. (1994), Kinetics of biodegradation rates of chicken manure and municipal refuse in a sandy soil. *Journal of Arid Environments*, **28** (2), 163-171.

Full Text: [1994\J Ari Env28, 163.pdf](1994/J%20Ari%20Env28,%20163.pdf)

Abstract: Incorporation of organic manure in sandy soils is known to improve soil properties related to agricultural production. Therefore, we studied the effect of temperature on the biodegradation of chicken manure and municipal refuse (measured by static alkali absorption of CO2) during a series of successive 2-day laboratory incubations at 0, 10, 20, 30 and 40°C using application rates equivalent to: 0, 4.1, 8.25, 16.5 and 33.0, and 0, 16.5, 33.0, 49.5 and 66.0 t ha-1, respectively. Regression analyses revealed that a linear relationship existed between temperature and rate of biodegradation. Based on an Arrhenius plot of log rate of biodegradation vs. 1/T (reciprocal of absolute temperature), the rate constant (k), activation energy (E(a)) and the temperature coefficient (Q(10)) of the biodegradation process at each temperature and rate were calculated. The results obtained indicated that at high rates of application the magnitude of k, E(a) and Q(10) was affected by the rate, irrespective of temperature. At application rates higher than the optimum (16.5 and 33.0 t ha-1 for chicken manure and municipal refuse, respectively) biodegradation was insensitive to temperature. This effect was reflected on the calculated values of k, E(a) and Q(10). Moreover, this study revealed significant correlations between the application rates of manures and some of the properties of the manure-treated sandy soil.

Keywords: Absorption, Activation, Activation Energy, Agricultural, Biodegradation, CO2, CO2 Evolution, Correlations, Energy, Kinetics, Linear, Manure, Municipal, Organic, Organic Manure, Process, Production, Properties, Q(10), Rate Constant, Sandy Soil, Sandy Soils, Saudi Arabia, Soil, Soil Properties, Soils, Static, T, Temperature, Urea Hydrolysis

? Sáenz, C., Sepúlveda, E. and Matsuhiro, B. (2004), Opuntia spp mucilage’s: A functional component with industrial perspectives. *Journal of Arid Environments*, **57** (3), 275-290.

Full Text: [2004\J Ari Env57, 275.pdf](2004/J%20Ari%20Env57,%20275.pdf)

Abstract: Opuntia genus is widely known for its mucilage production. Mucilage, a complex carbohydrate with a great capacity to absorb water, should be considered a potential source of industrial hydrocolloid. Mucilage contains varying proportions of L-arabinose, D-galactose, L-rhamnose, and D-xylose, as well as galacturonic acid. The mucilage content found in the cactus cladodes is influenced not only by the management of the crop but is also dependent on the temperature, irrigation and the rain.

In some countries, small farmers use cactus mucilage to purify drinking water. Another traditional use is for improving house paint. Recently, a cactus cladode extract was tested to improve water infiltration in soils.

Other properties of cactus mucilage, particularity culinary uses, have also been mentioned. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Mucilages, Hydrocolloids, Opuntia, Cactus Pear, Prickly Pear, Ficus-Indica Mucilage, Calcium-Oxalate Crystals, Streptacantha Lemaire, Guinea-Pigs, L Mill, Hypercholesterolemic Diet, Stereological Analysis, Diabetes-Mellitus, Water Relations, Pectin

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Full Text: [2009\J Ari Env73, 862.pdf](2009/J%20Ari%20Env73,%20862.pdf)

Abstract: While research-article impact is routinely judged by citation Counts, there is recognition that a much broader view is needed to better judge the true value of citations. This paper applies a developing framework based oil the application of network theory, where the network consists of journal articles on arid-systems research which are listed on ISI Web-of-Science. Keywords were used to identify articles related to arid-systems research. Linkages between articles were defined by citations, and we bound our analysis by focusing oil how the Australian subsample contributes to the international arid-systems literature. The analysis showed that impact based oil how articles contribute structurally to the now of knowledge within the literature offers an alternative metric to citation counts. The analysis also presented a partitioned view of the Australian arid literature. This showed that there exists some citation-based structure within the literature, and we showed this structure better describes the literature than a partition based on which journal articles are published in. Crown Copyright (C) 2009 Published by Elsevier Ltd. All rights reserved.

Keywords: Bibliometrics, Bibliometrics, Citation, Citation Indexes, Citations, Community Structure, Dryland, Eastern Australia, Ecology, Graph Theory, Knowledge, Organization, Rangeland, Research, Scientific Collaboration, Semiarid, Vegetation, Web of Science, Woodlands, Words

# Title: Journal of Arthroplasty

Full Journal Title: [Journal of Arthroplasty](http://www.sciencedirect.com/science/journal/08835403)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Hozack, W.J., Ranawat, C. and Rothman, R.H. (2002), Guidelines for authorship. *Journal of Arthroplasty*, **17** (5), 527.

Full Text: [J\J Art17, 527.pdf](J/J%20Art17,%20527.pdf)

? Lloyd, E.W., Geller, J.A., Iorio, R., Yoon, R.S., Huo, M. and Macaulay, W. (2006), Publication rates of scientific presentations at the American Association of Hip and Knee Surgeons annual meetings from 1996 to 2001. *Journal of Arthroplasty*, **21** (6), 2-5.

Full Text: [2006\J Art21, 2.pdf](2006/J%20Art21,%202.pdf)

Abstract: National orthopedic subspecialty meetings are a research forum where volumes of investigations are presented after a peer-reviewed selection process. The objective of this investigation was to determine the publication rate of recent scientific presentations presented at the American Association of Hip and Knee Surgeons (AAHKS) annual meetings. From 1996 to 2001, 168 (58%) of 292 podium abstracts presented at meetings were published. The average time to publication was 21.7±14.7 months. Three major orthopedic journals constituted 89% of the publications. The 58% publication rate for AAHKS ranks as one of the higher rates for orthopedic specialty meetings and validates the selection process for abstracts presented. In addition, AAHKS meetings are an excellent source for a wide array of quality research and scientific information.

Keywords: Information, Investigation, Investigations, Journals, Peer-Reviewed, Publication, Publications, Quality, Rates, Research, Scientific Information, Source, Specialty

# Title: JASSS-the Journal of Artificial Societies and Social Simulation

Full Journal Title: [JASSS-the Journal of Artificial Societies and Social Simulation](http://jasss.soc.surrey.ac.uk/JASSS.html)

ISO Abbrev. Title: JASSS

JCR Abbrev. Title: JASSS-J ARTIF SOC S

ISSN: 1460-7425

Issues/Year: 4

Language: English

Journal Country/Territory: England

Publisher: J A S S S

Publisher Address: Univ Surrey, Dept Sociology, Guildford GU2 7XH, Surrey, England

Subject Categories:

Social Sciences, Interdisciplinary: Impact Factor 1.234, 13/68 (2009)

? Meyer, M., Lorscheid, I. and Troitzsch, K.G. (2009), The development of social simulation as reflected in the first ten years of JASSS: A citation and co-citation analysis. *JASSS-the Journal of Artificial Societies and Social Simulation*, **12** (4), A224-A243.

Full Text: [2009\JASSS12, A224.pdf](2009/JASSS12,%20A224.pdf)

Abstract: Social simulation is often described as a multidisciplinary and fast-moving field. This can make it difficult to obtain an overview of the field both for contributing researchers and for outsiders who are interested in social simulation. The Journal for Artificial Societies and Social Simulation (JASSS) completing its tenth year provides a good opportunity to take stock of what happened over this time period. First, we use citation analysis to identify the most influential publications and to verify characteristics of social simulation such as its multidisciplinary nature. Then, we perform a co-citation analysis to visualize the intellectual structure of social simulation and its development. Overall, the analysis shows social simulation both in its early stage and during its first steps towards becoming a more differentiated discipline.

Keywords: Artificial Stock-Market, Bibliometrics, Bounded Confidence, Citation Analysis, Co-Citation Analysis, Communication, Dynamics, Genetical Evolution, Intellectual Structure, Lines of Research, Mathematical-Theory, Multidisciplinary, Network, Publications, Reputation, Science Studies, Social Simulation

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Full Text: 2011\JASSS14, 4.pdf

Abstract: This paper discusses how stylized facts derived from bibliometric studies can be used to build social simulation models of science. Based on a list of six stylized facts of science it illustrates how they can be brought into play to consolidate and direct research. Moreover, it discusses challenges such a stylized facts based approach of modeling science has to solve.

Keywords: Bibliometric, Bibliometric Studies, Bibliometrics, Half-Life, Methodology, Model Comparison, Modeling, Models, Research, Science, Simulation, Social, Stylized Facts, Validation

? Payette, N. (2011), For an integrated approach to agent-based modeling of science. *JASSS-the Journal of Artificial Societies and Social Simulation*, **14** (4), Article Number: 9.

Full Text: 2011\JASSS14, 9.pdf

Abstract: The goal of this paper is to provide a sketch of what an agent-based model of the scientific process could be. It is argued that such a model should be constructed with normative claims in mind: i.e. that it should be useful for scientific policy making. In our tentative model, agents are researchers producing ideas that are points on an epistemic landscape. We are interested in our agents finding the best possible ideas. Our agents are interested in acquiring credit from their peers, which they can do by writing papers that are going to get cited by other scientists. They can also share their ideas with collaborators and students, which will help them eventually get cited. The model is designed to answer questions about the effect that different possible behaviors have on both the individual scientists and the scientific community as a whole.

Keywords: Agent-Based Models, Approach, Evolutionary Computation, Model, Modeling, Papers, Points, Policy, Policy Making, Process, Researchers, Science, Science Dynamics, Scientific Policy, Scientometrics, Social Networks, Students, Writing

# Title: Journal of the Asia Pacific Economy

Full Journal Title: Journal of the Asia Pacific Economy

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Jongsthapongpanth, A. and Bagchi-Sen, S. (2007), US-Asia interdependencies: A study of business and knowledge links. *Journal of the Asia Pacific Economy*, **12** (2), 215-249.

Full Text: [2007\J Asi Pac Eco12, 215.pdf](2007/J%20Asi%20Pac%20Eco12,%20215.pdf)

Abstract: In the past two decades, US-Asia linkages have improved tremendously with the gradual transformation of some Asian countries as sources of high skilled as well as low cost labor. Extensive research on US-Japan relationships have been undertaken in the 1980s and the 1990s with a progression of research toward the four tigers and now China. South and South East Asian economies are usually neglected in academic research on Asia. This paper provides a comprehensive examination of business links (trade, foreign direct investment, licensing, and patents) and knowledge links (labor flow, publications and citations) within the context of technology transfer and technology cooperation between the two regions. The data show that the United States is increasingly dependent on imports from Asia while Asian nations are dependent on US FDI and technology licenses. For knowledge links, the United States continues to attract Asian scientists and engineers and, over the past ten years, interregional collaborations have strengthened. Economic linkages in the past 30 years are now complemented by knowledge links, which is creating transnational knowledge networks and will eventually facilitate further development of the science and technology workforce and innovation in Asian nations.

Keywords: Asia, Business Linkages, China, Citations, Countries, Development, East-Asia, Economic-Development, Electronics, Global Production Networks, Import Substitution, Innovation, International Collaboration, Knowledge, Knowledge Connections, Nations, Patents, Publications, Research, Science, Science and Technology, Scientometrics, Singapore, Technology, Technology Transfer, US

# Title: Journal of the Association for Information Systems

Full Journal Title: Journal of the Association for Information Systems

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Clarke, R. (2006), Plagiarism by academics: More complex than it seems. *Journal of the Association for Information Systems*, **7** (2), 91-120.

Full Text: [2006\J Ass Inf Sys7, 91.pdf](2006/J%20Ass%20Inf%20Sys7,%2091.pdf)

Abstract: The unattributed incorporation of the work of others into an academic publication is widely regarded as seriously inappropriate behavior. Yet imitation is fundamental to many things that people do, even in academic disciplines. This paper examines the range of activities in which academics engage, including a detailed study of the authoring of textbooks. It concludes that a more fine-grained analysis of plagiarism is needed, in order to distinguish copying that is harmful to the intellectual process, and that which is important to it.

Keywords: Ethics, Code of Conduct, Professional Misconduct, Incorporation, Attribution, Citation, Reference, Academic Publication, Originality, Copyright

? Straub, D. (2006), The value of scientometric studies: An introduction to a debate on IS as a reference discipline. *Journal of the Association for Information Systems*, **7** (5), 241-245

Full Text: [2006\J Ass Inf Sys7, 241.pdf](2006/J%20Ass%20Inf%20Sys7,%20241.pdf)

Keywords: Construct, Reference

? Lewis, B.R., Templeton, G.F. and Luo, X. (2007), A scientometric investigation into the validity of IS journal quality measures. *Journal of the Association for Information Systems*, **8** (12), 619-633.

Full Text: [2007\J Ass Inf Sys8, 619.pdf](2007/J%20Ass%20Inf%20Sys8,%20619.pdf)

Abstract: In this study we investigated the measurement validity of the findings in the IS journal quality stream over the past ten years. Our evaluation applied a series of validation tests to the metrics presented in these studies using data from multiple sources. The results of our tests for content, convergent, and discriminant validity, as well as those for parallel- form, test-retest, and item-tototal reliability, were highly supportive. From these findings, we conclude that recent studies in the IS journal quality stream are credible. As such, these IS journal quality measures provide appropriate indicators of relative journal quality. This conclusion is important for both academic administrators and scientometric researchers, the latter of whom depend on journal quality measures in the evalution of published IS research.

Keywords: Academic, Citation Analysis, Construct, Content, Data, Discriminant, Evaluation, Forums, Indicators, Information-Systems, Investigation, IS, IS Journal Quality Measurement, Journal, Journal Quality, Measurement, Metrics, MIS Research, Quality, Quality Measures, Rankings, Reference Discipline, Reliability, Research, Scholars, Scientometric, Scientometric Research, Sources, Standards, Stream, Test-Retest, Tests, Validation, Validity

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Full Text: [2009\J Ass Inf Sys10, 560.pdf](2009/J%20Ass%20Inf%20Sys10,%20560.pdf)

Abstract: This study is part of a program aimed at creating measures enabling a fairer and more complete assessment of a scholar’s contribution to a field, thus bringing greater rationality and transparency to the promotion and tenure process. It finds current approaches toward the evaluation of research productivity to be simplistic, atheoretic, and biased toward reinforcing existing reputation and power structures. This study examines the use of the Hirsch family of indices, a robust and theoretically informed metric, as an addition to prior approaches to assessing the scholarly influence of IS researchers. It finds that while the top tier journals are important indications of a scholar’s impact, they are neither the only nor, indeed, the most important sources of scholarly influence. Other ranking studies, by narrowly bounding the venues included in those studies, distort the discourse and effectively privilege certain venues by declaring them to be more highly influential than warranted. The study identifies three different categories of scholars: those who publish primarily in North American journals, those who publish primarily in European journals, and a transnational set of authors who publish in both geographies. Excluding the transnational scholars, for the scholars who published in these journal sets during the period of this analysis, we find that North American scholars tend to be more influential than European scholars, on average. We attribute this difference to a difference in the publication culture of the different geographies. This study also suggests that the influence of authors who publish in the European journal set is concentrated at a moderate level of influence, while the influence of those who publish in the North American journal set is dispersed between those with high influence and those with relatively low influence. Therefore, to be a part of the top European scholar list requires a higher level of influence than to be a part of the top North American scholar list.

Keywords: Assessment, Author Cocitation Analysis, Business, Citation Analysis, Citation Analysis, Contemporary Hirsch Index, Critical Perspective, Evaluation, Forums, G-Index, h-Index, h-Index, HC-Index, Hirsch Index, Impact, Information Sciences (InfSci), Information Systems (IS), Journal Rankings, Management-Information-Systems, Perceptions, Publications, Reification by Repetition, Research, Research Productivity, Scholarly Influence Ranking, Scientists, Scientometrics

# Title: Journal of the Association of Official Analytical Chemists

Full Journal Title: Journal of the Association of Official Analytical Chemists

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

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# Title: Journal of Assisted Reproduction and Genetics

Full Journal Title: Journal of Assisted Reproduction and Genetics

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Wang, W., Zhang, X.H., Wang, W.H., Liu, Y.L., Zhao, L.H., Xue, S.L. and Yang, K.H. (2011), The time interval between hCG priming and oocyte retrieval in ART program: A meta-analysis. *Journal of Assisted Reproduction and Genetics*, **28** (10), 901-910.

Full Text: [2011\J Ass Rep Gen28, 901.pdf](2011/J%20Ass%20Rep%20Gen28,%20901.pdf)

Abstract: Objective To evaluate the relationship between different hCG priming-to-oocyte retrieval intervals and assisted reproductive technology (ART) outcome. Methods We systematically searched PubMed, EMBASE, the Cochrane Library, Science Citation Index, Chinese biomedicine (CBM) literature database, and Chinese Journal Full-text Database for randomized controlled trials (RCTs) published up to November 2010. Data was extracted from the studies by two independent reviewers. Statistical analysis was performed with Cochrane Collaboration’s Review Manager (RevMan) 5.0.2. From extracted data, Risk Ratio (RR) with 95% confidence interval (CI) was calculated. Results 5 RCTs totaling 895 participants were included. Oocyte maturation rate was higher in the long interval group compared with short interval group (RR, 0.67; 95% CI, 0.62-0.73). There were no significant difference between the two groups with regard to fertilization rate (RR, 0.99; 95% CI, 0.94-1.04), implantation rate (RR, 0.91; 95% CI, 0.40-2.04), and pregnancy rate (RR, 0.79; 95% CI, 0.58-1.08). Conclusion The percentage of mature (MII) oocytes can be increased by prolonging the interval between hCG priming and oocyte retrieval. The prolonged interval could not increase the fertilization rate, implantation rate, and pregnancy rate. Although there was evidence to confirm the results, they still need to be confirmed by large-sample, multicenter, randomized controlled trials. The time interval dependent mechanisms responsible for ART performance need to be elucidated.

Keywords: Analysis, Art, Assisted Reproductive Technology, Citation, Cochrane, Database, Embase, Endothelial Growth-Factor, Follicular Rupture, Human Chorionic Gonadotropin, Human Chorionic-Gonadotropin, In-Vitro Fertilization, Infertility, Intrauterine Insemination, Invitro Fertilization, Journal, Literature, Luteinizing-Hormone, Mechanisms, Meta Analysis, Meta-Analysis, Methods, Oocyte Retrieval, Outcome, Ovarian Hyperstimulation Syndrome, Pregnancy, Pubmed, Randomized Controlled Trials, Review, Risk, Science, Science Citation Index, Single-Embryo-Transfer, Superovulation Therapy, Time Interval

# Title: Journal of Asthma

Full Journal Title: [Journal of Asthma](http://www.informaworld.com/smpp/title~db=all~content=t713597262~tab=issueslist)

ISO Abbreviated Title: J. Asthma

JCR Abbreviated Title: J Asthma

ISSN: 0277-0903

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Marcel Dekker Inc

Publisher Address: 270 Madison Ave, New York, NY 10016

Subject Categories:

Allergy: Impact Factor 1.020, 7/15 (2002)

Respiratory System: Impact Factor 1.020, 24/32 (2002)

? Smith, S., Mitchell, C. and Bowler, S. (2007), Patient-centered education: Applying learner-centered concepts to asthma education. *Journal of Asthma*, **44** (10), 799-804.

Full Text: 2007\J Ast44, 799.pdf

Abstract: Objective. To review studies of patient-centered asthma education. Method. CINAHL, MEDLINE, Psycinfo, Eric, PsycARTICLES, and web of science databases were searched. Results Asthma education programs are often based on health behavior theories. Many studies lack rigor in the assessment of the program’s efficacy and effectiveness. Asthma education that promotes self-management primarily uses a problem-based approach. Few studies have examined the way educators teach and patients learn. Patient-centered approaches to education have mainly focused on communication between the patient and the health professional. Decision making as part of shared responsibility may vary with every patient. Patient-centered care shares similarities with the Self-Determination Theory as a learner-centered approach to education. Conclusions. Many asthma education studies have been completed with varying levels of efficacy and effectiveness reported. Most programs focus on changing behavior with few studies examining educator behavior and/or the patient’s learning styles. With a patient-centered approach being the preferred model of care, the incorporation of learner-centered approaches to patient education may prove useful in the future.

Keywords: Adults, Assessment, Asthma, Attitudes, Communication, Databases, Decision Making, Decision-Making, Education, Effectiveness, Efficacy, General-Practitioners, Health Behavior, Health Belief Model, Knowledge, Learner-Centered Education, Learning, Medical Regimen, Model, Patient Education, Patient-Centered Care, Primary-Care, Professional, Randomized Controlled-Trial, Review, Science, Self-Management, Self-Management Education, Shared Decision-Making, Theories, Theory, Web of Science

? Groneberg-Kloft, B., Scutaru, C., Dinh, Q.T., Welte, T., Chung, K.F., Fischer, A. and Quarcoo, D. (2009), Inter-disease comparison of research quantity and quality: Bronchial asthma and chronic obstructive pulmonary disease. *Journal of Asthma*, **46** (2), 147-152.

Full Text: [2009\J Ast46, 147.pdf](2009/J%20Ast46,%20147.pdf)

Abstract: Background. The two obstructive airway diseases bronchial asthma and chronic obstructive pulmonary disease (COPD) represent major global causes of disability and death. Whereas COPD research was largely underfunded in the 1980s and 1990s, increased funding activities have been initiated since the year 2000. However, detailed scientometric data on the development of research for asthma and COPD have not been generated so far. Methods. The present scientometric study was conducted to establish a database of research quantity and quality in the 20-year period between 1987 and 2006 using the Web of Science information system and the United Kingdom and Germany for comparison of research activities. Results. The information database Web of Science was screened and during the period from 1987 to 2006 a number of 8,874 items related to asthma was published by UK affiliations. Of these, 1,824 were published in cooperation with a total of 86 other countries. This is a ratio of 20.55%. In the same period, 3,341 items were published by German institutions (923 in cooperation with 56 other countries, ratio of 27.63%). Citation analysis demonstrated an average citation of 24.48 per UK article and 17.62 per German article. For COPD, 2,179 items were published by UK affiliations and 689 items by German institutions. Of the UK COPD publications, 570 were published in cooperations with 47 countries (ratio of 22.95 %). By contrast, 218 of the 689 German COPD articles were published with 29 other countries (ratio of 25.49%). When citation analysis was performed, average citation ratios of 18.93 for the UK and 10.61 for German were found. Conclusion. Summarizing this first country-specific comparative benchmarking analysis for obstructive pulmonary diseases it can be concluded that (1) asthma research dominated in the past 20 years; (2) COPD research gained importance in the field since the end of the 1990s; (3) there are large differences present in the research output between the two high-income countries examined.

Keywords: Analysis, Asthma, Benchmarking, Bronchial Asthma, Burden, Chronic, Chronic Obstructive Pulmonary Disease, Citation, Citation Analysis, Comparison, Contrast, Cooperation, COPD, Data, Database, Death, Development, Disability, Disease, Diseases, Field, First, Funding, Germany, Information, Institutions, Publications, Pulmonary, Quality, Research, Science, Scientometric, Scientometry, UK, United Kingdom, United-States, Web of Science

? Klaewsongkram, J. and Reantragoon, R. (2009), Asthma research performance in Asia-pacific: A bibliometric analysis by searching PubMed database. *Journal of Asthma*, **46** (10), 1013-1020.

Full Text: [2009\J Ast46, 1013.pdf](2009/J%20Ast46,%201013.pdf)

Abstract: Background and Objective. Countries in the Asia-Pacific region have experienced an increase in the prevalence of asthma. and they have been actively involved in asthma research recently. This study aimed to analyze asthma research from Asia-Pacific in the last decade by bibliometric method. Method. Asthma articles from Asia-Pacific Countries published between 1998 and 2007 were retrieved from PubMed by searching MeSH for “asthma.” Results. Most of published asthma articles in Asia-Pacific are from affluent countries in northeast Asia and Oceania. Australia and Japan have been the regional powerhouses since they contributed more than half of regional articles on asthma. Asthma publications front emerging economics in Asia Such as South Korea, Taiwan, Hong Kong, and Singapore. have dramatically increased in the last decade in terms of quantity and quality aspects and were considerable sources of basic and translational research in the region. Mainland China and India have significantly increased their research capacity as well, but quality needs to be improved. Asthma publications from New Zealand and Australia. Countries with the highest asthma prevalence rates in the world, yielded highest citation Counts per articles and were published ill journals with high impact factor. Asthma research parameters per million population correlate well with gross domestic product per capita. Almost half (41%) of total articles were produced from only 25 institutions in the region and almost half of them (47%) were published in 20 journals. Conclusions. Asthma research in Asia-Pacific were mainly conducted in countries in Oceania and Northeast Asia and research performance strongly, correlated with the nation’s wealth. Interesting asthma research projects in the region were recommended.

Keywords: Allergy, Asia, Asthma, Atopy, Bibliometric, Bibliometric Analysis, Bibliometrics, Capacity, Children, China, Citation, Database, Epidemiology, Global Burden, Impact, Impact Factor, Increase, Isaac, Journals, Prevalence, Publications, Research, Research Performance, Science, Symptoms, Trends

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? Kaminski, T.W. and Hartsell, H.D. (2002), Factors contributing to chronic ankle instability: A strength perspective. *Journal of Athletic Training*, **37** (4), 394-405.

Full Text: [2002\J Bio Inf37, 394.pdf](2002/J%20Bio%20Inf37,%20394.pdf)

Abstract: Objective: To examine the concept of dynamic ankle stability and closely critique the relevant research over the past 50+ years focusing on strength as it relates to those with chronic ankle instability (CAI). Data Sources: We reviewed the literature regarding the assessment of strength related to CAI. We searched MEDLINE and ISI Web of Science from 1950 through 2001 using the key words functional ankle instability, chronic ankle instability, strength, ankle stability, chronic ankle dysfunction, and isokinetics. Data Synthesis: An overview of dynamic stability in the ankle is established, followed by a comprehensive discussion involving the variables used to assess ankle strength. Additionally, a historical look at deficits in muscular stability leading to CAI is provided, and a compilation of numerous contemporary approaches examining strength as it relates to CAI is presented. Conclusions/Recommendations: Although strength is an important consideration during ankle rehabilitation, deficits in ankle strength are not highly correlated with CAI. More contemporary approaches involving the examination of reciprocal muscle-group ratios as a measure of strength have recently been investigated and offer an insightful, albeit different, avenue for future exploration. Evidence pertaining to the effects of strength training on those afflicted with CAI is lacking, including what, if any, implication strength training has on the various measures of ankle strength.

Keywords: Ankle Instability, Assessment, Chronic Ankle Dysfunction, Chronic Ankle Instability, Concentric, Dynamic Ankle Stability, E : I Ratios, Eccentric, Eversion Strength, Functional, Functional Ankle Instability, Functionally Unstable Ankles, Injury Risk, Inversion, ISI, Isokinetics, Lateral Ankle Sprain, Lateral Ligament, Literature, Mechanical Instability, Medline, Muscle, Overview, Peak-Torque, Position Sense, Postural Sway, Reciprocal Muscle Group Ratios, Rehabilitation, Research, Science, Sources, Torque Measurements, Training, Web of Science

? Grindstaff, T.L., Hammill, R.R., Tuzson, A.E. and Hertel, J. (2006), Neuromuscular control training programs and noncontact anterior cruciate ligament injury rates in female athletes: A numbers-needed-to-treat analysis. *Journal of Athletic Training*, **41** (4), 450-456.

Full Text: [2006\J Bio Inf41, 450.pdf](2006/J%20Bio%20Inf41,%20450.pdf)

Abstract: Objective: To determine the numbers needed to treat (NNT) and relative risk reduction (RRR) associated with neuromuscular training programs aimed at preventing noncontact anterior cruciate ligament (ACL) injuries in female athletes. Data Sources: We searched PUBMED, MEDLINE, SPORT Discus, CINAHL, and Web of Science from 1966 through 2005 using the terms knee, injury, anterior cruciate ligament, ACL, prevention, plyometric, and neuromuscular training. Study Selection: Selected articles were from peer-reviewed journals written in English that described original research studies comparing neuromuscular training programs with control programs to determine the number of noncontact ACL injuries per event exposure or hours of playing time. Five studies met the inclusion criteria and were independently rated by 3 reviewers using the Physiotherapy Evidence Database (PEDro) scale. Consensus PEDro scores ranged from 4 to 7 out of 10. Data Extraction: We used numbers of subjects, ACL injuries, and injury exposure rates to calculate NNT and RRR for each study. The NNT calculations from all studies were based on the number of players across 1 competitive season and were described as NNT benefit or NNT harm. Data Synthesis: All 5 studies demonstrated a prophylactic effect due to the neuromuscular training programs. The pooled NNT estimates showed that 89 individuals (95% confidence interval: 66 to 136) would need to participate in the prophylactic training program to prevent 1 ACL injury over the course of 1 competitive season. Pooled RRR was 70% (95% confidence interval: 54% to 80%) among individuals who participated in the intervention program. One high-quality randomized control trial and 4 medium-quality prospective cohort studies showed mostly consistent findings. Thus, a Strength of Recommendation Taxonomy level of evidence of 1 with a grade B recommendation supports the use of neuromuscular training programs in the prevention of noncontact ACL injuries in female athletes.

Keywords: Analysis, Balance, Cohort Studies, Control, Extraction, Follow-Up, Injury, Injury Prevention, Intervention, Journals, Knee Injury, Knee Injury, Medline, Performance, Physiotherapy, Plyometrics, Power, Prevention, Pubmed, Recommendation, Relative Risk, Research, Risk, Risk Reduction, Science, Soccer Players, Sources, Sport, Strength, Taxonomy, Team Handball Players, Training, Web of Science

? Morrison, K.E. and Kaminski, T.W. (2007), Foot characteristics in association with inversion ankle injury. *Journal of Athletic Training*, **42** (1), 135-142.

Full Text: [2007\J Bio Inf42, 135.pdf](2007/J%20Bio%20Inf42,%20135.pdf)

Abstract: Objective: To review the literature that provides information to assist in analyzing the role of the foot in acute and chronic lateral ankle injury. Data Sources: We searched MEDLINE, CINAHL, Institute for Scientific Information’s Web of Science, and SPORT Discus from 1965-2005 using the terms lateral, ankle, ligament, injury, risk factors, foot, subtalar joint, talocrural joint, gait analysis, and foot biomechanics. Data Synthesis: We found substantial information on the incidence and treatment of lateral ankle sprains in sport but very few articles that focused on risk factors associated with these injuries and even less information on the foot as it relates to this condition. Moreover, little information was available regarding the risk factors associated with the development of chronic instability after a lateral ankle sprain. We critically analyzed the foot articulations and the foot’s role in the mechanism of injury to assist our clinical synopsis. Conclusions/Recommendations: An in-depth review of the foot complex in relation to lateral ankle sprains strongly suggested its importance when treating and preventing inversion ankle trauma. Throughout the literature, the only static foot measurements that show a significant correlation to this condition are an identified cavovarus deformity, increased foot width, and increased calcaneal eversion range of motion. Authors also provided dynamic measurements of the foot, which produced several significant findings that we discuss. Although our findings offer some insight into the relationship between foot characteristics and lateral ankle injuries, future research is needed to confirm the results of this review and expand this area of investigation.

Keywords: Alignment, Analysis, Ankle Instability, Ankle Ligaments, Ankle Sprain, Ankle Sprains, Chronic Ankle Instability, Development, Dorsiflexion, Foot Classification, Gait, Hindfoot, Information, Injury, Instability, Lateral Ankle Sprain, Literature, Mechanism, Medline, Motion, Players, Recruits, Research, Review, Risk, Risk Factors, Risk-Factors, Science, Sources, Sport, Sprains, Subtalar Joint, Trauma, Treatment, Web of Science

? Wasielewski, N.J. and Kotsko, K.M. (2007), Does eccentric exercise reduce pain and improve strength in physically active adults with symptomatic lower extremity tendinosis? A systematic review. *Journal of Athletic Training*, **42** (3), 409-421.

Full Text: [2007\J Bio Inf42, 409.pdf](2007/J%20Bio%20Inf42,%20409.pdf)

Abstract: Objective: To critically review evidence for the effectiveness of eccentric exercise to treat lower extremity tendinoses. Data Sources: Databases used to locate randomized controlled trials (RCTs) included PUBMED (1980-2006), CINAHL (1982-2006), Web of Science (1995-2006), SPORT Discus (1980-2006), Physiotherapy Evidence Database (PEDro), and the Cochrane Collaboration Database. Key words included tendon, tendonitis, tendinosis, tendinopathy, exercise, eccentric, rehabilitation, and therapy. Study Selection: The criteria for trial selection were (1) the literature was written in English, (2) the research design was an RCT, (3) the study participants were adults with a clinical diagnosis of tendinosis, (4) the outcome measures included pain or strength, and (5) eccentric exercise was used to treat lower extremity tendinosis. Data Extraction: Specific data were abstracted from the RCTs, including eccentric exercise protocol, adjunctive treatments, concurrent physical activity, and treatment outcome. Data Synthesis: The calculated post hoc statistical power of the selected studies (n = 11) was low, and the average methodologic score was 5.3/10 based on PEDro criteria. Eccentric exercise was compared with no treatment (n = 1), concentric exercise (n = 5), an alternative eccentric exercise protocol (n = 1), stretching (n = 2), night splinting (n = 1), and physical agents (n = 1). In most trials, tendinosis-related pain was reduced with eccentric exercise over time, but only in 3 studies did eccentric exercise decrease pain relative to the control treatment. Similarly, the RCTs demonstrated that strength-related measures improved over time, but none revealed significant differences relative to the control treatment. Based on the best evidence available, it appears that eccentric exercise may reduce pain and improve strength in lower extremity tendinoses, but whether eccentric exercise is more effective than other forms of therapeutic exercise for the resolution of tendinosis symptoms remains questionable.

Keywords: Achilles Tendon, Adults, Chronic Achilles Tendinosis, Chronic Patellar Tendinopathy, Cochrane, Collaboration, Concentric, Control, Databases, Diagnosis, Eccentric, Effectiveness, Exercise, Extraction, Follow-Up, Jumpers Knee, Literature, Neovascularization, Outcome, Pain, Patellar Tendon, Physical Activity, Physiotherapy, Protocol, Pubmed, Quality, Randomized Controlled Trials, Randomized Controlled-Trials, Rehabilitation, Reliability, Research, Research Design, Review, Science, Sources, Sport, Statistical, Symptoms, Systematic, Systematic Review, Tendon, Tendon Injuries, Therapy, Treatment, Treatment Outcome, Volleyball Players, Web of Science

? Lopez, R.M., Casa, D.J., McDermott, B.P., Ganio, M.S., Armstrong, L.E. and Maresh, C.M. (2009), Does creatine supplementation hinder exercise heat tolerance or hydration status? A systematic review with meta-analyses. *Journal of Athletic Training*, **44** (2), 215-223.

Full Text: [2009\J Bio Inf44, 215.pdf](2009/J%20Bio%20Inf44,%20215.pdf)

Abstract: Objective: To critically assess original research addressing the effect of creatine supplementation on exercise heat tolerance and hydration status. Data Sources: We searched the electronic databases PUBMED, Scopus, Web of Science, SPORTDiscus, and Rehabilitation & Physical Medicine, without date limitations, for the following key words: creatine, exercise, thermoregulation, dehydration, hyperthermia, heat tolerance, exertional heat illnesses, and renal function. Our goal was to identify randomized clinical trials investigating the effect of creatine supplementation on hydration status and thermoregulation. Citations from related articles also were identified and retrieved. Data Synthesis: Original research was reviewed using the Physiotherapy Evidence Database (PEDro) Scale. One author initially screened all articles. Fifteen of 95 articles examined the effects of creatine on thermoregulation or hydration status (or both). Two independent reviewers then reviewed these articles. Ten studies were selected on the basis of inclusion and exclusion criteria. The PEDro scores for the 10 studies ranged from 7 to 10 points (maximum possible score = 10 points). Conclusions: No evidence supports the concept that creatine supplementation either hinders the body’s ability to dissipate heat or negatively affects the athlete’s body fluid balance. Controlled experimental trials of athletes exercising in the heat resulted in no adverse effects from creatine supplementation at recommended dosages.

Keywords: Adults, Adverse Effects, Author, Balance, Citations, Clinical Trials, Databases, Dehydrated Men, Dehydration, Environment, Exercise, Exertional Heat Illness, Health, Hypohydration, Injury, Physiotherapy, Points, Pubmed, Randomized Clinical Trials, Rehabilitation, Renal Function, Research, Review, Scale, Science, Scopus, Sources, Systematic, Systematic Review, Thermoregulation, Thermoregulatory Responses, Web of Science

? Hart, J.M., Pietrosimone, B., Hertel, J. and Ingersoll, C.D. (2010), Quadriceps activation following knee injuries: A systematic review. *Journal of Athletic Training*, **45** (1), 87-97.

Full Text: [2010\J Bio Inf45, 87.pdf](2010/J%20Bio%20Inf45,%2087.pdf)

Abstract: Context: Arthrogenic muscle inhibition is an important underlying factor in persistent quadriceps muscle weakness after knee injury or surgery. Objective: To determine the magnitude and prevalence of volitional quadriceps activation deficits after knee injury. Data Sources: Web of Science database. Study Selection: Eligible studies involved human participants and measured quadriceps activation using either twitch interpolation or burst superimposition on patients with knee injuries or surgeries such as anterior cruciate ligament deficiency (ACLd), anterior cruciate ligament reconstruction (ACLr), and anterior knee pain (AKP). Data Extraction: Means, measures of variability, and prevalence of quadriceps activation (QA) failure (<95%) were recorded for experiments involving ACLd (10), ACLr (5), and AKP (3). Data Synthesis: A total of 21 data sets from 18 studies were initially identified. Data from 3 studies (1 paper reporting data for both ACLd and ACLr, 1 on AKP, and the postarthroscopy paper) were excluded from the primary analyses because only graphical data were reported. of the remaining 17 data sets (from 15 studies), weighted mean QA in 352 ACLd patients was 87.3% on the involved side, 89.1% on the uninvolved side, and 91% in control participants. The QA failure prevalence ranged from 0% to 100%. Weighted mean QA in 99 total ACLr patients was 89.2% on the involved side, 84% on the uninvolved side, and 98.5% for the control group, with prevalence ranging from 0% to 71%. Thirty-eight patients with AKP averaged 78.6% on the involved side and 77.7% on the contralateral side. Bilateral QA failure was commonly reported in patients. Conclusions: Quadriceps activation failure is common in patients with ACLd, ACLr, and AKP and is often observed bilaterally.

Keywords: Anterior Cruciate Ligament, Arthrogenic Muscle Inhibition, Arthrogenic Muscle Inhibition, Central Activation Ratio, Control, Extraction, Gait Patterns, Human, Injury, Joint Effusion, Knee Injury, Neural Activation, Neuromuscular Electrical-Stimulation, Pain, Patellar Tendon, Pool Excitability, Prevalence, Primary, Review, Science, Sources, Superimposed Burst, Surgery, Systematic, Systematic Review, Twitch Interpolation, Twitch Interpolation, Variability, Voluntary Activation, Voluntary Activation, Web of Science

? Jenkin, M., Sitler, M.R. and Kelly, J.D. (2010), Clinical Usefulness of the Ottawa Ankle Rules for Detecting Fractures of the Ankle and Midfoot. *Journal of Athletic Training*, **45** (5), 480-482.

Full Text: [2010\J Bio Inf45, 480.pdf](2010/J%20Bio%20Inf45,%20480.pdf)

Abstract: Clinical Question: What is the evidence for the accuracy of the Ottawa Ankle Rules as a decision aid for excluding fractures of the ankle and midfoot? Data Sources: Studies were identified by searching MEDLINE and PreMEDLINE (Ovid version: 1990 to present), EMBASE (Datastar version: 1990-2002), CINAHL (Winspires version: 1990-2002), the Cochrane Library (2002, issue 2), and the Science Citation Index database (Web of Science by Institute for Science Information). Reference lists of all included studies were also searched, and experts and authors in the specialty were contacted. The search had no language restrictions. Study Selection: Minimal inclusion criteria consisted of (1) study assessment of the Ottawa Ankle Rules and (2) sufficient information to construct a 2 x 2 contingency table specifying the false-positive and false-negative rates. Data Extraction: Studies were selected in a 2-stage process. First, all abstracts and titles found by the electronic searches were independently scrutinized by the same 2 authors. Second, copies of all eligible papers were obtained. A checklist was used to ensure that all inclusion criteria were met. Disagreements related to the eligibility of studies were resolved by consensus. Both authors extracted data from each included study independently. Methods of data collection, patient selection, blinding and prevention of verification bias, and description of the instrument and reference standard were assessed. Sensitivities (using the bootstrap method), specificities, negative likelihood ratios (using a random-effects model), and their standard errors were calculated. Special interest was paid to the pooled sensitivities and negative likelihood ratios because of the calibration of the Ottawa Ankle Rules toward a high sensitivity. Exclusion criteria for the pooled analysis were (1) studies that used a nonprospective data collection, (2) unknown radiologist blinding (verification bias), (3) studies assessing the performance of other specialists (nonphysicians) using the rules, and (4) studies that looked at modifications to the rules. Main Results: The search yielded 1085 studies, and the authors obtained complete articles for 116 of the studies. The reference lists from these studies provided an additional 15 studies. Only 32 of the studies met the inclusion criteria and were used for the review; 5 of these met the exclusion criteria. For included studies, the total population was 15 581 (range = 18-1032), and average age ranged from 11 to 31.1 years in those studies that reported age. The 27 studies analyzed (pooled) consisted of 12 studies of ankle assessment, 8 studies of midfoot assessment, 10 studies of both ankle and midfoot assessment, and 6 studies of ankle or midfoot assessment in children (not all studies assessed all regions). Pooled sensitivities, specificities, and negative likelihood ratios for the ankle, midfoot, and combined ankle and midfoot are presented in the Table. Based on a 15% prevalence of actual fracture in patients presenting acutely after ankle or foot trauma, less than a 1.4% probability of fracture existed. Because limited analysis was conducted on the data from the children, we elected to not include this cohort in our review. Conclusions: Evidence supports the use of the Ottawa Ankle Rules as an aid in ruling out fractures of the ankle and midfoot. The rules have a high sensitivity (almost 100%) and modest specificity. Use of the Ottawa Ankle Rules holds promise for saving time and reducing both costs and radiographic exposure without sacrificing diagnostic accuracy in ankle and midfoot fractures.

Keywords: Radiography, Clinical Guidelines, Lower Extremity Injuries, Ankle Sprains, Sports-Medicine Center, Injuries

? Wasielewski, N.J., Parker, T.M. and Kotsko, K.M. (2011), Evaluation of electromyographic biofeedback for the quadriceps Femoris: A systematic review. *Journal of Athletic Training*, **46** (5), 543-554.

Full Text: 2011\J Bio Inf46, 543.pdf

Abstract: Objective: To critically review evidence for the effectiveness of electromyographic biofeedback (EMGB) of the quadriceps femoris muscle in treating various knee conditions. Data Sources: Databases used to locate randomized controlled trials included PubMed (1980-2010), Cumulative Index of Nursing and Allied Health Literature (CINAHL, 1995-2007), Web of Science (1986-2010), SPORTDiscus (1990-2007), and Physiotherapy Evidence Database (PEDro). Key words were knee and biofeedback. Study Selection: The criteria for selection were clinical randomized controlled trials in which EMGB of the quadriceps femoris was used for various knee conditions of musculoskeletal origin. Trials were excluded because of research designs other than randomized controlled trials, articles published in a non-English language, inclusion of healthy research participants, inability to identify EMGB as the source of clinical improvement, and lack of pain, functional outcome, or quadriceps torque as outcome measures. Data Extraction: Twenty specific data points were abstracted from each clinical trial under the broad categories of attributes of the patient and injury, treatment variables for the EMGB group, treatment variables for the control group, and attributes of the research design. Data Synthesis: Eight trials yielded a total of 319 participants with patellofemoral pain syndrome (n = 86), anterior cruciate ligament reconstruction (n = 52), arthroscopic surgery (n = 91), or osteoarthritis (n = 90). The average methodologic score of the included studies was 4.6/10 based on PEDro criteria. Pooled analyses demonstrated heterogeneity of the included studies, rendering the interpretation of the pooled data inappropriate. The EMGB appeared to benefit short-term postsurgical pain or quadriceps strength in 3 of 4 postsurgical investigations but was ineffective for chronic knee conditions such as patellofemoral pain and osteoarthritis in all 4 studies. Because the findings are based on limited data, caution is warranted until more randomized controlled trials are conducted to support or refute the general trends observed in this report.

Keywords: Anterior Cruciate Ligament, Arthroscopic Partial Meniscectomy, Clinical Trial, Control, Database, Databases, Design, Effectiveness, Electrical-Stimulation, Evaluation, Exercise Program, Exercises, Extraction, Functional, Health, Injury, Interpretation, Knee, Knee-Joint Effusion, Literature, Muscle Strength, Nursing, Outcome, Pain, Patellofemoral Pain Syndrome, Physical-Therapy, Physiotherapy, Points, Pubmed, Randomized Controlled Trials, Randomized Controlled-Trials, Rehabilitation, Research, Research Design, Review, Science, Selection, Sources, Strength, Surgery, Synthesis, Systematic, Systematic Review, Treatment, Trends, Vastus Medialis Oblique, Web of Science

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Colvile, R.N., Choularton, T.W., Cape, J.N., Bandy, B.J., Bower, K.N., Burgess, R.A., Davies, T.J., Dollard, G.J., Gallagher, M.W., Hargreaves, K.J., Jones, B.M.R., Penkett, S.A. and Storeton-West, R.L. (1996), Processing of oxidized nitrogen compounds by passage through winter-time orographic cloud. *Journal of Atmospheric Chemistry*, **24**, 211-239.

Full Text: J Atm Che24, 211

Abstract: Four case studies are described, from a three-site field experiment in October/November 1991 using the Great Dun Fell flow-through reactor hill cap cloud in rural Northern England. Measurements of total odd-nitrogen nitrogen oxides (NOY) made on either side of the hill, before and after the air flowed through the cloud, showed that 10 to 50% of the NOY, called NOZ, was neither NO nor NO2. This NOZ failed to exhibit a diurnal variation and was often higher after passage through cloud than before. No evidence of conversion of NOZ to NO3-in cloud was found. A simple box model of gas-phase chemistry in air before it reached the cloud, including scavenging of NO3 and N2O5 by aerosol of surface area proportional to the NO2 mixing ratio, shows that NO3 and N2O5 may build up in the boundary layer by night only if stable stratification insulates the air from emissions of NO. This may explain the lack of evidence for N2O5 forming NO3-in cloud under well-mixed conditions in 1991, in contrast with observations under stably stratified conditions during previous experiments when evidence of N2O5 was found. Inside the cloud, some variations in the calculated total atmospheric loading of HNO2 and the cloud liquid water content were related to each other. Also, indications of conversion of NOX to NOZ were found. To explain these observations, scavenging of NOX and HNO2 by cloud droplets and/or aqueous-phase oxidation of NO2-by nitrate radicals are considered. When cloud acidity was being produced by aqueous-phase oxidation of NOX or SO2, NO3-which had entered the cloud as aerosol particles was liberated as HNO3 vapour. When no aqueous-phase production of acidity was occurring, the reverse, conversion of scavenged HNO3 to particulate NO3-, was observed.

Chughtai, A.R., Miller, N.J., Smith, D.M. and Pitts, J.R. (1999), Carbonaceous particle hydration III. *Journal of Atmospheric Chemistry*, **34** (2), 259-279.

Full Text: [J\J Atm Che34, 259.pdf](J/J%20Atm%20Che34,%20259.pdf)

Abstract: Previous soot hydration studies have been extended to compare the water uptake properties of soots from selected fuels (JP-8 Jet fuel, kerosene, diesel, and metal containing and S-containing synthetics) prepared under varying conditions with corresponding n-hexane model soots. Adsorption and desorption isotherms have yielded such adsorption parameters as the surface coverages at the limit of chemisorption and at 83% relative humidity (RH). These values increase with soot surface oxidation over the range 35-85% RH, while hydration levels at lower RH down to 22% are a function of fuel composition and combustion conditions, thus determining the extent of water uptake at higher RH. Both S-and metal-containing soots exhibit higher levels of hydration than those of the base fuel soots, a result with its origin in availability of sulfate and metal centers at the surface.

Keywords: Soots, Hydration, Water Adsorption, Surface, Diesel Soot Particles, Water-Adsorption, Black Carbon, Amorphous-Carbon, Dubinin-Astakhov, Oxidized Soots, Sulfur-Dioxide, Active Carbons, Oxidation, Kinetics

Betterton, E.A. (2001), Autoxidation of N(III), S(IV), and other species in frozen solution: A possible pathway for enhanced chemical transformation in freezing systems. *Journal of Atmospheric Chemistry*, **40** (2), 171-189.

Full Text: [J\J Atm Che40, 171.pdf](J/J%20Atm%20Che40,%20171.pdf)

Abstract: Freezing dilute aqueous solutions of certain oxidizable species such as nitrite and sulfite can promote the rate of autoxidation, instead of retarding it. Experiments show that nitrite and sulfite undergo rapid oxidation to nitrate and sulfate, respectively, in high yield (>90% under certain conditions) when their dilute (100 μM) aqueous solutions are frozen for 10–60 min. at -10 to -40°C. For example, the pseudo-second-order rate constant for nitrite autoxidation, k’, defined in d[NO3-]/dt = 2k’ [HNO2]2, reaches a maximum value of 117± 14 M-1s-1 at -15.5°C. This counterintuitive result is hypothesized to be the result of a freeze-concentration effect that occurs when reactants are concentrated into liquid micropockets ahead of the advancing ice front. Oxidation by hydrogen peroxide is also accelerated upon freezing. Since the yields and rates may be high compared to other competing pathways, this process may be significant where freeze/thaw cycles occur naturally, e.g., in glaciating clouds, snow packs, glaciers, and melt ponds on polar sea ice.

Keywords: Autoxidation, Frozen Solution, Ice Chemistry, Nitrite, Sulfite

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? Setright, R. (2011), Vitamin D3, the super nutrient: An independent review of complementary medicine evidence. *Journal of the Australian Traditional-Medicine Society*, **17** (2), 26-34.

Full Text: 2011\J Aus Tra-Med Soc17, 26.pdf

Abstract: A review of published studies found that a significant number of Australians and New Zealanders have less than optimal serum vitamin D levels, with mild to moderate deficiency ranging from 33% to 84% depending on age, skin colour and whether subjects were in residential care. These studies have also reported a significant relationship between low vitamin D status and an increase in the prevalence of diseases including; diabetes, CVD, metabolic syndrome, osteoporosis, hypertension, certain cancers, several autoimmune diseases, influenza, of which many cause mortality. The data also suggest that normalising blood 25(OH)VitD levels by supplementation with vitamin D3 may have a positive effect in disease prevention. Methods The literature up to April 2010 was searched without language restriction using the following databases: PubMed, ISI Web of Science (Science Citation Index Expanded), EMBASE, and the Cochrane Library.

Keywords: Citation, Databases, Diabetes, Embase, Influenza, Literature, Methods, Prevention, Pubmed, Review, Science, Science Citation Index, Web of Science

# Title: Journal of Bacteriology

Full Journal Title: [Journal of Bacteriology](http://jb.asm.org/)

ISO Abbreviated Title: J. Bacteriol.

JCR Abbreviated Title: J Bacteriol

ISSN: 0021-9193

Issues/Year: 24

Journal Country/Territory: United States

Language: English

Publisher: Amer Soc Microbiology

Publisher Address: 1325 Massachusetts Avenue, NW, Washington, DC 20005-4171

Subject Categories:

Microbiology: Impact Factor

? Giles, C.H. and McKay, R.B. (1965), Adsorption of cationic (basic) dyes by fixed yeast cells. *Journal of Bacteriology*, **89** (2), 390-397.

Full Text: [1960-80\J Bac89, 390.pdf](1960-80/J%20Bac89,%20390.pdf)

Abstract: GILES, CHARLES H. (The University of Strathclyde, Glasgow, Scotland), AND ROBERT B. McKAY. Adsorption of cationic (basic) dyes by fixed yeast cells. J. Bacteriol. 89:390-397. 1965.-The adsorption of 10 typical cationic dyes on formalin-fixed yeast cells has been studied by determining isotherms, and the results are consistent with an ion-exchange mechanism. The adsorption on this complex substrate is similar to that on the simpler substrate, alumina. The dyes are probably aggregated when adsorbed, and the size of the aggregates increases with increase in the molecular weight of the dye ion. After considering the possible adsorption sites, and comparing the data with adsorption on simpler substrates, we suggest that the most important adsorption sites may be phosphate or other strongly acidic groups.

Keywords: Adsorption, Dyes, Yeast

? Shannon, R. and Hedges, A.J. (1967), Kinetics of lethal adsorption of colicin E2 by escherichia coli. *Journal of Bacteriology*, **93** (4), 1353-1359.

Full Text: [1960-80\J Bac93, 1353.pdf](1960-80/J%20Bac93,%201353.pdf)

Abstract: The kinetics of lethal adsorption of colicin E2 by Escherichia coli C6 were studied by means of survivor plots. These were determined by a method which allowed rapid sampling of the reaction mixture and estimation of approximate confidence limits for the plotted data. The results were consistent with the predictions of a hypothetical model that assumed a single-hit mechanism of colicin action upon a bacterial population whose cells varied in their number of specific (lethal) receptors for colicin. The possibility of nonlethal adsorption is discussed.

? Reynolds, B.L. and Reeves, P.R. (1969), Kinetics of adsorption of colicin CA42-E2 and reversal of its bactericidal activity. *Journal of Bacteriology*, **100** (1), 301-??.

Full Text: [1960-80\J Bac100, 301.pdf](1960-80/J%20Bac100,%20301.pdf)

Asbtrat: The kinetics of killing of Escherichia coli K-12 by colicin CA42-E2 have been studied, and the data were used to estimate the adsorption constant of this colicin under various environmental conditions. Evidence was obtained suggesting that the adsorption of colicin occurred in two stages; the earlier stage was reversible and did not lead to the death of the cell, the latter stage was irreversible and bactericidal. Cells which had adsorbed a lethal quantity of colicin could be rescued for a short time by inactivating the adsorbed colicin with trypsin. However, when the metabolic activity of the cells was totally arrested the lethal effect of adsorbed colicin was subject to trypsin reversal over long periods of time.

Beveridge, T.J. and Murray, R.G.E. (1980), Uptake and retention of metals by cell walls of *Bacillus subtilis*. *Journal of Bacteriology*, **127** (3), 1502-1518.

Full Text: [1960-80\J Bac127, 1502.pdf](1960-80/J%20Bac127,%201502.pdf)

Abstract; Isolated walls of Bacillus subtilis Marburg, prepared in a manner which avoided metal contamination other than by the growth medium, were incubated in dilute metal solutions, separated by membrane filtration (0.22 μm), and monitored by atomic absorption to give uptake data for 18 metals. Substantial amounts of Mg2+, Fe3+, Cu2+, Na+, and K+ (amounts which were often visible as electron scattering in thin sections), intermediate amounts of Mn2, Zn2+, Ca2, Au3+, and Ni2+ (the higher atomic-numbered elements also visible as electron scattering), and small amounts of Hg2+, Sr2+, Pb2+, and Ag+ were taken into the wall. Some (Li+, Ba2+, Co2+, and Al3+) were not absorbed. Most metals which had atomic numbers greater than 11 and which could be detected by electron microscopy appeared to diffusely stain thin sections of the wall. Magnesium, on the other hand, partitioned into the central region, and these sections of walls resisted ruthenium red staining, which was not true for the other metals. Areas of the walls also acted as nucleation sites for the growth of microscopic elemental gold crystals when incubated in solutions of auric chloride. Retention or displacement of the metals was estimated by a “chromatographic” method using the walls cross-linked by the carbodiimide reaction to adipic hydrazide agarose beads (which did not take up metal but reduced the metal binding capacity of the walls by ca. 1%) packed in a column. When a series of 12 metal solutions was passed through the column, it became evident that Mg2+, Ca2+, Fe3+, and Ni2+ were strongly bound to the walls and could be detected by both atomic absorption and by their electron-scattering power in thin sections, qhereas the other metals were fisplaced or replaced. Partial lysozyme digestion of the walls (causing a 28% loss of a [3H]diaminopimelic acid label) greatly fiminished the Mg2+ retention but not that of Ca2+, Fe3+, or Ni2+, indicating that there are select sites for various cations.

Beveridge, T.J. and Murray, R.G.E. (1980), Sites of metal deposition in the cell wall of *Bacillus subtilis*. *Journal of Bacteriology*, **141**, 876-887.

Full Text: [1960-80\J Bac141, 876.pdf](1960-80/J%20Bac141,%20876.pdf)

Abstract: Amine and carboxyl groups of the cell wall of Bacillus subtilis were chemically modified individually to neutralize their electrochemical charge for determination of their contribution to the metal uptake process. Mild alkali treatment removed ca. 94% of the constituent teichoic acid (expressed as inorganic phosphorus) and allowed estimation of metal interaction with phosphodiester bonds. Chemical modifications of amine functions did not reduce the metal uptake values as compared to native walls, whereas extraction of teichoic acid caused a stoichiometric reduction in levels. In contrast, alteration of carboxyl groups severely limited metal deposition of most of the metals tested. X-ray diffraction and electron microscopy suggested, in this case, that the form and structure of the metal deposit could be different from that found in native walls. The observations suggest that carboxyl groups provide the major site of metal deposition in the B. subtilis wall.

Doyle, R.J., Matthews, T.H. and Streips, U.N. (1980), Chemical basisi for selectivity of metal ions by *Bacillus subtilis* cell wall. *Journal of Bacteriology*, **143** (1), 471-480.

Full Text: [1960-80\J Bac143, 471.pdf](1960-80/J%20Bac143,%20471.pdf)

Abstract: The use of equilibrium dialysis techniques established that isolated cell walls of Bacillus subtilis possess selective affinities for several cations. The binding of these cations to the cell wall was influenced by the presence of various functional groups in the peptidoglycan matrix. Selective chemical modification of the free carboxyl and amino groups showed that when amino groups were replaced by neutral, bulky, or negatively charged groups, the sites available for cation complexing generally increased. Introduction of positive charges into the wall resulted in a marked decrease in the numbers of metal binding sites and usually a decrease in the apparent association constants. Both teichoic acid and peptidoglycan contribute to the sites available for interaction with metals. Hill plots of equilibrium dialysis data suggest that metal binding to cell walls involves negative cooperativity. Competition between various metals for binding sites suggested that the cations complex with identical sites on the cell walls. When the hydrogen ion concentration was increased, the affinity of the walls for metals decreased, but the numbers of metal binding sites remained constant, suggesting that cations and protons also compete for the same sites.

Laddaga, R.A., Bessen, R. and Silver, S. (1985), Cadmium-resistant mutant of *Bacillus subtilis* 168 with reduced cadmium transport. *Journal of Bacteriology*, **162** (3), 1106-1110.

Full Text: [1985\J Bac162, 1106.pdf](1985/J%20Bac162,%201106.pdf)

Abstract: Cd21 and Mn21 accumulation was studied with wild-type Bacillus subtilis 168 and a Cd2+-resistant mutant. After 5 min of incubation in the presence of 0.1,uM ‘09Cd2+ or 54Mn2+, both strains accumnulated comparable amounts of 54Mn2+, while the sensitive cells accumulated three times more 109Cd2+ than the Cd2+-resistant cells did. Both 54Mn2+ and 109Cd2+ uptake, which apparently occur by the same transport system, demonstrated cation specificity; 20,uM Mn2+ or Cd2+ (but not Zn2+) inhibited the uptake of 0.1 p.M ‘09Cd2+ or 54Mn2+. 54Mn2+ and ‘09Cd2+ uptake was thergy dependent and temperature sensitive, but ‘09Cd2+ uptake in the Cd2+-resistant strain was only partially inhibited by an uncoupler or by a decreast in temperature. 109Cd2+ uptake in the sensitive strain followed MichaelisOIenten kinetics with a Km of 1.8,uM Cd2+ and a V..x of 1.5,imol/min. g (dry weight); 109Cd2+ uptake in the Cd2+-resistant strain was not saturable. The apparent Km value for the saturable component of “09Cd2+ uptake by the Cd2 -resistant strain was very similar to that of the sensitive strain, but the Vmax was 25 times lower than the V., for the sensitive strain. The Km and Vi.. for 54Mn2+ uptake by both strains were very similar. Cd2+ inhibition of M4Mn2+ uptake had an apparent Ki of 3.4 and 21.5,uM Cd2+ for the sensitive and Cd2 -resistant strains, respectively. Mn2+ had an apparent Ki of 1.2,uM Mn2+ for Inhibition of ‘09Cd2+ uptake by the sensitive strain, but the Cd2+-resistant strain had no defined Ki value for inhibition of Cd2+ uptake by Mn2+.

Notes: highly cited

? Guzman, L.M., Belin, D., Carson, M.J. and Beckwith, J. (1995), Tight regulation, modulation, and high-level expression by vectors containing the arabinose p-bad promoter. *Journal of Bacteriology*, **177** (14), 4121-4130.

Full Text: [1995\J Bac177, 4121.pdf](1995/J%20Bac177,%204121.pdf)

Abstract: We have constructed a series of plasmid vectors (pBAD vectors) containing the P-BAD promoter of the araBAD (arabinose) operon and the gene encoding the positive and negative regulator of this promoter, araC. Using the phoA gene and phoA fusions to monitor expression in these vectors, we show that the ratio of induction/repression can be 1,200-fold, compared with 50-fold for P-TAC-based vectors. phoA expression can be modulated over a wide range of inducer (arabinose) concentrations and reduced to extremely low levels by the presence of glucose, which represses expression. Also, the kinetics of induction and repression are very rapid and significantly affected by the ara allele in the host strain. Thus, the use of this system which can be efficiently and rapidly turned on and off allows the study of important aspects of bacterial physiology in a very simple manner and without changes of temperature. We have exploited the light regulation of the P-BAD promoter to study the phenotypes of null mutations of essential genes and explored the use of pBAD vectors as an expression system.

Keywords: Escherichia-Coli, Cloning Vectors, Arac Protein, Leader Peptidase, Cell-Division, TAC Promoter, Copy-Number, Membrane, Gene, DNA

# Title: Journal of Basic Microbiology

Full Journal Title: [Journal of Basic Microbiology](http://www3.interscience.wiley.com/cgi-bin/jhome/5007687)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories: Impact Factor

? El-Rahim, W.M.A. (2006), Assessment of textile dye remediation using biotic and abiotic agents. *Journal of Basic Microbiology*, **46** (4), 318-328.

Full Text: [2006\J Bas Mic46, 318.pdf](2006/J%20Bas%20Mic46,%20318.pdf)

Abstract: The aim of the current work was to assess the removal of direct and reactive dyes using biotic and abiotic agents. Removal of dyes and their derivatives from aqueous solutions was investigated using sugarcane bagasse, sawdust, rice straw, charcoal and fungal biomass as dye removing agents. Seven fungal strains known to have high capacity in removing textile dyes were used. Results of this study indicated that Penicillium commune, P. freii, and P. allii removed 96, 64 and 65%, respectively, of direct violet dye after two hours of incubation. In addition, the use of rice straw was shown to be more efficient in dye removal, than was bagasse or sawdust. Rice straw was effective in removing 72% of direct violet dye within 24 hours. However, with reactive dyes, removal activity was reduced to 27%. Similar trends were recorded with the other tested biotic agents, fast removal of reactive dye was not found after 48 hours of contact time. Results of this study indicate that low-cost, renewable, bioadsorption agents are relatively effective in removing textile dyes from solution.

Keywords: Lignin Peroxidase Isoenzymes, Phanerochaete-Chrysosporium, Color Removal, Aspergillus-Niger, Catalyzed Decolorization, Microbial Decolorization, Triphenylmethane Dyes, Aqueous-Solution, Polymeric Dyes, Synthetic Dyes

# Title: Journal of Behavioral Medicine

Full Journal Title: Journal of Behavioral Medicine

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories: Impact Factor

? Fitzgerald, T.E., Tennen, H., Affleck, G. and Pransky, G.S. (1993), The relative importance of dispositional optimism and control appraisals in quality-of-life after coronary-artery bypass-surgery. *Journal of Behavioral Medicine*, **16** (1), 25-43.

Abstract: Similar mechanisms have been proposed to explain the stress-buffering effects of both dispositional optimism and perceived control. Yet dispositional optimism as a personal resource should function independently of situational control appraisals. To evaluate the unique and additive contributions to adaptation of control appraisals and optimism, we followed 49 individuals scheduled for coronary artery bypass surgery. One month before surgery dispositional optimism was associated with neither health locus of control nor specific expectancies about the outcomes of surgery. Dispositional optimism, however, was associated with perceived control over the course of the illness and with quality of life appraisals. Although presurgery optimism predicted life quality 8 months after surgery, this was not the case when general and specific control appraisals and specific expectancies were included in the prediction. These findings are discussed as they relate to current conceptions of trait optimism.

Keywords: Generalized Outcome Expectancies, Self-Blame, Perceived Control, Personal Control, Disease, Health, Adjustment, Stress, Depression, Recovery, Adaptation, Coronary Bypass Surgery, Optimism, Control, Quality of Life

# Title: Journal of Biobased Materials and Bioenergy

Full Journal Title: [Journal of Biobased Materials and Bioenergy](http://www.ingentaconnect.com/content/asp/jbmb;jsessionid=401388r3atkph.alice); [Journal of Biobased Materials and Bioenergy](http://www.aspbs.com/jbmbe.html)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Yan, L.F., Yang, F. and Jia, L. (2009), Preparation of cationic wheat straw and its application on anionic dye removal. *Journal of Biobased Materials and Bioenergy*, **3** (2), 205-212.

Full Text: J Bio Mat Bio3, 205.pdf

Abstract: Cationic wheat straw has been prepared for anionic dyes removal from aqueous solution. It included two steps: pretreatment of straw to remove most lignin and the quaternization of the residual straw. Acetic acid pulping was used to remove lignin and the quaternization was carried out in an aqueous suspension. The dye removal results revealed that the maximum adsorption capacity of the cationic straw for dye AB92 could arrive 1072 g/kg. The effect of temperature, reaction time and the extents of the quaternization on the adsorption capacity were studied. The pseudo-second-order kinetic model was applied to describe the kinetic data and the rate constants were evaluated. The Freundlich and Langmuir adsorption models were used to describe the mechanism. The adsorption data indicated that the capacity of the adsorbents was depended obviously on the initial pH of dye solution and initial dye concentration.

Keywords: Acid Orange-7 Dye, Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Anionic Dyes, Aqueous Solution, Aqueous-Solutions, Biosorption, Capacity, Cellulose, Concentration, Data, Dye, Dye Removal, Dyes, Feasibility, Freundlich, Kinetic, Kinetic Model, Langmuir, Lignin, Low-Cost Adsorbents, Mechanism, Metal-Ions, Model, Models, Ph, Pretreatment, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Quaternization, Rate Constants, Removal, Solution, Spectroscopy, Spent Brewery Grains, Straw, Suspension, Temperature

# Title: Journal of Biochemical and Biophysical Methods

Full Journal Title: [Journal of Biochemical and Biophysical Methods](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=4912&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=f88a40457c41ec01a309cb5ff29f6114)

ISO Abbreviated Title:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Breier, A., Ďurišová, V., Stankovičová, T., Mislovičová, D. and Gemeiner, P. (1991), Application of adsorption-kinetics for estimation of dissociation-constants. *Journal of Biochemical and Biophysical Methods*, **22** (3), 185-193.

Full Text: [1991\J Bio Bio Met22, 185.pdf](1991/J%20Bio%20Bio%20Met22,%20185.pdf)

Abstract: Substances such as drugs, as well as special ligands with expressive biospecific properties, all with different affinities, interact with proteins which can be characterized by dissociation constants. The method for estimation of the dissociation constant on the basis of adsorption kinetics was verified for two typical cases: adsorption of lactate dehydrogenase onto bead cellulose derivatized by reactive dyes C.I.2. or C.I.19, and adsorption of different drugs (neuroleptics and local anesthetics) onto calmodulin immobilized on agarose gel. The real equilibrium values obtained by using the complete time-concentration model of adsorption were fitted according to the respective adsorption isotherms by non-linear regression.

Keywords: Adsorption, Affinity, Anesthetic, Local, Calmodulin, Derivatives, Dissociation Constant, Drugs, Isotherms, Kinetics, Lactate Dehydrogenase, Lactate-Dehydrogenase, Model, Neuroleptic, Reactive Dye, Reactive Dyes

Liao, F., Zhu, X.Y., Wang, Y.M., and Zuo, Y.P. (2005), The comparison of the estimation of enzyme kinetic parameters by fitting reaction curve to the integrated Michaelis–Menten rate equations of different predictor variables. *Journal of Biochemical and Biophysical Methods*, **62** (1), 13-24.

Full Text: [2005\J Bio Bio Met62, 13.pdf](2005/J%20Bio%20Bio%20Met62,%2013.pdf)

Abstract: The estimation of enzyme kinetic parameters by nonlinear fitting reaction curve to the integrated Michaelis–Menten rate equation ln(*S*0/*S*)+(*S*0−*S*)/*K*m=(*V*m/*K*m)×*t*was investigated and compared to that by fitting to (*S*0−*S*)/*t*=*V*m−*K*m×[ln(*S*0/*S*)/*t*] (Atkins GL, Nimmo IA. The reliability of Michaelis-Menten constants and maximum velocities estimated by using the integrated Michaelis-Menten equation. Biochem J 1973;135:779-84) with uricase as the model. Uricase reaction curve was simulated with random absorbance error of 0.001 at 0.075 mmol/l uric acid. Experimental reaction curve was monitored by absorbance at 293 nm. For both CV and deviation <20% by simulation, *K*m from 5 to 100 μmol/l was estimated with Eq. (1) while *K*m from 5 to 50 μmol/l was estimated with Eq. (2). The background absorbance and the error in the lag time of steady-state reaction resulted in negative *K*m with Eq. (2), but did not affect *K*m estimated with Eq. (1). Both equations gave better estimation of *V*m. The computation time and the goodness of fit with Eq. (1) were 40-fold greater than those with Eq. (2). By experimentation, Eq. (1) yielded *K*m consistent with the Lineweaver–Burk plot analysis, but Eq. (2) gave many negative parameters. Apparent *K*m by Eq. (1) linearly increased, while *V*m were constant, vs. xanthine concentrations, and the inhibition constant was consistent with the Lineweaver–Burk plot analysis. These results suggested that the integrated rate equation that uses the predictor variable of reaction time was reliable for the estimation of enzyme kinetic parameters and applicable for the characterization of enzyme inhibitors.

Keywords: The Integrated Method, Michaelis–Menten Constant, Reaction Curve, Predictor Variable, Nonlinear Fitting, Uricase

# Title: Journal of Biochemistry

Full Journal Title: [Journal of Biochemistry](http://jb.oupjournals.org/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

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Publisher:

Publisher Address:

Subject Categories: Impact Factor

Sakoda, M. and Hiromi, K. (1976), Determination of best-fit values of kinetic parameters of Michaelis-Menten equation by method of least-squares with Taylor expansion. *Journal of Biochemistry*, **80** (3), 547-555.

Full Text: [J\J Bio80, 547.pdf](J/J%20Bio80,%20547.pdf)

Abstract: The best-fit values of the Michaelis constant (Km) and the maximum velocity(V) in the Michaelis-Menten equation can be obtained by the method of leastsquares with the Taylor expansion for the sum of squares of the absoluteresidual, i.e., the difference between the observed velocity and thecorresponding velocity by calculation. This method makes it possible todetermine the values of Km and V not in a trial-and-error manner but in adeductive and unique manner after some iterative procedures starting fromarbitrary approximate values of Km and V. These values can be said to beuniquely determined for a set of data as the finally converged values areno longer dependent upon the initial approximate values of Km and V. It isalso very important to obtain initial approximate values of parameters forthe application of the method described above. A simple method is proposedto estimate the approximate values of parameters involved in fractionalfunctions. The method of rearrangement after canceling of denominator of afractional function can be utilized to obtain approximate values, not onlyfor cases of two unknown parameters such as the Michaelis-Menten equation, but also for cases with more than two unknowns.

# Title: Journal of Biogeography

Full Journal Title: [Journal of Biogeography](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=jbi&journal=jbi), [Journal of Biogeography](http://uk.jstor.org/journals/03050270.html)

ISO Abbreviated Title: J. Biogeogr.

JCR Abbreviated Title: J Biogeogr

ISSN: 0305-0270

Issues/Year: 6

Journal Country/Territory: England

Language: Multi-Language

Publisher: Blackwell Science Ltd

Publisher Address: PO Box 88, Osney Mead, Oxford OX2 0NE, Oxon, England

Subject Categories:

Ecology Geography: Impact Factor

Rundle, S.D. and Ramsay, P.M. (1997), Microcrustacean communities in streams from 2 physiographically contrasting regions of Britain. *Journal of Biogeography*, **24** (1), 101-111.

Full Text: [J\J Bio24, 101.pdf](J/J%20Bio24,%20101.pdf)

Abstract: Benthic microcrustaceans were sampled from forty-three streams in two physiographically contrasting regions of Britain: lowland southern England and upland Wales. Lowland streams had a significantly higher species richness than upland streams and, of the forty-three copepod and cladoceran species identified, only fourteen (33%) were found in both the lowlands and uplands. Canonical correspondence analysis revealed large differences in community structure between regions and between streams within regions. Differences within regions were related to pH, the distance downstream of a site and the presence of upstream impoundments. Variables underlying the large biological differences between regions are also discussed, including differences in chemistry (ionic content), physical parameters (e.g. flow), habitat availability and the influence of species biogeography. The importance of understanding species ecology and biogeography when assessing pollution impacts on stream communities is emphasized and a model is proposed for predicting the composition of microcrustacean communities in temperate European streams.

# Title: Journal of Biological Inorganic Chemistry

Full Journal Title: Journal of Biological Inorganic Chemistry

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ISSN: 0949-8257

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Hissen, A.H.T. and Moore, M.M. (2005), Site-specific rate constants for iron acquisition from transferrin by the *Aspergillus fumigatus* siderophores N’,N’’,N’’’-triacetylfusarinine C and ferricrocin. *Journal of Biological Inorganic Chemistry*, **10** (3), 211-2207.

Full Text: [2005\J Bio Ino Che10, 211.pdf](2005/J%20Bio%20Ino%20Che10,%20211.pdf)

Abstract: *Aspergillus fumigatus* is an opportunistic fungal pathogen that causes life-threatening infections in immunocompromised patients. Despite low levels of free iron, A. fumigatus grows in the presence of human serum in part because it produces high concentrations of siderophores. The most abundant siderophores produced by A. fumigatus are N’,N&DPRIME;,N’’’-triacetylfusarinine C (TAF) and ferricrocin, both of which have thermodynamic iron binding constants that theoretically allow them to remove transferrin (Tf)-bound iron. Urea-polyacrylamide gel electrophoresis was used to measure the change in concentration of Tf species incubated with TAF or ferricrocin. The rate of removal of iron from diferric Tf by both siderophores was measured, as were the individual microscopic rates of iron removal from each Tf species (diferric Tf, N-terminal monoferric Tf and C-terminal monoferric Tf). TAF removed iron from all Tf species at a faster rate than ferricrocin. Both siderophores showed a preference for removing C-terminal iron, evidenced by the fact that k(1C) and k(2C) were much larger than k(1N) and k(2N). Cooperativity in iron binding was observed with TAF, as the C-terminal iron was removed by TAF much faster from monoferric than from diferric Tf. With both siderophores, C-terminal monoferric Tf concentrations remained below measurable levels during incubations. This indicates that k(2C) and k(1C) are much larger than k(1N). TAF and ferricrocin both removed Tf-bound iron with second-order rate constants that were comparable to those of the siderophores of several bacterial pathogens, indicating they may play a role in iron uptake in vivo and thereby contribute to the virulence of A. fumigatus.

Keywords: N’,N’’,N’’’-Triacetylfusarinine C, Ferricrocin, Transferring, Kinetics, *Aspergillus fumigatus*, Pseudomonas-Aeruginosa, Hydroxamate Siderophores, Coordination Chemistry, Diferric Transferrin, Mediated Utilization, Transport Compounds, Serum Transferrin, Escherichia-Coli, Virulence, Removal

# Title: Journal of Biomaterials Science-Polymer Edition

Full Journal Title: Journal of Biomaterials Science-Polymer Edition

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Yilmaz, E., Uzun, L., Rad, A.Y., Kalyoncu, U., Unal, S. and Denizli, A. (2003), Specific adsorption of the autoantibodies from rheumatoid arthritis patient plasma using histidine-containing affinity beads. *Journal of Biomaterials Science-Polymer Edition*, **19** (7), 875-892.

Full Text: [2003\J Bio Sci-Pol Edi19, 875.pdf](2003/J%20Bio%20Sci-Pol%20Edi19,%20875.pdf)

Abstract: Rheumatoid arthritis is characterized by chronic polyarthritis and destruction of multiple joints. In this study, poly (hydroxyethyl methacrylate-N-methacryloyl-(L-histidine)-methylester) (PHEMAH) beads were used in the removal of pathogenic antibodies from rheumatoid arthritis patient plasma in a packed bed column. PHEMAH beads, in the size range of 80-120 μm, were produced by suspension polymerization. The beads were contacted with blood in an in vitro system. Loss of blood cells and clotting times were followed. PHEMAH beads were characterized by scanning electron microscopy. We found that PHEMAH beads had a spherical shape and porous structure. Loss of cells in the blood contacting with PHEMAH beads was negligible. IgM-antibody adsorption capacity decreased significantly with the increase of the plasma flow-rate. With increasing IgM-antibody concentration, the amount of IgM-antibody adsorbed per unit mass increased and then reached saturation. Maximum IgM-antibody adsorption amount was 69.2 mg/g. IgM-antibody molecules could be repeatedly adsorbed and desorbed without noticeable loss in the IgM-antibody adsorption amount.

Keywords: Antibody Removal, Immunoadsorption, Affinity Beads, *Rheumatoid Arthritis*, Hollow-Fiber Membranes, Systemic-Lupus-Erythematosus, Stabilized Fluidized-Bed, Immobilized L-Histidine, Immunoglobulin-G, Prosorba Column, Immunoadsorption, Removal, Chromatography, Plasmapheresis

# Title: Journal of Biomechanics

Full Journal Title: Journal of Biomechanics

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Al Nazer, R., Lanovaz, J., Kawalilak, C., Johnston, J.D. and Kontulainen, S. (2012), Direct in vivo strain measurements in human bone-A systematic literature review. *Journal of Biomechanics*, **45** (1), 27-40.

Full Text: [2012\J Bio45, 27.pdf](2012/J%20Bio45,%2027.pdf)

Abstract: Bone strain is the governing stimuli for the remodeling process necessary in the maintenance of bone’s structure and mechanical strength. Strain gages are the gold standard and workhorses of human bone experimental strain analysis in vivo. The objective of this systematic literature review is to provide an overview for direct in vivo human bone strain measurement studies and place the strain results within context of current theories of bone remodeling (i.e. mechanostat theory). We employed a standardized search strategy without imposing any time restriction to find English language studies indexed in PubMed and Web of Science databases that measured human bone strain in vivo. Twenty-four studies met our final inclusion criteria. Seven human bones were subjected to strain measurements in vivo including medial tibia, second metatarsal, calcaneus, proximal femur, distal radius, lamina of vertebra and dental alveolar. Peak strain magnitude recorded was 9096 mu epsilon on the medial tibia during basketball rebounding and the peak strain rate magnitude was -85,500 mu epsilon/s recorded at the distal radius during forward fall from standing, landing on extended hands. The tibia was the most exposed site for in vivo strain measurements due to accessibility and being a common pathologic site of stress fracture in the lower extremity. This systematic review revealed that most of the strains measured in vivo in different bones were generally within the physiological loading zone defined by the mechanostat theory, which implies stimulation of functional adaptation necessary to maintain bone mechanical integrity. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Adaptation, Analysis, Author, Bone, Canada, Cycle Number, Databases, Deformation, English, Exercise, Experimental, Fatigue, Fracture, Functional, Human, Human Tibial Strains, In Vivo, Literature, Literature Review, Mass, Measurement, Overview, Process, Pubmed, Review, Science, Spine Fusion, Strain, Strategy, Strength, Stress, Stress-Fracture, Systematic, Systematic Literature Review, Systematic Review, Theories, Theory, Walking, Web of Science, Web-of-Science

# Title: Journal of Biomedical Informatics

Full Journal Title: [Journal of Biomedical Informatics](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6848&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=3281709&md5=f5fd6a55b3540b3715c380e29f284538)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

Rindflesch, T.C. and Fiszman, M. (2003), The interaction of domain knowledge and linguistic structure in natural language processing: Interpreting hypernymic propositions in biomedical text. *Journal of Biomedical Informatics*, **36** (6), 462-477.

Full Text: [J\J Bio Inf36, 462.pdf](J/J%20Bio%20Inf36,%20462.pdf)

Abstract: Interpretation of semantic propositions in free-text documents such as MEDLINE citations would provide valuable support for biomedical applications, and several approaches to semantic interpretation are being pursued in the biomedical informatics community. In this paper, we describe a methodology for interpreting linguistic structures that encode hypernymic propositions, in which a more specific concept is in a taxonomic relationship with a more general concept. In order to effectively process these constructions, we exploit underspecified syntactic analysis and structured domain knowledge from the Unified Medical Language System (UMLS). After introducing the syntactic processing on which our system depends, we focus on the UMLS knowledge that supports interpretation of hypernymic propositions. We first use semantic groups from the Semantic Network to ensure that the two concepts involved are compatible; hierarchical information in the Metathesaurus then determines which concept is more general and which more specific. A preliminary evaluation of a sample based on the semantic group Chemicals and Drugs provides 83% precision. An error analysis was conducted and potential solutions to the problems encountered are presented. The research discussed here serves as a paradigm for investigating the interaction between domain knowledge and linguistic structure in natural language processing, and could also make a contribution to research on automatic processing of discourse structure. Additional implications of the system we present include its integration in advanced semantic interpretation processors for biomedical text and its use for information extraction in specific domains. The approach has the potential to support a range of applications, including information retrieval and ontology engineering.

Keywords: Natural Language Processing, Semantic Processing, Knowledge Representation, Information Extraction

? Collier, N. and Takeuchi, K. (2004), Comparison of character-level and part of speech features for name recognition in biomedical texts. *Journal of Biomedical Informatics*, **37** (6), 423-435.

Full Text: [J\J Bio Inf37, 423.pdf](J/J%20Bio%20Inf37,%20423.pdf)

Abstract: The immense volume of data which is now available from experiments in molecular biology has led to an explosion in reported results most of which are available only in unstructured text format. For this reason there has been great interest in the task of text mining to aid in fact extraction, document screening, citation analysis, and linkage with large gene and gene-product databases. In particular there has been an intensive investigation into the named entity (NE) task as a core technology in all of these tasks which has been driven by the availability of high volume training sets such as the GENIA v3.02 corpus. Despite such large training sets accuracy for biology NE has proven to be consistently far below the high levels of performance in the news domain where *F* scores above 90 are commonly reported which can be considered near to human performance. We argue that it is crucial that more rigorous analysis of the factors that contribute to the model’s performance be applied to discover where the underlying limitations are and what our future research direction should be. Our investigation in this paper reports on variations of two widely used feature types, part of speech (POS) tags and character-level orthographic features, and makes a comparison of how these variations influence performance. We base our experiments on a proven state-of-the-art model, support vector machines using a high quality subset of 100 annotated MEDLINE abstracts. Experiments reveal that the best performing features are orthographic features with *F* score of 72.6. Although the Brill tagger trained in-domain on the GENIA v3.02p POS corpus gives the best overall performance of any POS tagger, at an *F* score of 68.6, this is still significantly below the orthographic features. In combination these two features types appear to interfere with each other and degrade performance slightly to an *F* score of 72.3.

Keywords: Text Mining, Support Vector Machines, Part of Speech, Orthography

? Cokol, M. and Rodriguez-Esteban, R. (2008), Visualizing evolution and impact of biomedical fields. *Journal of Biomedical Informatics*, **41** (6), 1050-1052.

Full Text: [2008\J Bio Inf41, 1050.pdf](2008/J%20Bio%20Inf41,%201050.pdf)

Abstract: We describe a new tool for visualization of biomedical scientific trends. The method captures variations in scientific impact over time to allow for a comparison of relative significance and evolution of fields similar to a financial market scorecard. The tool is available at SciTrends (http://www.scitrends.net), depicting the evolution of almost 200 thousand biomedical fields in time. With millions of articles on thousands of topics published in biomedicine, we envision that only with such large-scale tools researchers can objectively understand the ever-changing interests in the biomedical sciences and make more informed decisions. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Biomedical, Biomedical Fields, Genes, Impact, Knowledge Propagation, Sciences, Scientific Trends, Scientometrics, Trends, Visualization

? Tanaka, L.Y., Herskovic, J.R., Iyengar, M.S. and Bernstam, E.V. (2009), Sequential result refinement for searching the biomedical literature. *Journal of Biomedical Informatics*, **42** (4), 678-684.

Full Text: [2009\J Bio Inf42, 678.pdf](2009/J%20Bio%20Inf42,%20678.pdf)

Abstract: Information overload is a problem for users of MEDLINE, the database of biomedical literature that indexes over 17 million articles. Various techniques have been developed to retrieve high quality or important articles. Some techniques rely on using the number of citations as a measurement of an article’s importance. Unfortunately, citation information is proprietary, expensive, and suffers from “citation lag.” MEDLINE users have a variety of information needs. Although some users require high recall, many users are looking for a “few good articles” on a topic. For these users, precision is more important than recall. We present and evaluate a method for identifying articles likely to be highly cited by using information available at the time of listing in MEDLINE. The method uses a score based on Medical Subject Headings (MeSH) terms, journal impact factor (JIF), and number of authors. This method can filter large MEDLINE result sets (>1000 articles) returned by actual user queries to produce small, highly cited result sets. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Algorithms, Bibliometrics, Citation, Citations, Highly-Cited, Impact, Impact Factor, Information Storage and Retrieval, Methods, Journal Impact, Journals, Medline, Networks, Quality, Retrieval

? Owlia, P., Vasei, M., Goliaei, B. and Nassiri, I. (2011), Normalized impact factor (NIF): An adjusted method for calculating the citation rate of biomedical journals. *Journal of Biomedical Informatics*, **44** (2), 216-220.

Full Text: [2011\J Bio Inf44, 216.pdf](2011/J%20Bio%20Inf44,%20216.pdf)

Abstract: The interests in journal impact factor (JIF) in scientific communities have grown over the last decades. The JIFs are used to evaluate journals quality and the papers published therein. JIF is a discipline specific measure and the comparison between the JIF dedicated to different disciplines is inadequate, unless a normalization process is performed. In this study, normalized impact factor (NIF) was introduced as a relatively simple method enabling the JIFs to be used when evaluating the quality of journals and research works in different disciplines. The NIF index was established based on the multiplication of JIF by a constant factor. The constants were calculated for all 54 disciplines of biomedical field during 2005, 2006, 2007, 2008 and 2009 years. Also, ranking of 393 journals in different biomedical disciplines according to the NIF and JIF were compared to illustrate how the NIF index can be used for the evaluation of publications in different disciplines. The findings prove that the use of the NIF enhances the equality in assessing the quality of research works produced by researchers who work in different disciplines. (c) 2010 Elsevier Inc. All rights reserved.

Keywords: Assessing, Biomedical, Biomedical Journals, Biomedical Sciences, Citation, Comparison, Different Subject Categories, Equality, Evaluation, Field, Impact, Impact Factor, Index, Journal, Journal Impact, Journal Impact Factor, Journals, Measure, Normalization, Papers, Publications, Quality, Quality of, Ranking, Research, Research Performance, Rights, Scientometrics, SI, Work

? Fu, L.D., Aphinyanaphongs, Y., Wang, L.L. and Aliferis, C.F. (2011), A comparison of evaluation metrics for biomedical journals, articles, and websites in terms of sensitivity to topic. *Journal of Biomedical Informatics*, **44** (4), 587-594.

Full Text: [2011\J Bio Inf44, 587.pdf](2011/J%20Bio%20Inf44,%20587.pdf)

Abstract: Evaluating the biomedical literature and health-related websites for quality are challenging information retrieval tasks. Current commonly used methods include impact factor for journals, PubMed’s clinical query filters and machine learning-based filter models for articles, and PageRank for websites. Previous work has focused on the average performance of these methods without considering the topic, and it is unknown how performance varies for specific topics or focused searches. Clinicians, researchers, and users should be aware when expected performance is not achieved for specific topics. The present work analyzes the behavior of these methods for a variety of topics. Impact factor, clinical query filters, and PageRank vary widely across different topics while a topic-specific impact factor and machine learning-based filter models are more stable. The results demonstrate that a method may perform excellently on average but struggle when used on a number of narrower topics. Topic-adjusted metrics and other topic robust methods have an advantage in such situations. Users of traditional topic-sensitive metrics should be aware of their limitations. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Bibliometrics, Biomedical, Biomedical Literature, Evaluation, Impact, Impact Factor, Impact Factors, Information, Information Retrieval, Journal Impact Factor, Journals, Link, Literature, Machine Learning, Metrics, Pagerank, Pagerank, Search, Topic-Sensitivity

# Title: Journal of Biomedical Materials Research

Full Journal Title: Journal of Biomedical Materials Research

ISO Abbreviated Title: J. Biomed. Mater. Res.

JCR Abbreviated Title: J Biomed Mater Res

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

Graham, M.J., Larsen, U. and Xu, X. (1999), Secular trend in age at menarche in China: A case study of two rural counties in Anhui Province. *Journal of Biosocial Science*, **31** (2), 257-267.

? Lee, R.G. and Kim, S.W. (1974), Adsorption of proteins onto hydrophobic polymer surfaces: Adsorption isotherms and kinetics. *Journal of Biomedical Materials Research*, **8** (5), 251-259.

# Title: Journal of Biomedical Materials Research Part A

Full Journal Title: Journal of Biomedical Materials Research Part A

ISO Abbreviated Title:

JCR Abbreviated Title :

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Coleman, N.J., Awosanya, K. and Nicholson, J.W. (2009), Aspects of the *in vitro* bioactivity of hydraulic calcium (alumino)silicate cement. *Journal of Biomedical Materials Research Part A*, **90A** (1), 166-174.

Full Text: [2009\J Bio Mat Res Par A90A, 166.pdf](2009/J%20Bio%20Mat%20Res%20Par%20A90A,%20166.pdf)

Abstract: In response to a burgeoning interest in the prospective clinical applications of hydraulic calcium (alumino)silicate cements, the in vitro bioactivity and dissolution characteristics of a white Portland cement have been investigated. The formation of an apatite layer within 6 h of contact with simulated body fluid was attributed to the rapid dissolution of calcium hydroxide from the cement matrix and to the abundance of pre-existing Si-OH nucleation sites presented by the calcium silicate hydrate phase. A simple kinetic model has been used to describe the rate of apatite formation and an apparent pseudo-second-order rate constant for the removal of HPO42- ions frorn solultion has been calculated (k(2) = 5.8 x 10-4 g mg-1)). Aspects of the chemistry of hydraulic cements are also discussed with respect to their potential use in the remedial treatment of living tissue. (C) 2008 Wiley Periodicals, Inc. J Biomed Mater Res 90A: 166-174, 2009.

Keywords: Behavior, Biocompatibility, Bone, Features, Glass, Hydroxyapatite, Hydroxyapatite, In Vitro Bioactivity, Mechanism, Mineral Trioxide Aggregate, Portland Cement, Pseudo-Second-Order Kinetic Model, Simulated Body Fluid, Sorption, White Portland Cements

# Title: Journal of Biomedical Science

Full Journal Title: Journal of Biomedical Science

ISO Abbreviated Title: J. Biomed. Sci.

JCR Abbreviated Title: J Biomed Sci

ISSN: 1021-7770

Issues/Year: 6

Journal Country/Territory: Taiwan

Language: English

Publisher: Karger

Publisher Address: Allschwilerstrasse 10, CH-4009 Basel, Switzerland

Subject Categories

Medicine, Research & Experimental: Impact Factor 0.990, 42/ 76 (1999); Impact Factor 1.798, 31/ 74 (2000); Impact Factor 1.761, 29/ 75 (2001); Impact Factor 2.322, 21/74 (2002)

# Title: Journal of Bioscience and Bioengineering

Full Journal Title: [Journal of Bioscience and Bioengineering](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6260&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=ea6b284511dbdb2674059b1e188a52fd)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

: Impact Factor

Tsuruta, T. (2002), Removal and recovery of uranyl ion using various microorganisms. *Journal of Bioscience and Bioengineering*, **94** (1), 23-28.

Full Text: [J\J Bio Bio94, 23.pdf](J/J%20Bio%20Bio94,%2023.pdf)

Abstract: The adsorption of uranyl ion by microorganisms was examined. Among the 76 strains of 69 species tested (23 bacteria, 20 actinomycetes, 18 fungi, and 15 yeasts), high uranyl ion adsorption ability was exhibited by strains of the bacteria, *Arthrobacter nicotianae*, *Bacillus subtilis*, and *Micrococcus luteus. A. nicotianae* cells, which showed the best performance, could adsorb about 698 mg uranyl ion (2.58 mmol) per gram dry wt. of microbial cells. The adsorption of uranyl ion was rapid, selective, and mostly dependent on physico-chemical binding to the cell components. As well as uranyl ion, *A. nicotianae* could adsorb thorium ion with high efficiency. Cells immobilized with polyacrylamide gel could be used during repeated adsorption-desorption cycles.

Keywords: Removal and Recovery of Uranyl Ion, Microorganisms, *Arthrobacter Nicotianae*, *Bacillus Subtilis*, *Micrococcus Luteus*

Watanabe, M., Kawahara, K., Sasaki, K. and Noparatnaraporn, N. (2003), Biosorption of cadmium ions using a photosynthetic bacterium, *Rhodobacter sphaeroides* S and a marine photosynthetic bacterium, *Rhodovulum* sp. and their biosorption kinetics. *Journal of Bioscience and Bioengineering*, **95** (4), 374-378.

Full Text: [J\J Bio Bio95, 374.pdf](J/J%20Bio%20Bio95,%20374.pdf)

Abstract: We examined the biosorption characteristics of cadmium ions onto a photosynthetic bacterium, *Rhodobacter sphaeroides* S and a marine photosynthetic bacterium *Rhodovulum* sp. PS88 in a batch culture system. Both photosynthetic bacteria are capable of cadmium removal with 30 g/*l* sodium chloride and divalent cations (Mg2+ and Ca2+) in the culture medium. In particular, the strain PS88 hows a high removal ratio and high specific removal rate of cadmium ions from the culture medium under aerobic-dark (heterotrophic) and anaerobic-light (photoheterotrophic) conditions. The adsorption of cadmium onto strains PS88 and S is dependent on the cadmium concentration, and follows the Freundlich adsorption isotherm. In addition, biosorption isotherms for cadmium show that the strain PS88 exhibits higher values of the empirical constant for the cadmium adsorption capacity, Kr, than that of the strain S under both aerobic-dark (*K*f=17.44) and anaerobic-light (*K*f=1.270) conditions.

Keywords: Biosorption, Cadmium Ion, pHotosynthetic Bacteria, Marine Environment, Adsorption Isotherm Model

? Sumino, T., Isaka, K., Ikuta, H., Saiki, Y. and Yokota, T. (2003), Nitrogen removal from wastewater using simultaneous nitrate reduction and anaerobic ammonium oxidation in single reactor. *Journal of Bioscience and Bioengineering*, **102** (4), 346-351.

Full Text: [2006\J Bio Bio102, 346.pdf](2006/J%20Bio%20Bio102,%20346.pdf)

Abstract: The effects of C/N ratio and total organic carbon (TOC) loading on nitrogen removal through simultaneous nitrate reduction and anaerobic ammonium oxidation in a single reactor were examined. Granular sludge taken from a methane fermentation reactor was placed in an upflow reactor and supplied with synthetic wastewater containing nitrate at a C/N ratio of 1 to grow heterotrophic denitrifying bacteria. When nitrogen removal ratio reached 30%, anammox sludge attached to nonwoven-carrier was added into the same reactor and then ammonia was added to the synthetic wastewater. Nitrogen removal ratio was markedly increased to 80-94%. In this system, nitrogen removal ratio was affected by C/N ratio and TOC loading, not by the amount of granular sludge. A stable isotopic analysis using N-15-labeled nitrate showed that N2 gas was formed by anammox reaction.

Keywords: Nitrogen Removal, Anaerobic Ammonium Oxidation, Denitrification, Stable Isotopic Analysis, Bacteria, Sludge

? Sahabi, D.M., Takeda, M., Suzuki, I. and Koizurni, J. (2009), Removal of Mn2+ from water by “aged” biofilter media: The role of catalytic oxides layers. *Journal of Bioscience and Bioengineering*, **107** (2), 151-157.

Full Text: [2009\J Bio Bio107, 151.pdf](2009/J%20Bio%20Bio107,%20151.pdf)

Abstract: The present work was aimed at evaluating the surface coatings characteristics and autocatalytic manganese oxidation potentials of two groups of “aged” biofilter media. This refers to the anthracite filter media of a biological water treatment plant on which metal oxides and a biofilm have deposited on the surface of the filter media over long time of filtration. Duplicate samples of anthracite filter media were collected from each of the six filter wells in the plant and classified into two groups, based on their duration of operation, as 3-years filter media and 15-years filter media. Batch experiments showed that the 15-years filter media exhibited very high manganese sorption capacity and were less dependent on the microbial activity than the 3-years filter media. Results of the surface coatings analyses indicated that the biofilter materials is predominantly composed of variable layers of manganese and iron oxides, with microbial biomass contributing only about 3.5 and 1.4% of the dry weight of the surface coatings on the 3- and 15-years filter media respectively. Investigations onto the Mn2+ sorption by the lyophilized biofilter media showed that, the sorption kinetics on the catalytic oxides layers followed the pseudo-second-order kinetics model, thus suggesting chemisorption as the dominant mechanism of Mn2+ removal. This implied that manganese removal by these biofilters is mainly by adsorption of Mn2+ onto the iron and manganese (catalytic) oxides layers and autocatalytic oxidation. The present study has clearly linked Mn2+ oxidation to the catalytic oxides layers on the aged biofilter media. (C) 2008, The Society for Biotechnology, Japan. All rights reserved.

Keywords: Ammonium, Autocatalysis, Binding, Biofilter Media, Biofiltration, Biological Mn Oxidation, Catalytic Oxides Layer, Coatings, Groundwaters, Iron, Manganese Removal, Microcosms, Oxidation, Surface Coatings, Surfaces

? Ye, J.H., Wang, L.X., Chen, H., Dong, J.J., Lu, J.L., Zheng, X.Q., Wu, M.Y. and Liang, Y.R. (2011), Preparation of tea catechins using polyamide. *Journal of Bioscience and Bioengineering*, **111** (2), 232-236.

Full Text: [2011\J Bio Bio111, 232.pdf](2011/J%20Bio%20Bio111,%20232.pdf)

Abstract: An adsorption separation method using Polyamide-6 (PA) as an adsorbent was developed to separate catechins from green tea extract. The adsorption capacity of total catechins for PA was 193.128 mg g-1 with an adsorption selectivity coefficient K-A(B) of total catechins over caffeine 21.717, which was better than macroporous resin model HPD 600. The Langmuir model and the pseudo-second order mode were primely fitted to describe its equilibrium data and adsorption kinetics, respectively. PA column separation by two-step elution using water and 80% (v/v) aqueous ethanol was established to prepare catechins complex which contained 670.808 mg g-1 total catechins and 1.828 mg g-1 caffeine. It is considered that PA was a promising adsorbent for selective isolation of catechins. (C) 2010, The Society for Biotechnology, Japan. All rights reserved.

Keywords: Adsorption, Caffeine-Free, Camellia Sinensis, Caprolactam, Chromatography, Column, Equilibrium, Extract, Green Tea, Kinetics, L., Langmuir, Resin, Separation, Sorption, Two-Step Elution

# Title: Journal of Biosciences

Full Journal Title: Journal of Biosciences

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories: Impact Factor

? Lai, W.F. (2011), Nucleic acid therapy for lifespan prolongation: Present and future. *Journal of Biosciences*, **36** (4), 725-729.

Full Text: [2011\J Bio36, 725.pdf](2011/J%20Bio36,%20725.pdf)

Abstract: Lifespan prolongation is a common desire of the human race. With advances in biotechnology, the mechanism of aging has been gradually unraveled, laying the theoretical basis of nucleic acid therapy for lifespan prolongation. Regretfully, clinically applicable interventions do not exist without the efforts of converting theory into action, and it is the latter that has been far from adequately addressed at the moment. This was demonstrated by a database search on PubMed and Web of Science, from which only seven studies published between 2000 and 2010 were found to directly touch on the development of nucleic acid therapy for anti-aging and/or longevity enhancing purposes. In light of this, the objective of this article is to overview the current understanding of the intimate association between genes and longevity, and to bring the prospect of nucleic acid therapy for lifespan prolongation to light.

Keywords: Acid, Aging, Aging Rats, Author, Biotechnology, Caenorhabditis-Elegans, China, Delivery, Development, Dysfunction, Gene-Therapy, Genes, Hong Kong, Hormone Replacement Therapy, Human, Interventions, Lifespan, Longevity, Longevity, Mechanism, Mice, Mutation, Nucleic Acid Therapy, Overview, Pubmed, Race, Restriction, Science, Theory, Therapy, Touch, Web of Science

# Title: Journal of Biosocial Science

Full Journal Title: Journal of Biosocial Science

ISO Abbreviated Title: J. Biosoc. Sci.

JCR Abbreviated Title: J Biosoc Sci

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories: Impact Factor

Graham, M.J., Larsen, U. and Xu, X. (1999), Secular trend in age at menarche in China: A case study of two rural counties in Anhui Province. *Journal of Biosocial Science*, **31** (2), 257-267.

Full Text: [J\J Bio Sci3, 257.pdf](J/J%20Bio%20Sci3,%20257.pdf)

Abstract: There is increasing evidence that age at menarche has decreased in Europe and the United States during the last century and in Japan over the last several decades. Data from a community-based survey conducted in two rural counties of Anhui Province in China indicate a similar, downward secular trend in age at menarche for Chinese women. The present study shows the mean age at menarche decreased by 2.8 years, from 16.5 to 13.7, over an approximate 40-year time interval. This rapid decrease in age at menarche may partly be due to better nutrition and living standards reflected by the improved socioeconomic standards experienced in China over the past few decades. To test this hypothesis, a number of determinants of age at menarche were assessed; year of birth, literacy status, county of residence, amount of physical labour, general health status, pesticide exposure before age at menarche, and drinking water source were all found to be associated with age at menarche.

# Title: Journal of Biotechnology

Full Journal Title: [Journal of Biotechnology](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=4943&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=3281709&md5=bd087d9e29d8e3cf5dea40b5f9f3a1e6)

ISO Abbreviated Title: J. Biotechnol.

JCR Abbreviated Title: J Biotechnol

ISSN: 0168-1656

Issues/Year: 21

Journal Country/Territory: Netherlands

Language: English

Publisher: Elsevier Science BV

Publisher Address: PO Box 211, 1000 AE Amsterdam, Netherlands

Subject Categories:

Biotechnology & Applied Microbiology: Impact Factor

Leusch, A. and Volesky, B. (1995), The influence of film diffusion on cadmium biosorption by marine biomass. *Journal of Biotechnology*, **43** (1), 1-10.

Full Text: [J\J Bio43, 1.pdf](J/J%20Bio43,%201.pdf)

Abstract: The sorption of cadmium by biomass of brown marine alga *Sargassum* fluitans has been studied in a standard mixed batch reactor at steady-state and transient conditions. Steady-state sorption data over the temperature range of 7℃to 60℃ indicated a higher cadmium uptake at elevated temperatures. Overall adsorption rates also slightly increased with increasing temperature in the range of 20℃ to 60℃. Assuming only a single external mass transfer resistance to adsorption external mass transfer coefficients were determined. Experimental data were compared to a single resistance model for several variable system parameters such as agitation, particle size and sorbent loadings under transient batch conditions. The biosorption system operated at the optimal pH 4.5 with 20 mM Na-acetate buffer. The model reflected the experimental data well only at high sorbent and low metal concentrations, which generally represents batch sorber conditions. Under these conditions, film diffusion appeared to be the rate-controlling step in adsorption. However, at low sorbent concentrations the model could not represent the sorption system behavior due to the likely predominant influence of intraparticle diffusion.

O’Brien, S.M., Thomas, O.R.T. and Dunnill, P. (1996), Non-porous magnetic chelator supports for protein recovery by immobilised metal affinity adsorption. *Journal of Biotechnology*, **50** (1), 13-25.

Full Text: [J\J Bio50, 13.pdf](J/J%20Bio50,%2013.pdf)

Abstract: Micron-sized non-porous magnetic adsorbents derivatized with the metal chelating agent, iminodiacetic acid (IDA), have been prepared for the selective recovery of proteins. Four preparative routes employing epoxide activation chemistry were investigated to introduce IDA onto the surface of polyglutaraldehyde-coated particles. The presence of surface bound IDA was demonstrated by the selective binding of Cu2+ and by the behaviour of Cu2+-charged and uncharged supports towards native haem proteins known to bind porous polymer-based Cu2+-IDA adsorbents. The simplest and most direct procedure was developed further. Supports prepared by this method were optimised with respect to ligand density and specific binding capacity. These coating and derivatization methods resulted in supports with a high level of substitution and low non-specific binding while retaining a high effective surface area for binding of the target protein (>200 mgg-1). The resulting magnetic chelator supports possess excellent long term storage stability.

Puranik, P.R. and Paknikar, K.M. (1997), Biosorption of lead and zinc from solutions using Streptoverticillium cinnamoneum waste biomass. *Journal of Biotechnology*, **55** (2), 113-124.

Full Text: [J\J Bio55, 113.pdf](J/J%20Bio55,%20113.pdf)

Abstract: Mycelial wastes of microbial origin from fermentation industries have been recognized as potential biosorbents for decontamination of waste waters containing heavy metals. Dried, nonliving, granulated biomass of Streptoverticillium cinnamoneum was used for the recovery of lead and zinc from solutions. It was found that pretreatment of the biomass with boiling water for 15 min increased the biosorption of lead and zinc by 52 and 41%, respectively. The optimum pH range for lead uptake was 3.5-4.5 while for zinc it was 5.0-6.0. The lead and zinc adsorption data when applied to Freundlich and Langmuir isotherm equations showed good correlation (r2 = 0.97) and hence equal conformity to both models. The Scatchard plots indicated clearly that more than one type of binding sites were involved in the adsorption of lead and zinc by the biomass. The maximum loading capacity of S. cinnamoneum biomass was; found to be 57.7 mg/g for lead and 21.3 mg/g for zinc with boiling water pretreatment. The loaded metals could be desorbed effectively with dilute hydrochloric acid, nitric acid and 0.1 M EDTA. Treatment with 0.1 M sodium carbonate permitted reuse of the desorbed biomass although the metal loading capacity in the subsequent cycles decreased by 14-37%. The metal biosorbent granules prepared are a value-added product that has the potential for removal/recovery of lead and zinc from dilute solutions on a commercial scale. (C) 1997 Elsevier Science B.V.

Keywords: Removal, Uranium, Mechanisms, arrhizus, Binding, Metals, pH, Metal Biosorption, Lead, Zinc, Metal Desorption, Waste Biomass, Streptoverticillium Cinnamoneum

Pethkar, A.V. and Paknikar, K.M. (1998), Recovery of gold from solutions using *Cladosporium* *cladosporioides* biomass beads. *Journal of Biotechnology*, **63** (2), 121-136.

Full Text: [J\J Bio63, 121.pdf](J/J%20Bio63,%20121.pdf)

Abstract: A fungal isolate, *Cladosporium cladosporioides* was used for biosorption of gold from solutions. The fungal biomass was granulated by mixing it with a matrix derived from keratinous material of natural origin. The resulting biosorbent beads adsorbed 100 mg gold per gram from a solution of gold. Maximum biosorption of gold (80%) occurred under acidic pH conditions (pH 1–5). The contact time required for 80% biosorption of gold could be reduced to 20 min by pre-soaking the beads in deionized distilled water. Gold uptake by the beads was found to increase linearly as a function of metal concentration. The data could be fitted into Freundlich model of adsorption isotherms. A column packed with 3 g biosorbent beads was used for continuous adsorption of gold. The gold loading capacity obtained in the system was to the tune of 110 mg g−1. Gold was removed from an electroplating unit effluent with 55% efficiency in batch experiment and the loading capacity was 36 mg g−1. It was found that gold could be removed from solutions in the presence of carbonate and complexing agents like citrate, sulfite and thiosulfate albeit with less efficiency. The beads were found to biodegrade in soil in about 140 days. The process, thus, has the prospect of becoming an efficient and environmental friendly method to recover gold from aqueous solutions.

Keywords: Biosorption, Cladosporium Cladosporioides, Gold

Blanco, A., Sanz, B., Llama, M.J. and Serra, J.L. (1999), Biosorption of heavy metals to immobilised *pHormidium laminosum* biomass. *Journal of Biotechnology*, **69** (2-3), 227-240.

Full Text: [J\J Bio69, 227.pdf](J/J%20Bio69,%20227.pdf)

Abstract: The capacity to biosorb Cu(II), Fe(II), Ni(II) and Zn(II) by non-viable biomass of the cyanobacterium *pHormidium laminosum* entrapped in polysulfone and epoxy resin beads was investigated. The biosorption process depended on the wetting of biomass beads, the rate of metal biosorption decreasing when dry biomass beads were used. A decrease in the immobilised biomass bead size led to an increase in the rate of metal biosorption. The amount of metal biosorbed increased with the biomass and the amount of metal available. The biosorbed metal was completely desorbed from the biomass beads by washing with 0.1 M HCl. Polysulfone biomass beads can be reused for, at least, ten consecutive biosorption/desorption cycles without apparent loss of efficiency after its reconditioning with 0.1 M NaOH. (C) 1999 Elsevier Science B.V.

Keywords: Cyanobacteria, Non-Viable Biomass, Immobilisation, Polysulfone, Epoxy Resin, Metal Biosorption, Metal Desorption

Matsunaga, T., Takeyama, H., Nakao, T. and Yamazawa, A. (1999), Screening of marine microalgae for bioremediation of cadmium-polluted seawater. *Journal of Biotechnology*, **70** (1-3), 33-38.

Full Text: [J\J Bio70, 33.pdf](J/J%20Bio70,%2033.pdf)

Abstract: Twenty four strains out of 191 marine microalgal strains exhibited cadmium (Cd) resistance. They were tested for their Cd removal ability in growth media containing 50 μM Cd. Six strains out of 19 green algae and one out of five cyanobacteria removed more than 10% of total Cd from the medium. The marine green alga *Chlorella* sp. NKG16014 showed the highest removal of Cd 48.7% of total. Cd removal by NKG16014 was further quantitatively evaluated by measuring the amount of cell adsorption and intracellular accumulation. After 12 days incubation, 67% of the removed Cd was accumulated intracellularly and 25% of the Cd removed was adsorbed on the algal cell surface. The maximum Cd adsorption (*q*max) was estimated to be 37.0 mg Cd (g dry cells)−1 using the Langmuir sorption model. The Cd removal by freeze-dried NKG16014 cells was also determined. Cd was more quickly adsorbed by dried cells than that by living cells, with a *q*max of 91.0 mg Cd (g dry cells)−1. (C) 1999 Elsevier Science B.V.

Keywords: Bioremediation, Cadmium, Screening, Marine Microalgae, Marine *Chlorella*, Adsorption

Hirano, S., Nakahira, T., Nakagawa, M. and Kim, S.K. (1999), The preparation and applications of functional fibres from crab shell chitin. *Journal of Biotechnology*, **70** (1-3), 373-377.

Full Text: [J\J Bio70, 373.pdf](J/J%20Bio70,%20373.pdf)

Abstract: Novel chitin-silk fibroin fibres and chitin fibres were prepared by an environmental friendly wet-spinning method. Each aqueous solution of sodium chitin (N-acetylchitosan) salt and its blends of silk fibroin in aqueous 14% sodium hydroxide was spun through a viscose-type spinneret into an aqueous 10% sulfuric acid solution saturated with ammonium sulfate (about 43%), and the corresponding white filament was obtained. The tenacity and elongation values of the chitin-silk fibroin filament decreased with an increase of fibroin content up to 33% by weight. A scanning electron microscopy analysis revealed that both the chitin filament and the chitin-silk fibroin (67:33, w/w) filament had vertical strips with faint scale structures on their surfaces. Some applications of these staple fibres were also reported. (C) 1999 Elsevier Science B.V. All rights reserved.

Keywords: Chitin Fibres, Chitin-Silk Fibroin Fibres, Chitosan, Fibroin, Textile, Wound Dressing, N-Acylchitosan, Fibers

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Full Text: [J\J Bio80, 1.pdf](J/J%20Bio80,%201.pdf)

Abstract: The review presented in this paper focuses on applications of particulate biofilm reactors (e.g. Upflow Sludge Blanket, Biofilm Fluidized Bed, Expanded Granular Sludge Blanket, Biofilm Airlift Suspension, Internal Circulation reactors). Several full-scale applications for municipal and industrial wastewater treatment are presented and illustrated, and their most important design and operation aspects (e.g. biofilm formation, hydrodynamics, mass transfer, mixing) are analysed and discussed. It is clear from the review that this technology can be considered a grown up technology for which good design and scale-up guidelines are available. (C) 2000 Elsevier Science B.V. All rights reserved.

Keywords: Airlift, Airlift Suspension Reactor, Biofilm Reactor, Bubble-Column, Coke Plant Wastewater, Draft-Tube, Egsb, Fluidized Bed, Fluidized-Bed Reactor, Gas Holdup, Internal Circulation, Liquid Mass-Transfer, Low-Density Particles, Phase Hold-Ups, Small Suspended Particles, Use, Wastewater, Wastewater Treatment

Wang, J.L., Zhan, X.M., Ding, D.C. and Zhou, D. (2001), Bioadsorption of lead(II) from aqueous solution by fungal biomass of *Aspergillus niger*. *Journal of Biotechnology*, **87** (3), 273-277.

Full Text: [J\J Bio87, 273.pdf](J/J%20Bio87,%20273.pdf)

Abstract: The removal of lead by waste fungal biomass of *Aspergillus niger*, originated from citric acid fermentation industry, was investigated. The experimental results indicated that the bioadsorption achieved equilibrium within 4 h. The kinetic analysis of lead adsorption onto the fungal biomass revealed that the bioadsorption process followed the first-order reaction kinetics. The adsorption isotherm can be simulated by Freundlich model, which gave a correlation coefficient equal to 0.93. The lead-loaded biomass can be effectively regenerated by 0.1 M nitric acid. This research demonstrated that the waste biomass of *A. niger* is a potential bioadsorbent for the removal of lead from aqueous solution. (C) 2001 Elsevier Science B.V.

Keywords: Biosorption, Isotherm, Kinetic, Biomass, Lead, *Aspergillus niger*

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Full Text: [2001\J Bio89, 175.pdf](2001/J%20Bio89,%20175.pdf)

Abstract: Recently, an increasing application of so called advanced oxidation processes (AOPs) to industrial wastewater has been observed. In particular, an integrated approach of biological and chemical treatment of wastewater is advantageous conceptually. The subject of our study was synthetic wastewater, simulating effluents from knitting industry. The wastewater contained components that are very often used in Polish textile industry: an anionic detergent Awiwaz KG conc., a softening agent Tetrapol CLB and an anthraquinone dyestuff-Acid Blue 40, CI 2125. The toxicity of the detergents and the dye was determined in terms of effective concentration EC50 using mixed cultures of activated sludge as well as pure culture of luminescent bacteria Vibrio fischerii NRRLB-11177. The dye did not undergo biodegradation without AOPs pretreatment, therefore a degree of its removal (decolourisation) by the AOPs has been determined and its bio-sorption properties on the flocks of activated sludge have been studied. The dye adsorption onto flocks of activated sludge was described by Henry’s isotherm. Our investigations focussed on the influence of various oxidants like O3, H2O2 and UV fight on biodegradation of single components aqueous solution as well as of the whole textile wastewater. The results of kinetic measurements of the biodegradation (by means of acclimated activated sludge) was described by Monod type of kinetic equation. The experimental evidence of the positive effect of chemical oxidation pretreatment on the biodegradation of recalcitrant compounds was quantified by estimation of the kinetic parameters of the Monod equation. Due to the AOPs pretreatment a decrease of the Monod constant and an increase of maximal specific growth rate was observed. The activity of degradative enzymes of activated sludge was assayed by the methods of 2-[4-iodophenyl]-3-[4-nitrophenyl]-5-phenyltetrazolium chloride test. (C) 2001 Elsevier Science B.V. All rights reserved.

Keywords: Textile Wastewater, Toxicity, Biodegradation Kinetics, Advanced Oxidation Processes, Biological Treatment, Water

? Chen, K.C., Wu, J.Y., Huang, C.C., Liang, Y.M. and Hwang, S.C.J. (2003), Decolorization of azo dye using PVA-immobilized microorganisms. *Journal of Biotechnology*, **101** (3), 241-252.

Full Text: [2003\J Bio101, 241.pdf](2003/J%20Bio101,%20241.pdf)

Abstract: A microbial consortium having a high capacity for rapid decolorization of azo dye (RED RBN) was immobilized by a phosphorylated polyvinyl alcohol (PVA) gel. The immobilized-cell beads exhibited a color removal capability of 75%, even at a high concentration of RED RBN (500 mg l-1) within 12 h using flask culture. The continuous operation was conducted at a hydraulic retention time (HRT) of 5-20 h in which the dye loading rate ranged from 240 to 60 mg dye h-1. A removal efficiency exceeding 90% was obtained at the HRT higher than 10 h. No recognizable destruction of bead appearance was observed in the 6-month operation. Examination of the mechanism of the decolorization process by cell beads indicated that it proceeded primarily by biological decolorization associated with partial adsorption of the dye onto the entrapped cells and gel matrix. Microscopic observation revealed that the microbial consortium contained in the gel beads was at least made up of three kinds of bacterial species. From the economical viewpoint, alternative cheaper nitrogen sources such as fish meal, soybean meal, pharmamedia and vita yeast powder were examined. (C) 2003 Elsevier Science B.V. All rights reserved.

Keywords: Azo Dyes, Microbial Consortium, Decolorization, Immobilized-Cell Beads, Textile Dyes, Biodegradation, Reduction, Effluents, Cultures, Fungi, Gel

Liu, Y., Xu, H., Yang, S.F. and Tay, J.H. (2003), A general model for biosorption of Cd2+, Cu2+ and Zn2+ by aerobic granules. *Journal of Biotechnology*, **102** (3), 233-239.

Full Text: [J\J Bio102, 233.pdf](J/J%20Bio102,%20233.pdf)

Abstract: Aerobic granules are microbial aggregates with a strong and compact structure. This study looked into the feasibility of aerobic granules as a novel type of biosorbent for the removal of individual Cd2+, Cu2+ and Zn2+ from aqueous solution. Based on the thermodynamics of biosorption reaction, a general model was developed to describe the equilibrium biosorption of individual Cd2+, Cu2+ and Zn2+ by aerobic granules. This model provides good insights into the thermodynamic mechanisms of biosorption of heavy metals. The model prediction was in good agreement with the experimental data obtained. It was further demonstrated that the Langmuir, Freundlich and Sips or Hill equations were particular cases of the proposed model. The biosorption capacity of individual Cd2+, Cu2+ and Zn2+ on aerobic granules was 172.7, 59.6 and 164.5 mg g-1, respectively. These values may imply that aerobic granules are effective biosorbent for the removal of Cd2+, Cu2+ and Zn2+ from industrial wastewater.

Keywords: Aerobic Granule, Biosorption, Thermodynamics, Cadmium, Copper, Zinc, Equilibrium, Model

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Full Text: [2006\J Bio121, 227.pdf](2006/J%20Bio121,%20227.pdf)

Abstract: This study investigated the effect of different feeding regimes on the cobalt sorption capacity of anaerobic granular sludge from a full-scale bioreactor treating paper mill wastewater. Adsorption experiments were done with non-fed granules in monometal (only Co) and competitive conditions (Co and Ni in equimolar concentrations). In order to modify the extracellular polymeric substances and sulfides content of the granules, the sludge was fed for 30 days with glucose (pH 7. 30 degrees C, organic loading rate = 1.2 g glucose 1-1 day-1) in the presence (COD/SO42- = 1) or absence of sulfate. The partitioning of the sorbed cobalt between the exchangeable, carbonates, organic matter/sulfides and residual fractions was deter-mined using a sequential extraction procedure (modified Tessier). Experimental equilibrium sorption data for cobalt were analysed by the Langmuir, Freundlich and Redlich-Peterson isotherm equations. The total Langmuir maximal sorption capacity of the sludge fed with glucose and sulfate loaded with cobalt alone displayed a significantly higher maximal cobalt sorption (Q(max) = 18.76 mg g-1 TSS) than the sludge fed with glucose alone (Q(max) = 13.21 mg g-1 TSS), essentially due to an increased sorption capacity of the exchangeable (30-107%) and organic/sulfides fractions (70-30%). Environmental scanning electron microscopy coupled with an energy dispersive X-ray analysis of granular cross-sections showed that mainly iron minerals (i.e. iron sulfides) were involved in the cobalt accumulation. Moreover, the sorbed cobalt was mainly located at the edge of the granules. The sorption characteristics of the exchangeable and carbonates fractions fitted well to the Redlich-Peterson model (intermediate multi-layer sorption behaviour), whereas the sorption characteristics of the organic matter/sulfides and residual fractions fitted well to the Langmuir model (monolayer sorption behaviour). The organic matter/sulfides fraction displayed the highest affinity for cobalt for the three sludge types investigated. (c) 2005 Elsevier B.V. All rights reserved.

Keywords: Anaerobic Granular Sludges, Cobalt, Biosorption, Sequential Extraction, SEM/BSE/EDX, Extracellular Polymeric Substances, Sequential Extraction Procedure, Soluble Microbial Products, Heavy-Metals, Methanol Degradation, Activated-Sludge, UASB Reactors, Nickel, Sulfide, EPS

# Title: Journal of Biological Chemistry

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Notes: highly cited

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Full Text: [-1959\J Bio Che38, 81.pdf](-1959/J%20Bio%20Che38,%2081.pdf)

Keywords: Analysis

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Keywords: Chemistry

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Full Text: [-1959\J Bio Che51, 21.pdf](-1959/J%20Bio%20Che51,%2021.pdf)

Keywords: Plasma

Notes: highly cited

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Keywords: Plasma, Proteins

Notes: highly cited

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Keywords: Equilibria, Water

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Keywords: Proteins

Notes: highly cited 21995, 27/05/10

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| http://www.bbs.chinanmr.cn/data/attachment/album/201105/02/045117nuzewdfi2wipfm1y.jpg | Notes: highly cited, 295960 times, 24/08/12, The top one in the world  Oliver Howe Lowry: MD, PhD (July 18, 1910 – June 29, 1996) was an American biochemist. He is best remembered for devising the Lowry protein assay. |

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Abstract: The phosphorus assay method of Fiske and SubbaRow (1) has been modified to increase its sensitivity and to facilitate multiple total phosphorus analyses on eluates from chromatographic columns.

Weber, A. and Herz, R. (1963), The binding of calcium to actomyosin systems in relation to their biological activity. *Journal of Biological Chemistry*, **238** (2), 599-605.

Full Text: [J\J Bio Che238, 599.pdf](J/J%20Bio%20Che238,%20599.pdf)

Abstract: The fact that actomyosin and myofibrils under certain conditions require the addition of calcium for superprecipitation and maximal adenosine triphosphatase activity was recently demonstrated by us (1, 2) and by Ebashi (3). This effect of calcium is difficult to understand in view of the finding of Parker and Gergely (4) that added calcium, i.e. exchangeable calcium, is actually not bound to actomyosin structures in the presence of MgATP. However, their results are at variance with those of Ebashi (3), who found Cad5 bound to actomyosin. Therefore, we reinvestigated the binding of Ca to myofibrils and actomyosin under various conditions, particularly in the presence of MgATP. A preliminary account of some of these results has already been presented (5).

Notes: highly cited 11,575, 24/08/11

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Full Text: [J\J Bio Che240, 863.pdf](J/J%20Bio%20Che240,%20863.pdf)

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Full Text: [J\J Bio Che242, 4501.pdf](J/J%20Bio%20Che242,%204501.pdf)

Abstract: Difference spectra induced by ATP and its analogues of theultraviolet absorption of heavy meromyosin around 280 mµwere measured by the double cell method. The difference spectruminduced by ATP showed two peaks, at 281 and 289 mµ, anda shoulder near 300 mµ. The maximum value of the differencemolar extinction coefficient, Δ*E*, at 289 mµ, was 5000 ±300 m-1 cm-1. The difference spectrum caused by ATP near 290mµ decreased with time after its addition and reached thesame value as that induced by ADP. The difference spectrum attributableto ADP showed two peaks at 280 and 288 mµ, but the shouldernear 300 mµ was scarcely observable. The maximum valueof Δ*E* at 288 mµ was 2700 ± 600 m-1 cm-1.

AMP, adenosine, adenine, and d-ribose induced slight but detectable differencespectra of heavy meromyosin. Pyrophosphate and sodium triphosphateinduced difference spectra similar in shape to that of ADP, but the values of Δ*E* at 287 mµ were only about 1500 m-1 cm-1.

The difference optical density at 288 mµ was measuredas a function of ADP concentration in the presence of 0.06 mKCl and 8.3 mm MgCl2. The unit weight of heavy meromyosin wascalculated to be 3.65 x 105, after determining the minimum ADPconcentration needed to give a maximum spectral change.

Thedecay of change in difference optical density, ΔO.D., inducedby ATP was measured as a function of time at a fixed wave length.The initial velocity of steady state ATPase of heavy meromyosinwas measured by the pH-stat method, and the rate constant ofthe step from the enzyme-substrate complex to the products, *k*2, was evaluated. The decay of ΔO.D. was found to agree wellwith that expected for the enzyme-substrate complex over a widerange of concentrations of KCl, NaCl, and MgCl2.

Times Cited: 23463, 27/05/10

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Full Text: [1960-80\J Bio Che244, 4406.pdf](1960-80/J%20Bio%20Che244,%204406.pdf)

Abstract: Forty proteins with polypeptide chains of well characterizedmolecular weights have been studied by polyacrylamide gel electrophoresisin the presence of sodium dodecyl sulfate following the procedureof Shapiro, Viñuela, and Maizel (*Biochem. Biophys. Res.Commun.*, 28, 815 (1967)). When the electrophoretic mobilitieswere plotted against the logarithm of the known polypeptidechain molecular weights, a smooth curve was obtained. The resultsshow that the method can be used with great confidence to determinethe molecular weights of polypeptide chains for a wide varietyof proteins.

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Full Text: [J\J Bio Che245, 4814.pdf](J/J%20Bio%20Che245,%204814.pdf)

Abstract: The errors of the Michaelis-Menten equation and three otherapproximations have been examined in relation to the true rateequation in which the depletion of free substrate by bindingto the enzyme is taken into account. The true velocities anderrors are computed for various concentrations of the totalenzyme and the total substrate. It has been shown that, whenthe concentrations of the total enzyme and the total substrateboth lie within 10-fold of the Michaelis constant, the errorof the Michaelis-Menten equation ranges from 0.08 to 900%, whereasthat of the Cha-Cha approximation, *v* = *VS*/(*K* + *S* + *E*), rangesfrom 0.7 to 34.8%, and that of the asymptote of the true curvein the reciprocal plot, *v* = *VS*/(*K* + *E* + *KS*/(*K* + *E*)), rangesfrom less than 0.1 to 58.5%.

Times Cited: 17762, 27/05/10

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Full Text: [1960-80\J Bio Che250, 4007.pdf](1960-80/J%20Bio%20Che250,%204007.pdf)

Abstract: A technique has been developed for the separation of proteins bytwo-dimensional polyacrylamide gel electrophoresis. Due to its resolutionand sensitivity, this technique is a powerful tool for the analysis anddetection of proteins from complex biological sources. Proteins areseparated according to isoelectric point by isoelectric focusing in thefirst dimension, and according to molecular weight by sodium dodecylsulfate electrophoresis in the second dimension. Since these two parametersare unrelated, it is possible to obtain an almost uniform distribution ofprotein spots across a two-diminsional gel. This technique has resolved1100 different components from Escherichia coli and should be capable ofresolving a maximum of 5000 proteins. A protein containing as little as onedisintegration per min of either 14C or 35S can be detected byautoradiography. A protein which constitutes 10 minus 4 to 10 minus 5% ofthe total protein can be detected and quantified by autoradiography. Thereproducibility of the separation is sufficient to permit each spot on oneseparation to be matched with a spot on a different separation. Thistechnique provides a method for estimation (at the described sensitivities)of the number of proteins made by any biological system. This system canresolve proteins differing in a single charge and consequently can be usedin the analysis of in vivo modifications resulting in a change in charge.Proteins whose charge is changed by missense mutations can be identified. Adetailed description of the methods as well as the characteristics of thissystem are presented.

Chou, T.C. and Talaly, P. (1977), A simple generalized equation for the analysis of multiple inhibitions of Michaelis-Menten kinetic systems. *Journal of Biological Chemistry*, **252** (18), 6438-6442.

Full Text: [J\J Bio Che252, 6438.pdf](J/J%20Bio%20Che252,%206438.pdf)

Abstract: The summation of the effects of two or more reversible inhibitors ofvarious types on the initial velocity of enzyme systems obeyingMichaelis-Menten kinetics is described by the the general relation:(formula: see text) wherein v1,2,3...n is the velocity of reaction in thesimultaneous presence of n inhibitors, vi is the velocity observed in thepresence of each individual inhibitor, and v0 is the velocity in theabsence of inhibition. The derivation is based on the assumption that eachenzyme species can combine with no more than one of the inhibitors (i.e.the inhibitors are mutually exclusive). The above relationship holdsirrespective of the number of inhibitors, the type of inhibition(competitive, noncompetitive, or uncompetitive), or the kinetic mechanism(sequential or ping-pong) of the enzyme reaction under consideration.Deviations from this equality define synergism or antagonism of inhibitorsdepending on whether the value of the left side of the above equation isgreater or smaller than the right, respectively. Knowledge of the kineticconstants for substrates and inhibitors is not required. If two or moreinhibitors act independently (i.e. are not mutually exclusive), theircombined effects are necessarily synergistic. Under certain circumstances, described in the text, mutually nonexclusive inhibitors obey the fractionalvelocity product relationship: v1,2,3...n/v0 = (v1/v0) x (v2/v0) x(v3/v0)...(vn/v0).

Notes: highly cited 16089, 12/04/06

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Full Text: [1985\J Bio Che260, 3440.pdf](1985/J%20Bio%20Che260,%203440.pdf)

Abstract: A new family of highly fluorescent indicators has been synthesized forbiochemical studies of the physiological role of cytosolic free Ca2+. Thecompounds combine an 8-coordinate tetracarboxylate chelating site withstilbene chromophores. Incorporation of the ethylenic linkage of thestilbene into a heterocyclic ring enhances the quantum efficiency andphotochemical stability of the fluorophore. Compared to their widely usedpredecessor, “quin2”, the new dyes offer up to 30-fold brighterfluorescence, major changes in wavelength not just intensity upon Ca2+ binding, slightly lower affinities for Ca2+, slightly longer wavelengths ofexcitation, and considerably improved selectivity for Ca2+ over otherdivalent cations. These properties, particularly the wavelength sensitivityto Ca2+, should make these dyes the preferred fluorescent indicators formany intracellular applications, especially in single cells, adherent celllayers, or bulk tissues.   
Williams, T.C., Corson, D.C., Sykes, B.D. and MacManus, J.P. (1987), Oncomodulin. 1H NMR and optical stopped-flow spectroscopic studies of its solution conformation and metal-binding properties. *Journal of Biological Chemistry*, **262** (13), 6248-6256.

Full Text: [J\J Bio Che262, 6248-1.pdf](J/J%20Bio%20Che262,%206248-1.pdf) [J\J Bio Che262, 6248.pdf](J/J%20Bio%20Che262,%206248.pdf)

Abstract: As deduced from its 1H NMR spectrum, oncomodulin’s solution conformation is very similar to the tertiary structure of other single domain 2-site calcium-binding proteins of the troponin C c

lass. Despite its extensive amino acid sequence homology with parvalbumins, however, oncomodulin differs significantly from these proteins in its Ca(II)----Ln(III) exchange characteristics. Although the relative affinity of Lu(III) for the EF site of Ca2-oncomodulin was normal, beta Lu: EF/beta Ca: EF being 175±15, displacement of Ca(II) from the CD site was not favored, beta Lu: CD/beta Ca: CD being 1.2±0.1. Lineshape analyses of several 1H NMR resonances generated by the Lu(III) titration of Ca2-oncomodulin indicated that Ca(II)----Ln(III) exchange at the CD site was 15-20 s-1, approximately 100 times faster than exchange at the CD site of parvalbumins. Analyses of the distribution of metal-bound oncomodulin species showed that Ca(II)----Lu(III) exchange was cooperative, the coefficient of cooperativity being estimated as 5±1. The kinetics of the release of Yb(III) from oncomodulin as measured by optical stopped-flow techniques corroborated the observed cooperativity in metal binding; the off-rate constant of Yb(III) from the EF site of Yb2-oncomodulin was 0.0036 s-1, approximately 19 times slower than the release of Yb(III) from the EF site of Ca1Yb1-oncomodulin. We attribute part of the reduced preference of small Ln(III)s for the CD site of oncomodulin to a combination of this site’s inherent incompressibility (Williams, T.C., Corson, D.C. & Sykes, B.D. (1984) J. Am. Chem. Soc., 106, 5698-5702) and the Glu----Asp substitution at sequence position 59, the residue which chelates metal at the-X coordination position. Like the CD site in oncomodulin, site III in troponin C has not only a lower affinity for calcium relative to the CD site of parvalbumins but also aspartic acid at its-X position; a water molecule bridges the gap between bound metal and the carboxyl group of the relatively short side chain of Asp-114 (Herzberg, O. & James, M. N. G. (1985) Biochemistry 24, 5298-5302). Hence, we suggest that Asp-59 in oncomodulin binds metal only indirectly through an intervening water molecule, a proposal which is consistent with the CD site’s reduced affinity for ions the size of Ca(II) or smaller.

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Full Text: [J\J Bio Che267, 18008-1.pdf](J/J%20Bio%20Che267,%2018008-1.pdf) [J\J Bio Che267, 18008.pdf](J/J%20Bio%20Che267,%2018008.pdf)

Abstract: Estrogen receptor (ER) binding has been shown to decrease in breast cancer cell lines exposed to sodium butyrate, however, the underlying mechanisms are unknown. In MCF-7 breast cancer cells, butyrate caused a rapid time-and concentration-dependent decrease in ER mRNA levels, apparent by 3 h at 3 mm butyrate. ER gene transcription rate was decreased and cycloheximide co-treatment did not relieve this inhibitory effect, suggesting that the butyrate effect was not dependent on ongoing protein synthesis. In both MCF-7 and T-47D cells the decrease in ER mRNA was mirrored by an increase in the level of epidermal growth factor receptor (EGF-R) mRNA. A marked inverse relationship exists between ER and EGF-R in human breast cancer biopsies and cell lines, and the reciprocal modulation of these genes by butyrate suggests that the expression of ER and EGF-R may be co-regulated. This relationship was further investigated in lines expressing only one or the other receptor. In the ER-positive EGF-R-negative line, MDA-MB-134-VI, butyrate exposure decreased ER mRNA levels, implying that the regulation of ER mRNA by butyrate is independent of EGF-R expression. However, butyrate decreased EGF-R mRNA in two ER-negative lines, MDA-MB-231 and HBL-100. As this effect differed from that in ER-positive lines, the regulation of EGF-R may depend on the expression of ER. The possibility that ER and EGF-R gene expression are closely linked has implications in the understanding of progression of human breast cancers to a hormone-independent phenotype and for the use of ER and EGF-R levels as independent prognostic indicators.

Keywords: Transcriptional Regulation, Progesterone-Receptor, Carcinoma Cells, Messenger-RNAs, MCF-7, Differentiation, Sensitivity, Milk, Amplification, Stimulation

Notes: highly cited

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Full Text: [1993\J Bio Che269, 22369.pdf](1993/J%20Bio%20Che269,%2022369.pdf)

Abstract: We report in this paper that highly purified Escherichia coli dihydroxy-acid dehydratase, fumarase A, fumarase B, and mammalian aconitase are inactivated by O2 with second order rate constants in the range of 106 to 107 M-1 s-1. Each of these enzymes belongs to the hydrolyase class and contains catalytically active [4Fe-4S] clusters. Simultaneous with inactivation by O2 is the release of iron from their clusters. Our working hypothesis is O2 inactivates these enzymes by oxidizing their clusters to an unstable oxidation state, and cluster degradation follows. Consistent with this hypothesis is our observation that spinach dihydroxy-acid dehydratase, a member of the hydro-lyase class that has a catalytically active [2Fe-2S] cluster, is not inactivated and does not lose iron in the presence of O2. Porcine fumarase, a member of the hydro-lyase class that does not contain an Fe-S cluster, is also not inactivated by O2. We also report the rate constants for the inactivation of E. coli dihydroxy-acid dehydratase, fumarase A, fumarase B, and mammalian aconitase by O2 are close to 2×102 M-1 s-1, and the rate constants for the inactivation of E. coli dihydroxy-acid dehydratase and mammalian aconitase by H2O2 are about 103 M-1 s-1. E. coli dihydroxy-acid dehydratase has been reported previously to be inactivated in vivo when cells are grown in hyperbaric O2, presumably due to the increased O2 generated under these conditions. We report here that E. coli fumarase A, fumarase B, and aconitase are also inactivated in vivo by hyperbaric O2. Thermodynamic parameters for the oxidation of the cluster of aconitase by O2 and O2 are calculated.

Keywords: Electron-Paramagnetic-Res, Amino-Acid Biosynthesis, Escherichia-Coli, Activated Aconitase, Hyperbaric-Oxygen, 4Fe-4S Cluster, Dehydratase, Enzyme, Purification, Iron

Kratz, F., Hartmann, M., Keppler, B. and Messori, L. (1994), The binding properties of two antitumor ruthenium(III) complexes to apotransferrin. *Journal of Biological Chemistry*, **269** (4), 2581-2588.

Full Text: [J\J Bio Che269, 2581-1.pdf](J/J%20Bio%20Che269,%202581-1.pdf) [J\J Bio Che269, 2581.pdf](J/J%20Bio%20Che269,%202581.pdf)

Abstract: The interaction of two ruthenium(III) complexes exhibiting high anticancer activity, namely trans-indazolium (bisindazole)tetrachlororuthenate(III) (ruind) and trans-imidazolium (bisimidazole)tetrachlororuthenate(III) (ru-im), with human serum apotransferrin has been investigated through spectroscopic and chromatographic techniques with the ultimate goal of preparing adducts with good selectivity for cancer cells. Whereas the binding of ru-im to human serum apotransferrin takes several hours, ru-ind, the less toxic complex, gives rise to a well defined 2: 1 complex within a few minutes. We have ascertained that ru-ind binding occurs around the iron binding sites, binding does not occur in the absence of bicarbonate, and this anion dictates the kinetic and mechanistic characteristics of protein binding of ru-ind. The two ruthenium(III) complexes do not behave as iron(III) complexes, eg. FE (EDTA) or Fe (nitrilotriacetate), which lose their respective ligands when binding apotransferrin, but the N-heterocycles remain attached to the metal in the protein-bound species. Reversion of binding is obtained by acidification in the presence of chelators such as citrate or ATP. In comparison with cisplatin and its deactivation by serum proteins, our results indicate that other metal complexes such as ruind could use transferrin as a drug delivery system. Furthermore, the rapid protein binding of ru-ind seems to be related to a lower toxicity while still exhibiting high antitumor activity.

Keywords: Iron-Metabolism, Perspectives, Transferrins, Cisplatin

Poulin, R., Lessard, M. and Zhao, C.Q. (1995), Inorganic cation dependence of putrescine and spermidine transport in human breast cancer cells. *Journal of Biological Chemistry*, **270** (4), 1695-1704.

Full Text: [J\J Bio Che270, 1695.pdf](J/J%20Bio%20Che270,%201695.pdf)

Abstract: The mechanism of polyamine uptake in mammalian cells is still poorly understood, The role of inorganic cations in polyamine transport was investigated in ZR-75-1 human breast cancer cells, Although strongly temperature dependent, neither putrescine nor spermidine uptake was mediated by a Na+ cotransport mechanism, In fact, Na+ and cholinium competitively inhibited putrescine uptake relative to that measured in a sucrose based medium, On the other hand, ouabain, H+, Na+, and Ca2+ ionophores, as well as dissipation of the K+ diffusion potential, strongly inhibited polyamine uptake in keeping with a major role of membrane potential in that process, Polyamine transport was inversely de pendent on ambient osmolality at near physiological values, Putrescine transport was inhibited by 70% by decreasing extracellular pH from 7.2 to 6.2, whereas spermidine uptake had a more acidic optimum, Deletion of extracellular Ca2+ inhibited putrescine uptake more strongly than chelation of intracellular Ca2+. In fact, bound divalent cations were absolutely required for polyamine transport, as shown after brief chelation of the cell monolayers with EDTA, Either Mn2+, Ca2+, or Mg2+ sustained putrescine uptake activity with high potency (Km = 50-300 µM). Mn2+ was a much stronger activator of spermidine than putrescine uptake, suggesting a specific role for this metal in polyamine transport, Other transition metals (Co2+, Ni2+, Cu2+, and Zn2+) were mixed activators/antagonists of carrier activity, while Sr2+ and Ba2+ were very weak agonists, while not interfering with Ca2+/Mg2+-dependent trans port, Thus, polyamine uptake in human breast tumor cells is negatively affected by ionic strength and osmolality, and is driven, at least in part, by the membrane potential, but not by the Na+ electrochemical gradient, Moreover, the polyamine carrier, or a tightly coupled accessory component, appears to have a high-affinity binding site for divalent cations, which is essential for the uptake mechanism.

Keywords: *Escherichia*-Coli Chromosome, Vacuolar Membrane-Vesicles, Isolated Rat Enterocytes, Brush-Border Membrane, Proton Motive Force, Polyamine Transport, Ornithine Decarboxylase, Leukemia-Cells, *Saccharomyces-Cerevisiae*, Intracellular Calcium

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Full Text: [J\J Bio Che270, 9258.pdf](J/J%20Bio%20Che270,%209258.pdf)

Abstract: Microsatellite DNA is a useful tool for detecting DNA polymorphisms among species or individuals, especially those among closely related individuals, We constructed a library of clones that contained poly (dG-dA). Poly (dT-dC) tracts from human genomic DNA by Mg2+-dependent tripler DNA formation, Examination of tripler DNA formation in the presence of various metal ions Mg2+, Mn2+, or Zn2+ revealed that the procedure worked best in the presence of Mg2+, Affinity enrichment was performed with AluI-digested chromosomal DNA mixed with biotinylated (dG-dA)17 in the presence of Mg2+, A library constructed after three cycles of affinity enrich ment showed that over 80% of the clones contained at least one poly (dG-dA) poly (dT-dC) tract, Most of them contained a perfect (dG-dA)n repeat 30-84 base pairs in length, while some contained variants such as (dC-dT)10-(dC)-(dC-dT)9. Using the clones from the library as a probe, we detected DNA polymorphisms associated with the repeat length of the tracts in the Japanese population, We also detected a microsatellite instability among the tracts in a cancer tissue sample.

Keywords: Sister Chromatid Exchange, Site-Specific Cleavage, Genetic-Linkage Map, Handed Z-DNA, Helix Formation, H-DNA, Sequences, Purification, Element, Invitro

Farias-Eisner, R., Chaudhuri, G., Aeberhard, E. and Fukuto, J.M. (1996), The chemistry and tumoricidal activity of nitric oxide/hydrogen peroxide and the implications to cell resistance susceptibility. *Journal of Biological Chemistry*, **271** (11), 6144-6151.

Full Text: [J\J Bio Che271, 6144.pdf](J/J%20Bio%20Che271,%206144.pdf)

Abstract: The mechanism of cytotoxicity of the NO donor 3-morpholino-sydnonimine toward a human ovarian cancer cell line (OVCAR) was examined. It was found that the NO-mediated loss of cell viability was dependent on both NO and hydrogen peroxide (H2O2). Somewhat surprisingly, superoxide (O-2 (-.)) and its reaction product with NO, peroxynitrite ((OONO)-O--), did not appear to be directly involved in the observed NO-mediated cytotoxicity against this cancer cell line. The toxicity of NO/H2O2 may be due to the production of a potent oxidant formed via a trace metal-, H2O2-, and NO-dependent process. Because the combination of NO and H2O2 was found to be particularly cytotoxic, the effect of NO on cellular defense mechanisms involving H2O2 degradation was investigated. It was found that NO was able to inhibit catalase activity but had no effect on the activity of the glutathione peroxidase (GSHPx)-glutathione reductase system. It might therefore be expected that cells that utilize primarily the GSHPx-glutathione reductase system for degrading H2O2 would be somewhat resistant to the cytotoxic effects of NO. Consistent with this idea, it was found that ebselen, a compound with GSHPx-like activity, was able to protect cells against NO toxicity. Also, lowering endogenous GSHPx activity via selenium depletion resulted in an increased susceptibility of the target cells to NO-mediated toxicity. Thus, a possible NO/H2O2/metal-mediated mechanism for cellular toxicity is presented as well as a possible explanation for cell resistance/susceptibility to this NO-initiated process.

Keywords: Glutathione-Peroxidase, Activated Macrophages, Lipid-Peroxidation, Superoxide, Oxygen, Peroxynitrite, Iron, Inhibition, Generation, Oxidation

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Full Text: [1996\J Bio Che271, 9201.pdf](1996/J%20Bio%20Che271,%209201.pdf)

Abstract: The committed step of taxol (paclitaxel) biosynthesis is catalyzed by taxa-4(5),11(12)-diene synthase, a diterpene cyclase responsible for transforming the ubiquitous isoprenoid intermediate geranylgeranyl diphosphate to the parent olefin with a taxane skeleton, To obtain the corresponding cDNA clone, a set of degenerate primers was constructed based on consensus sequences of related monoterpene, sesquiterpene, and diterpene cyclases, Two of these primers amplified a 83-base pair fragment that was cyclase-like in sequence and that was employed as a hybridization probe to screen a cDNA library constructed from poly(A)(+) RNA extracted from Pacific yew (Taxus brevifolia) stems, Twelve independent clones with insert size in excess of 2 kilobase pairs were isolated and partially sequenced. One of these cDNA isolates was functionally expressed in Escherichia coli, yielding a protein that was catalytically active in converting geranylgeranyl diphosphate to a diterpene olefin that was confirmed to be taxa-4(5),11(12)-diene by combined capillary gas chromatography-mass spectrometry, The sequence specifies an open reading frame of 2586 nucleotides, and the complete deduced polypeptide, including a long presumptive plastidial targeting peptide, contains 862 amino acid residues and has a molecular weight of 98,303, compared with about 79,000 previously determined for the mature native enzyme, Sequence comparisons with monoterpene, sesquiterpene, and diterpene cyclases of plant origin indicate a significant degree of similarity between these enzymes; the taxadiene synthase most closely resembles (46% identity, 67% similarity) abietadiene synthase, a diterpene cyclase from grand fir.

Keywords: Site-Directed Mutagenesis, Sesquiterpene Cyclase, 4S-Limonene Synthase, Bacterial Expression, Conserved Aspartate, Gene, Proteins, Residues, Agents

Yokoyama, K., Zimmerman, K., Scholten, J. and Gelb, M.H. (1997), Differential prenyl pyrophosphate binding to mammalian protein geranylgeranyltransferase-i and protein farnesyltransferase and its consequence on the specificity of protein prenylation. *Journal of Biological Chemistry*, **272** (7), 3944-3952.

Full Text: [J\J Bio Che272, 3944.pdf](J/J%20Bio%20Che272,%203944.pdf)

Abstract: Protein geranylgeranyltransferase-I (PGGT-I) and protein farnesyltransferase (PFT) attach geranylgeranyl and farnesyl groups, respectively, to the C termini of eukaryotic cell proteins, In vitro, PGGT-I and PFT can transfer both geranylgeranyl and farnesyl groups from geranylgeranyl pyrophosphate (GGPP) and farnesyl pyrophosphate (FPP) to their protein or peptide prenyl acceptor substrates. In the present study it is shown that PGGT-I binds GG 330-fold tighter than F and that PFT binds F 15-fold tighter than GGPP, Therefore, in vivo, where both GG and F compete for the binding to prenyltransferases, PGGT-I and PFT will likely be bound predominantly to GG and FPP, respectively. Previous studies have shown that K-Ras4B and the Ras-related GTPase TC21 are substrates for both PGGT-I and PFT in vitro, It is shown that TC21 can compete with the C-terminal peptide of the gamma subunit of heterotrimeric G proteins and with the C-terminal peptide of lamin B for geranylgeranylation by PGGT-I and for farnesylation by PFT, respectively, K-Ras4B competes in both cases but is almost exclusively farnesylated by PFT in the presence of the lamin B peptide competitor. Rapid and single turnover kinetic studies indicate that the rate constant for the PGGT-I-catalyzed geranylgeranyl transfer step of the reaction cycle is 14-fold larger than the steady-state turnover number, which indicates that the rate of the overall reaction is limited by a step subsequent to prenyl transfer such as release of products from the enzyme, PGGT-I-catalyzed farnesylation is 37-fold slower than geranylgeranylation and is limited by the farnesyl transfer step, These results together with earlier studies provide a paradigm for the substrate specificity of PGGT-I and PFT and provide information that is critical for the design of prenyltransferase inhibitors as anti-cancer agents.

Keywords: Kinetic Mechanism, Metal Requirements, Peptide-Binding, Gamma-Subunits, α-Subunit, Cdna Cloning, Transferase, Farnesyl, Ras, Expression

Lee, X., Thompson, A., Zhang, Z., Ton-that, H., Biesterfeldt, J., Ogata, C., Xu, L., Johnston, R.A. and Young, N.M. (1998), Structure of the complex of *Maclura pomifera* agglutinin and the T-antigen disaccharide, Galβ, 3GalNAc. *Journal of Biological Chemistry*, **273** (11), 6312-6318.

Full Text: [J\J Bio Che273, 6312.pdf](J/J%20Bio%20Che273,%206312.pdf)

Abstract: Maclura pomifera agglutinin is a tetrameric plant seed lectin with high affinity for the tumor-associated T-antigen disaccharide, Galbeta1, 3GalNAcalpha, and hence for many O-linked glycopeptide structures. Unlike members of most lectin families, it lacks both metal ions and Cys residues. The structure of its complex with Galbeta1, 3GalNAc was determined to 2.2 by first using multiwavelength anomalous diffraction with a lead derivative of the native protein, and then using molecular replacement with the unrefined structure as a model to solve the structure of the complex. The subunits share the beta-prism architecture and three-fold pseudo-symmetry of the related lectin jacalin, with the 21-residue beta-chains in the center of the tetramer. Interactions with the GalNAc predominate in the binding of the disaccharide. It forms a network of H-bonds with only one side chain, from an Asp residue, the amino group of the N-terminal Gly of the alpha-chain, and peptide backbone atoms of two aromatic residues. The Gal moiety does not H-bond directly with residues in the same monomer, i.e. there is no true subsite for it, but there are interactions through two water molecules. In the crystal, it interacts with residues in the binding site of an adjacent tetramer. The minimum energy conformation expected for the disaccharide is retained, despite its mediating the tetramer-tetramer interactions in the crystal packing. The resulting lattice is comparable to those seen for complexes of other lectins with branched glycopeptides.

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Full Text: [J\J Bio Che276, 9330.pdf](J/J%20Bio%20Che276,%209330.pdf)

Abstract: Butyrylcholinesterase (BChE) is important in cocaine metabolism, but it hydrolyzes (-)-cocaine only one-two thousandth as fast as the unnatural (+)-stereoisomer, A starting point in engineering BChE mutants that rapidly clear cocaine from the bloodstream, for overdose treatment, is to elucidate structural factors underlying the stereochemical difference in catalysis, Here, we report two three-dimensional Michaelis-Menten complexes of BChE liganded with natural and unnatural cocaine molecules, respectively, that were derived from molecular modeling and supported by experimental studies. Such complexes revealed that the benzoic ester group of both cocaine stereoisomers must rotate toward the catalytic Ser(198) for hydrolysis, Rotation of (-)-cocaine appears to be hindered by interactions of its phenyl ring with pHe(329) and Trp(430). These interactions do not occur with (+)-cocaine, Because the rate of (-)-cocaine hydrolysis is predicted to be determined mainly by the re-orientation step, it should not be greatly influenced by pH. In fact, measured rates of this reaction were nearly constant over the pH range from 5.5 to 8.5, despite large rate changes in hydrolysis of (+)-cocaine, Our models can explain why BChE hydrolyzes (+)-cocaine faster than (-)-cocaine, and they suggest that mutations of certain residues in the catalytic site could greatly improve catalytic efficiency and the potential for detoxication.

Keywords: Protein Data-Bank, Molecular-Dynamics, Acetylcholinesterase, Intoxication, Constraints, Metabolism, Hydrolysis, Binding, Plasma

# Title: Journal of Bone and Joint Surgery

Full Journal Title: [Journal of Bone and Joint Surgery](http://findarticles.com/p/articles/mi_qa3767?tag=artBody;col1); [Journal of Bone and Joint Surgery](http://www.jbjs.org.uk/archive/)

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ISSN: 0301-620X

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Language:

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Publisher Address:

Subject Categories:

: Impact Factor

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Keywords: Journals, Review

# Title: Journal of Bone and Joint Surgery-American Volume

Full Journal Title: [Journal of Bone and Joint Surgery-American Volume](http://www.ejbjs.org/contents-by-date.0.dtl)

ISO Abbreviated Title:

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Full Text: [1999\J Bon Joi Sur-Ame Vol81, 1679.pdf](1999/J%20Bon%20Joi%20Sur-Ame%20Vol81,%201679.pdf)

Abstract: Background: Previous studies have shown that applicants for postgraduate training may misrepresent research citations. We evaluated the research citations that mere identified in a review of the Publications and Work and Research sections from the Electronic Residency Application Service (ERAS) data for all applicants to our orthopaedic residency program for the 1998 to 1999 academic gear.

Methods: The citations were searched for on Medline. We initially used the name of the first author, then the name of the applicant, the name of the journal, the volume number, the issue number, and the page numbers, When a journal was not listed in Medline, an interlibrary search was instituted with use of the same format. When no match was made for any category, the citation was defined as misrepresented. Point estimates are reported as percentages.

Results: Publications were listed on sixty-four (30.0 percent) of 213 applications. One hundred and thirty-eight publications were cited; there were fifteen citations (10.9 percent) to book chapters, twenty-sis (18.8 percent) to journals not listed in Ulrich’s International Periodicals Directory, and twenty-one (15.2 percent) to articles listed as in press, in print, or submitted for publication. Seventy-sis articles that had been cited as appearing in journals listed in Ulrich’s Directory were checked and verified. Fourteen (18 percent) of these seventy-sis publications mere misrepresented, Misrepresentations included citations of nonexistent articles in actual journals and nonauthorship of existing articles.

Conclusions: We concluded that publications listed on postgraduate applications should be scrutinized carefully, Copies of cited publications should be required by residency programs before applications are considered complete, The importance of professionalism needs to be emphasized in the curricula of medical schools. Residency training programs should develop guidelines regarding misrepresentation.

Keywords: Publications

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Full Text: [2004\J Bon Joi Sur-Ame Vol86, 1012.pdf](2004/J%20Bon%20Joi%20Sur-Ame%20Vol86,%201012.pdf)

Abstract: Background: Investigators aim to publish their research papers in top journals to disseminate their findings to the widest possible audience. Systematic reviews of the literature occupy the highest position in currently proposed hierarchies of evidence. We hypothesized that the number of citations (a measure of scholarly interest) for systematic reviews (or meta-analyses) published in leading orthopaedic journals would be greater than the number of citations for narrative reviews published in the same journals. Methods: We identified fifteen journals that had high Science Citation Index impact factors for the orthopaedic subspecialty and were believed to have a higher yield of studies and reviews of scientific merit and clinical relevance. For the year 2000, six research associates applied methodological criteria to each article in each issue of the fifteen journals to determine whether the article was scientifically sound (rigorous versus nonrigorous). Of the 3916 articles identified, 2331 were original or review articles. We queried the ISI (Institute for Scientific Information) Web of Science database to ascertain, as of March 2003, the number of subsequent citations to each one of the reviews after its original publication in all journals that published both narrative and systematic reviews. Results: Of the 2331 articles published across the fifteen journals in the year 2000, 110 were review articles. Only seventeen (15%) of the 110 reviews met our criteria for systematic reviews with rigor. Rigorous systematic reviews received more than twice the mean number of citations compared with other systematic or narrative reviews (13.8 compared with 6.0, p = 0.008). The rigor of a review was a significant predictor of the number of citations in other orthopaeclic journals (p = 0.01). In addition, rigor was significantly associated with the number of citations in nonorthopaedic journals (p = 0.03). Conclusions: Our findings suggest that journal editors and authors can improve the relevance and scholarly interest in their reviews (as shown by the number of citations) by meeting standard guidelines for methodological rigor.

Keywords: Citation, Health-Care, Impact, Metaanalyses, Randomized Control Trials, Research, Science

? Bryant, D., Havey, T.C., Roberts, R. and Guyatt, G. (2006), How many patients? How many limbs? Analysis of patients or limbs in the orthopaedic literature: Asystematic review. *Journal of Bone and Joint Surgery-American Volume*, **88** (1), 41-45.

Full Text: [2006\J Bon Joi Sur-Ame Vol88, 41.pdf](2006/J%20Bon%20Joi%20Sur-Ame%20Vol88,%2041.pdf)

Abstract: Background: Clinical studies assessing orthopaedic interventions often include data from two limbs or multiple joints within single individuals. Without appropriate design or statistical approaches to address within-individual correlations, this practice may contribute to false precision and possible bias in estimates of treatment effect. We conducted a systematic review of the orthopaedic literature to determine the frequency of inappropriate inclusion of nonindependent limb or joint observations in clinical studies. Methods: We identified seven orthopaedic journals with high Science Citation Index impact factors and retrieved all clinical studies for 2003 for any intervention on any limb or joint. Results: We identified 288 clinical studies, 143 of which involved two limbs or multiple joint observations from single individuals. These studies included nineteen randomized clinical trials (13%) fifty-eight two-group cohort studies (41%), and sixty-six one-group cohort studies (46%). Seventy-six (53%) of the 143 studies involved statistical comparisons between patient groups with use of tests of association, and an additional sixty studies (42%) presented estimates of proportions without statistical comparisons. Only sixteen of the seventy-six studies involving statistical comparisons involved the use of any technique or methodological approach to account for multiple, nonindependent observations. A median of approximately 13% of the patients in these studies contributed more than one observation. The median proportion of nonindependent observations to total observations (the unit of analysis) was approximately 23%. Conclusions: Our findings suggest that a high proportion (42%) of clinical studies in high-impact-factor orthopaedic journals involve the inappropriate use of multiple observations from single individuals, potentially biasing results. Orthopaedic researchers should attend to this issue when reporting results.

Keywords: Bias, Citation, Cohort, Groups, Impact, Impact Factors, Intervention, Journals, Literature, Precision, Researchers, Review, Science, Science Citation Index, Statistics Notes, Systematic Review, Treatment

? Davids, J.R., Weigl, D.M., Edmonds, J.P. and Blackhurst, D.W. (2010), Reference accuracy in peer-reviewed pediatric orthopaedic literature. *Journal of Bone and Joint Surgery-American Volume*, **92A** (5), 1155-1161.

Full Text: [2010\J Bon Joi Sur-Ame Vol92, 1155.pdf](2010/J%20Bon%20Joi%20Sur-Ame%20Vol92,%201155.pdf)

Abstract: Background: Reference accuracy of articles published in the biomedical literature is determined by the presence of citation and quotation errors. A recent review demonstrated that the median citation error rate per biomedical journal was 39%, and the median quotation error rate per journal was 20%. Reference accuracy in pediatric orthopaedic articles has not been previously reported, to our knowledge. Methods: Two hundred references from twenty articles published in four peer-reviewed orthopaedic journals were randomly selected for assessment of citation and quotation accuracy. Full-text copies of all original references were obtained by interlibrary loan methods and reviewed directly to establish citation accuracy. The presence of citation errors was determined by a single investigator. The relevance of citation errors was determined by assessing the ease of reference retrieval through PubMed. Quotation accuracy was determined by two examiners who reviewed each of the twenty articles and 200 references to compare the claims made for the references in the article against the data and opinions expressed in the actual reference. Results: The total citation error rate across all of the journals was 26% (fifty-one of 200 references) with a 95% confidence interval of 16.5% to 37.3%. The median citation error rate per journal was 27% (range, 10% to 38%). Although citation errors were common, most were of minimal significance, as 196 of the 200 references could be retrieved with ease from PubMed. The total quotation error rate across all of the articles was 38% (152 of 398 reference citations) with a 95% confidence interval of 30.1% to 47.0%. The median quotation error rate per journal was 38% (range, 28% to 46%). Conclusions: Citation and quotation errors are common in the pediatric orthopaedic literature. Reference accuracy continues to be a substantial problem in the biomedical literature despite recent technological advances such as online databases, easily accessible search engines, and widely available bibliographic software.

Keywords: Accuracy, Advances, Assessing, Assessment, Biomedical, Citation, Citation Accuracy, Citation Error, Citation Errors, Citations, Confidence, Data, Databases, Error, Error Rate, Errors, Interval, Journal, Journal Impact Factor, Journals, Knowledge, Literature, Methods, Opinions, Pediatric, Peer-Reviewed, Pubmed, Quality, Quotation, Quotation Accuracy, Quotation Error, Quotation Errors, Recent, Reference, Reference Accuracy, References, Relevance, Review, Significance, Software, Surgery, Surgical Journals

? Berbari, E., Mabry, T., Tsaras, G., Spangehl, M., Erwin, P.J., Murad, M.H., Steckelberg, J. and Osmon, D. (2010), Inflammatory blood laboratory levels as markers of prosthetic joint infection: A systematic review and meta-analysis. *Journal of Bone and Joint Surgery-American Volume*, **92A** (11), 2102-2109.

Full Text: 2010\J Bon Joi Sur-Ame Vol92, 2102.pdf

Abstract: Background: The preoperative diagnosis of prosthetic joint infection in patients with a total hip or knee arthroplasty may rely in part on the use of systemic inflammation markers. These markers have unclear accuracy. The objective of this review was to summarize the evidence on the accuracy of the peripheral white blood-cell count, the erythrocyte sedimentation rate, serum C-reactive protein levels, and serum interleukin-6 levels for the diagnosis of prosthetic joint infection. Methods: We searched electronic databases (MEDLINE, EMBASE, Cochrane Library, Web of Science, and Scopus) from 1950 through 2009. Eligible studies evaluated the accuracy of white blood-cell count, erythrocyte sedimentation rate, serum C-reactive protein level, and serum interleukin-6 level for the intraoperative diagnosis of prosthetic joint infection at the time of revision arthroplasty. Two reviewers working independently extracted study characteristics and data to estimate the diagnostic odds ratio and 95% confidence interval for each result. Results: We included thirty eligible studies that included 3909 revision total hip or knee arthroplasties. The prevalence of prosthetic joint infection was 32.5% (1270 of 3909). The accuracy of assessed inflammation markers, represented with a diagnostic odds ratio, was 314.7 (95% confidence interval, 113.0 to 876.8) for interleukin-6 (three studies), 13.1 (95% confidence interval, 7.9 to 21.7) for C-reactive protein level (twenty-three studies), 7.2 (95% confidence interval, 4.7 to 10.9) for erythrocyte sedimentation rate (twenty-five studies), and 4.4 (95% confidence interval, 2.9 to 6.6) for white blood-cell count (fifteen studies). Conclusions: The diagnostic accuracy for prosthetic joint infection was best for interleukin-6, followed by C-reactive protein level, erythrocyte sedimentation rate, and white blood-cell count. Given the limited numbers of studies assessing interleukin-6 levels, further investigations assessing the accuracy of interleukin-6 for the diagnosis of prosthetic joint infection are warranted.

Keywords: Accuracy, Arthroplasty, Aspiration, C-Reactive Protein, Cochrane, Databases, Diagnosis, Embase, Erythrocyte Sedimentation-Rate, Infection, Interleukin-6, Medline, Methods, Periprosthetic Infection, Prevalence, Ratio, Replacements, Review, Science, Scintigraphy, Scopus, Systematic, Systematic Review, Total Hip-Arthroplasty, Total Knee Arthroplasty, Web of Science

# Title: Journal of Bone and Joint Surgery-British Volume

Full Journal Title: [Journal of Bone and Joint Surgery-British Volume](http://www.jbjs.org.uk.ludwig.lub.lu.se/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0301-620X

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sutherland, A.G., Craig, N., Maffulli, N., Brooksbank, A. and Moir, J.S. (2000), Accuracy of references in the orthopaedic literature. *Journal of Bone and Joint Surgery-British Volume*, **82B** (1), 9-10.

Full Text: [2000\J Bon Joi Sur-Bri Vol82B, 9.pdf](2000/J%20Bon%20Joi%20Sur-Bri%20Vol82B,%209.pdf)

Keywords: Journals, Surgery, Anesthesia, Citations

? Kelly, J.C., Glynn, R.W., O’Briain, D.E., Felle, P. and Mccabe, J.P. (2010), The 100 classic papers of orthopaedic surgery a bibliometric analysis. *Journal of Bone and Joint Surgery-British Volume*, **92B** (10), 1338-1343.

Full Text: [2010\J Bon Joi Sur-Bri Vol92B, 1338.pdf](2010/J%20Bon%20Joi%20Sur-Bri%20Vol92B,%201338.pdf)

Abstract: The credibility and creativity of an author may be gauged by the number of scientific papers he or she has published, as well as the frequency of citations of a particular paper reflecting the impact of the data on the area of practice. The object of this study was to identify and analyse the qualities of the top 100 cited papers in orthopaedic surgery. The database of the Science Citation Index of the Institute for Scientific Information ( 1945 to 2008) was used. A total of 1490 papers were cited more than 100 times, with the top 100 being subjected to further analysis. The majority originated in the United States, followed by the United Kingdom. The top 100 papers were published in seven specific orthopaedic journals. Analysis of the most-cited orthopaedic papers allows us a unique insight into the qualitites, characteristics and clinical innovations required for a paper to attain ‘classic’ status.

Keywords: 10-Year Follow-up, Articular-Cartilage, Author, Bibliometric Analysis, Carpal-Tunnel Syndrome, Citation, Citation-Classics, Citations, Femoral Components, Full-Thickness Defects, Journal Impact Factor, Journals, Low-Back-Pain, Rating Systems, Science Citation Index, Total Hip-Replacement

# Title: Journal of Bone and Mineral Research

Full Journal Title: Journal of Bone and Mineral Research

ISO Abbreviated Title: J. Bone Miner. Res.

JCR Abbreviated Title: J Bone Miner Res

ISSN: 0884-0431

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Amer Soc Bone & Mineral Res

Publisher Address: PO Box 2759, Durham, NC 27715-2759

Subject Categories:

Endocrinology & Metabolism: Impact Factor

? Cauley, J.A., Murphy, P.A., Riley, T.J. and Buhari, A.M. (1995), Effects of fluoridated drinking water on bone mass and fractures: The study of osteoporotic fractures. *Journal of Bone and Mineral Research*, **10** (7), 1076-1086.

Abstract: To determine if optimal fluoridation of public water supplies influences bone mass and fractures, we studied 2076 non-black women, all aged > or = 65 years recruited into the Study of Osteoporotic Fractures at the Pittsburgh clinic. Information on fluoride exposure was limited to community water supplies. The variable used in the analysis was years of exposure to fluoridated water in community drinking water supplies. Bone mineral density (BMD) was measured at the spine and hip using dual energy X-ray absorptiometry and at the midpoint and ultradistal radius and calcaneus using single photon absorptiometry. Prevalent and incident vertebral fractures were determined by morphometry. Incident nonspine fractures were ascertained every 4 months and confirmed by radiographic report. Exposure to residential fluoridated water had no effect on bone mass. Women exposed to fluoride for > 20 years had similar axial and appendicular bone mass to women not exposed or women exposed for < or = 20 years. There was some suggestion that women exposed to fluoride for > 20 years had a lower relative risk of nonspine fractures (relative risk, RR, = 0.73; 95% confidence interval [CI] 0.48-1.12), osteoporotic fractures, RR = 0.74 (CI 0.46-1.19), and hip fractures, RR = 0.44 (CI 0.10-1.86), compared with women not exposed, but none of these relative risks was statistically significant. There was no association with wrist or spinal fractures. Our results do not support the findings from recent ecological studies which showed an increased risk of hip fracture among individuals exposed to fluoridated public water.

Keywords: Hip Fracture, Mineral Density, Calcium Intake, Elderly Women, Communities

# Title: Journal of the Brazilian Chemical Society

Full Journal Title: [Journal of the Brazilian Chemical Society](http://www.scielo.br/scielo.php/script_sci_serial/pid_0103-5053/lng_en/nrm_iso)

ISO Abbreviated Title: J. Braz. Chem. Soc.

JCR Abbreviated Title: J Brazil Chem Soc

ISSN: 0103-5053

Issues/Year: 6

Journal Country/Territory: Brazil

Language: English

Publisher: Soc Brasileira Quimica

Publisher Address: Caixa Postal 26037, 05599-970 Sao Paulo, Brazil

Subject Categories:

Chemistry, Multidisciplinary: Impact Factor 0.895, 53/123 (2003); Impact Factor 1.458, 59/138 (2009)

Longhinotti, E., Pozza, F., Furlan, L., Sanchez, M.D.N.D., Klug, M., Laranjeira, M.C.M. and Favere, V.T. (1998), Adsorption of anionic dyes on the biopolymer chitin. *Journal of the Brazilian Chemical Society*, **9** (5), 435-440.

Full Text: [J\J Bra Che Soc9, 435.pdf](J/J%20Bra%20Che%20Soc9,%20435.pdf)

Abstract: The adsorption of the anionic dyes orange IV, orange G and xylenol orange on chitin was studied, employing the Langmuir isotherm. The adsorption parameters were determined utilizing various linear regressions of the isotherm. The results showed that the adsorption capacity is dependent on pH. In acid pH, the polymer amino groups are protonated and the polymer chain is positively charged, with a predominance of adsorption through ion exchange. Van der Waals adsorption, as well as adsorption through hydrogen bonding, is also likely to occur to some extent. For xylenol orange, a linear regression was found, with an angular coefficient of 0.726 L mg-1. The temperature increase reduces adsorption capacity by chitin, due to the enhancement of the desorption step in the mechanism. Delta H values of -10.9 kJ mol-1 for orange G and -28.9 kJ mol-1 for orange IV prove the physical nature of the adsorption by these dyes on the chitin surface.

Keywords: Adsorption, Anionic Dyes, Chitin, Langmuir Adsorption Isotherm

Grassi, M.T., Shi, B. and Allen, H.E. (2000), Partition of copper between dissolved and particulate phases using aluminum oxide as an aquatic model phase: Effects of pH, solids and organic matter. *Journal of the Brazilian Chemical Society*, **11** (5), 516-524.

Full Text: [J\J Bra Che Soc11, 516.pdf](J/J%20Bra%20Che%20Soc11,%20516.pdf)

Abstract: The sorption of copper ions from aqueous solutions onto modified aluminum oxide was investigated as a function of pH, solids concentration and both particulate and dissolved organic matter. The aluminum oxide studied was modified by adsorption of humic acid. The pH value, organic matter content, and solids concentration dominated copper adsorption onto modified aluminum oxide. The adsorption of copper increased with increasing pH. An increase in particulate organic carbon resulted in an enhanced copper uptake. The partition coefficient (K-d) of copper decreased as the solids concentration increased. Copper partitioning was maximal in the neutral pH range and decreased at either low or high pH values. There was also a decrease in copper adsorption with increasing dissolved organic matter concentration.

Keywords: Copper, Aluminum Oxide, Partitioning, Natural Waters, Humic Acids, Humic Substances, Adsorption Characteristics, Surface-Charge, Trace-Metals, Water, Sediments, Sorption, Cadmium, Cu(II), Soil

Duarte, M.M.M.B., da Silva, J.E., Passavante, J.Z.D., Pimentel, M.F., Neto, B.D. and da Silva, V.L. (2001), Macroalgae as lead trapping agents in industrial effluents: A factorial design analysis. *Journal of the Brazilian Chemical Society*, **12** (4), 499-506.

Full Text: [J\J Bra Che Soc12, 499.pdf](J/J%20Bra%20Che%20Soc12,%20499.pdf)

Abstract: A two-level factorial design was employed to analyze the influence of agitation, contact time, amount of algae and type of pretreatment on heavy metal removal by Arribadas algae, in a batch system consisting of a synthetic solution simulating a typical effluent from battery manufacturing processes. Dried, ground and sieved 4 g algae samples were able to remove 99 % lead from 100 mL samples of synthetic effluent. Maximum removals for zinc and iron were 37 % and 80 %, respectively. Lead removal using this method is potentially useful for large-scale industrial applications, because Arribadas algae are cheap, abundant, naturally occurring waste materials.

Keywords: Factorial Design, Algae, Lead, Zinc, Iron, Aqueous-Solutions

Pereira, M.G. and Arruda, M.A.Z. (2003), Vermicompost as a natural adsorbent material: Characterization and potentialities for cadmium adsorption. *Journal of the Brazilian Chemical Society*, **14** (1), 39-47.

Full Text: [J\J Bra Che Soc14, 39.pdf](J/J%20Bra%20Che%20Soc14,%2039.pdf)

Abstract: Vermicompost (humic material) samples were submitted to characterization by infrared spectroscopy, X-ray diffractometry, thermogravimetric analysis, electron microscopy etc. In addition, its cation exchange capacity (CEC) was determined. Factorial experiments were designed in order to elucidate the interaction mechanisms between Cd2+ and the adsorptive sites of vermicompost. The maximum adsorptive capacity for cadmium was evaluated by a Langmuir isotherm. The characterization revealed that vermicompost exhibits high CEC values (ca. 72.9 meq per 100 g), high surface area (porous material), chelating groups and a maximum adsorptive capacity for Cd (38.6 mg g-1) at pH 5.0. This potential application was exploited in the analysis of synthetic and real (mineral water) samples with Cd concentrations of ca 5 mug L-1, requiring a preconcentration step. An enrichment factor of 100 was attained.

Keywords: Vermicompost, Characterization, Cadmium Adsorption, Aqueous-Solutions, Metal-Ions, Soils, Extraction, Sediments

? Praus, P. and Turicova, M. (2007), A physico-chemical study of the cationic surfactants adsorption on montmorillonite. *Journal of the Brazilian Chemical Society*, **18** (2), 378-383.

Full Text: [2007\J Bra Che Soc18, 378.pdf](2007/J%20Bra%20Che%20Soc18,%20378.pdf)

Abstract: The adsorption of cetyltrimethylammonium (CTA) bromide and cetylpyridinium (CP) chloride on Na+-rich montmorillonite (MMT) was studied. An ad hoc isotachophoretic (ITP) method was developed for the simultaneous and rapid determination of the cationic surfactants (CSs) adsorbed. In order to decrease the detection limits, ITP was on-line coupled with capillary zone electrophoresis. Adsorption data were analysed by their fitting with adsorption isotherms. The adsorption of CP is well described by the Langmuir isotherm. It indicates the monolayer arrangement of CP on the MMT surface. In case of the CTA data, the best fitting Langmuir-Freundlich model with the power constant r < 1 was found. It can be explained by the CTA interactions because of its intercalation into the MMT interlayer space.

Keywords: Adsorption Isotherms, Montmorillonite, Cetyltrimethylammonium, Cetylpyridinium, Capillary Isotachophoresis, Capillary-Zone-Electrophoresis, Performance Liquid-Chromatography, Conductivity Detection, Organic-Compounds, Isotachophoresis, Sorption, Online, Cetyltrimethylammonium, Clays, Cetylpyridinium

? Hoffmann, A.A., Dias, S.L.P., Benvenutti, E.V., Lima, E.C., Pavan, F.A., Rodrigues, J.R., Scotti, R., Ribeiro, E.S. and Gushikem, Y. (2007), Cationic dyes immobilized on cellulose acetate surface modified with titanium dioxide: Factorial design and an application as sensor for NADH. *Journal of the Brazilian Chemical Society*, **18** (8), 1462-1472.

Full Text: [2008\J Bra Che Soc18, 1462.pdf](2008/J%20Bra%20Che%20Soc18,%201462.pdf)

Abstract: The electrochemical properties of meldola blue and toluidine blue cationic dyes immobilized on cellulose acetate surface modified with titanium dioxide were investigated by cyclic voltammetry. The materials synthesized were employed as carbon paste electrodes. The redox mediator properties of the meldola blue and toluidine blue chemically modified electrodes were optimized using a factorial design, consisting of two levels and four factors with two pseudo-central points (n= 20 experiments). The factorial analysis was carried out by searching for better reversibility of the redox process, such as the lowest separation between anodic and cathodic potential peaks and a current ratio near unity. The factors that presented significant effects on the overall optimization of the system to achieve the best conditions of the reversibility of electron transfer were the main factors scan rate and type of electrode ( meldola blue or toluidine blue), besides the interaction factors KCl concentration x type of electrode ( B x D) and the pH x [KCl] concentration x scan rate (A x B x C) interaction. The best electrochemical reversibility conditions obtained were: using the CA-TiO2-MB electrode, 1.0 mol L-1 KCl as supporting electrolyte, at scan rate of 10.0 mV s(-1). Afterwards, the CA-TiO2-MB modified electrode was tested as an amperometric sensor for the determination of NADH, with a detection limit of 0.1 mu mol L-1.

Keywords: Acetate, Analysis, Application, Araucaria-Angustifolia Wastes, Carbon, Carbon Paste Electrode, Cationic Dyes, Cellulose, Cobalt(II) Hematoporphyrin-Ix, Concentration, Design, Dissolved-Oxygen Reduction, Dyes, Electrocatalytic Oxidation, Electrochemical Properties, Experiments, Factorial Design, Graphite-Electrodes, Immobilized, Interaction, KCl, L1, Meldola Blue, Meldolas-Blue, Methylene-Blue, Modified, Modified Cellulose Acetate, Nadh, Nicotinamide Adenine-Dinucleotide, Optimization, pH, Potential, Reversibility, Sensor, Separation, Silica-Gel Surface, Surface, Titanium, Titanium Dioxide, Toluidine Blue, Toluidine-Blue-O, Voltammetry

? Hoffmann, A.A., Dias, S.L.P., Rodrigues, J.R., Pavan, F.A., Benvenutti, E.V. and Lima, E.C. (2008), Methylene blue immobilized on cellulose acetate with titanium dioxide: an application as sensor for ascorbic acid. *Journal of the Brazilian Chemical Society*, **19** (5), 943-949.

Full Text: [2008\J Bra Che Soc19, 943.pdf](2008/J%20Bra%20Che%20Soc19,%20943.pdf)

Abstract: In this work, methylene blue dye was immobilized on the surface of cellulose acetate modified with titanium dioxide, producing a solid hybrid material designated as CA-TiO2MB. The experiment yielded an amount of 1.8 mmol g(-1) of TiO2 incorporated in the cellulose acetate and an amount of 0.170 +/- 0.005 mmol g(-1) of methylene blue adsorbed onto CA-TiO2 surface. A carbon paste electrode of this material was used to study the electrocatalytic oxidation of ascorbic acid by cyclic voltammetric and chronoamperometric techniques. The pH of the solution had no effect on the anodic peak potential and anodic peak current when ranging from 3.0 to 7.0. The oxidation of the analyte occurred at 75 mV versus SCE in 1.0 mol L-1 KCl solution and pH 7.0. The intensity of the anodic peak current varied with the concentration of ascorbic acid from 5.0 x 10(-4) mol L-1 to 4.5 x 10(-3) mol L-1 and a linear correlation was observed, with a detection limit of 15 mu mol L-1, quantification limit of 50 mu mol-L-1 and a sensitivity of 7.1 mu A L mol(-1). The electrode response was very fast, with an elapsed time of about 1.0 s, showing the potentiality to be utilized as an electrochemical sensor for determination of ascorbic acid in commercial samples.

Keywords: Acetate, Application, Ascorbic Acid, Carbon, Carbon Paste Electrode, Carbon-Paste Electrode, Cellulose, Chloride Silsesquioxane Polymer, Cobalt(II) Hematoporphyrin-IX, Composite Membrane, Concentration, Correlation, Dye, Electrochemical Properties, Experiment, Flow-Injection System, Glassy-Carbon, Hybrid, Immobilized, KCl, L1, Methylene Blue, Modified, Modified Cellulose Acetate, Oxidation, Oxygen Reduction, Ph, Potential, Quantification, Real Samples, SCE, Sensitivity, Sensor, Solution, Surface, Techniques, TiO2, Titanium, Titanium Dioxide, Work, Zirconium-Phosphate

? Mouta, E.R., Soares, M.R. and Casagrande, J.C. (2008), Copper adsorption as a function of solution parameters of variable charge soils. *Journal of the Brazilian Chemical Society*, **19** (5), 996-1009.

Full Text: [2008\J Bra Che Soc19, 996.pdf](2008/J%20Bra%20Che%20Soc19,%20996.pdf)

Abstract: Effects of pH and ionic strength (1) on copper (Cu) adsorption and the driving force of the reaction in variable charge soils were evaluated from batch studies. Experimental results of Cu adsorption fitted Langmuir model. According to adsorption isotherms, Cu affinity (K,) was greater in the subsoil (0.061-0.468 L kg-1) than in the topsoil samples (0.169-0.359 L kg-1). Maximum adsorption (Ads(max)) ranged from 1114-2422 mg kg-1 (topsoil) to 1002-1334 mg kg-1 (subsoil). Strong dependence of Cu adsorption on the pH was observed in subsoil samples. Adsorption edges showed sharply increase of Cu adsorption (20-90%) in the 4.0-5.0 pH range. Copper adsorption changed with increase in I and indicated different metal retention mechanisms (outer- and inner-spheres). Adsorption reaction was favorable and spontaneous, as indicated by negative values of the free energy variation (Delta G) and the separation factor K-R < 1. Soil-solution interface and Cu adsorption were also thermodynamically described by a theoretical approach.

Keywords: Tropical Soils, Ionic Strength, pH, Isotherms, Langmuir, Heavy-Metal Adsorption, Organic-Matter, Thermodynamic Parameters, Competitive Adsorption, Tropical Soils, Zinc Sorption, Clay-Minerals, pH, Desorption, Equilibrium

? Vieira, A.P., Santana, S.A.A., Bezerra, C.W.B., Silva, H.A.S., Chaves, J.A.P., de Melo, J.C.P., da Silva, E.C. and Airoldi, C. (2011), Epicarp and mesocarp of babassu (*Orbignya speciosa*): Characterization and application in copper phtalocyanine dye removal. *Journal of the Brazilian Chemical Society*, **22** (1), 21-29.

Full Text: [2011\J Bra Che Soc22, 21.pdf](2011/J%20Bra%20Che%20Soc22,%2021.pdf)

Abstract: The mesocarp and epicarp components of the babassu palm tree were applied as novel alternative biosorbents for copper phtalocyanine textile dye removal from aqueous solutions. The natural biopolymers were characterized by elemental analyses, solid state C-13 NMR, infrared spectroscopy, thermogravimetric analysis and X-ray diffractometry. Results demonstrated that the compositions of the mesocarp and epicarp are similar to those of other lignocellulosic materials, and that they were very effective for removal of the textile dye Turquoise Remazol. A pseudo second-order kinetic model resulted in the best fit with experimental data for both epicarp and mesocarp (R-2 = 0.999), providing rate constants of sorption, k(2), of 0.31 and 1.43 g mg-1 min-1, respectively. The Langmuir and Freundlich isotherm models were employed for adsorption analysis of the experimental data in their linearized forms. The second model resulted in the better fit for Turquoise Remazol dye, which presented maximum adsorption of 1.44 and 2.38 mg g-1 at pH 6.0 for mesocarp and epicarp, respectively.

Keywords: Adsorption, Alternative, Analyses, Analysis, Aqueous Solutions, Aqueous-Solutions, Babassu Coconut, Biopolymers, Biosorbents, C-13, Characterization, Chitosan Beads, Congo Red, Copper, Data, Dye, Dye Removal, Dye Textile, Epicarp, Experimental, Forms, Freundlich, Freundlich Isotherm, Infrared Spectroscopy, Isotherm, Kinetic, Kinetic Model, Langmuir, Leaf Powder, Low-Cost Adsorbents, Mesocarp, Methylene-Blue Adsorption, Model, Models, Natural, Natural Adsorbents, NMR, Part I, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Rate Constants, Removal, Rice-Husk, Second Order, Second-Order, Solutions, Sorption, Spectroscopy, State, Textile Dye, X-Ray

? Garcia, S. and Gaubeur, I. (2011), An anionic resin modified by di-2-pyridyl ketone salicyloylhydrazone as a new solid preconcentration phase for copper determination in ethanol fuel samples. *Journal of the Brazilian Chemical Society*, **22** (3), 501-510.

Full Text: [2011\J Bra Che Soc22, 501.pdf](2011/J%20Bra%20Che%20Soc22,%20501.pdf)

Abstract: The adsorption of DPKSH onto anionic resin was investigated at 25±1 degrees C and pH 12 on the basis of three kinetic models including pseudo-first order, pseudo-second order and intraparticle diffusion. Isotherm equations including Langmuir, Freundlich and Dubinin-Radushkevich (D-R) were successfully applied to model the experimental data. An anionic resin loaded with DPKSH was used in a flow system for the in-line concentration of copper prior to spectrophotometric determination. Under optimized conditions, a linear response was observed between 20 and 80 mu g L-1, with limits of detection and quantification estimated at 0.5 and 1.8 mu g L-1, respectively, at the 95% confidence level with an enrichment factor of 11. The relative standard deviation was estimated to be 2.6% for 32 mu g L-1 Cu(II) (n = 20). The results obtained for copper determination in ethanol fuel samples agreed with those achieved by flame atomic absorption spectrometry (F AAS) at the 99% confidence level.

Keywords: Adsorption, Atomic-Absorption-Spectrometry, Copper, Cu(II), DPKSH, Ethanol Fuel Sample, Extraction, Flow Analysis, Freundlich, Isotherm, Isotherms, Kinetic, Langmuir, Lead, Modified, Molecular Spectrophotometry, Nickel, pH, Polyurethane Foam, Preconcentration, Resin, Separation, Silica-Gel, Spectrophotometric Determination

# Title: Journal of Broadcasting & Electronic Media

Full Journal Title: [Journal of Broadcasting & Electronic Media](http://www.heinonline.org/HOL/Index?index=journals/jbem&collection=journals); [Journal of Broadcasting & Electronic Media](http://www.informaworld.com/smpp/title~content=t775648091~db=all)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0883-8151

Issues/Year:

Journal Country/Territory:

Language:

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Subject Categories:

: Impact Factor

? Rice, R.E., Chapin, J., Pressman, R., Park, S. and Funkhouser, E. (1996), What’s in a name? Bibliometric analysis of 40 years of the *Journal of Broadcasting & Electronic Media*. *Journal of Broadcasting & Electronic Media*, **40** (4), 511-539.

Full Text: [1996\J Bro Ele Med40, 511.pdf](1996/J%20Bro%20Ele%20Med40,%20511.pdf)

Abstract: This study analyzed citation data involving a “core” set of 17 communication journals from 1977 through 1993, measures of the Journal of Broadcasting & Electronic Media’s influence within the communication discipline, most frequently cited author and publication data collected from the Social Science Citation Index, a citation matrix hand-culled from 27 communication journals in 1990, the semantic patterns of words in the titles of all the articles from the past 40 years, and the semantic relationships among the topic categories assigned to those articles. Special attention was paid to the periods of time preceding and following the Journal’s 1985 change in title and mission. These analyses reveal shifts in the patterns of citations, article title words, and topics. While the editorial board was correct in its assessment that the Journal of Broadcasting did not accurately reflect the research of the prior few years, the journal continues to be a cohesive whole in thematic content, impact, and standing in the network of communication journals

Keywords: Citation, Citation Analysis, Citations, Communication Journals, English, Impact, Journal, Journals, Online, Publication, Reliability, Research, Scholarship, Science

? Dominick, J.R. (1997), Citation analysis of the *Journal of Broadcasting & Electronic Media*: Another perspective. *Journal of Broadcasting & Electronic Media*, **41** (3), 427-438.

Full Text: [1997\J Bro Ele Med41, 427.pdf](1997/J%20Bro%20Ele%20Med41,%20427.pdf)

Keywords: Analysis, Articles, Bibliometrics, Citation, Citation Analysis, Communication Journals, Scholarly Communication

# Title: Journal of Bryology

Full Journal Title: Journal of Bryology

ISO Abbreviated Title: J. Bryol.

JCR Abbreviated Title: J Bryol

ISSN: 0373-6687

Issues/Year: 4

Journal Country/Territory: England

Language: English

Publisher: Maney Publishing Ltd

Publisher Address: Hundson Rd, Leeds LS9 7DL, England

Subject Categories:

Plant Sciences: Impact Factor 0.495, 92/137 (2000)

? Porley, R.D. (1996), A bryophyte flora of sarsen stones and an assessment of their bryological interest. *Journal of Bryology*, **19**, 79-88.

Abstract: Sarsen stones, hard acidic rock fragments, are restricted to just six sites in southern England but they provide an important habitat for both lichens and bryophytes. The bryophytes of sarsen stones have received less attention than the lichens but they include many species that are either rare or absent throughout the region, or occur only in man-made habitats such as in churchyards or on roofs. Members of the Grimmiaceae are well represented including Grimmia decipiens, G. laevigata, G. trichophylla and Racomitrium heterostichum. Other notable species include Hedwigia ciliata s.s., H. stellata, Pterogonium gracile and Porella obtusata.

Unlike the lichen flora there is no maritime element among the bryophytes of sarsen stones, but shared with the lichens is a clear upland element. This is in a large part a reflection of the scarcity of hard acidic rock outcrops in southern England; many of the notable species occurring on sarsen stones are more common in the upland areas of west and north Britain where suitable rock is extensive. A comparative assessment of the status of some of the more notable species in southern England demonstrates the high bryological importance of sarsen stones. Although the existing sarsen stone sites are to some degree protected, they occur within a farmed landscape and the widespread use of agricultural chemicals and the impact of grazing need to be carefully monitored. Air pollution may also be a contributory factor in the decline and loss of certain sarsen stone species.

# Title: Journal of Building Physics

Full Journal Title: [Journal of Building Physics](http://jen.sagepub.com/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Delgado, J.M.P.Q., Ramos, N.M.M. and De Freitas, V.P. (2006), Can moisture buffer performance be estimated from sorption kinetics? *Journal of Building Physics*, **29** (4), 281-299.

Full Text: [2006\J Bui Phy29, 281.pdf](2006/J%20Bui%20Phy29,%20281.pdf)

Abstract: This article describes the research on the moisture buffering effect of building materials. A set of experiments on samples of current building materials are conducted under transient conditions of relative humidity (RH).

The results obtained are then analyzed using kinetics models. The experimental settings are based on the moisture buffer value (MBV) test method currently under study by Nordic researchers. The main result from these tests is the MBV number that can be used to characterize the moisture buffer performance of a material or a system.

The application of kinetics models to the experimental results is explored and several parameters are retrieved. A proposal for the use of these parameters is presented and its practical use is discussed.

Keywords: Kinetics Models, Sorption Curves, Moisture Buffer Value, Building Materials

# Title: Journal of Burn Care & Research

Full Journal Title: Journal of Burn Care & Research

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Oremus, M., Hanson, M.D., Whitlock, R., Young, E., Archer, C., Dal Cin, A., Gupta, A. and Raina, P. (2007), A systematic review of heparin to treat burn injury. *Journal of Burn Care & Research*, **28** (6), 794-804.

Abstract: This systematic review was conducted to assess the evidence for using heparin to treat burn injury. The following databases were searched for relevant studies: MEDLINE, EMBASE, CINAHL, The Cochrane Central Database of Controlled Trials, Web of Science, and BIOSIS. Additional searches involved the reference lists of included studies, the “grey” literature (eg, government reports), and consultations with experts to obtain unpublished manuscripts. Included studies were summarized descriptively and in tabular form, and assessed for methodological quality. A metaanalysis was conducted to obtain a summary estimate for the association between heparin use and postburn mortality. Nine studies were abstracted and included in the review. Five studies contained adult and pediatric patients, one contained adults only, and three contained pediatric patients only. Burn etiologies included flame, scald, thermal, or smoke inhalation. Heparin administration was done topically, subcutaneously, intravenously, or via aerosol. Heparin was reported to have a beneficial impact on mortality, graft and wound healing, and pain control. For mortality, the overall estimate (relative risk) of heparin’s effect was 0.32 (95% confidence interval = 0.18-0.57). Heparin’s reported benefits may be severely biased because the abstracted studies were beset by poor methodological quality (eg, inadequate definitions of treatment and outcome, no control of confounding). Given poor study quality, there is no strong evidence to indicate that heparin can improve clinical outcomes in the treatment of burn injury. Further research is needed to assess the clinical utility of using heparin in the treatment of burn injury.

Keywords: Adult, Adults, Aerosol, Anticoagulant, Clinical Utility, Cochrane, Confounding, Control, Databases, Definitions, Embase, Heparin, Impact, Injury, Literature, Medline, Mortality, Outcome, Outcomes, Pain, Pediatric, Reduction, Relative Risk, Research, Review, Risk, Science, Systematic, Systematic Review, Therapy, Treatment, Web of Science, Wounds

# Title: Journal of Business Chemistry

Full Journal Title: [Journal of Business Chemistry](http://www.businesschemistry.org/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Su, H.N. and Lee, P.C. (2009), Assessment of thermal-stable polymer nanocomposite techniques by patent citation network analysis. *Journal of Business Chemistry*, **6** (3), 108-125.

Full Text: [2009\J Bus Che6, 108.pdf](2009/J%20Bus%20Che6,%20108.pdf)

Abstract: Nanocomposite material with new functions or properties superior to traditional composite materials opens a door to transform the way that material is currently applied. This study aims to provide 1) a systematic and quantitative method for obtaining global patent overview, 2) a global patent-citation overview on thermalstable polymer nanocomposite patents retrieved from the United States Patent and Trademark Office (USPTO). The systematic method provided in this paper is integration of basic patent statistics, technology-function classification, standard industrial classification, patent citation and network properties calculation. All of these contribute not only to a systematic approach for obtaining a quantitative overview of large amount of selected patents, but also bridge the gap between patented techniques and business management activities, e.g. R&D resource allocation, performance evaluation, patent map visualization, patent valuation, in business and industry.

# Title: Journal of Business Ethics

Full Journal Title: Journal of Business Ethics

ISO Abbreviated Title: J. Bus. Ethics

JCR Abbreviated Title: J Bus Ethics

ISSN: 0167-4544

Issues/Year: 24

Journal Country/Territory: Netherlands

Language: English

Publisher: Kluwer Academic Publ

Publisher Address: Van Godewijckstraat 30, 3311 GZ Dordrecht, Netherlands

Subject Categories:

Business: Impact Factor 0.401, / (2001) SSCI

Ethics: Impact Factor 0.401, / (2001) SSCI

Alder, G.S. (1998), Ethical Issues in electronic performance monitoring: A consideration of deontological and teleological perspectives. *Journal of Business Ethics*, **17** (7), 729-743.

Full Text: [J\J Bus Eth17, 729.pdf](J/J%20Bus%20Eth17,%20729.pdf)

Abstract: Extensive and growing use of electronic performance monitoring in organizations has resulted in considerable debate. Advocates of electronic monitoring approach the debate in teleological terms arguing that monitoring benefits organizations, customers, and society. Its critics approach the issue in deontological terms countering that monitoring is dehumanizing, invades worker privacy, increases stress and worsens health, and decreases work-life quality. In contrast to this win-lose approach, this paper argues that an approach which emphasizes communication in the design and implementation of monitoring systems offers a win-win solution that should satisfy both deontological and teleological ethicists.

Keywords: Surveillance, Justice

Sabrin, M. (1998), A ranking of the most productive business ethics scholars: A five-year study. *Journal of Business Ethics*, **36** (4), 355-379.

Full Text: [J\J Bus Eth36, 355.pdf](J/J%20Bus%20Eth36,%20355.pdf)

Abstract: This paper presents the results of a study that counted articles and the number of pages written on business ethics and published during the five-year period 1995-1999. Individual scholars were ranked on the basis of total articles and total pages published. Institutions were also ranked based on the number of pages and articles their scholars published in selected business ethics journals. This article is the first one to rank schools and individual scholars on the basis of research productivity in business ethics.

? Ma, Z.Z. (2009), The status of contemporary business ethics research: Present and future. *Journal of Business Ethics*, **90**, 255-265.

Full Text: [2009\J Bus Eth90, 255.pdf](2009/J%20Bus%20Eth90,%20255.pdf)

Abstract: This study provides a general overview of contemporary business ethics research of the last 10 years (1997-2006) and discusses potential future research directions in business ethics based on the overview. Using citation and co-citation analysis, this study examined the citation data of journal articles, books, and other publications collected in the Social Sciences Citation Index (SSCI), wherein key research themes in business ethics studies in 1997-2006 and correlations between these themes were explored. The results show that major research themes in business ethics have shifted in the last decade from research on ethical decision making and on the relationship between corporate social responsibility and corporate performance to research on stakeholder theory in business ethics and on the relationship between consumer behavior and corporate social responsibility. The results of this study help map the invisible network of knowledge production in business ethics research and provide important insights on future business ethics research.

Keywords: Author Cocitation, Business Ethics, Citation Analysis, Corporate Social Responsibility, Corporate Social-Responsibility, Decision-Making, Ethical Decision Making, Financial Performance, Knowledge Network, Link, Management, Model, Research

? Caldwell, C. (2010), A ten-step model for academic integrity: A positive approach for business schools. *Journal of Business Ethics*, **92** (1), 1-13.

Full Text: 2010\J Bus Eth92, 1.pdf

Abstract: The problem of academic dishonesty in Business Schools has risen to the level of a crisis according to some authors, with the incidence of reports on student cheating rising to more than half of all the business students. In this article we introduce the problem of academic integrity as a holistic issue that requires creating aa cultural pound change involving students, faculty, and administrators in an integrated process. Integrating the extensive literature from other scholars, we offer a ten-step model which can create a positive culture for academic integrity. The successful implementation of a well-crafted academic integrity program can have a positive impact on business schools and improve the reputation of tomorrow’s business leaders.

Keywords: Academic Dishonesty, Academic Integrity, Authors, Cheating, Codes, Contextual Influences, Dishonesty, Ethics, Internet, Literature, Plagiarism, Prevalence, Rethinking, Students, Teaching Business Ethics, Tolerance

? Uysal, Ö.Ö. (2010), Business ethics research with an accounting focus: A bibliometric analysis from 1988 to 2007. *Journal of Business Ethics*, **93** (1), 137-160.

Full Text: [2010\J Bus Eth93, 137.pdf](2010/J%20Bus%20Eth93,%20137.pdf)

Abstract: This article uses bibliometric analysis to empirically examine research on business ethics published in a broad set of journals, focused over the period 1988-2007. We consider those journals with an emphasis on accounting. First, we determine the citation frequencies of documents to identify the core articles in accounting research with an ethics focus as well as the contributions of influential fields included in the research sphere of these journals. We also employ document co-citation analysis to analyze the scholarly communication patterns that exist within the realm of the specified articles. Second, we utilize social network analysis tools to profile the centrality features of the co-citation network of these documents.

Keywords: Accounting Ethics, Articles, Auditor Independence, Author Cocitation Analysis, Bibliometric, Bibliometric Analysis, Citation, Citation Analysis, Citation Analysis, Co-Citation, Co-Citation Analysis, Cocitation Analysis, Core, Decision-Making, Document Co-Citation Analysis, Ethics, Information-Science, Intellectual Structure, Journals, Management, Network Analysis, Research, Scholarly Communication, Scientific Literatures, Social Network Analysis, Social Networks, Tools

? Talukdar, D. (2011), Patterns of research productivity in the business ethics literature: Insights from analyses of bibliometric distributions. *Journal of Business Ethics*, **98** (1), 137-151.

Full Text: [2011\J Bus Eth98, 137.pdf](2011/J%20Bus%20Eth98,%20137.pdf)

Abstract: In any academic discipline, published articles in respective journals represent “production units” of scientific knowledge, and bibliometric distributions reflect the patterns in such outputs across authors or “producers.” Closely following the analysis approach used for similar studies in the economics and finance literature, we present the first study to examine whether there exists an empirical regularity in the bibliometric patterns of research productivity in the business ethics literature. Our results present strong evidence that there indeed exists a distinct empirical regularity. It is the so-called Generalized Lotka’s Law of scientific productivity pattern: the number of authors publishing n papers is about 1/n (c) of those publishing one paper. We discuss the likely processes that underlie the productivity pattern postulated by the Generalized Lotka’s Law. We find that the value of the exponent c is equal to about 2.6 for the comprehensive bibliometric data across the two leading business ethics journals. The observed research productivity pattern in the business ethics area, a relatively young discipline, is interestingly very consistent with those found in much older, related business disciplines like economics, accounting, and finance. We discuss the general implications of our findings.

Keywords: Academic Discipline, Analysis, Authors, Bibliometric, Bibliometric Distributions, Business Ethics, Computer-Science, Cumulative Advantage, Cumulative Advantage, Data, Economics, Empirical Regularity, Ethics, Growth, Journals, Knowledge Creation, Literature, Lotka’s Law, Lotkas Law, Mechanism, Number of Authors, Processes, Productivity, Publishing, Research, Research Output, Research Productivity Patterns, Scientific Productivity

? Calabretta, G., Durisin, B. and Ogliengo, M. (2011), Uncovering the intellectual structure of research in business ethics: A journey through the history, the classics, and the pillars of *Journal of Business Ethics*. *Journal of Business Ethics*, **104** (4), 499-524.

Full Text: [2011\J Bus Eth104, 499.pdf](2011/J%20Bus%20Eth104,%20499.pdf)

Abstract: After almost 30 years of publications, Journal of Business Ethics (JBE) has achieved the position of main marketplace for business ethics discussion and knowledge generation. Given the large amount of knowledge produced, an assessment of the state of the art could benefit both the constructive development of the discipline and the further growth of the journal itself. As the evolution of a discipline is set to be reflected in the evolution of its leading journal, we attempt to characterize changes in the intellectual structure of business ethics through a bibliometric analysis of articles published in JBE. Specifically, we conduct a knowledge-stock analysis to assess the evolution, major trends, and current state of the journal. Additionally, we use citation and co-citation analysis to provide an accurate description of the content and the advancement of research in business ethics. Through the results of our analysis, we are able to: (1) pinpoint the characteristics of the growing stock of knowledge published by JBE over the years; (2) identify the most influential works on business ethics research; and (3) detect the formation and evolution of schools of thought in business ethics.

Keywords: Analysis, As, Assessment, Author Cocitation, Behavior, Bibliometric, Bibliometric Analysis, Bibliometrics, Business Ethics, Citation, Co-Citation Analysis, Cocitation, Cocitation Analysis, Corporate Social Responsibility, Corporate Social-Responsibility, Decision-Making, Development, Empirical-Examination, Ethical Decision Making, Ethics, Evolution, Financial Performance, Growth, History, Intellectual Structure, Journal, Knowledge, Literature Review, Model, Organizations, Product-Innovation-Management, Publications, Research, Schools, State of the Art, Structure, Trends

# Title: Journal of Business Logistics

Full Journal Title: [Journal of Business Logistics](http://cscmp.org/memberonly/jbl.asp?XX=1)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Charvet, F.F., Cooper, M.C. and Gardner, J.T. (2008), The intellectual structure of supply chain management: A bibliometric approach. *Journal of Business Logistics*, **29** (1), 47-73.

Full Text: [2008\J Bus Log29, 47.pdf](2008/J%20Bus%20Log29,%2047.pdf)

Abstract: Now that supply chain management has a two-decade research history, it is possible to examine the literature to identify whether there is any latent intellectual structure using bibliometric tools. The study applies a citation and co-citation approach to reveal four clusters of research that have emerged. One cluster has strong ties to the logistics field, with primarily conceptual articles. A second cluster finds its roots in operations research, and consists mainly of modeling articles. The application of multidimensional scaling, cluster analysis, and factor analysis on co-citations demonstrated a clearly identifiable structure. The structure is examined and implications for the future development of supply chain research are discussed.

Keywords: Author Cocitation, Bibliometric, Bibliometrics, Citation, Citation Analysis, Classification, Co-Citation Analysis,Logistics, Cocitation Analysis, Consumer Research, Discipline, Factor Analysis, Incentives, Information, Marketing Journals, Modeling, Operations Research, Perspective, Production and Operations Management, Purchasing, Research, Supply Chain Management

? Georgi, C., Darkow, I.L. and Kotzab, H. (2010), The intellectual foundation of the *Journal of Business Logistics* and its evolution between 1978 and 2007. *Journal of Business Logistics*, **31** (2), 63-109

Full Text: [2010\J Bus Log31, 63.pdf](2010/J%20Bus%20Log31,%2063.pdf)

Keywords: Author Cocitation Analysis, Bibliometrics, Buyer-Seller Relationships, Citation Analysis, Information-Systems, Operations Management, Pearsons R, Physical Distribution Service, Similarity Measures, Supply Chain Management

# Title: Journal of Business and Technical Communication

Full Journal Title: Journal of Business and Technical Communication

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1050-6519

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Reinsch, Jr., N.L. and Reinsch, J.W. (1996), Some assessments of business communication scholarship from social science citations. *Journal of Business and Technical Communication*, **10** (1), 28-47.

Full Text: [1996\J Bus Tec Com10, 28.pdf](1996/J%20Bus%20Tec%20Com10,%2028.pdf)

Abstract: This article reports Social Sciences Citation Index(R) citations of six periodicals, three that cover business communication explicitly and three that address related areas. The results indicate that business communication articles are cited by many different journals-primarily in the areas of written communication, social sciences and education, and business and economics-but are not cited frequently. The results also indicate that business communication periodicals compare favorably on several indexes of impact with 10 communication journals studied by Clement So. Some differences are noted between the six journals, and the most-cited business communication articles are identified.

Keywords: Assessments, Business, Business Communication, Citations, Communication, Education, Impact, Journals, Periodicals, Scholarship, Science, Sciences, Social, Social Sciences

# Title: Journal of the Canadian Dental Association

Full Journal Title: [Journal of the Canadian Dental Association](http://www.cda-adc.ca/jcda/back_issue.html)

ISO Abbreviated Title:

JCR Abbreviated Title: J Can Dent Assoc

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Carlsson, G.E. (2005), Changes in the prosthodontic literature 1966 to 2042. *Journal of the Canadian Dental Association*, **71** (5), 328.

Full Text: [2005\J Can Den Ass71, 328.pdf](2005/J%20Can%20Den%20Ass71,%20328.pdf)

Abstract: PURPOSE: To describe the growth and content of the prosthodontic literature over the last 4 decades, to make a prognosis on its probable development in the coming 4 decades and to discuss changes in the content of the International Journal of Prosthodontics (IJP) from its start in 1988 to 2004. METHODS: MEDLINE was searched for articles on prosthodontics published between 1966 and April 2004. All volumes of IJP were examined with respect to type, subject area and geographic origin of articles. RESULTS: Using the term “prosthodontics,” the MEDLINE search produced 66,600 hits. The proportion of clinical studies increased from 1% during the first 10-year period to 13% since 2001. Articles on removable dentures decreased during the period reviewed, whereas those on implant prosthodontics increased. Randomized controlled trials were rare and often of inadequate quality. Literature reviews have become popular, but many do not follow current guidelines for systematic reviews. A marked change in geographic origin of articles in IJP has occurred, with a decrease in material from North America and an increase in that from Europe and Asia. The Internet and open-access publishing will probably have a great impact on the future development of the prosthodontic literature. CONCLUSIONS: Substantial changes have occurred in the prosthodontic literature between 1966 and 2004, and they can be expected to continue with the rapid development of information technology and increased use of the Internet.

Keywords: Asia, Changes, Clinical, Clinical Studies, Development, Europe, First, Growth, Guidelines, Impact, Information, Information Technology, Internet, Literature, MEDLINE, Methods, North, Open Access, Origin, Prognosis, Publishing, Purpose, Quality, Rapid Development, Reviews, Systematic Reviews, Technology, Term

# Title: Journal of Canadian Petroleum Technology

Full Journal Title: Journal of Canadian Petroleum Technology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address: 0

Subject Categories:

Impact Factor

? Moazed, H. and Viraraghavan, T. (2001), Organo-clay/anthracite filtration for oil removal. *Journal of Canadian Petroleum Technology*, **40** (9), 37-42.

Abstract: A bentonite organo-clay/anthracite mixture in the granular form (EC-100) was used in filtration (column) studies in treating four representative oil-in-water emulsions. The oil-in-water emulsions used were as follows: Standard Mineral Oil (SMO), Kutwell 45 (KUT) and Valcool (VAL), two cutting oils; and Refinery Effluent (RE) from the Co-operative Oil Refinery, Regina, Saskatchewan. The concentrations of oil in the oily waters varied from 8.3 to 69.3 mg/L. Eight-hour column studies were conducted in a 19 mm ID, 450 mm/1200 mm long cast acrylic pipe with an organo-clay/anthracite depth of 300 mni/1,000 mm. The SMO, KUT, and VAL oil-in-water emulsions were pumped into the column at four flow rates of 3, 6, 9, and 12 mL/min (0.3, 0.5, 0.8, and 1.0 gpm/ft2, respectively). Column breakthrough studies were conducted in a 19 mm ID, 1,200 mm long cast acrylic pipe using the organo-clay/anthracite mixture of 1,000 mm depth. The study was conducted for SMO, KUT, VAL and RE oil-in-water emulsions with a flow rate of 12 mL/mim (1 gpm/ft2). The eight-hour column tests with 300 mm bed depth and all oil-in-water emulsions indicated that generally, the oil removal efficiencies decreased with an increase in flow rate. The percentage reduction in oil removal efficiency was 29 and 37 for SMO, 51 and 59 for KUT, and 9 and 57 for VAL when the flow rate was increased from 3 mL/min to 6 and 9 mL/min, respectively. The results of the eight-hour experiments with a 1,000 mm depth of organo-clay/anthracite bed and with a flow rate of 12 mL/min showed that oil removal efficiency for SMO, KUT, and VAL varied between 65 and 70%. In the case of RE, which is a treated and highly stable emulsion, the oil removal efficiency was found to be 99.5%. The results from the breakthrough studies clearly indicated that the Thomas equation provides a reasonable fit of the data. The oil-sorption capacities (x/m) based on a mass balance analysis were found to be 0.0036, 0.0019, 0.0015, and 0.0018 for SMO, KUT, VAL, and RE, respectively. The analysis of the breakthrough data using the Thomas model resulted in similar values of x/m. The results also showed that uptake of oil by an organo-clay/anthracite mixture can well be described by a simple equation involving time, such as Weber and Morris model.

Keywords: Pollutants

# Title: Journal of Cancer Education

Full Journal Title: Journal of Cancer Education

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Heneghan, M.K., Hazan, C., Halpern, A.C. and Oliveria, S.A. (2007), Skin cancer coverage in a national newspaper: A teachable moment. *Journal of Cancer Education*, **22** (2), 99-104.

Full Text: [2007\J Can Edu22, 99.pdf](2007/J%20Can%20Edu22,%2099.pdf)

Abstract: Background. The objectives of this study were to (1) identify the number of published articles related to skin cancer in The New York Times newspaper from 1980-2004; (2) assess the content of the articles related to skin cancer, and (3) examine the trends in media coverage of skin cancer over time. Methods. We performed a content analysis on articles related to skin cancer appearing in The New York Times during January 1, 1980, through December 31, 2004, using the ProQuest (R) online content repository database and key words skin cancer. We conducted an advanced focus search of all “skin cancer” articles using key words “melanoma,” “squamous cell carcinoma,” “basal cell carcinoma “ “sunscreen,” “tanning,” “sunbathing,” and “tanning salon”. Results. We identified 874 published articles relating to skin cancer. Melanoma was the primary subject of the 874 articles, with 29% of the articles focusing on some aspect of melanoma. Coverage of other major subjects included sunscreen (11%), tanning (9%), basal cell carcinoma (7%), squamous cell carcinoma (3%), sunbathing (2%), and tanning salon (2%). The remaining 37% of articles contained some mention of skin cancer, but skin cancer was not the main topic nor were any of the focus terms. Over the 25-year period we examined, there was a slight upward trend in the number of skin-cancer-related articles, although we observed year-to-year variation. Conclusions. Understanding how the print media portrays skin cancer issues provides valuable feedback for federal agencies and cancer organizations and may ultimately help promote skin cancer prevention and education.

Keywords: Analysis, Cancer, Content Analysis, Coverage, Database, Education, Media, Melanoma, New York, Prevention, Primary, Skin, Squamous Cell Carcinoma, Trend, Trends

? Preminger, B.A., Lemaine, V., Sulimanoff, I., Pusic, A.L. and McCarthy, C.M. (2011), Preoperative patient education for breast reconstruction: A systematic review of the literature. *Journal of Cancer Education*, **26** (2), 270-276.

Full Text: [2011\J Can Edu26, 270.pdf](2011/J%20Can%20Edu26,%20270.pdf)

Abstract: This study aims to assess the current state of patient educational tools available for the purposes of educating women about postmastectomy breast reconstruction. A systematic review of the English language literature was conducted between the years 1966 and 2009 of all studies pertaining to the use of educational materials for breast reconstruction. MEDLINE, CINAHAL, PsycINFO, EMBASE, SCOPUS, and the Science Citation Index were searched. Only studies that both employed and evaluated a patient educational tool in the setting of postmastectomy reconstruction were selected for review. Qualifying studies were then evaluated with respect to their study design, sample size, and outcome measure evaluated. Each educational tool identified was similarly evaluated with respect to its development process, content, and educational medium. A total of 497 articles were retrieved. Of these, only seven met our inclusion criteria. These publications evaluated a total of seven educational tools. Among them were employed various mediums including written, visual, and audio materials. Detailed review revealed that the development of only one educational program included an educational needs assessment. Only two of the seven studies identified evaluated the efficacy of their educational tool using a randomized controlled trial study design. Outcome measures evaluated varied among the studies identified and included: knowledge gains (n = 4), the ‘yes’ or ‘no’ decision to undergo reconstruction (n = 3), satisfaction with decision regarding reconstruction (n = 1), decisional conflict (n = 3), and type of reconstruction (n = 3). This review highlights the need for well-designed, methodologically sound research into patient education regarding breast reconstruction. Such information is invaluable in developing patient education programs and decision aids that aim at patient empowerment.

Keywords: Aid, Assessment, Breast Cancer, Breast Reconstruction, Cancer Patients, Citation, Decision Aids, Decision-Making, Development, Education, Embase, Information, Literature, Mastectomy, Medline, Outcomes, Patient Education, Patients Expectations, Publications, Randomized-Trial, Research, Review, Satisfaction, Science Citation Index, Scopus, Surgery, Systematic Review, Treatment Decision

# Title: Journal of Cancer Research and Clinical Oncology

Full Journal Title: [Journal of Cancer Research and Clinical Oncology](http://link.springer.de/link/service/journals/00432/tocs.htm)

ISO Abbreviated Title: J. Cancer Res. Clin. Oncol.

JCR Abbreviated Title: J Cancer Res Clin

ISSN: 0171-5216

Issues/Year: 12

Journal Country/Territory: Germany

Language: English

Publisher: Springer Verlag

Publisher Address: 175 Fifth Ave, New York, NY 10010

Subject Categories:

Oncology Impact Factor

? Kraft, R.P., Gao, C.L. and Clauss, W. (1983), The growth of publications on monoclonal-antibodies 1975-1981: A bibliometric evaluation. *Journal of Cancer Research and Clinical Oncology*, **105** (2), 199-201.

? Miller, A.B. (1991), Epidemiological approaches to primary and secondary prevention of cancer [editorial]. *Journal of Cancer Research and Clinical Oncology*, **117** (3), 177-185.

Abstract: Primary prevention of cancer requires control of both involuntary and voluntary exposures. Involuntary exposures include carcinogens in air and water, and various forms of radiation. Often these exposures are difficult to characterise individually and difficult to study epidemiologically. Although it is unlikely that they account for more than a small proportion of cancers, it is important that we refine our techniques of study to facilitate their control. Voluntary (lifestyle) exposures are responsible for the majority of cancers. In many developed countries, tobacco accounts for approximately 30% of cancer deaths, and major public health endeavours are justified to reduce this toll. Dietary factors may be as important, with dietary fat the most important risk factor, vegetables and fruits being protective. In several studies, including a cohort study in Canada, dietary fat increases breast cancer risk, though other studies have been negative. The evidence for fat increasing the risk of colorectal is more consistent. Epidemiology has shown that secondary prevention of cancer is applicable by screening for breast cancer with mammography with or without physical examination in women age 50-69, and screening for cervix cancer in women age 25-60 with cervical cytology. Organised screening programmes are essential to ensure that a high proportion of women are screened, and that the tests are high qulity with adequate quality control. Under these circumstances screening every 2 years for breast cancer and every 3 years for cervix cancer is cost-effective. Screening for other cancers cannot be recommended currently. There is a time to effect that must be recognised in planning primary or secondary prevention. Full effect of most primary activities will not be achieved for decades, screening may require a decade. Available knowledge must be applied now, however, to ensure the effect will eventually be seen, as is now occurring in some countries with the downturn in lung cancer mortality following smoking reduction in men.

(1991), Impact Factor: Online first publication. *Journal of Cancer Research and Clinical Oncology*, **127** (9), 521.

Full Text: [J\J Can Res Cli Onc127, 521.pdf](J/J%20Can%20Res%20Cli%20Onc127,%20521.pdf)

# Title: Journal of Cancer Survivorship-Research and Practice

Full Journal Title: Journal of Cancer Survivorship-Research and Practice

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Haseen, F., Murray, L.J., Cardwell, C.R., O’Sullivan, J.M. and Cantwell, M.M. (2010), The effect of androgen deprivation therapy on body composition in men with prostate cancer: Systematic review and meta-analysis. *Journal of Cancer Survivorship-Research and Practice*, **4** (2), 128-139.

Abstract: Introduction The use of androgen deprivation therapy (ADT) in the treatment of prostate cancer is associated with changes in body composition including increased fat and decreased lean mass. Limited information exists regarding the rate and extent of these changes. This systematic review was conducted to determine the effects of ADT on body composition in prostate cancer patients. Methods Literature searches were conducted on MEDLINE, EMBASE and Web of Science for studies until January 2009. Only longitudinal studies that examined ADT and body composition in prostate cancer patients were included. Data were extracted on body weight, BMI, percentage of fat mass and lean body mass. Results Sixteen studies (14 cohorts and 2 RCTs) met the inclusion criteria. Pooled data, calculated according to a random effects model, showed that ADT increased % body fat by on average 7.7% (95% CI 4.3, 11.2, from seven studies, P < 0.0001) and decreased % lean body mass by on average -2.8% (95% CI -3.6, -2.0, from six studies, P < 0.0001) but for both there was marked heterogeneity between studies (I2= 99% I2= 73%, respectively). Similarly, body weight (2.1%, P < 0.0001 from nine studies) and BMI (2.2%, P < 0.0001, from eight studies) increased significantly. More extensive changes were seen with longer duration of treatment. Conclusions Substantial increases in fat and declines in lean mass were observed in prostate cancer patients treated with ADT. Lifestyle changes or suitable interventions to minimize the effect of ADT on body composition need to be investigated. Implications for cancer survivors Prostate cancer survivors should be made aware of the side effect of treatment on body composition and further work is required to determine what interventions can minimize the impact of ADT on body composition and therefore what evidence based advice they should be provided with. In general, though recommendation of a healthy diet and moderate exercise is reasonable.

Keywords: 150 Mg, Adt, Bicalutamide Monotherapy, BMI, Body Composition, Body Weight, Bone-Mineral Density, Cancer, Carcinoma, Deprivation, Embase, Exercise, Fat, Fat Mass, Follow-Up, Hormone Agonist Treatment, Impact, Information, Interventions, Longitudinal Studies, Mass, Medline, Meta-Analysis, Methods, Model, Prostate, Prostate Cancer, Radiotherapy, Review, Science, Suppression, Systematic, Systematic Review, Therapy, Treatment, Web of Science

# Title: Journal of Cardiac Failure

Full Journal Title: Journal of Cardiac Failure

ISO Abbreviated Title:

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ISSN:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Massie, B.M. (2002), What is the significance of a journal’s impact factor? *Journal of Cardiac Failure*, **8** (6), 363-364.

Full Text: [J\J Car Fai8, 363.pdf](J/J%20Car%20Fai8,%20363.pdf)

# Title: Journal of Cardiopulmonary Rehabilitation and Prevention

Full Journal Title: Journal of Cardiopulmonary Rehabilitation and Prevention

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Yeh, G.Y., Wang, C.C., Wayne, P.A. and Phillips, R. (2009), Tai Chi exercise for patients with cardiovascular conditions and risk factors a systematic review. *Journal of Cardiopulmonary Rehabilitation and Prevention*, **29** (3), 152-160.

Full Text: [2009\J Car Reh Pre29, 152.pdf](2009/J%20Car%20Reh%20Pre29,%20152.pdf)

Abstract: EPURPOSE: To conduct a systematic review of the literature evaluating tai chi exercise as an intervention for patients with cardiovascular disease (CVD) or with CVD risk factors (CVDRF). METHODS: We searched (1) MEDLINE, CAB Alt HealthWatch, BIOSIS previews, Science Citation Index, EMBASE, and Social Science Citation Index from inception through October 2007; (2) Chinese Medical Database, China Hospital Knowledge, China National Knowledge Infrastructure, and China Traditional Chinese Medicine Database from inception through June 2005; and (3) the medical libraries of Beijing and Nanjing Universities. Clinical studies published in English and Chinese including participants with established CVD or CVDRF were included. Data were extracted in a standardized manner; 2 independent investigators assessed methodological quality, including the Jadad score for randomized controlled trials (RCTs). RESULTS: Twenty-nine studies met inclusion criteria: 9 RCTs, 14 nonrandomized Studies, and 6 observational trials. Three studies examined subjects with coronary heart disease, 5 in subjects with heart failure, and 10 in heterogeneous populations that included those with CVD. Eleven studies examined subjects with CVDRF (hypertension, dyslipidemia, impaired glucose metabolism). Study duration ranged from 8 weeks to 3 years. Most Studies included fewer than 100 subjects (range, 5-207). Six of 9 RCTs were of adequate quality (Jadad >= 3). Most Studies reported improvements with tai chi, including blood pressure reductions and increases in exercise capacity. No adverse effects were reported. CONCLUSION: Preliminary evidence suggests that tai chi exercise may be a beneficial adjunctive therapy for some patients with CVD and CVDRF. Further research is needed.

Keywords: Aerobic Exercise, Blood-Pressure, Capacity, Cardiovascular Disease Prevention, Chi, Chuan, Citation, Coronary, Disease, Exercise, Heart-Failure, Intervention, Knowledge, Medline, Quality, Randomized Controlled-Trial, Research, Risk Factors, Science, Systematic Review, Tai Chi, Universities

# Title: Journal of Cardiothoracic and Vascular Anesthesia

Full Journal Title: [Journal of Cardiothoracic and Vascular Anesthesia](http://www.sciencedirect.com/science/journal/08886296)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1053-0770

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Nishina, K., Asano, M., Mikawa, K., Maekawa, N. and Obara, H. (1995), The accuracy of references in the *Journal of Cardiothoracic and Vascular Anesthesia*. *Journal of Cardiothoracic and Vascular Anesthesia*, **9** (5), 622-623.

Full Text: [1995\J Car Vas Ane9, 622.pdf](1995/J%20Car%20Vas%20Ane9,%20622.pdf)

? Kaplan, J.A. (1995), The accuracy of references in the *Journal of Cardiothoracic and Vascular Anesthesia* - Reply. *Journal of Cardiothoracic and Vascular Anesthesia*, **9** (5), 624.

Full Text: [1995\J Car Vas Ane9, 624.pdf](1995/J%20Car%20Vas%20Ane9,%20624.pdf)

? Nishina, K., Mikawa, K. and Obara, H. (2000), Improvement of the accuracy of references in the *Journal of Cardiothoracic and Vascular Anesthesia*. *Journal of Cardiothoracic and Vascular Anesthesia*, **14** (4), 495-496.

Full Text: [2000\J Car Vas Ane14, 495.pdf](2000/J%20Car%20Vas%20Ane14,%20495.pdf)

Keywords: Accuracy, References

? Landoni, G., Bignami, E., Nicolotti, D., Pieri, M., Silvetti, S., Buratti, L., Landoni, P., John, M. and Zangrillo, A. (2010), Publication trends in the *Journal of Cardiothoracic and Vascular Anesthesia*: A 10-year analysis. *Journal of Cardiothoracic and Vascular Anesthesia*, **24** (6), 969-973.

Full Text: [2010\J Car Vas Ane24, 969.pdf](2010/J%20Car%20Vas%20Ane24,%20969.pdf)

Abstract: Objective: Good quality clinical research in anesthesiology is now performed all over the world. The aim of this article was to present and analyze the scientific contributions published in the Journal of Cardiothoracic and Vascular Anesthesia and to give a structured view focused on the countries where these studies were performed. Design: Bibliometric analysis. Setting: Teaching hospital. Participants: None. Interventions:The authors analyzed the geographic distribution of the authors publishing in cardiac anesthesia. Measurements and Main Results: Data were obtained from the Scopus database. All works belonging to document-type articles, reviews, letters, and editorials published over a 10-year period (2000-2009) in the Journal of Cardiothoracic and Vascular Anesthesia (JCVA) were tracked. For each article, the country of origin of the corresponding author was retrieved. JCVA published 1,816 articles from 45 different countries. The United States accounted for 43.8% of the total, followed by India (8.3%), Germany (5.5%), United Kingdom (4.7%), and Italy (4.4%). Conclusions: JCVA has a widespread influence and receives contributions from all over the world. More and more biomedical research is conducted outside North America and Europe, with India leading the group of “rest of the world” countries. The recent development of Asian countries clearly challenges North America and European countries that can no longer ignore the scientific contribution from these parts of the world. With this in mind, some journals such as JCVA are giving voice to these prolific countries, which represents a fundamental forum for these newcomers to the field of cardiac anesthesia. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Analysis, Anesthesia, Author, Bibliography, Bibliometric, Bibliometric Analysis, Biomedical Research, Cardiac-Surgery, Cardiopulmonary Bypass, Contribution, Database, Developing Countries, Development, Europe, Field, Geographic Distribution, Germany, India, Italy, Journal of Cardiothoracic and Vascular Anesthesia, Journals, Publishing, Publishing Trends, Research, Scopus, Thermodilution

? Pagel, P.S. and Hudetz, J.A. (2011), Scholarly productivity of United States Academic Cardiothoracic Anesthesiologists: Influence of fellowship accreditation and transesophageal echocardiographic credentials on h-Index and other citation bibliometrics. *Journal of Cardiothoracic and Vascular Anesthesia*, **25** (5), 761-765.

Full Text: [2011\J Car Vas Ane25, 761.pdf](2011/J%20Car%20Vas%20Ane25,%20761.pdf)

Abstract: Objective: The h-index allows the evaluation of scholarly output in academics, but this bibliometric statistic has not been applied extensively to measure productivity in anesthesiology. The authors tested the hypothesis that the h-index is dependent on academic rank, American College of Graduate Medical Education (ACGME) accreditation of the training program, and National Board of Echocardiography credentials in perioperative transesophageal echocardiography (TEE) in United States academic cardiothoracic anesthesiologists. Design: Observational. Setting: Internet analysis. Participants: United States academic cardiothoracic anesthesiologists. Interventions: None. Measurements and Main Results: Faculty members from 30 randomly selected fellowship programs with or without accreditation were identified using the Society of Cardiovascular Anesthesiologists web site. The status of each faculty member’s credentials in perioperative TEE was defined using the “verify certification” function on the National Board of Echocardiography web site. Publications, citations, citations/publication, and the h-index for each faculty member were obtained using Scopus. Two hundred fifty-nine cardiothoracic anesthesiologists (204 men and 55 women) were identified (8 instructors [3%], 123 assistant professors [48%], 56 associate professors [22%], 63 professors [24%], and 9 chairpersons [3%]). The average cardiothoracic anesthesiologist had an h-index of 6 +/- 7 with 28 +/- 46 publications, 499 +/- 988 total citations, and 13 +/- 18 citations per publication. The h-index increased significantly (p < 0.05) among ranks (instructors [1 +/- 1], assistant professors [3 +/- 3], associate professors [7 +/- 5], professors [12 +/- 8], and chairpersons [18 +/- 13]). Significant differences in the number of publications and total citations also were observed among ranks. Differences in the h-index among ranks were observed regardless of program accreditation status or transesophageal echocardiographic credentials. Faculty members working in American College of Graduate Medical Education accredited programs had more publications and citations and higher h-indices than their counterparts in programs that were not accredited. Except for program directors, the scholarly output of academic cardiothoracic anesthesiologists with or without transesophageal echocardiographic credentials was similar within each academic rank. Conclusions: The results show that the h-index increases progressively with academic rank and is dependent on fellowship program accreditation status but not transesophageal echocardiographic credentials in United States academic cardiothoracic anesthesiologists. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Academics, Accreditation, Analysis, Anesthesia, Author, Authors, Bibliometric, Bibliometrics, Cardiothoracic Anesthesia, Citation, Citations, Differences, Education, Evaluation, Faculty, h Index, h-Index, h-Indices, Impact, Internet, Journals, Men, Performance Measures, Productivity, Publication, Publications, Scholarship, Scopus, Significant, Training, USA, Women

# Title: Journal of Cardiovascular Medicine

Full Journal Title: Journal of Cardiovascular Medicine

ISO Abbreviated Title:

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ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Deng, J.L., Luo, R. and Li, X.P. (2011), HLA-DRB1 gene polymorphism is associated with idiopathic dilated cardiomyopathy: A meta-analysis. *Journal of Cardiovascular Medicine*, **12** (9), 648-652.

Full Teat: 2011\J Car Med12, 648.pdf

Abstract: Objective Some studies have reported that the HLA-DRB1 allele was associated with idiopathic dilated cardiomyopathy. However, there have been inconsistent results among different studies. To clarify the association of HLA-DRB1 and idiopathic dilated cardiomyopathy, a meta-analysis of case-control studies was performed. Methods PubMed database, Science Citation Index database, The Cochrane Central Register of Controlled Trials database, China National Knowledge Information database, Chinese Biomedical Literature database, Wanfang database, and VIP database in China were searched. Search terms included dilated cardiomyopathy and DRB1. Five case-control studies were included in the present meta-analysis to assess the association between HLA-DRB1\*1401, HLA-DRB1\*0901, HLA-DRB1\*0301, and idiopathic dilated cardiomyopathy. Results A total of four studies were included in our meta-analysis for HLA-DRB1\*1401 and HLA-DRB1\*0901. The pooled odds ratio (OR) was 2.6 [95% confidence interval (CI) 1.11-6.11, P<0.05] and 0.70 (95% CI 0.48-1.00, P=0.05), respectively. For the HLA-DRB1\*0301 allele, just three studies were included in our meta-analysis. The pooled OR was 0.49 (95% CI 0.27-0.91, P<0.05). The present meta-analysis indicated that the frequency of HLA-DRB1\*1401 was higher in idiopathic dilated cardiomyopathy patients than in healthy people, whereas HLA-DRB1\*0901 and HLA-DRB1\*0301 were higher in healthy people than in idiopathic dilated cardiomyopathy patients. Conclusion The HLA-DRB1\*1401 allele might be a risk factor for idiopathic dilated cardiomyopathy and HLA-DRB1\*0901 and HLA-DRB1\*0301 might protect humans from idiopathic dilated cardiomyopathy.

Keywords: Alleles, Antibodies, Antigen, Case-Control, Case-Control Studies, China, Citation, Cochrane, Dilated Cardiomyopathy, Disease, DQ, Frequency, Gene Polymorphism, HLA-Class-II, HLA-DRB1, Humans, Idiopathic Dilated Cardiomyopathy, Japanese Patients, Knowledge, Literature, Meta Analysis, Meta-Analysis, Methods, Myocarditis, Patients, Polymorphism, Pubmed, Ratio, Risk, Risk Factor, Science, Science Citation Index, Susceptibility

# Title: Journal of Cardiovascular Nursing

Full Journal Title: Journal of Cardiovascular Nursing

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Radhakrishnan, K. and Jacelon, C. (2012), Impact of telehealth on patient self-management of heart failure: A review of literature. *Journal of Cardiovascular Nursing*, **27** (1), 33-43.

Full Text: [2012\J Car Nur27, 33.pdf](file:///H:\Bibliometric%20References\2012\J%20Car%20Nur27,%2033.pdf)

Abstract: Purpose: The objective of the study was to explore the impact of telehealth interventions on individuals’ self-care of heart failure (HF). Background: Heart failure is a chronic illness that requires a complex treatment regimen over a long period. Historically, effective self-care has been difficult for this population. There is a need for innovative and effective approaches to improve individual self-care. Telehealth can potentially help individuals with HF follow the plan of care resulting in improved health outcomes and a better quality of life. Review Methods: A comprehensive computer-assisted literature search using the terms “(telemedicine OR telehealth) AND (self-care OR self-management) AND (heart failure)” was conducted using electronic databases of ASP, CINAHL, Cochrane reviews, ERIC, PubMed, PsychINFO, Social Sciences Abstracts Index, and Web of Science for studies published between 2000 and 2010 to find research that met the inclusion criteria. Results: Fourteen studies were included in the review. Telehealth resulted in significant improvement of HF self-care behaviors of daily weighing, medication management, exercise adherence, fluid and alcohol restriction, salt restriction, or stress reduction in the telehealth intervention group in 5 studies. Participants reported improved HF self-care behaviors in 3 other studies with pretest-posttest design. Five others found no difference between the intervention and control groups. Content analysis of the data in the qualitative study revealed themes suggesting that telehealth can be effective in promoting self-care for individuals with HF. However, small sample size and inadequate measurement methods limit the generalizability of the findings of the studies included in this review. Conclusion: Although this review included several studies with flawed design issues, the available evidence supports the use of telehealth in enabling self-care of HF. Further exploration is needed to determine the effect of telehealth on HF self-care outcomes using studies with high-quality design and improved data collection procedures.

Keywords: Adherence, Alcohol, Analysis, Care, Chronic Illness, Cochrane, Computer-Assisted, Content Analysis, Control, Control Groups, Data Collection, Databases, Design, Disease, Exercise, Health Outcomes, Heart Failure, Home, Home Healthcare, Impact, Intervention, Interventions, Literature, Management, Measurement, Medication, Medication Management, Methods, Outcomes, Pubmed, Qualitative, Quality, Quality of Life, Reduction, Research, Review, Risk, Salt, Science, Sciences, Self-Care, Self-Management, Social Sciences, Stress, Telehealth, Telemonitoring, Treatment, Web of Science

# Title: Journal of Cardiovascular Pharmacology

Full Journal Title: Journal of Cardiovascular Pharmacology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

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Journal Country/Territory:

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Publisher Address:

Subject Categories:

: Impact Factor

? Rosen, M.R. (2010), Plagiarism in the medical/scientific literature. *Journal of Cardiovascular Pharmacology*, **56** (6), 709.

Keywords: Plagiarism

# Title: Journal of Catalysis

Full Journal Title: [Journal of Catalysis](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6852&_auth=y&_acct=C000053193&_version=1&_urlVersion=0&_userid=1495547&md5=c0311fdfa4e794a8746356d7ae34b440)

ISO Abbreviated Title: J. Catal.

JCR Abbreviated Title: J Catal

ISSN: 0021-9517

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Journal Country/Territory: United States

Language: English

Publisher: Academic Press Inc

Publisher Address: 525 B St, Ste 1900, San Diego, CA 92101-4495

Subject Categories:

Chemistry, Physical: Impact Factor 3.030, 15/91 (2000); Impact Factor 3.118, / (2002)

Engineering, Chemical: Impact Factor 3.293, 2/123 (2001); Impact Factor 3.118, 2/126 (2002)

Notes: highly cited

? Parry, E.P. (1963), An infrared study of pyridine adsorbed on acidic solids characterization of surface acidity. *Journal of Catalysis*, **2** (5), 371-379.

Full Text: [1960-80\J Cat2, 371.pdf](1960-80/J%20Cat2,%20371.pdf)

The infrared spectrum in the 1400 to 1700 cm-1 region has been determined for pyridine adsorbed on acidic solids. The spectrum of pyridine coordinately bonded to the surface is markedly different from that of the pyridinium ion. This permits the differentiation of acid type on the surface of acidic solids. From the frequency shift of one of the bands of coordinately bonded pyridine over that found in the liquid phase, and from the relative retention of the band upon evacuation and heating, a very rough estimate of the strength of surface Lewis sites can be inferred. It is shown that a silica surface hydrogen bonds pyridine only. Alumina has considerable strong Lewis acidity but no proton acidity while a cracking catalyst has both. The effect on the acidity of sodium poisoning a cracking catalyst is discussed.

Notes: highly cited

? Lippens, B.C., Linsen, B.G. and Deboer, J.H. (1964), Studies on pore systems in catalysts. I. The adsorption of nitrogen; apparatus and calculation. *Journal of Catalysis*, **3** (1), 32-37.

Full Text: [1960-80\J Cat3, 32.pdf](1960-80/J%20Cat3,%2032.pdf)

Abstract: A new apparatus for measuring complete nitrogen adsorption-desorption isotherms is described, after the guiding considerations have been laid down, The calculation technique is then briefly explained, whereupon the experimental curve, giving the thickness of the adsorbed layer of nitrogen on alumina preparations as a function of relative pressure, has been newly determined (the t curve). It is pointed out which corrections are necessary for older t curves.

Keywords: Adsorption

? Carrà, S., Beltrame, P. and Ragaini, V. (1964), Kinetics of the hydrogen transfer reaction of cyclohexene on palladium powder. *Journal of Catalysis*, **3** (4), 353-362.

Full Text: [1960-80\J Cat3, 353.pdf](1960-80/J%20Cat3,%20353.pdf)

Abstract: The disproportionation of cyclohexene to cyclohexane and benzene has been kinetically followed in tetrahydrofuran solution on palladium powder at 50 ° to 60 °C. The behavior of 1,3-cyclohexadiene under the same conditions has been studied too. Gas chromatography was used for the analytical determinations. The diene is noticeably more reactive than cyclohexene, and has been detected in low concentration in the reaction products from the latter. It is suggested that it is an intermediate of the reaction.

Experimental results of the kinetics of cyclohexene are well accounted for by a second order rate law that takes into account the adsorption of cyclohexene and benzene on the catalyst. The adsorption coefficients for benzene are ca. five times larger than those of cyclohexene. Adsorption heats are 5.2 and 9.3 kcal/mole, respectively, for cyclohexene and benzene from the solution. The activation energy of the reaction is 14 kcal/mole.

Details are given of the application of the steepest descent method for the leastsquares fitting of the kinetic equation to experimental data.

Winter, E.R.S. (1965), The kinetics of adsorption on a nonuniform surface. *Journal of Catalysis*, **4** (2), 134-139.

Full Text: [J\J Cat4, 134.pdf](J/J%20Cat4,%20134.pdf)

Abstract: The Roginsky-Zeldovich-Elovich equations describing the rates of chemisorption of gases onto solid surfaces are adequately accounted for in the case of nondissociative adsorption by assuming a surface consisting of only three to five sets of sites, each set comprising about the same number of sites. The rate constants for the adsorption onto these sets must fall within certain limits but the variation permissible is sufficient to allow appreciable variation between the sets in the activation energy for adsorption. The model can be extended to include a desorption process.

Notes: highly cited

? Lippens, B.C. and de Boer, J.H. (1965), Studies on pore systems in catalysts: V. The *t* method. *Journal of Catalysis*, **4** (3), 319-323.

Full Text: [1960-80\J Cat4, 319.pdf](1960-80/J%20Cat4,%20319.pdf)

Abstract: Valuable information about the specific surface area, the size, and the shapes of pores, the setting in of reversible capillary condensation and of complete filling of pores may be obtained by plotting the experimental volumes of adsorbed nitrogen, *V*a, as a function of the statistical thickness, *t*, of the adsorbed layer, as given in Paper I of this series. The *V*a−*t* plot, together with the experimental adsorption and desorption isotherm gives a very good picture of the whole pore system.

Peers, A.M. (1965), Elovich adsorption kinetics and heterogeneous surface. *Journal of Catalysis*, **4** (4), 499-503.

Full Text: [J\J Cat4, 499.pdf](J/J%20Cat4,%20499.pdf)

Abstract: Earlier treatments of the rate of adsorption on a heterogeneous surface have given results which do not agree with the Elovich equation at very short times. It is shown that the familiar, simple model of a nonuniform surface does, in fact, lead to a rate equation in good agreement with the Elovich equation at very short as well as at very long times. The model gives a physical significance to the constant *t*0 and, when *t*0 is appreciable, leads to Elovich plots having two linear sections. Similar experimental plots can be found. The common assumption that the activation energy for chemisorption increases with the energy of adsorption is incompatible with the model when the energy of chemisorption decreases with coverage and is thus difficult to justify: The apparent justification to be found in earlier treatments of the simple model is shown to be unsound.

Peers, A.M. (1965), The kinetics of adsorption of carbon monoxide hydrogen, and oxygen on finely divided nickel oxide. *Journal of Catalysis*, **4** (6), 672-684.

Full Text: [J\J Cat4, 672.pdf](J/J%20Cat4,%20672.pdf)

Abstract: The adsorption of CO, H2, and O2 on NiO at 25 °C has been studied with a constant-volume system and is found, in all cases, to obey the Elovich equation, with constants α and βwhich are strongly dependent on the initial pressure. In the case of H2 and CO adsorption, α is also sensitive to the presence of excess oxygen irreversibly held at 200 °C. CO adsorption isotherms, however, show no dependence on excess oxygen content. The initial rate of adsorption of hydrogen is found to be proportional to the square root of the pressure, indicating dissociative adsorption with a rate-limiting process involving the hydrogen atom. A brief, critical, review of theoretical interpretations of Elovich kinetics is given. None of these can account for the hydrogen and oxygen adsorption kinetics. The adsorption of CO on stoichiometric (yellow-green) NiO is in satisfactory agreement with the kinetic equation of Sutherland and Winfield for a rate-limiting Knudsen diffusion mechanism.

Notes: highly cited

? Broekhof, J.C. and Deboer, J.H. (1967), Studies on pore systems in catalysts. IX. Calculation of pore distributions from adsorption branch of nitrogen sorption isotherms in case of open cylindrical pores. A. Fundamental equations. *Journal of Catalysis*, **9** (1), 8-14.

Full Text: [1960-80\J Cat9, 8.pdf](1960-80/J%20Cat9,%208.pdf)

Abstract: A study is made of the possible cause for sorption hysteresis in the case of cylindrical pores of uniform diameter, open at both ends. By means of simple thermodynamic reasoning, the equation of Cohan for capillary condensation in open cylinders during adsorption, is shown not to be suitable for quantitative work. After the introduction of the t curve of multimolecular adsorption, a model is given for the occurrence of hysteresis in this special case. From this model, quantitative relations are derived for the spontaneous filling of pores during adsorption, as well as for the evaporation of capillary condensate on desorption, in dependence of the pore radius. The relation between these equations and the work of Foster and Derjaquin is discussed.

Keywords: Adsorption

? Benson, J.E., Ushira, K. and Boudart, M. (1967), Ammonia adsorption on a decationized Y zeolite. *Journal of Catalysis*, **9** (1), 91-94.

Full Text: [1960-80\J Cat9, 91.pdf](1960-80/J%20Cat9,%2091.pdf)

Broekhoff, J.C.P. and De Boer, J.H. (1968), Studies on pore systems in catalysts. XI. Pore distribution calculations from adsorption branch of a nitrogen adsorption isotherm in case of “ink-bottle” type pores. *Journal of Catalysis*, **10** (2), 153-165.

Full Text: [J\J Cat10, 153.pdf](J/J%20Cat10,%20153.pdf)

Abstract: The method of analysis of the adsorption branch of a nitrogen sorption isotherm, as given in Part IX and Part X of this series, is extended to the model of spheroidal cavities. The results of the cumulative calculations are shown to be satisfactory in appropriate cases, provided the necessary corrections for the influence of adsorption are made to the fundamental equations governing adsorption and capillary condensation in spheroidal cavities.

? Broekhof, J.C. and de Boer, J.H. (1968), Studies on pore systems in catalysts. XII. Pore distributions from desorption branch of a nitrogen sorption isotherm in case of cylindrical pores. A. An analysis of capillary evaporation process. *Journal of Catalysis*, **10** (4), 368-376.

Full Text: [J\J Cat10, 368.pdf](J/J%20Cat10,%20368.pdf)

Abstract: A refinement is given of the classical Kelvin equation in pores, which takes into account the influence of adsorption forces on the shape of the liquid-vapor meniscus. It is shown that the curvature of the meniscus is dependent on the distance to the walls of the pores and that taking into account this dependence leads to a different shape of the meniscus from the hemispherical shape generally assumed for cylindrical pores. The influence of adsorption forces on the liquid-vapor equilibrium is shown to result in a stabilizing of the capillary-condensed liquid in the pore, as well as in a mechanism for the evaporation process which is different from that which is based on the application of the classical Kelvin equation in cylindrical pores.

? Broekhof, J.C. and de Boer, J.H. (1968), Studies on pore systems in catalysts. XIII. Pore distributions from desorption branch of a nitrogen sorption isotherm in case of cylindrical pores. B. Applications. *Journal of Catalysis*, **10** (4), 377-390.

Full Text: [J\J Cat10, 377.pdf](J/J%20Cat10,%20377.pdf)

Abstract: Calculations of cylindrical pore distributions from the desorption branch of nitrogen sorption isotherms may be performed with the aid of a corrected form of the Kelvin equation. Quantitative evaluation of the influence of adsorption forces on capillary evaporation from pores in oxydic adsorbents shows that the application of the classical uncorrected Kelvin equation to pore-size determinations from sorption isotherms leads to values for the pore radius which are too small.

The theoretical width of the hysteresis loop for open cylinders is determined as a function of relative pressure. The results of this calculation are applied to the analysis of pore shape from the width of the hysteresis loop.

A comparison is made between the results of pore-size distribution calculations from the desorption branch and those from the adsorption branch as calculated according to a method discussed in a preceding part of this series. In appropriate cases, there is a fair agreement between both methods.

? Broekhof, J.C. and de Boer, J.H. (1968), Studies on pore systems in catalysts. XIV. Calculation of cumulative distribution functions for slit-shaped pores from desorption branch of a nitrogen sorption isotherm. *Journal of Catalysis*, **10** (4), 391-400.

Full Text: [J\J Cat10, 391.pdf](J/J%20Cat10,%20391.pdf)

Abstract: The influence of adsorption on capillary evaporation of nitrogen from slit-shaped pores is discussed quantitatively. Thermodynamic reasoning results in a correction to the classical Kelvin equation, similar to that discussed by Derjaguin. The connection between contact angle and capillary evaporation is discussed. It is shown that, except for very wide pores, liquids exhibiting contact angles with the solid adsorbent surface are not suitable for pore distribution analysis from vapor sorption data. The application of the corrected Kelvin equation to the calculation of pore-size distribution functions from nitrogen sorption isotherms is discussed. Examples show the proposed method to load to satisfactory results in practice.

Kolboe, S. (1969), Kinetics of dehydrogenation of isopropyl alcohol over a zinc oxide catalyst: Consistency with the adsorption function of isopropyl alcohol on zinc oxide. *Journal of Catalysis*, **13** (2), 208-214.

Full Text: [J\J Cat13, 208.pdf](J/J%20Cat13,%20208.pdf)

Abstract: The rate of dehydrogenation of isopropyl alcohol over a zinc oxide catalyst has been measured at 158–195 °C, at an isopropyl alcohol pressure range of 0.03–100 torr.

The rate measurements have been tested for consistency with a previously determined adsorption function of isopropyl alcohol on zinc oxide. The adsorption function assumes Langmuir adsorption on a heterogeneous surface with five sets of adsorbing sites.

The corresponding kinetic equation could be well fitted to the experimental rates using a suitable set of rate constants and activation energies, but using the previously determined adsorption function directly. In the experimental range which covered a factor of more than 3000 in isopropyl alcohol pressure and a factor in reaction rates of 170 the mean deviation between observed and calculated rates was less than 6%. The results are therefore an indication that a previously proposed model, assuming that a heterogeneously catalyzed reaction may take place on more than one set of active centers on the catalyst, is correct.

Otto, K. and Shelef, M. (1969), The adsorption of nitric oxide on chromia supported on alumina. *Journal of Catalysis*, **14** (3), 226-237.

Full Text: [J\J Cat14, 226.pdf](J/J%20Cat14,%20226.pdf)

Abstract: Adsorptive properties of chromia supported on alumina have been studied with an electrobalance for NO as an adsorbate. Isotherms are presented in the range from −78 ° to 150 °C for both an oxidized and a reduced surface. The isotherms are of the Freundlich type at pressures between 0.1 and 300 torr. Maximum coverage corresponds to approximately one molecule of NO per atom of chromium in the surface. The adsorption of NO can therefore be used to assess the actual chromia surface in the presence of a support material. Changes in pressure and temperature influence the coverage on an oxidized surface more strongly than on a reduced surface.

Kinetic measurements at constant temperature and pressure show a significant difference between an oxidized and a reduced chromia surface. In the first case a uniform decrease of the adsorption rate with time is observed, while in the second case a fast initial adsorption is followed by a much slower process, indicated by a sharp break in the corresponding Elovich curves. The kinetic parameters as well are influenced by temperature more strongly for the oxidized than for the reduced state.

An attempt is made to relate these chemisorption results to the catalytic behavior of supported chromia for the reduction of NO.

Baker, B.G. and Lawson, A. (1970), Chemisorption of xenon and fluorine on nickel and palladium. *Journal of Catalysis*, **16** (1), 108-116.

Full Text: [J\J Cat16, 108.pdf](J/J%20Cat16,%20108.pdf)

Abstract: A radiotracer technique was used to study the adsorption of xenon in the presence of fluorine on nickel and palladium foils. Isotherms measured at temperatures of 243–373 °K showed that xenon was adsorbed. Examination of the surfaces by electron microscopy showed that the presence of xenon markedly influences the attack of fluorine on the metal. It is suggested that xenon is chemically bound to fluorine in the absorbed state, and that this constitutes the intermediate in the catalyic formation of xenon difluoride.

McLintock, I.S. (1970), Comments on the Elovich equation. *Journal of Catalysis*, **16** (1), 126-128.

Full Text: [J\J Cat16, 126.pdf](J/J%20Cat16,%20126.pdf)

Tanaka, M. and Ogasawara, S. (1970), *n*-Butene isomerization on HCl-treated alumina. *Journal of Catalysis*, **16** (2), 164-172.

Full Text: [J\J Cat16, 164.pdf](J/J%20Cat16,%20164.pdf)

Abstract: Interconversion of *n*-butene was studied on HCI-treated alumina by using both closed circulation system and microcatalytic technique. In former experiments, the reaction rate obeyed the Elovich equation and the stereoselectivity to *cis*-2-butene on 1-butene isomerization was much higher than the selectivity to *trans*-2-butene. In later experiments, active sites were blocked by the irreversible adsorption of butenes. On the deuterated catalyst, D atoms transferred from the surface were mainly found in the product butenes. However, the concentration of deutero products was much lower than that estimated by considering that the active sites were only Brönsted type. It is concluded from all results obtained that the isomerization proceeds directly on Lewis acid sites and Brönsted acid sites which were produced by adsorbed HCl rather than on butene “residue”.

Massoth, E.E. and Bidlack, D.L. (1970), Sulfiding of tungsten oxide supported on silica-alumina. *Journal of Catalysis*, **16** (3), 303-315.

Full Text: [J\J Cat16, 303.pdf](J/J%20Cat16,%20303.pdf)

Abstract: Tungsten trioxide supported on silica-alumina was sulfided with mixtures of hydrogen sulfide and hydrogen at temperatures between 500 and 1100 °F and hydrogen sulfide partial pressure of 0.1–5 atm. Kinetic data were correlated with a logarithmic-type growth law, which accounts for the rather flat percentage sulfur versus time profiles. Rates were proportional to the square root of the hydrogen sulfide partial pressure. The apparent activation energy for sulfidation was 36 kcal/mole of W. Studies of partially reacted samples showed the sulfided species to be WS2 and the unconverted oxide to be W20O58, suggesting that partial reduction precedes sulfidation. Evidence is advanced to support a pore-blocking model for the sulfidation. Differences in reactivity of bulk compared to supported tungsten trioxide are discussed.

Setínek, K. and Beránek, L. (1971), Kinetics and adsorption on acid catalysts. I. Gas-phase reesterification of esters with alcohols on sulfonated ion exchanger. *Journal of Catalysis*, **17** (3), 306-314.

Full Text: [J\J Cat17, 306.pdf](J/J%20Cat17,%20306.pdf)

Abstract: Kinetics of the reesterification of ethyl acetate with methanol, 1-propanol, and 2, 2-dimethylpropanol and of ethyl formate and ethyl isobutyrate with 1-propanol was investigated. The reaction was carried out at 120 °C in gaseous phase using sulfonated styrene-divinylbenzene copolymer as catalyst. The results of kinetic analysis performed by means of the method of initial reaction rates as well as confrontation with the mechanisms accepted for similar reactions in solutions show that the reaction proceeds by a bimolecular mechanism, both reaction components being adsorbed on the surface of the catalyst. The constancy of adsorption coefficients of ethyl acetate or 1-propanol determined by kinetic analysis of their reactions with series of substances of different reactivity indicates that physical meaning can be ascribed to these coefficients.

Otto, K. and Shelef, M. (1970), The adsorption of nitric oxide on iron oxides. *Journal of Catalysis*, **18** (2), 184-192.

Full Text: [J\J Cat18, 184.pdf](J/J%20Cat18,%20184.pdf)

Abstract: Adsorption isotherms and rates were measured for NO chemisorption on supported and unsupported samples of Fe2O3 and Fe3O4 in the 26–150 °C temperature range. The adsorption behavior is well described by Freundlich isotherms in the pressure range from 1 to 200 Torr. Monolayer coverage is attained at 500 Torr for the reduced samples and at 25000 (by extrapolation) on the oxidized samples.

Kinetic measurements were evaluated using the Elovich equation. These plots were monotonic in the case of supported Fe2O3 and showed a sharp discontinuity in the case of supported Fe3O4 at θ = 0.5.

A close parallelism is noted with previously studied chemisorption behavior on reduced and oxidized supported chromium oxide.

Bhattacharyya, S.K. and Mahanti, P. (1971), Studies on kinetics of chemisorption of oxygen and electrical conductivity changes on vanadium pentoxide catalysts. *Journal of Catalysis*, **20** (1), 10-18.

Full Text: [J\J Cat20, 10.pdf](J/J%20Cat20,%2010.pdf)

Abstract: Vanadium pentoxide prepared by the decomposition of vanadyl oxalate (catalyst I) has been reported by Bhattacharyya and co-workers to have better catalytic activity for certain oxidation reactions than the one prepared by the decomposition of ammonium metavanadate (catalyst II). The kinetics of chemisorption of oxygen and the accompanying changes of electrical conductivity have now been studied on V2O5 prepared by the two different methods.

The oxygen chemisorption kinetics in the temperature range 100–400 °C could be well described by the Elovich equation. The rate and amount of oxygen adsorbed on catalyst I was almost double that on catalyst II. A decrease in electrical conductivity with increasing oxygen pressure was noted for both catalysts. However, the rate of decrease of conductivity, under similar conditions, was always more for catalyst I. These observations can probably be related to the greater activity of catalyst I.

Lefrancois, M. and Malbois, G. (1971), The nature of the acidic sites on mordenite characterization of adsorbed pyridine and water by infrared study. *Journal of Catalysis*, **20** (3), 350-358.

Full Text: [J\J Cat20, 350.pdf](J/J%20Cat20,%20350.pdf)

Abstract: The infrared spectrum of pyridine adsorbed on mordenite H+ and exchanged with different cations has been studied at high temperature. Three types of acid sites have been observed. The H+—or incompletely cationized—samples have both Lewis and Brönsted acidities, the Lewis acidity being present even at moderate temperature. A rise in temperature promotes the Lewis acidity while the addition of water completely changes the Lewis acidity into Brönsted acidity. The completely cationized mordenite samples have, besides the Lewis acidity, a third type of acidity which fixes pyridine by a strong hydrogen bond. On these samples, the Brönsted acidity is not present. The strongly cationized mordenite H+ samples have the three types of acid sites. Heavy water has been used for studying the conversion of Lewis sites into Brönsted sites.

Narayana, S. and Yeddanap, L.M. (1971), Kinetics of hydrogen adsorption on nickel-alumina catalysts. *Journal of Catalysis*, **21** (3), 356-365.

Full Text: [J\J Cat21, 356.pdf](J/J%20Cat21,%20356.pdf)

Abstract: Kinetics of hydrogen chemisorption on four coprecipitated nickel-alumina catalysts have been studied at a variety of temperatures and pressures. The Elovich equation has been used to analyze the experimental results. The Elovich parameters obtained at different temperature and pressure regions are arranged according to the multiple kinetic stages hypothesis by Low and a plausible explanation on the nature of the active sites on nickel-alumina catalysts for hydrogen chemisorption is given.

Gandhi, H.S.and Shelef, M. (1972), The adsorption of nitric oxide and carbon monoxide on nickel oxide. *Journal of Catalysis*, **24** (2), 241-249.

Full Text: [J\J Cat24, 241.pdf](J/J%20Cat24,%20241.pdf)

Abstract: Adsorption isotherms and rates for NO and CO chemisorption were measured on supported and unsupported nickel oxide samples in the 0–140 °C temperature range. The isotherms are of the Freundlich type in the pressure range from 1 to 125 Torr. Monolayer coverage is attained at 110 Torr for the NO adsorption and at 530 Torr for the CO adsorption. The uptake at monolayer coverage in CO adsorption is ~30% smaller than the corresponding NO amount, indicating that about 1/3 of the adsorbed CO molecules are present in the bridged form. Similarly to the previously studied oxide adsorbents, there is a 1:1 correspondence between adsorbed NO molecules and Ni atoms on the surface.

The chemisorption rate of both adsorbates is described by the Elovich plots. These are more complex for CO than for NO. In the investigated temperature range, the rate of chemisorption and the heat of chemisorption are higher for NO than for CO. The rates of NO chemisorption for the transition metal oxides studied so far are in the order: iron oxide > chromium oxide > nickel oxide.

Jonas, L.A. and Svirbely, W.J. (1972), The kinetics of adsorption of carbon tetrachloride and chloroform from air mixtures by activated carbon. *Journal of Catalysis*, **24** (3), 446-459.

Full Text: [J\J Cat24, 446.pdf](J/J%20Cat24,%20446.pdf)

Abstract: The kinetics of gas adsorption were studied in an air flow apparatus using CCl4 and CHCl3 as the adsorbate vapors and activated carbon as the adsorbent. Five fractions of uniformly activated carbon granules, in size ranges of 0.130 to 0.036 cm diam, were packed in glass columns to various bed depths and weights, and subjected at several temperatures to a 0.1 relative pressure of the adsorbate vapor at various fixed flow velocities. On plotting the ratio of exit to inlet vapor concentrations against time, sigmoid shaped curves were obtained at all flow rates, carbon weights, and granule diameters. Vapor breakthrough of the bed was taken as the time when 1% of the inlet concentration appeared in the exit flow stream, (*Cx*/*C*0) = 0.01.

The Wheeler adsorption equation was used to analyze the experimental data for a fixed temperature at this breakthrough time (*tb*). The adsorption rate constant at this breakthrough time was first order with respect to gas molecules and essentially independent of carbon granule diameters. The values were 4000 min−1 and 7255 min−1 at 25 °C for CCl4 and CHCl3, respectively.

The sigmoid curve for the complete breakthrough of CCl4 was found to contain three adsorption rate constants. The pseudo first-order constant was operative when the concentration of active sites was much larger than the concentration of gas molecules (0 < *Cx*/*C*0 < 0.04); a second-order rate constant was operative when active sites and concentrations of gas molecules were both affecting the rate (0.04 < *Cx*/*C*0 < 0.65); and a pseudo first-order rate constant with respect to active sites when the concentration of gas molecules was much greater than active sites (0.65 < *Cx*/*C*0 < 0.95). Arguments are advanced to explain the variation of the rate constants between large and small carbon granules in terms of a combined mechanism which involves internal diffusion and surface adsorption.

Turner, N.H. (1975), Kinetics of chemisorption: An examination of the Elovich equation. *Journal of Catalysis*, **36** (3), 262-265.

Full Text: [J\J Cat36, 262.pdf](J/J%20Cat36,%20262.pdf)

Weinberg, W.H., Comrie, C.M. and Lambert, R.M. (1976), The kinetics of adsorption of CO on group VIII transition metals. *Journal of Catalysis*, **41** (3), 489-493.

Full Text: [J\J Cat41, 489.pdf](J/J%20Cat41,%20489.pdf)

Kuiper, A.E.T., Van Bokhoven, J.J.G.M. and Medema, J. (1976), The role of heterogeneity in kinetics of a surface reaction. I. Infrared characterization of adsorption structures of organophosphonates and their decomposition. *Journal of Catalysis*, **43** (1-3), 154-167.

Full Text: [J\J Cat43, 154.pdf](J/J%20Cat43,%20154.pdf)

Abstract: Infrared investigation shows that isopropyl methylphosphonofluoridate (sarin) is strongly adsorbed on γ-alumina via its phosphoryl oxygen. Two decomposition reactions are observed: either propene is liberated as a result of dealkylation of the adsorbed species or the P---F bond is hydrolyzed. Fluorine released in the latter reaction is also adsorbed; the remaining phosphorus compound is bonded to the surface via its POO grouping. The hydrolysis reaction, which is the predominant process, is activated by basic surface sites. Water accelerates this reaction. The surface is inactivated by adsorption of HF. The hydrolysis proceeds considerably faster over magnesium oxide.

Notes: highly cited

? Chang, C.D. and Silvestri, A.J. (1977), Conversion of methanol and other o-compounds to hydrocarbons over zeolite catalysts. *Journal of Catalysis*, **47** (2), 249-259.

Full Text: [1960-80\J Cat47, 249.pdf](1960-80/J%20Cat47,%20249.pdf)

Abstract: The conversion of methanol and other O-compounds to CrClo hydrocarbons using a new class of shape-selective zeolites is reported. Methanol, dimethyl ether, or an equilibrium mixture thereof appears to be converted in a first reaction sequence to olefins predominantly in the C-G, range. In the final steps of the reaction path, the C&G, olefins are converted to paraffins, aromafics, cycloparaffins and Ce+ olefins. The final hydrocarbons are largely in the gasoline(C4-Cla) boiling range. The thermochemistry of the methanol to hydrocarbon reaction is described and possible reaction mechanisms are discussed.

Frennet, A., Lienard, G., Crucq, A. and Degols, L. (1978), Effect of multiple sites and competition in adsorption on kinetics of reactions catalyzed by metals. *Journal of Catalysis*, **53** (1), 150-163.

Full Text: [J\J Cat53, 150.pdf](J/J%20Cat53,%20150.pdf)

Abstract: A model is developed that expresses the adsorption rate (Ra) of saturated hydrocarbons in terms of competition for chemisorption on the same “potential sites” on metal surfaces. The “active site for hydrocarbon chemisorption” is defined as a patch of Z first neighbor free “potential sites.” The potential sites are likened to the H chemisorption site. The association of these factors enables one to express Ra as proportional to the fraction of free potential sites (θS), at a power equal to Z, and thus to relate Ra to the coverages of adsorbed species. The introduction of numerical values for the coverages predicts large variations both of the adsorption rate Ra (several powers of 10), the orders of reaction (from highly negative up to positive values), and the temperature factor (up to several tens of kcal/mole). The shape of the variations is analyzed, on rhodium, using the H2 experimental adsorption isotherms. Emphasis is on the use of the isotopic exchange rate as a means to measure the adsorption rate, at adsorption-desorption equilibrium. From the results in the literature and those obtained in this laboratory for the CH4-D2 exchange on Rh, in a pressure range extending over more than three powers of 10, a good agreement is obtained between the experimental values of the order α versus the D2 pressure (varying from 0 to −1.2) and the calculated values using a single Z value of 7. In the same way, the temperature factor is analyzed.

? Solymosi, F. and Kiss, J. (1978), Adsorption and reduction of NO on tin(IV) oxide doped with chromium(III) oxide. *Journal of Catalysis*, **54** (1), 42-51.

Full Text: [J\J Cat54, 42.pdf](J/J%20Cat54,%2042.pdf)

Abstract: Rates for NO chemisorption were measured on SnO2 containing small amounts of Cr2O3. Evaluation of the NO chemisorption rate was done by the Elovich equation. Very large increases in the rate and amount of adsorbed NO were obtained by adding 1% Cr2O3 to SnO2. It was found that preadsorbed NO promotes the adsorption of CO. Analyses of the gas-phase during the adsorption and thermal desorption measurements indicated that the extent of the dissociative adsorption of NO was greatly enhanced by adding Cr2O3 to SnO2. The catalytic reduction of NO with CO on pure SnO2 proceeded with reproducible rates and complete conversion only above 360 °C. Catalytic reaction was detected below 200 °C as well. The conversion of NO, however, was much less and the surface very soon became poisoned by CO. A marked increase in the efficiency of the catalyst was experienced when a small amount of Cr2O3 was incorporated into the SnO2. The reduction of NO with CO occurred with a complete conversion and well-measurable rates at 150–220 °C. CO exerted no poisoning effect at all. The high activity of SnO2 containing Cr2O3 is attributed to the chromium ions located in the surface layer of SnO2, which can easily be oxidized by NO and rapidly reduced by CO. A possible mechanism of the catalytic reduction of NO is discussed.

Aldag, A.W. and Clark, A. (1978), On the interpretation of apparent heats of adsorption from kinetics for a nonuniform surface. *Journal of Catalysis*, **54** (1), 98-101.

Full Text: [J\J Cat54, 98.pdf](J/J%20Cat54,%2098.pdf)

Notes: highly cited

? Chang, C.D., Lang, W.H. and Smith, R.L. (1979), Conversion of methanol and other o-compounds to hydrocarbons over zeolite catalysts. II. Pressure effects. *Journal of Catalysis*, **56** (2), 169-173.

Full Text: [1960-80\J Cat56, 169.pdf](1960-80/J%20Cat56,%20169.pdf)

Abstract: The effect of pressure on the conversion of methanol to hydrocarbons over ZSM-5 class zeolites is reported. Varying reactant partial pressure affects mainly the relative rates of the dehydration and aromatization steps in the reaction sequence.

? Lee, P.I. and Schwarz, J.A. (1982), Adsorption-desorption kinetics of H2 from supported nickel catalysts. *Journal of Catalysis*, **73** (2), 272-287.

Full Text: [1982\J Cat73, 272.pdf](1982/J%20Cat73,%20272.pdf)

Abstract: The adsorption-desorption interactions of hydrogen from a nickel-supported silica catalyst were studied by pulsed chemisorption and temperature-programmed desorption (TPD) techniques incorporating on-line mass spectrometric detection in a flow system. Pulsed chemisorption results of the metal surface area agree with results from more conventional static measurements. A combination of pressure pulse analysis and flow rate variation allowed the adsorption kinetics to be determined as (1 − θ)2, where θ is the fractional coverage. The activation energy for adsorption, *E*a, is nearly zero. TPD spectra showed a general trend of second-order desorption kinetics with a shift in peak temperature to lower temperatures as the coverage was increased. After experimentally eliminating all transport considerations which would have caused shaping of the spectra, a self-consistent analysis of the desorption rate isotherms, characteristic plots, and lineshapes of the spectra led to the conclusion that free readsorption of hydrogen dominated during the desorption. The activation energy, *E*d, is 89 kJ/mole at low coverage and 55 kJ/mole at higher coverages. The falloff in *E*d with θ occurs at a critical coverage which is strongly dependent on the sample weight. When the role of readsorption was clarified and provided that the catalyst bed length approached “differential bed” requirements, the variation in the activation energy with coverage agreed quantitatively with results obtained from single-crystal experiments. The compensation effect in the desorption rate constant was also observed.

Toolenaar, F.J.C.M., Bastein, A.G.T.M. and Ponec, V. (1983), The effect of particle-size in the adsorption of carbon-monoxide on iridium: An infrared investigation. *Journal of Catalysis*, **82** (1), 35-44.

Full Text: [J\J Cat82, 35.pdf](J/J%20Cat82,%2035.pdf)

Abstract: The effect of a varying particle size on the infrared absorption band frequency of CO adsorbed on Ir/Al2O3 has been investigated. The experimentally observed increase of the frequency with increasing particle size is ascribed to a weaker electron exchange of CO with the metal. This picture is confirmed by hydrogen and carbon monoxide adsorption measurements. By use of the isotopic dilution method, other possible effects, such as a varying dipole-dipole coupling, an electronic influence of the carrier, or electronic structure changes due to a varying metal particle size, could be discarded as possible explanations.

Yitzhaki, D. and Aharoni, C. (1987), Kinetics and mechanism of catalytic hydrodesulfurization of gas oil: Adsorption and hydrogenation of the sulfur-compounds. *Journal of Catalysis*, **107** (2), 255-262.

Full Text: [J\J Cat107, 255.pdf](J/J%20Cat107,%20255.pdf)

Abstract: Sulfur compounds contained in gas oil were adsorbed on hydrodesulfurization catalysts containing Ni and Mo, or one of these metals, at temperatures between 420 and 650 K and pressures of 20 MPa. In runs performed with a limited amount of gas oil and excess adsorbent during 4 h, the extent of sulfur removal increases with the temperature and is determined by the rate of adsorption of the slowly adsorbed species. Some of the compounds adsorbed at low temperatures are desorbed at higher temperatures without decomposition and formation of H2S, but when the temperature is raised further they are desorbed with the formation of H2S. The nickel in the Ni---Mo catalyst does not promote the adsorption of the sulfur compounds but it inhibits cracking and other hydrocarbon reactions.

Notes: highly cited

? Haruta, M., Yamada, N., Kobayashi, T. and Iijima, S. (1989), Gold catalysts prepared by coprecipitation for low-temperature oxidation of hydrogen and of carbon-monoxide. *Journal of Catalysis*, **115** (2), 301-309.

Full Text: [1989\J Cat115, 301.pdf](1989/J%20Cat115,%20301.pdf)

Abstract: Novel gold catalysts were prepared by coprecipitation from an aqueous solution of HAuCl4 and the nitrates of various transition metals. Calcination of the coprecipitates in air at 400°C produced ultrafine gold particles smaller than 10 nm which were uniformly dispersed on the transition metal oxides. Among them, Au/α-Fe2O3, Au/Co3O4, and Au/NiO were highly active for H2 and CO oxidation, showing markedly enhanced catalytic activities due to the combined effect of gold and the transition metal oxides. For the oxidation of CO they were active even at a temperature as low as -70 °C.

Notes: highly cited

? Turchi, C.S. and Ollis, D.F. (1990), Photocatalytic degradation of organic-water contaminants: Mechanisms involving hydroxyl radical attack. *Journal of Catalysis*, **122** (1), 178-192.

Full Text: [1990\J Cat122, 178.pdf](1990/J%20Cat122,%20178.pdf)

Abstract: Hydroxyl and other oxygen-containing radicals are known to be present during the degradation of organic water pollutants in illuminated TiO2 photocatalyst slurries. It is proposed that the hydroxyl radical, OH·, is the primary oxidant in the photocatalytic system. Four possible mechanisms are suggested, all based on OH· attack of the organic reactant. The cases of reaction on the surface, in the fluid, and via a Rideal mechanism are shown to yield expressions similar to Langmuir-Hinshelwood (L---H) rate forms. Compared with traditional L---H constants, the derived kinetic parameters represent fundamentally different reactions and properties. A rate parameter independent of organic reactant is predicted by the model and substantiated by experimental degradation data. On the basis of these model results, the kinetic parameters for the photocatalytic degradation may be estimated from data on the photocatalyst’s physical properties, the knowledge of electron-hole recombination and trapping rates, and the values of second-order reaction rate constants for hydroxyl radicals.

Keywords: State

Notes: highly cited

? Haruta, M., Tsubota, S., Kobayashi, T., Kageyama, H., Genet, M.J. and Delmon, B. (1993), Low-temperature oxidation of Co over gold supported on TiO2, α-Fe2O3, and Co3O4. *Journal of Catalysis*, **144** (1), 175-192.

Full Text: [1993\J Cat144, 175.pdf](1993/J%20Cat144,%20175.pdf)

Abstract: Gold can be highly dispersed on a variety of metal oxides by coprecipitation and deposition-precipitation followed by calcination in air. The small gold particles are hemispherical in shape and stabilized by epitaxial contact, dislocations, or contact with an amorphous oxide layer. Such supported gold differs in catalytic nature from unsupported gold particles and exhibits high catalytic activities for low-temperature oxidation of CO. Especially, gold supported on TiO2, α-Fe2O3, Co3O4, NiO, Be(OH)2, and Mg(OH)2 is very active even at temperatures below 0°C. Among the gold catalysts supported on TiO2, α-Fe2O3, and Co3O4 the turnover frequencies for CO oxidation per surface gold atom are almost independent of the kind of support oxides used and increase sharply with a decrease in diameter of gold particles below 4 nm. Small gold particles not only provide the sites for the reversible adsorption of CO but also appreciably increase the amount of oxygen adsorbed on the support oxides. In the temperature range -10 to 65°C, the activation energies for CO oxidation were 8.2 kcal/mol (Au/TiO2), 8.4 kcal/mol (Au/α-Fe2O3), and 3.9 kcal/mol (Au/Co3O4). The rate of CO oxidation is zero order with respect to CO for the three catalysts, and 0.2-0.3 for Au/TiO2 and Au/Co3O4 and zero order for Au/α-Fe2O3 with respect to O2. By taking into consideration TPD and FT-IR data, a mechanism is proposed in which CO adsorbed on gold particles migrates toward the perimeter on support oxides and there it reacts with adsorbed oxygen to form bidentate carbonate species. The decomposition of the carbonate intermediate is considered to be rate-determining.

Keywords: Behavior, Carbon-Monoxide, Catalytic Properties, CO2-Laser, Hydrogenation, Mechanism, Oxide, Particle-Size, Performance, Pretreatment

Notes: highly cited

? Chen, L.Y., Lin, L.W., Xu, Z.S., Li, X.S. and Zhang, T. (1995), Dehydro-oligomerization of methane to ethylene and aromatics over molybdenum/hzsm-5 catalyst. *Journal of Catalysis*, **157** (1), 190-200.

Full Text: [1995\J Cat157, 190.pdf](1995/J%20Cat157,%20190.pdf)

Abstract: The structures of Mo/HZSM-5 catalysts with various molybdenum loadings were studied by means of XRD, IR, UV diffuse reflectance spectroscopy, TPR, and ammonia adsorption and desorption measurements. Both the BET surface areas and the acidities of catalysts decrease with an increase in molybdenum loading in the catalyst. The threshold of a monolayer dispersion of molybdenum is about 5 g of molybdenum per 100 g of HZSM-5 zeolite. Methane conversion under nonoxidizing conditions over Mo/HZSM-5 catalyst was tested. It was found that the catalyst with a molybdenum loading of 2-3 wt% exhibits optimum activity for the dehydro-oligomerization of methane to aromatics. Modifications of the 2% Mo/HZSM-5 catalyst with lithium or phosphorus cause a decrease in the acidity of the catalyst as well as in the catalyst activity. Addition of lithium shifts the selectivity toward ethylene at the expense of the yield of benzene. It is also demonstrated that the molybdenum oxide species are partially reduced by methane during the reaction. The removable lattice oxygen of molybdenum oxide oxidized adsorbed CHx species to CO, which results in a side reaction to the catalytic oligomerization of methane to aromatics. The diminution of acidity of the catalyst and the blockage of the channels of HZSM-5 zeolite due to deposited carbon may be the main reasons for the deactivation of the catalyst. The methane oligomerization reaction is proposed to be catalyzed by molybdenum species located in the zeolite channels together with the Bronsted acid sites of HZSM-5 zeolite. A synergistic effect between these two kinds of centers plays an important role in the catalysis of the title reaction. Ethylene is identified to be a primary product while benzene is a final product in the dehydro-oligomerization reaction of methane. (C) 1995 Academic Press, Inc.

Keywords: Ray Photoelectron-Spectroscopy, Higher Hydrocarbons, Partial Oxidation, Zeolites, Alumina, Molybdena, Oxide

Chuang, C.C., Wu, W.C., Huang, M.C., Huang, I.C. and Lin, J.L. (1999), FTIR study of adsorption and reactions of methyl formate on powdered TiO2. *Journal of Catalysis*, **185** (2), 423-434.

Full Text: [J\J Cat185, 423.pdf](J/J%20Cat185,%20423.pdf)

Abstract: Adsorption, thermochemistry, and photochemistry of methyl formate on powdered TiO2 have been studied by Fourier-transformed infrared spectroscopy. Methyl formate is adsorbed on the TiO2 surface in two forms. One is molecularly adsorbed methyl formate showing a red-shifted carbonyl stretching. The other is a structure-reorganized species showing absorption bands at 2841, 2866, and 2942 cm-1 in the CHx stretching region. An orthoester-type intermediate is proposed to explain the observed infrared absorption bands. In the thermal reactions, all the detected carbon-containing gas products are derived from CH3O(a) and HCOO(a), which are generated as surface intermediates in the process of methyl formate decomposition. In methyl formate photochemistry, both O2 and TiO2 are essential. The origins of the gas products relating to the adsorbed species are also discussed. (C) 1999 Academic Press.

Keywords: FTIR, Methyl Formate, TiO2, Adsorption, pHotochemistry, Porous Vycor Glass, Formic-Acid, Zinc-Oxide, Spectroscopic Characterization, pHotocatalytic Oxidation, Surfaces, Oxygen, Catalysts, Methanol, Copper

Notes: highly cited

? Maira, A.J., Yeung, K.L., Lee, C.Y., Yue, P.L. and Chan, C.K. (2000), Size effects in gas-phase photo-oxidation of trichloroethylene using nanometer-sized TiO2 catalysts. *Journal of Catalysis*, **192** (1), 185-196.

Full Text: [2000\J Cat192, 185.pdf](2000/J%20Cat192,%20185.pdf)

Abstract: TiO2 catalysts were prepared by using a modified sol-gel technique and were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM), and N2 physi-adsorption methods. The effects of different synthesis parameters on the size and morphology of the TiO2 particles were investigated. A method for obtaining TiO2 with different primary and secondary particle sizes was developed. By changing the water concentration during the hydrolysis of titanium isopropoxide, amorphous titania gel spheres of well-defined morphology and particle size were prepared. These gel spheres define the secondary particle or aggregate size. Following controlled thermal and hydrothermal treatments the primary TiO2 particles (anatase) were formed from the gel spheres without alteration of the aggregate size and shape, Anatase TiO2 catalysts with crystal size of 2.3-30 nm and aggregate size of 100-900 nm were prepared for the gas-phase photo-oxidation of trichloroethylene (TCE), The catalyst performance for TCE degradation exhibited strong dependence on both primary and secondary particle sizes of TiO2, (C) 2000 Academic Press.

Keywords: Nanostructured Catalyst, Titanium Dioxide, Photocatalysis, Volatile Organic Compounds, Trichloroethylene, Sol-Gel Method, Heterogeneous Photocatalytic Oxidation, Titanium-Dioxide, Particle-Size, Nanocrystalline Titania, Hydrolysis, Powders, Degradation, Alkoxide, Ethanol, Air

Notes: highly cited

? Xu, A.W., Gao, Y. and Liu, H.Q. (2002), The preparation, characterization, and their photocatalytic activities of rare-earth-doped TiO2 nanoparticles. *Journal of Catalysis*, **207** (2), 151-157.

Full Text: [2002\J Cat207, 151.pdf](2002/J%20Cat207,%20151.pdf)

Abstract: RE/TiO2 photocatalysts were prepared by the sol-gel method using rare earth (RE = La3+, Ce3+, Er3+, Pr3+, Gd3+, Nd3+, Sm3+) metal salts and tetra-n-butyl titanate as precursors, and were characterized by XRD, IR, UV-vis diffuse reflection, and transient absorption spectra. Their photocatalytic activities were evaluated using nitrite as a decomposition objective. As a result, suitable content of doping rare earth in TiO2 can efficiently extend the light absorption properties to the visible region. At the same time, it is beneficial to NO2- adsorption over the catalysts due to rare earth doping. RE/TiO2 samples can enhance the photocatalytic activity to some extent as compared with naked TiO2. The increase in photoactivity is probably due to the higher adsorption, red shifts to a longer wavelength, and the increase in the interfacial electron transfer rate. Nitrite is almost completely degraded over RE/TiO2 catalysts after longer irradiation, which is different from Degussa P-25 with a plateau of activity after ca. 20 min irradiation. Gd3+-doped TiO2 showed the highest reaction activity among all concerned RE-doped samples because of its specific characteristics. The amount of RE doping was an important factor affecting photocatalytic activity; the optimum amount of RE doping is ca. 0.5 wt%, at which each RE/TiO2 sample shows the most reactivity. The photocatalytic degradation reaction of nitrite over Gd3+-doped samples and P-25 follows apparent first order kinetics, which is different from that of Sm3+, Ce3+, Er3+, Pr3+, La3+, and Nd3+-doped TiO2 catalysts, which obey zero-order kinetics, indicating that these processes were dominated by electron-hole recombination. (C) 2002 Elsevier Science (USA).

Keywords: Rare Earth Ions, TiO2, Sol-Gel Method, Photocatalytic Oxidation, Nitrite, Titanium-Dioxide, Dinitrogen Photoreduction, Recombination Dynamics, Thin-Films, Oxidation, Air, Photodegradation, Degradation, Acetone, Anatase

Ros, T.G., Keller, D.E., van Dillen. A.J., Geus, J.W. and Koningsberger, D.C. (2002), Preparation and activity of small rhodium metal particles on fishbone carbon nanofibres. *Journal of Catalysis*, **211** (1), 85-102.

Full Text: [J\J Cat211, 85.pdf](J/J%20Cat211,%2085.pdf)

Abstract: A number of different impregnation and ion-exchange procedures have been employed to synthesize very small rhodium metal particles on HNO3/H2SO4-oxidized fishbone carbon nanofibres. The surface-oxidation of the nanofibres with HNO3/H2SO4 is a prerequisite for a good interaction between aqueous catalyst precursor solutions and the fibres. Depending upon the preparation technique applied and using 1 wt% rhodium metal loadings average particle sizes ranging from 1.1 to 2.1 nm were detected with XAFS spectroscopy. The rhodium metal particles are so small that metal-support interactions on carbon nanofibres can be investigated with XAFS spectroscopy. All catalysts are highly active in the liquid-phase hydrogenation of cyclohexene. No significant effect of particle size on the catalytic activity is observed, suggesting that other factors, such as clustering of the support particles in the liquid phase, are much more important. (C) 2002 Elsevier Science (USA).

Keywords: Carbon Nanofibres, Exafs Spectroscopy, Heterogeneous Catalysis, Hydrogenation, Rhodium Metal Particles, Absorption Fine-Structure, Supported Nickel Particles, Liquid-Phase Reaction, Xafs Spectroscopy, Catalytic Behavior, Hydrogenation, Palladium, Cyclohexene, Adsorption, Nanotubes

Stone, F.S. (2003), Research Perspectives during 40 Years of the *Journal of Catalysis*. *Journal of Catalysis*, **216** (1-2), 2-11.

Full Text: [J\J Cat216, 2.pdf](J/J%20Cat216,%202.pdf)

Abstract: Research developments recorded in the *Journal of Catalysis* over the past 40 years are reviewed. The journal was launched at a propitious time, as is made clear from the accounts presented of various topics newly introduced in the 1960s, which laid the foundation for achievements to come later, notably in catalysis by zeolites but also in reactions catalyzed by metals and transition metal oxides. The early years are shown to have been followed by a period marked by the skilled application of new experimental techniques, especially spectroscopic methods for catalyst characterization and chemisorption. Research in which ideas and methodology were interchanged between homogeneous and heterogeneous catalysis are also indicated. By the middle years perspectives in catalysis were becoming strongly influenced by concerns regarding oil reserves and care of the environment. Examples of fundamental research reflecting this are described. The article briefly digresses to recall the members who have composed the editorial team of the *Journal of Catalysis* over the past 40 years, all of them personally active in basic research and recognizable from their work as sympathetic to the drive for understanding catalysis at the molecular level. In a final section the survey returns to its leitmotiv when some research themes from recent years are collated, among them the continuing progress with zeolite-related catalysis, the search for improved enantioselective catalysts, and the application of techniques in theoretical chemistry to chart catalytic reaction mechanisms.

# Title: Journal of Cataract and Refractive Surgery

Full Journal Title: Journal of Cataract and Refractive Surgery

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mcghee, C.N.J. and Gilhotra, A.K. (2005), Ophthalmology and vision science research - Part 3: Avoiding writer’s block - Understanding the ABCs of a good research paper. *Journal of Cataract and Refractive Surgery*, **31** (12), 2413-2419.

Full Text: [2005\J Cat Ref Sur31, 2413.pdf](2005/J%20Cat%20Ref%20Sur31,%202413.pdf)

Abstract: Completion of a scientific manuscript for submission to a peer-reviewed journal is a daunting task for clinicians and scientists early in their careers. In an ongoing series, this third article is the first of 2 related articles that deal with the basics of producing a high-quality research manuscript. Although ophthalmology and vision science are the principal focus of this series, the general concepts essential to producing a quality manuscript are applicable to diverse fields of research. This article highlights the exponential growth in the scientific literature over the past 40 years, considers why it is important to publish completed research, and discusses the necessity of identifying the key messages of the research, and their context, in relation to the published literature. The ethics of publishing biomedical research and scientific misconduct, such as duplicate publication or plagiarism, are outlined. To avoid later conflict, there is a critical need for coworkers to carefully address authorship order and inclusion early in the manuscript process. Internationally agreed guidelines are identified to guide this process. The importance of choosing the correct journal for a specific article and the nature of basic citation indices are discussed. The article concludes by elaborating and contrasting different scientific writing styles and emphasizing the considerable importance of developing a representative title and applying clarity and appropriate structure to the abstract.

Keywords: Authorship, Biomedical, Biomedical Research, Citation, Citation Indices, Duplicate Publication, Ethics, Growth, Guidelines, Journal, Journal Impact Factors, Literature, Misconduct, Plagiarism, Publication, Publications, Publishing, Quality, Research, Science, Scientific Literature, Scientific Misconduct, Writing

# Title: Journal of Cave and Karst Studies

Full Journal Title: [Journal of Cave and Karst Studies](http://www.caves.org/pub/journal/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Herrando-Perez, S., Baratti, M. and Messana, G. (2008), Subterranean ecological research and multivariate statistics: A review (1945-2006). *Journal of Cave and Karst Studies*, **70** (2), 120-128.

Full Text: [2008\J Cav Kar Stu70, 120.pdf](2008/J%20Cav%20Kar%20Stu70,%20120.pdf)

Abstract: Subterranean ecosystem studies using multivariate Ordination and/or agglomerative classification statistical methods were reviewed in the Science Citation Index (SCI) between 1945 and 2006. Nearly 57,000 publications cited subterranean habitats or their associated biota in the SCI abstracts, however, multivariate statistics applied to strictly hypogean taxa occurred in only 65 papers from 1990 onwards. Over 90% of the multivariate applications were devoted to morphometric or genetic Studies of single species and to relationships between the environment and species assemblages. In terms of taxa and ecosystem types, stygobite and waterless cave studies featuring multivariate applications predominated, respectively. Only six different methods (Agglomerative Clustering, Canonical Correspondence Analysis, Correspondence Analysis, Discriminant Analysis, non-metric Multidimensional Scaling.. Principal Component Analysis) were used among the >30 multivariate techniques available within the biostatistical toolbox. The retrieved set Of publications was sorted in a simple table by keyword according to type of biota, habitat, research topic and multivariate method, while online biostatistical resources are appended. Further comments are made on the use of statistics in the biological sciences in general.

Keywords: Basalt Aquifer, Canonical Correspondence-Analysis, Citation, Conservation Status, Constrained Ordination, Hypogean Waters, Hyporheic Zone, Microbial Communities, Publications, Redundancy Analysis, Research, Review, Science, Spalax-Ehrenbergi, Statistics, Triatoma-Dimidiata Hemiptera

# Title: Journal of Cell Biology

Full Journal Title: Journal of Cell Biology

ISO Abbreviated Title:

JCR Abbreviated Title:

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Journal Country/Territory:

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Publisher Address:

Subject Categories:

: Impact Factor

Notes: IImpact

? Rossner, M., Van Epps, H. and Hill, E. (2007), Show me the data. *Journal of Cell Biology*, **179** (6), 1091-1092.

Full Text: [2007\J Cer Pro Res179, 1091.pdf](2007/J%20Cer%20Pro%20Res179,%201091.pdf)

? Rossner, M., Van Epps, H. and Hill, E. (2008), Irreproducible results: A response to Thomson Scientific. *Journal of Cell Biology*, **180** (2), 254-255.

Full Text: [2008\J Cer Pro Res180, 254.pdf](2008/J%20Cer%20Pro%20Res180,%20254.pdf)

# Title: Journal of Cell Science

Full Journal Title: Journal of Cell Science

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Publisher:

Publisher Address:

Subject Categories: Impact Factor

Notes: highly cited

? Maheshwari, G., Brown, G., Lauffenburger, D.A., Wells, A. and Griffith, L.G. (2000), Cell adhesion and motility depend on nanoscale RGD clustering. *Journal of Cell Science*, **113** (10), 1677-1686.

Full Text: [2000\J Cel Sci113, 1677.pdf](2000/J%20Cel%20Sci113,%201677.pdf)

Abstract: Integrin adhesion receptors play a crucial role in regulating interactions between cells and extracellular matrix (ECM). Integrin activation initiates multiple intracellular signaling pathways and results in regulation of cell functions such as motility, proliferation and differentiation. Two keg observations regarding the biophysical nature of integrin-mediated cell-matrix interactions motivated the present study: (1) cell motility can be regulated by modulating the magnitude of cell-substratum adhesion, by varying cell integrin expression level, integrin-ECM binding affinity or substratum ECM surface density; and (2) integrin clustering enables assembly of multiple cytoplasmic regulatory and structural proteins at sites of aggregated integrin cytoplasmic domains, activating certain intracellular signalling pathways. Here, using a minimal integrin adhesion ligand, YGRGD, we test the hypothesis that ligand clustering can affect cell migration in a manner related to its modulation of cell-substratum adhesion. We employ a synthetic polymer-linking method, which allows us to independently and systematically vary both the average surface density and the local (approx. 50 nm scale) spatial distribution of the YGRGD peptide, against a background otherwise inert with respect to cell adhesion. In this system, the ligand was presented in three alternative spatial distributions: singly, in clusters with an average of five ligands per cluster, or in clusters with an average of nine ligands per cluster; for each of these spatial distributions, a range of average ligand densities (1,200,000,000 ligands/mu m(2)) were examined. Cluster spacing was adjusted in order to present equivalent average ligand densities independently of cluster size. The murine NR6 fibroblast cell line was used as a model because its migration behavior on ECM in the presence and absence of growth factors has been well-characterized and it expresses integrins known to interact with the YGRGD peptide. Using time-lapse videomicroscopy and analysis of individual cell movement paths, we find that NR6 cells can migrate on substrata where adhesion is mediated solely by the YGRGD peptide. As previously observed for migration of NR6 cells on fibronectin, migration speed on YGRGD is a function of the average surface ligand density. Strikingly, clustering of ligand significantly reduced the average ligand density required to support cell migration. In fact, nonclustered integrin ligands support cell attachment but neither full spreading nor haptokinetic or chemokinetic motility. In addition, by quantifying the strength of cell-substratum adhesion, we find that the variation of cell speed with spatial presentation of YGRGD is mediated via its effect on cell adhesion. These effects on motility and adhesion are also observed in the presence of epidermal growth factor (EGF), a known motility-regulating growth factor. Variation in YGRGD presentation also affects the organization of actin filaments within the cell, with a greater number of cells exhibiting stress fibers at higher cluster sizes of YGRGD. Our observations demonstrate that cell motility may be regulated by varying ligand spatial presentation at the nanoscale level, and suggest that integrin clustering is required to support cell locomotion.

Keywords: Integrin, RGD, Cell Motility, Cell/Substratum Adhesion, Epidermal Growth-Factor, Ligand-Binding-Affinity, Extracellular-Matrix, Focal Adhesions, Poly(Ethylene Oxide), Plasma Fibronectin, Beta-1 Integrins, Migration Speed, Cytoskeletal, Fibroblasts

# Title: Journal of Cellular Biochemistry

Full Journal Title: [Journal of Cellular Biochemistry](http://www3.interscience.wiley.com/cgi-bin/jtoc?ID=35503)

ISO Abbreviated Title: J. Cell. Biochem.

JCR Abbreviated Title: J Cell Biochem

ISSN:

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Subject Categories: Impact Factor

? Sewerynek, E., Abe, M., Reiter, R.J., Barlowwalden, L.R., Chen, L., Mccabe, T.J., Roman, L.J. and Diazlopez, B. (1995), Melatonin administration prevents lipopolysaccharide-induced oxidative damage in phenobarbital-treated animals. *Journal of Cellular Biochemistry*, **58** (4), 436-444.

Abstract: The protective effect of melatonin on lipopolysaccharide (LPS)-induced oxidative damage in phenobarbital-treated rats was measured using the following parameters: changes in total glutathione (tGSH) concentration, levels of oxidized glutathione (GSSG), the activity of the antioxidant enzyme glutathione peroxidase (GSH-PX) in both brain and liver, and the content of cytochrome P450 reductase in liver. Melatonin was injected intraperitoneally (ip, 4mg/kg BW) every hour for 4 h after LPS administration; control animals received 4 injections of diluent. LPS was given (ip, 4 mg/kg) 6 h before the animals were killed. Prior to the LPS injection, animals were pretreated with phenobarbital (PB), a stimulator of cytochrome P450 reductase, at a dose 80 mg/kg BW ip for 3 consecutive days. One group of animals received LPS together with N-w-nitro-L-arginine methyl ester (L-NAME), a blocker of nitric oxide synthase (NOS) (for 4 days given in drinking water at a concentration of 50 mM). In liver, PB, in all groups, increased significantly both the concentration of tGSH and the activity of GSH-PX. When the animals were injected with LPS the levels of tGSH and GSSG were significantly higher compared with other groups while melatonin and L-NAME significantly enhanced tGSH when compared with that in the LPS-treated rats. Melatonin alone reduced GSSG levels and enhanced the activity of GSH-PX in LPS-treated animals. Additionally, LPS diminished the content of cytochrome P450 reductase with this effect being largely prevented by L-NAME administration. Melatonin did not change the content of P450 either in PB- or LPS-treated animals. In brain, melatonin and L-NAME increased both tGSH levels and the activity of GSH-PX in LPS-treated animals. The results suggest that melatonin protects against LPS-induced oxidative toxicity in PB-treated animals in both liver and brain, and the findings are consistent with previously published observations related to the antioxidant activity of the pineal hormone. (C) 1995 Wiiey-Liss, Inc.

Keywords: Melatonin, Glutathione, Lipopolysaccharide, Oxidative Damage, Oxygen Free Radicals, Antioxidant, Phenobarbital, Cytochrome P450 Reductase, Tumor-Necrosis-Factor, Free-Radicals, Glutathione-Peroxidase, N-Acetylcysteine, Nitric-Oxide, Xanthine-Oxidase, Pineal Hormone, Oxygen, Mice, Metabolism

? Musgrove, E.A., Sarcevic, B. and Sutherland, R.L. (1996), Inducible expression of cyclin D1 in T-47D human breast-cancer cells is sufficient for Cdk2 activation and Prb hyperphosphorylation. *Journal of Cellular Biochemistry*, **60** (3), 363-378.

Abstract: The sequential transcriptional activation of cyclins, the regulatory subunits of cell cycle specific kinases, regulates progress through the cell cycle. In mitogen-stimulated cells cyclin D1 induction in early G (1) is followed by induction of cyclin E, activation of the cyclin-dependent kinase Cdk2, and hyperphosphorylation of the retinoblastoma gene product (pRB) in mid-to-late G (1) phase. T-47D breast cancer cells expressing cyclin D1 under the control of a metal-responsive metallothionein promoter were used to determine whether Cdk2 activation and pRB hyperphosphorylation are consequences of cyclin D1 induction. A 4-5-fold increase in cyclin D1 protein abundance was followed by approximately 2-fold increases in cyclin E protein abundance and Cdk2 activity and by hyperphosphorylation of pRB. These responses were apparent similar to 3 h after the increase in cyclin D1 protein, and similar to 3 h prior to the entry of cyclin D1-stimulated cells into S phase 12 h after zinc treatment. Cyclin D1 immunoprecipitates contained Cdk4 but no detectable Cdk2 and displayed pRb but not histone H1 kinase activity. Cdk2 activation was therefore likely to be due to increased abundance of cyclin E/Cdk2 complexes rather than formation of active cyclin D1/Cdk2 complexes. The sequence of events following zinc induction of cyclin D1 thus mimicked that following mitogen induction of cyclin D1. These data show that cyclin D1 induction is sufficient for Cdk2 activation and pRB hyperphosphorylation in T-47D human breast cancer cells, providing evidence that cyclin D1 induction is a critical event in G (1) phase progression. (C) 1996 Wiley-Liss, Inc.

Keywords: Cyclin D1 Function, Cdk Activity, Prb pHosphorylation, G (1) Phase, Cell Cycle Control, Retinoblastoma Gene-Product, Dependent Kinases, Growth-Factor, Protein-Kinase, Progression, Fibroblasts, Phase, pHosphorylation, Identification, Overexpression

Lee, J.S., Scala, S., Matsumoto, Y., Dickstein, B., Robey, R., Zhan, Z.R., Altenberg, G. and Bates, S.E. (1997), Reduced drug accumulation and multidrug-resistance in human breast-cancer cells without associated p-glycoprotein or MRP overexpression. *Journal of Cellular Biochemistry*, **65** (4), 513-526.

Full Text: [J\J Cel Bio65, 513.pdf](J/J%20Cel%20Bio65,%20513.pdf)

Abstract: MCF-7 human breast cancer cells selected in Adriamycin in the presence of verapamil developed a multidrug resistant phenotype, which was characterized by as much as 100,000-fold resistance to mitoxantrone, 667-fold resistance to daunorubicin, and 600-fold resistance to doxorubicin. Immunoblot and PCR analyses demonstrated no increase in MDR-1 for MRP expression in resistant cells, relative to parental cells. This phenotype is similar to one previously described in mitoxantrone-selected cells. The cells, designated MCF-7 AdVp, displayed a slower growth rate without alteration in topoisomerase ll α level or activity. increased efflux and reduced accumulation of daunomycin and rhodamine were observed when compared to parental cells. Depletion of ATP resulted in complete abrogation of efflux of both daunomycin and rhodamine. No apparent alterations in subcellular daunorubicin distribution were observed by confocal microscopy. No differences were noted in intracellular pH. Molecular cloning studies using DNA differential display identified increased expression oi the α subunit of the amiloridc-sensitive sodium channel in resistant cells. Quantitative PCR studies demonstrated an eightfold overexpression of the α subunit of the Na+ channel in the resistant subline. This channel may be linked to the mechanism of drug resistance in the AdVp cells. The results presented here support the hypothesis that a novel energy-dependent protein is responsible for the efflux in the AdVp cells. Further identification awaits molecular cloning studies. J. Cell. Biochem. 65: 513-526. (C) 1997 Wiley-Liss, Inc.

Keywords: Mitoxantrone, Drug Resistance, NON-PGP MDR, Rhodamine, Polymerase Chain-Reaction, Sensitive Na+ Channel, Membrane-Protein, Cellular Accumulation, Molecular-Cloning, Carcinoma-Cells, Messenger-RNA, Tumor Samples, Expression, Mitoxantrone

# Title: Journal of Cellular Physiology

Full Journal Title: [Journal of Cellular Physiology](http://www3.interscience.wiley.com/cgi-bin/jtoc?ID=31010)

ISO Abbreviated Title:

JCR Abbreviated Title:

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Publisher Address:

Subject Categories: Impact Factor

? Woodfork, K.A., Wonderlin, W.F., Peterson, V.A. and Strobl, J.S. (1995), Inhibition of atp-sensitive potassium channels causes reversible cell-cycle arrest of human breast-cancer cells in tissue-culture. *Journal of Cellular Physiology*, **162** (2), 163-171.

Abstract: The purpose of this study was to determine if potassium channel activity is required for the proliferation of MCF-7 human mammary carcinoma cells. We examined the sensitivities of proliferation and progress through the cell cycle to each of nine potassium channel antagonists. Five of the potassium channel antagonists produced a concentration-dependent inhibition of cell proliferation with no evidence of cytotoxicity following a 3-day or 5-day exposure to drug. The ICvalues for these five drugs, quinidine (25 µM), glibenclamide (50 µM), linogliride (770 µM), 4-aminopyridine (1.6 mM), and tetraethylammonium (5.8 mM) were estimated from their respective concentration-response curves. Four other potassium channel blockers were tested at supra-maximal channel blocking concentrations, including charybdotoxin (200 nM), iberiotoxin (100 nM), margatoxin (10 nM), and apamin (500 nM), and they had no effect on MCF-7 cell proliferation, viability, or cell cycle distribution. of the five drugs that inhibited proliferation, only quinidine, glibenclamide, and linogliride also affected the cell cycle distribution. Cell populations exposed to each of these drugs for 3 days showed a statistically significant accumulation in G0/G1 phase and a significant proportional reduction in S phase and G2/M phase cells. The inhibition of cell proliferation correlated significantly with the extent of cell accumulation in G0/G1 phase, and the threshold concentrations for inhibition of growth and G0/G1 arrest were similar. The G0/G1 arrest produced by quinidine and glibenclamide was reversed by removing the drug, and cells released from arrest entered S phase synchronously with a lag period of similar to 24 hours. Based on the differential sensitivity of cell proliferation and cell cycle progression to the nine potassium channel antagonists, we conclude that inhibition of ATP-sensitive potassium channels in these human mammary carcinoma cells reversibly arrests the cells in the G0/G1 phase of the cell cycle, resulting in an inhibition of cell proliferation. (C) 1995 Wiley-Liss, Inc.

Keywords: Epidermal Growth-Factor, Mammary Epithelial-Cells, Lymphocyte-Tactivation, Human-Melanoma Cells, K+ Channels, Respiratory Cells, Ion Channel, Proliferation, Calcium, Fibroblasts

# Title: Journal of Central South University of Technology

Full Journal Title: [Journal of Central South University of Technology](http://www.springerlink.com/content/120426/?p=11a4119b9c864fb7ae192f0a9305e069&pi=0)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

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Language:

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Subject Categories:

: Impact Factor

? Liu, R.L., Liu, Z.H., Yang, X.B., Chen, G.Y. and Liu, Q.C. (2007), Removal of fluoride from wastewater by READ-F resin. *Journal of Central South University of Technology*, **14** (S3), 388-395.

Full Text: 2007\J Cen Sou Uni Tec14, 388.pdf

Abstract: The dynamic adsorption,and regeneration experiment of READ-F resin for fluoride in wastewater were studied. The adsorption kinetics, isotherms and mechanism for fluoride removal were discussed. Various parameters (pH, feed flow rate, initial concentration of fluoride, temperature and coexisted anions) for dynamic adsorption were investigated. Experimental results show that the dynamic adsorption of fluoride on READ-F resin meets Thomas model and the saturated adsorption capacity is approximately 24 mg center dot g-1 of resin. The adsorption of fluoride on READ-F resin is fitted to pseudo-second-order reaction kinetics and Freundlich isotherm in the tested range of F- concentration. The resin can be regenerated multiply with 0.1 mol/L NaOH solution and reused. The low-concentration industrial wastewater containing fluoride can be lowered to 2.0 mg center dot L-1, which is much lower than 10.0 mg center dot L-1 of the state discharge criteria. The surface of the used resin has much tiny needle-liked crystallization of CeF2 and CeF3 which can be distinctly detected by XRD and SEM. The site of removing fluoride on READ-F resin is definite at pore channels of outer surface other than the inner ones.

Keywords: Adsorption, Adsorption Capacity, Adsorption Kinetics, Behavior, Capacity, Criteria, Fluoride, Fluoride Removal, Freundlich, Freundlich Isotherm, Hydrous Ceria, Ion-Exchanger, Isotherm, Isotherms, Kinetics, Mechanism, Model, NaOH, pH, Pseudo Second Order, Pseudo-Second-Order, Reaction Kinetics, Read-F Resin, Regeneration, Removal, Resin, Sem, Solution, Temperature, Wastewater, XRD

? Wang, X.Q., Guo, J.S. and Wai, W.H. (2007), Effects of suspended particles on TP, TN, CODMn concentrations in the Three Gorges reservoir. *Journal of Central South University of Technology*, **14** (S3), 439-446.

Full Text: 2007\J Cen Sou Uni Tec14, 439.pdf

Abstract: In order to study the effects of the suspended particles on water quality in the Three Gorges reservoir, the relationship between suspended particles and nutrient pollutants, that is total phosphorus (TP), total nitrogen (TN), chemical oxygen demand (CODMn) in the Three Gorges reservoir and the two tributaries of the Yangtze river flowing into the reservoir were studied in two steps: synchronous monitoring in the field and the laboratory experiments. Adsorption equilibrium and adsorption kinetic experiments were carried out using two groups of suspended particles: particle size of 8-20 μm and particle size of less than 8 mu m. The synchronous monitoring, results on seven cross-sections show that there is strong relationship between the suspended particle concentration and the concentrations of the following pollutants: particulate phosphorus (PP), particular nitrogen (PN), and particulate CODMn. The results from adsorption equilibrium experiments show that the experimental data can fit well in Langmuir isotherm equations. Particle concentration and particle size remarkably affected equilibrium adsorption amount. The experimental data from phosphorus adsorption kinetics provide a good fit in a second-order model.

Keywords: Adsorption, Adsorption Equilibrium, Adsorption Kinetic, Adsorption Kinetics, Baltic Sea, Chemical Oxygen Demand, Demand, Dissolved Silicon, Dynamics, Equilibrium, Experimental, Experiments, Hydrocarbons, Isotherm, Isotherm Equations, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Matter, Model, Particle Size, Particles, Phosphorus, Pollutants, Quality, Second Order, Second-Order, Second-Order Model, Sediment, Sediments, Size, Sorption, Total Nitrogen, Total Phosphorus, Water, Yangtze-River

? Wang, Y.H., Lan, Y. and Huang, C.B. (2008), Adsorption behavior of Pb2+ and Cd2+ ions on bauxite flotation tailings. *Journal of Central South University of Technology*, **15** (2), 183-187.

Full Text: [2008\J Cen Sou Uni Tec15, 183.pdf](2008/J%20Cen%20Sou%20Uni%20Tec15,%20183.pdf)

Abstract: The adsorption behavior of Pb2+ and Cd2+ ions on bauxite flotation tailings was investigated to demonstrate the adsorptivity of the bauxite flotation tailings. The adsorption percentage of Pb2+ and Cd2+ ions as a function of adsorbent dosage, solution pH value and shaking time were determined by batch experiments. The maximum adsorption percentage of 99.93% for Pb2+ ions and 99.75% for Cd2+ ions were obtained by using bauxite flotation tailings as adsorbent. The methods, such as zeta potentials, specific surface area measurements and the analysis of adsorption kinetics, were introduced to analyze the adsorption mechanisms of the Pb2+ ions on bauxite flotation tailings. The isoelectric point of bauxite flotation tailings shifts from 3.6 to 5.6 in the presence of Pb2+ ions. The specific surface area of bauxite flotation tailings changes from 12.57 to 20.63 m2, g after the adsorption of Pb2+ ions. These results indicate that a specific adsorption of the cation species happens on the surface of bauxite flotation tailings. Adsorption data of Pb2+ ions on the surface of bauxite flotation tailings can be well described by Langmuir model, and the pseudo-second-order kinetic model provides the best correlation for the adsorption data of Pb2+ and Cd2+ ions on bauxite flotation tailings.

Keywords: Adsorbent, Adsorption, Adsorption Behavior, Adsorption Kinetics, Analysis, Bauxite Flotation Tailings, Behavior, Cation, Cd2+, Changes, Clay, Experiments, Function, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Model, Methods, Model, Pb2+, Pd2+, pH, Removal, Solution, Surface Area, Water

? Yang, Z.H., Wang, B., Chai, L.Y., Wang, Y.Y., Wang, H.Y. and Su, C.Q. (2009), Removal of Cr(III) and Cr(VI) from aqueous solution by adsorption on sugarcane pulp residue. *Journal of Central South University of Technology*, **16** (1), 101-107.

Full Text: [2009\J Cen Sou Uni Tec16, 101.pdf](2009/J%20Cen%20Sou%20Uni%20Tec16,%20101.pdf)

Abstract: Sugarcane pulp residue (SPR), a waste from sugar-refinery, which possesses a large surface area, can be used for removing chromium (Cr(III) and Cr(VI)) from wastewater. In this work, the kinetics, isotherms of Cr(III) and Cr(VI) adsorption and their removal by SPR were investigated. The results show that the removal percentages of Cr(VI) and Cr(III) increase with increasing SPR dosage and temperature and decrease with increasing SPR particle size and the initial concentration of chromium ions. However, the influence of pH value on the Cr(VI) removal differs from that of the Cr(III) removal. The Cr(VI) removal percentage decreases with increasing pH values, while the Cr(III) removal percentage increases with increasing pH value. The adsorption kinetics of Cr(VI) and Cr(III) well fits with pseudo-second-order model. Langmuir adsorption isotherm can well describe the adsorption phenomena of chromium ions with the maximum adsorption capacity of 0.567 mg/g for Cr(VI) and 3.446 mg/g for Cr(III). Moreover, SPR reveals higher adsorption capacity for Cr(III) than that for Cr(VI), which implies that SPR has more potential application for Cr(III)-containing wastewater treatment than that for Cr(VI)-containing wastewater treatment.

Keywords: Adsorption, Ash, Cr(III), Cr(VI), Hexavalent Chromium, Kinetics, Red Mud, Removal, Sawdust, Sugarcane Pulp Residue, Toxicity, Waste, Water

? Xiong, C.H., Feng, Y.J. and Yao, C.P. (2009), Adsorption of Pb2+ on macroporous weak acid adsorbent resin from aqueous solutions: Batch and column studies. *Journal of Central South University of Technology*, **16** (4), 569-574.

Full Text: [2009\J Cen Sou Uni Tec16, 569.pdf](2009/J%20Cen%20Sou%20Uni%20Tec16,%20569.pdf)

Abstract: The adsorption properties of a novel macroporous weak acid resin (D152) for Pb2+ were investigated with chemical methods. The optimal adsorption condition of D152 resin for Pb2+ is at pH 6.00 in HAc-NaAc medium. The statically saturated adsorption capacity is 527 mg/g at 298 K. Pb2+ adsorbed on D152 resin can be eluted with 0.05 mol/L HCl quantitatively. The adsorption rate constants determined under various temperatures are k (288 K)=2.22×10-5 s-1, k (298 K)=2.51×10-5 s-1, and k (308 K)= 2.95×10-5 s-1, respectively. The apparent activation energy, E (a) is 10.5 kJ/mol, and the adsorption parameters of thermodynamics are Δ*H* (I similar to)=13.3 kJ/mol, Δ*S* (I similar to)=119 J/(mol center dot K), and Δ*G* (I similar to) 298 K =-22.2 kJ/mol, respectively. The adsorption behavior of D152 resin for Pb2+ follows Langmuir model.

Keywords: Activated Carbon, Activation, Activation Energy, Adsorbent, Adsorbent Resin, Adsorption, Adsorption Behavior, Adsorption Capacity, Adsorption Properties, Adsorption Rate, Amberlite XAD-4, Aqueous Solutions, Batch And Column Studies, Behavior, Capacity, Chelating Resin, Chemical, Column, Column Studies, Energy, Extraction, Industrial-Waste-Water, Langmuir, Langmuir Model, Lead, Macroporous, Macroporous Weak Acid Resin, Methods, Model, Pb(II) Ions, Pb2+, pH, Rate Constants, Removal, Resin, Solutions, Sorption, Thermodynamics

? Ding, P., Huang, K.L., Yang, H., Li, G.Y. and Liu, Y.F. (2010), Equilibrium and kinetics of adsorption of Ca(II) ions onto KCTS and HKCTS. *Journal of Central South University of Technology*, **17** (2), 277-284.

Full Text: [2010\J Cen Sou Uni Tec17, 277.pdf](2010/J%20Cen%20Sou%20Uni%20Tec17,%20277.pdf)

Abstract: The adsorption of Ca(II) ions from aqueous solution by chitosan alpha-ketoglutaric acid (KCTS) and hydroxamated chitosan alpha-ketoglutaric acid (HKCTS) was studied in a batch adsorption system. The Langmuir and Freundlich adsorption models were applied to describing the equilibrium isotherms, and isotherm constants were determined. The kinetics of the adsorption with respect to the initial Ca(II) ions concentration, temperature and pH was investigated. The pseudo-first-order and second-order kinetic models were used to describe the kinetic data and the rate constants were evaluated. The results show that the experimental data fit well to the Langmuir isotherms with a high correlation coefficient (R (2)). The pseudo-second-order rate expression provides the best fitting kinetic model. The pseudo second-order kinetic model is indicated with the activation energy of 26.22 kJ/mol and 6.16 kJ/mol for KCTS and HKCTS, respectively. It is suggested that the overall rate of adsorption of Ca(II) ions is likely to be controlled by the chemical process.

Keywords: Activation, Activation Energy, Adsorption, Adsorption Kinetics, Aqueous Solution, Aqueous-Solution, Batch, Batch Adsorption, Ca(Ii) Ions, Chemical, Chitin, Chitosan, Chitosan Alpha-Ketoglutaric Acid, Concentration, Correlation, Correlation Coefficient, Data, Dye, Energy, Equilibrium, Equilibrium Isotherms, Experimental, Expression, Flake, Freundlich, Humic-Acid, Hydroxamated Chitosan Alpha-Ketoglutaric Acid, Ions, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Kinetics of Adsorption, Langmuir, Langmuir Isotherms, Linked Chitosan Beads, Metal, Model, Models, pH, Pseudo First Order, Pseudo Second Order, Pseudo Second-Order, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Rate Constants, Second Order, Second-Order, Solution, Sorption, Temperature

? Huang, K., Shao, J.G., Zhu, H.M. and Katsutoshi, I. (2011), Removal of fluoride from aqueous solution onto Zr-loaded garlic peel (Zr-GP) particles. *Journal of Central South University of Technology*, **18** (5), 1448-1453.

Full Text: [2011\J Cen Sou Uni Tec18, 1448.pdf](2011/J%20Cen%20Sou%20Uni%20Tec18,%201448.pdf)

Abstract: Garlic peel, as the raw material, was modified by loading with zirconium(IV), exhibiting quite good uptaking behaviour for fluoride anion. The adsorption experiments were carried out in batch shaking vessels, and the process was strongly dependent on the pH value. The adsorption fits Langmuir model well, and the maximum adsorption capacities at equilibrium pH 2 and 6 are evaluated to be 1.10 and 0.89 mol(fluoride)/kg of Zr-loaded garlic peel gel, respectively. The evaluation of effects of coexisting anions such as nitrate, sulfate and phosphate shows that nitrate and sulfate have no negative effect on the adsorption of fluoride, while phosphate has a little effect. Adsorption kinetics of fluoride is well described by pseudo-second-order rate equation, and the corresponding adsorption rate constant is calculated to be 3.25x10-3 g/(mg center dot min).

Keywords: Adsorption, Adsorption Kinetics, Aqueous Solution, Bio-Adsorption, Drinking-Water, Equilibrium, Fluoride Removal, Kinetics, Langmuir, Low-Cost Materials, Orange Waste, pH, Phosphate, Pseudo Second Order, Removal, Separation, Zirconium, Zirconium-Loaded Garlic Peel

# Title: Journal of Cerebral Blood Flow and Metabolism

Full Journal Title: Journal of Cerebral Blood Flow and Metabolism

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gibson, C.L., Gray, L.J., Murphy, S.P. and Bath, P.M.W. (2006), Estrogens and experimental ischemic stroke: A systematic review. *Journal of Cerebral Blood Flow and Metabolism*, **26** (9), 1103-1113.

Abstract: Estrogens are believed to provide females with endogenous protection against cerebrovascular events although clinical trials studying long-term hormone replacement have yielded disappointing results. In contrast, estrogens might be neuroprotective after experimental ischemia. We performed a systematic review of controlled experimental studies that administered estrogens before, or after, cerebral ischemia and measured lesion volume. Relevant studies were found from searching PUBMED, EMBASE and Web of Science. From 161 identified publications, 27 studies using 1304 experimental subjects were analyzed using the Cochrane Review Manager software. Estrogens reduced lesion volume in a dose-dependent manner, after either transient (P < 0.001) or permanent (P < 0.001) ischemia and whether administered before or up to 4 h after ischemia onset; no studies assessed efficacy for later time periods. The effect size for estrogens decreased with increasing quality scores for studies of transient ischemia. Estrogens reduced lesion volume when administered to ovariectomized females and young adult males, but had no effect in intact females. Limited data were present for aged animals and the full dose-response relationship was not available in all experimental groups. On the basis of these data, estrogens are a candidate treatment for ischemic stroke, although further preclinical studies are also warranted.

Keywords: Adult, Aged, Artery Occlusion, Brain-Injury, Clinical Trials, Cochrane, Dose-Response, Efficacy, Estradiol, Estrogens, Focal Cerebral-Ischemia, Functional Recovery, Hormone Replacement Therapy, Infarct Size, Ischemia, Mouse Model, Neuroprotection, Protective Factor, Publications, Pubmed, Review, Science, Senescent Female Rats, Software, Stroke, Systematic, Systematic Review, Transient Forebrain Ischemia, Treatment, Web of Science

# Title: Journal of Ceramic Processing Research

Full Journal Title: [Journal of Ceramic Processing Research](http://jcpr.kbs-lab.co.kr/english/ch00.htm)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1229-9162

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Garfield, E. and Pudovkin, A.I. (2003), From materials science to nano-ceramics: Citation analysis identifies the key journals and players. *Journal of Ceramic Processing Research*, **4** (4), 155-167.

Full Text: [2003\J Cer Pro Res4, 155.pdf](2003/J%20Cer%20Pro%20Res4,%20155.pdf)

Abstract: The Science Citation Index was designed primarily to help the scientist or engineer retrieve relevant literature on specific topics. This database is now on-line as part of ISIs Web of Science and covers over thirty million papers containing nearly a half-billion cited references. For each source paper included, backward and foreward links are provided to the cited and citing papers. ISI also publishes additional databases such as the Journal Citation Reports and Journal Performance Indicators which can provide qualitative and quantitative information on thousands of journals, including impact factors. Using these files and a variety of bibliometric techniques we demonstrate how to identify the core journals of materials science, ceramics, and nanoceramics. Other ISI resources such as ISI Essential Science Indicators identify the leading countries, institutions, and authors of materials science. The output of a WoS search is used to analyze over 10,000 papers on nano-crystals and nano-ceramics. We have identified dozens of highly-cited papers, which are visualized as a series of historiographs; and topological maps These HistCite, maps and tables demonstrate the chronological development of the field [1].

Keywords: Nano-Ceramics, Science Citation Index, Ctation Analysis, Web of Science, ISI, Biology Journals

# Title: Journal of Cereal Science

Full Journal Title: Journal of Cereal Science

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0733-5210

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mussatto, S.I., Dragone, G. and Roberto, I.C. (2006), Brewers’ spent grain: Generation, characteristics and potential applications. *Journal of Cereal Science*, **43** (4), 1-14.

Abstract: Brewers’ spent grain (BSG) is the major by-product of the brewing industry, representing around 85% of the total by-products generated. BSG is a lignocellulosic material containing about 17% cellulose, 28% non-cellulosic polysaccharides, chiefly arabinoxylans, and 28% lignin. BSG is available in large quantities throughout the year, but its main application has been limited to animal feeding. Nevertheless, due to its high content of protein and fibre (around 20 and 70% dry basis, respectively), it can also serve as an attractive adjunct in human nutrition. Recently, attempts have been made to use BSG in biotechnological processes, such as in cultivation of mushrooms and actinobacteria, as a source of value-added products, such as, ferulic and p-coumaric acids, xylose, arabinose, or as raw material for xylitol and arabitol production. The main characteristics and potential applications of BSG are reviewed focussing on these alternative uses of this agroindustrial by-product as a raw material in foods, in energy production and in biotechnological processes. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Brewers’ Spent Grain, Chemical Composition, Animal and Human Nutrition, Biotechnological Processes, Germinated Barley Foodstuff, Solid-State Fermentation, Induced Intestinal Tumors, Dietary Fiber-Rich, Malt Protein Flour, Acid Orange-7 Dye, Aspergillus-Oryzae, Aqueous-Solution, Wheat Bran, Dairy-Cows

# Title: Journal of the Chartered Institution of Water and Environmental Management

Full Journal Title: Journal of the Chartered Institution of Water and Environmental Management

ISO Abbreviated Title: J. Chart. Inst. Water. Environ. Manage.

JCR Abbreviated Title: J Chart Inst Water E

ISSN: 0951-7359

Issues/Year: 6

Journal Country/Territory: England

Language: English

Publisher: Chartered Inst Water Environmental Management

Publisher Address: 15 John St, London, England WC1N 2EB

Subject Categories:

Environmental Sciences: Impact Factor 0.358, 105/126 (1999); Impact Factor 0.167, 119/127 (2000)

Limnology Water Resources: Impact Factor 0.167, 43/47 (2000)

? Lamont, J.R., Mcmanus, E.W. and Sutton, G.K. (1995), The sanitary administration of Belfast in the MID-1990s. *Journal of the Chartered Institution of Water and Environmental Management*, **9**, 43-52.

Abstract: The paper presented in 1898 by F. W. Lockwood (a) provided a detailed description of the many and varied factors contributing to the health and welfare of the population of Belfast, and (b) took a forward look as to where improvements could be foreseen. This paper considers theIssues which were raised almost a hundred years ago and assesses the changes and developments in the fields of politics, legislation, demography, topography, water, sewerage, environmental health, public health, waste management and housing. It is likely that Lockwood would be satisfied by the overall improvement to people’s general health and their environment, although the utopia he wished for is still some way off.

? Lewis, J. (1995), The use of bone charcoal in the treatment of rural water supplies. *Journal of the Chartered Institution of Water and Environmental Management*, **9** (4), 385-395.

Abstract: As a result of the Water Act of 1989 on the quality of water intended for human consumption, a number of small spring sources in Yorkshire were the subject of legal undertakings for remedial action to reduce the concentration of trihalomethanes in the distribution system. The trihalomethanes are formed when the colour in these waters, which is made up of predominantly fulvic and humic acids, is chlorinated. Therefore, in order to solve the problem of trihalomethanes in treated water, colour removal was necessary. The paper describes the use of bone charcoal in slow sand filters to remove colour from rural water supplies. It covers six months pilot-plant work which was undertaken at Marsett water-treatment works (near Richmond), and the implementation at other plants within Yorkshire, low-rate filtration through bone charcoal ensured that the colour and trihalomethane concentrations in filtered water complied with EC standards, and the material coped well with rapid changes in raw water quality.

Keywords: Bone Charcoal, Color Adsorption, Spring Sources, Trihalomethanes

? Holmes, P.R. (1996), Effluent control: The Hong Kong approach. *Journal of the Chartered Institution of Water and Environmental Management*, **10**, 199-204.

Abstract: Water pollution has existed for many years in Hong Kong, but the Government’s strategy for pollution control is now beginning to take effect. The strategy includes planning legislation and the provision of sewage-disposal systems. In the past, the main thrust has been against traditional pollutants measured by BOD, suspended solids and various nutrients, but as these are brought under control, attention will be given to the need to control toxic pollutants. The existing policy and legislation does not deal with toxic pollutants well and past work on toxic substances in Hong; Kong has concentrated on individual chemicals. The Environmental Protection Department is now seeking to (a) develop ecotoxicological expertise to identify toxicant pathways in the environment, (b) introduce mater-quality objectives for toxic substances which it can monitor effectively and (c) improve standards for effluent control.

? Lindley, E. (1997), Accounting for polycyclic aromatic hydrocarbons in public water supplies. *Journal of the Chartered Institution of Water and Environmental Management*, **11**, 119-125.

Abstract: Asset management plans were prepared in 1989 and 1994 by water companies in England and Wales for submission to the Office of Water Services. These plans constituted the financial programming required by water companies to meet specified standards of service, particularly with respect to water quality. Detailed studies have previously established that problems associated with iron from unlined ferrous mains, particularly in soft water areas, is often the main cost ‘driver’ for water distribution investment. However, many of the so-called unlined iron mains were treated with a coal-tar pitch lining for corrosion protection before installation and residues of this painted lining can give rise to unsatisfactory levels of polycyclic aromatic hydrocarbons in drinking water. The paper describes how desk-study research, followed by the development and application of a modified ‘focused downstream series sampling’ water-quality modelling technique allowed polycyclic aromatic hydrocarbons to be accounted for in two water company asset management plan submissions. The paper also raises a number of fundamental implications with respect to the occurrence of these carcinogenic compounds in drinking water.

? Karcher, S., Caceres, L., Jekel, M. and Contreras, R. (1999), Arsenic removal from water supplies in northern Chile using ferric chloride coagulation. *Journal of the Chartered Institution of Water and Environmental Management*, **13** (3), 164-169.

Abstract: Many raw waters in the and North of Chile contain high concentrations of arsenic (0.1-1.0 mg/l) and, during the 1970s, drinking-water treatment using coagulation was introduced in an attempt to comply with the Chilean standard of 0.05 mg/l. The new World Health Organization recommendation of 0.01 mg/l for drinking water has led to efforts to enhance arsenic removal. This paper describes pilot-plant experiments which were carried out to optimize removal by varying the ferric chloride coagulant dose (3-9 mg/l Fe) and pH value (pH 5.5-8.0) in a raw water which contained an average arsenic concentration of 0.44 mg/l. At pH 5.5), arsenic adsorption was best; however, A. pH of 6.5 was considered to be the most suitable for treatment when considering flee elimination. An empirical formula to predict residual arsenic under different operational conditions was obtained and this was confirmed by data collected at a full-scale water-treatment plant.

Keywords: Arsenic, Chile, Coagulation, Ferric Chloride, pH, Water Treatment

# Title: Journal of the China Society for Scientific and Technical Information

Full Journal Title: [Journal of the China Society for Scientific and Technical Information](http://e28.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=QBXB&NaviLink=%e6%83%85%e6%8a%a5%e5%ad%a6%e6%8a%a5)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1000-0135

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Jiang, Q.H. and Zhang, Z.H. (2007), Literature review of bibliometric analysis of patent resource. *Journal of the China Society for Scientific and Technical Information,* **26** (1), 134-140.

Full Text: [2007\J Chi Soc Sci Tec Inf26, 134.pdf](2007/J%20Chi%20Soc%20Sci%20Tec%20Inf26,%20134.pdf)

Abstract: The function of patent literature as legal documents and technology materials is publicly well-known. However, the adoption of patent resource in the bibliometric analysis so as to estimate the technology development level, to predict the technology development tendency, to evaluate the technology innovation capability, to instruct the set-up of relevant policy, etc. has not been allocated fare enough attention in China. To advance the development of such kind of work, the article analyzes the value of the p...

Keywords: Patent, Patent Resource, Technology Innovation, Bibliometric Analysis

# Title: Journal of Chemical Documentation

Full Journal Title: [Journal of Chemical Documentation](http://pubs3.acs.org/acs/journals/toc.page?incoden=jci001)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sher, I.H., Oconnor, J. and Garfield, E. (1964), Rotadex - A new index for generic searching of chemical compounds. *Journal of Chemical Documentation*, **4** (1), 49-53.

Full Text: [1960-80\J Che Doc4, 49.pdf](1960-80/J%20Che%20Doc4,%2049.pdf)

? Sher, I.H., Garfield, E. and Elias, A.W. (1966), Control and elimination of errors in ISI services. *Journal of Chemical Documentation*, **6** (3), 132-135.

Full Text: [1960-80\J Che Doc6, 132.pdf](1960-80/J%20Che%20Doc6,%20132.pdf)

Abstract: The Institute for Scientific Information produces several indexes and abstracting and alerting services which contain error-controlling features. Curent Contents, Index Chernicus have different and unique mechanisms for finding and correcting errors that have appeared in the primary literature and those generated during their production of these secondary publications. Aspects of error control in these publications will be discussed.

? Ewing, G.J. (1966), Citation of articles from volume 58 of *Journal of Physical Chemistry*. *Journal of Chemical Documentation*, **6** (4), 247-250.

Full Text: [1960-80\J Che Doc6, 247.pdf](1960-80/J%20Che%20Doc6,%20247.pdf)

Abstract: The self-citation intensity in references per 100 pages was found to decrease with a half life of three and one half years, only partially counterbalanced by a doubling of journal size every six years. SCI data, on the other hand, suggest that the chance for citation of a given paper may be fairly constant. About 80% of the articles written in Volume 58 of the Journal of Physical Chemistry were cited in the sources surveyed. A superficial study of these uncited papers showed no noticeable difference from other papers in the iournal except for a few, such as an introduction to a symposium, that might not be expected to be cited.

? Garfield, E. and Sher, I.H. (1967), ISI’s experiences with ASCA - A selective dissemination system. *Journal of Chemical Documentation*, **7** (3), 147-153.

Full Text: [1960-80\J Che Doc7, 147.pdf](1960-80/J%20Che%20Doc7,%20147.pdf)

Abstract: ASCA (Automatic Subject Citation Alert) is a commercially available SDI system covering the journal literature. The repertoire of questions which ASCA can utilize includes cited references, words from titles, authors, organizations, etc., and allows for logical combinations of these questions. This paper discusses differences and similarities between “citations” and “words” in retrieving and disseminating information. The problem of user-system interaction is explored, and some techniques for developing effective interest profiles are described. Although ASCA is a multi-disciplinary system, examples from fields like synthetic chemistry and biochemistry are provided.

# Title: Journal of Chemical Education

Full Journal Title: [Journal of Chemical Education](http://jchemed.chem.wisc.edu/)

ISO Abbreviated Title: J. Chem. Educ.

JCR Abbreviated Title: J Chem Educ

ISSN: 0021-9584

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Amer Chemical Soc

Publisher Address: 1155 16th St, NW, Washington, DC 20036

Subject Categories:

Chemistry Education, Scientific Disciplines: Impact Factor

Livingston, R. (1930), An introduction to chemical catalysis in homogenous ssytems. *Journal of Chemical Education*, **7** (12), 2887-2903.

? Lobo, L.S. and Bernardo, C.A. (1974), Textbook errors. 119. Adsorption-isotherms and surface-reaction kinetics. *Journal of Chemical Education*, **51** (11), 723-724.

Potgoeter, J.H. (1991), Adsorption of Methylene Blue on activated carbon. *Journal of Chemical Education*, **68** (4), 349-350.

? Fraiji, L.K., Hayes, D.M. and Werner, T.C. (1992), Static and dynamic fluorescence quenching experiments for the physical-chemistry laboratory. *Journal of Chemical Education*, **69** (5), 424-428.

Keywords: Beta-Cyclodextrin, Aqueous-Solution, Inclusion

Lynam, M.M., Kilduff, J.E. and Weber, Jr., W.J. (1995), Adsorption of *p*-nitrophenol from dilute aqueous solution. *Journal of Chemical Education*, **72** (1), 80-84.

Keywords: Activated Carbon, Equilibrium, Langmuir, Isotherm

# Title: Journal of Chemical and Engineering Data

Full Journal Title: [Journal of Chemical and Engineering Data](http://pubs.acs.org/journals/jceaax/index.html)

ISO Abbreviated Title: J. Chem. Eng. Data

JCR Abbreviated Title: J Chem Eng Data

ISSN: 0021-9568

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Amer Chemical Soc

Publisher Address: 1155 16th St, NW, Washington, DC 20036

Subject Categories:

Chemistry, Multidisciplinary: Impact Factor 1.081, 36/121 (1999); Impact Factor 0.988, (2000); Impact Factor 0.950, 52/123 (2003); Impact Factor 1.601, 38/125 (2005); Impact Factor 1.642, 40/124 (2006); Impact Factor 1.695, 53/140 (2009)

Engineering, Chemical: Impact Factor 1.081, 14/110 (1999); Impact Factor 0.988, 18/117 (2000); Impact Factor, 0.950 (2003); Impact Factor 1.601, 19/116 (2005); Impact Factor 1.642, 16/110 (2006); Impact Factor 1.695, 40/128 (2009)

? Kuo, S.L., Pedram, E.O. and Hines, A.L. (1985), Analysis of ammonia adsorption on silica-gel using the modified potential-theory. *Journal of Chemical and Engineering Data*, **30** (3), 330-332.

Full Text: [1985\J Che Eng Dat30, 330.pdf](1985/J%20Che%20Eng%20Dat30,%20330.pdf)

Abstract: The adrorptkn of NH, on Davkon rWca gel was studled at 298, 313, and 333 K by wlng a packed bed method. Equiliklwn koth” were calculated from the adsorption data and were modeled by the Langmuh and modled Polanyl potentla1 equathw. ExperkrrcMtsl breakthrough curves were obtalned for dx concentrattons of NH, In dry helium gas at each temperature. The Isosterk heats of adrorption were also cakulated at three ad8orbent load- and were found to be nearly Mepmdmt of loadlng. A calculated heat of ackorpllon of the same order of msgnlhrde as the heai of condenmtkn lndkated that the adeorptlon was prhnarlly due to phydcal forces.

Costa, E., Calleja, G., Marrón, C., Jiménez, A. and Pau, J. (1989), Equilibrium adsorption of methane, ethylene and propylene and their mixture on activated carbon. *Journal of Chemical and Engineering Data*, **34** (2), 156-160.

Full Text: [J\J Che Eng Dat34, 156.pdf](J/J%20Che%20Eng%20Dat34,%20156.pdf)

Abstract: Pure gas adsorption isotherms of methane, ethane, ethylene, and propylene on activated carbon have been determined at 323 K and pressures in the range 0-100 kPa. Binary and ternary adsorption isotherms were also determined at the same temperature and pressures for ail the mixtures of these adsorbates, with the exception of methane-propylene mixtures due to their difference in adsorption capacity. Two models have been applied for correlation and prediction of mixture adsorption equilibria-the ideal adsorbed solution (IAS) and the real adsorbed solution (RAS). This second model provides better results for ail the systems.

Costa, E., Calleja, G., Marrón, C., Jiménez, A. and Pau, J. (1989), Adsorption equilibrium ethylene, propane, propylene, carbon, dioxide and their mixtures on 13X zeolite. *Journal of Chemical and Engineering Data*, **36** (2), 218-224.

Full Text: [J\J Che Eng Dat36, 218.pdf](J/J%20Che%20Eng%20Dat36,%20218.pdf)

Abstract: Equlllbrlum Isotherms for the adsorption of ethylene, propane, propylene, and carbon dioxide on 13X zeollte have been obtained at 279, 293, and 308 K, In the pressure range 0-100 kPa. Experlmental data were fltted to Langmulr, Prausnitz, and BET equations, showing the best resutts wlth Prausnltz Isotherm. Blnary adsorption isotherms for all binary systems were also obtained at 293 K and the same pressure range. Some displacement effects were observed for several systems at the adsorbed phase. Thus, propane Is displaced by propylene for increasing pressures, showing a maximum in its lndlvldual adsorptlon Isotherms.

Kuo, S.L. and Hines, A.L. (1992), Adsorption of 1,1,1-trichlorethane and tetrachloroethylene on silica-gel. *Journal of Chemical and Engineering Data*, **37** (1), 1-3.

Full Text: [J\J Che Eng Dat37, 1.pdf](J/J%20Che%20Eng%20Dat37,%201.pdf)

Abstract: Dsorption studies of 1,1,1-trichloroethane and tetrachloroethylene on silica gel were carried out at 288, 293, and 298 K. Experimental data provided type I isotherms and were correlated by the Langmuir equation, the model of Hines et al., and the vacancy solution model developed on the basis of the Flory-Huggins activity coefficient model. The absolute errors between the values calculated by these models and the experimental data were below 5%. The surface area occupied by each adsorbate was calculated by using the BET equation.

Akgerman, A. and Zardkoohi, M. (1996), Adsorption of phenolic compounds on fly ash. *Journal of Chemical and Engineering Data*, **41** (2), 185-187.

Full Text: [J\J Che Eng Dat41, 185.pdf](J/J%20Che%20Eng%20Dat41,%20185.pdf)

Abstract: Adsorption isotherms for adsorption of phenol, S-chlorophenol and 2,4-dichlorophenol from water onto fly ash were determined. These isotherms were modeled by the Freundlich isotherm. The fly ash adsorbed 67, 20 and 22 mg/g for phenol, chlorophenol and 2,4-dichlorophenol, respectively, for the highest water phase concentrations used. The affinity of phenolic compounds for fly ash is above the expected amount corresponding to a monolayer coverage considering that the surface area of fly ash is only 1.87 m2/g. The isotherms for contaminants studied were unfavorable, indicating that adsorption becomes progressively easier as more solutes are taken up. phenol displayed a much higher affinity for fly ash than 3-chlorophenol and 2,4-dichlorophenol.

Juang, R.S., Wu, F.C. and Tseng, R.L. (1996), Adsorption isotherms of phenolic compounds from aqueous solutions onto activated carbon fibers. *Journal of Chemical and Engineering Data*, **41** (3), 487-492.

Full Text: [J\J Che Eng Dat41, 487.pdf](J/J%20Che%20Eng%20Dat41,%20487.pdf)

Abstract: Liquid-phase adsorption equilibria of eight phenolic compounds onto activated carbon fibers were measured in the concentration range 40-500 g m-3 at 303 K. High adsorption capacities were observed for the chlorinated phenols compared to the methyl-substituted phenols. Several two-and three-parameter isotherm equations were tested. Among the equations tried, the three-parameter equation of Jossens et al. based on a heterogeneous surface adsorption theory was found to be the most satisfactory over the entire range of concentration. The widely used two-parameter equations of Langmuir and Freundlich were not applicable to the present adsorption systems.

Keywords: Equilibrium, Organics, Acid

Choy, K.K.H., Porter, J.F. and McKay, G. (2000), Langmuir isotherm models applied to the multicomponent sorption of acid dyes from effluent onto activated carbon. *Journal of Chemical and Engineering Data*, **45** (4), 575-584.

Full Text: [J\J Che Eng Dat45, 575.pdf](J/J%20Che%20Eng%20Dat45,%20575.pdf)

Abstract: The adsorption of three acidic dyes, Acid Blue 80 (AB80), Acid Red 114 (AR114), and Acid Yellow 117 (AY117) onto activated carbon, Filtrasorb 400, has been studied. Three single-component and three binary, AB80 + AR114, AB80 + AY117, and AR114 + AY117, isotherms were determined. Four models for predicting the multicomponent equilibrium sorption isotherms have been compared in order to determine which is the best; fit model to predict or correlate binary adsorption data. These were an extended Langmuir isotherm, a simplified model based on single-component equilibrium factors, a modified extended Langmuir isotherm with a constant interaction factor, and a modified extended Langmuir isotherm incorporating a surface coverage dependent interaction factor.

Keywords: Adsorption, Equilibrium, Removal, Prediction, Adsorbents, Chitin, Earth

Yun, J.H. (2001), Equilibrium isotherms of dichloromethane, trichloroethylene, and 1,1,1-trichloroethane on activated carbon fiber. *Journal of Chemical and Engineering Data*, **46** (1), 156-159.

Full Text: [J\J Che Eng Dat46, 156.pdf](J/J%20Che%20Eng%20Dat46,%20156.pdf)

Abstract: The adsorption equilibrium isotherms of dichloromethane; trichloroethylene, and 1,1,1-trochloroethane on activated carbon fiber (KF-1500) were measured by a static volumetric technique. Equilibrium data were obtained at (298, 323, and 348) K and pressures up to 40 kPa for dichloromethane, 8 kPa for trichloroethylene, and 12 kPa for 1,1,1-trichloroethane, respectively. The Dubinin-Astakhov isotherm equation was found to preside an excellent fit to the experimental data.

Keywords: Adsorption, Vapors

Jáuregui-Haza, U.J., Wilhelm, A.M., Canselier, J.P. and Delmas, H. (2001), Adsorption of benzenesulfonic acid; 3,3’,3”-phosphinidynetris-, trisodium salt; and di(mu-terbiobutylthiolato) dicarbonyl, bis(benzenesulfonic acid, 3,3’,3”-phosphinidynetris-, trisodium salt) dirhodium from aqueous solutions on silica. *Journal of Chemical and Engineering Data*, **46** (2), 281-285.

Full Text: [J\J Che Eng Dat46, 281.pdf](J/J%20Che%20Eng%20Dat46,%20281.pdf)

Abstract: Adsorption studies of benzenesulfonic acid; 3,3’,3”-phosphinidynetris-, trisodium salt (TPPTS); and di-(mu-tertiobutylthiolato) dicarbonyl, bis(benzenesulfonic acid, 3,3’,3-phosphinidynetris-, trisodium salt) dirhodium ([Rh(mu (SBu)-Bu-t)(CO)(TPPTS)](2)) from aqueous solutions on four different silica samples were carried out at 25 degreesC. The isotherms obtained were correlated by several models, among which Fowler’s one was found to be the most satisfactory. The: solubilities of TPPTS and [Rh(mu-(SBu)-Bu-t)(CO)(TPPTS)](2) in water at four temperatures in the range (25-80) degreesC were also studied.

Keywords: Freundlich Isotherm Model, Heterogeneous Surfaces, Catalysts, Phase, Hydroformylation, Substitution, Solubility

de Miguel, E.M., Yanes, C. and Maestre, A. (2001), Mixing enthalpies of alkylureas with electrolytes in water at 298.15 K. *Journal of Chemical and Engineering Data*, **46** (2), 423-427.

Full Text: [J\J Che Eng Dat46, 423.pdf](J/J%20Che%20Eng%20Dat46,%20423.pdf)

Abstract: Excess enthalpies of several alkylureas (methylurea, 1,1-dimethylurea, Ill-dimethylurea, and tetra-methylurea) with some aqueous electrolytes (NaCl, NaBr, Me4NBr, and Bu4NBr) have been determined by flow microcalorimetry at 298.15 K. Enthalpic pair interaction coefficients;. h(NE), of the virial expansion of the mixing enthalpy were derived. These are negative for the interaction of methylurea and 1;1-dimethylurea with NaCl, NaBr, and Me4NBr. The remaining systems exhibit positive coefficients. A linear dependence between h(EN) and the number of CH3 groups in the hydrocarbon chain of alkylurea is observed.

Keywords: Urea, 25-Degrees-C, Mixtures

Zhang, J., Zhu, W., Makkee, M., van der Linden, B., Kapteijn, F. and Moulijn, J.A. (2001), Adsorption of 1,2-dichloropropane on activated carbon. *Journal of Chemical and Engineering Data*, **46** (3), 662-664.

Full Text: [J\J Che Eng Dat46, 662.pdf](J/J%20Che%20Eng%20Dat46,%20662.pdf)

Abstract: The adsorption of 1,2-dichloropropane vapor on activated carbon has been investigated using a novel technique, TEOM. The adsorption isotherms are for the first time reported at temperatures in the range from 303 to 473 K and at pressures up to 6 kPa. The Tóth isotherm appropriately describes the equilibrium data. The thermodynamic properties such as the Henry law constant and enthalpy associated with adsorption are derived to characterize interactions between adsorptive and adsorbent.

Keywords: Light Alkanes, Silicalite-1

Hindarso, H., Ismadji, S., Wicaksana, F., Mudjijati, and Indraswati, N. (2001), Adsorption of benzene and toluene from aqueous solution onto granular activated carbon. *Journal of Chemical and Engineering Data*, **46** (4), 788-791.

Full Text: [J\J Che Eng Dat46, 788.pdf](J/J%20Che%20Eng%20Dat46,%20788.pdf)

Abstract: The liquid-phase adsorption of benzene and toluene on granular activated carbon TOG 20×50 has been studied at (303.15, 313.15, and 323.15) K. The temperature dependent forms of the Tóth and Sips equations were used to correlate the experimental data. Excellent agreement between the experimental data and those two equations are observed.

Keywords: Liquid-Phase Adsorption, Isotherms, phenols, Fibers, Acid

Choung, J.H., Lee, Y.W., Choi, D.K. and Kim, S.H. (2001), Adsorption equilibria of toluene on polymeric adsorbents. *Journal of Chemical and Engineering Data*, **46** (4), 954-958.

Full Text: [J\J Che Eng Dat46, 954.pdf](J/J%20Che%20Eng%20Dat46,%20954.pdf)

Abstract: Adsorption equilibria of toluene on various polymeric adsorbents were obtained by a static volumetric technique. The polymeric adsorbents used were Ambersorb 600 (Rohm and Haas Co.), Sp 850 (Mitsubishi Chemical Co.), and Dowex Optipore V493 (Dow Chemical Co.). The equilibrium measurements were done at 273.15, 298.15, 323.15, and 348.15 K and pressures up to 2.95 kPa for toluene. The experimental data of Ambersorb 600 were correlated by the Unilan equation and the Dubinin-Astakhov (D-A) equation was used to correlate experimental data of Sp 850 and Dowex Optipore V493. The isosteric heat of adsorption was calculated. It was found that the values of isosteric heat of adsorption varied with surface loading.

Keywords: Activated Carbon, Vapors, Isotherms, Benzene

? Bautista, L.F., Pinilla, J., Aracil, J. and Martinez, M. (2002), Adsorption isotherms of aspartame on commercial and chemically modified divinylbenzene-styrene resins at different temperatures. *Journal of Chemical and Engineering Data*, **47** (3), 620-627.

Full Text: [2002\J Che Eng Dat47, 620.pdf](2002/J%20Che%20Eng%20Dat47,%20620.pdf)

Abstract: The equilibria of adsorption of aspartame in an aqueous solution on a commercial resin and three chemically modified Amberlite XAD-2 resins were measured at different temperatures within the range (0 to 35) degreesC. The functional groups, introduced by nucleophilic substitution in the aromatic rings of the divinylbenzene-styrene matrix, were bromine (-Br), bromoethyl (-CH2CH2Br), and chloromethyl (-CH2Cl). All of the isotherms showed a nonlinear and favorable shape with decreasing adsorption capacity as the temperature increased. The chloromethylated resin, and, to a lesser degree, the bromoethylated resin, increased the adsorption capacity for aspartame compared to Amberlite XAD-2. At 35 degreesC, the chloromethyl resin showed up to a 280% higher saturation capacity than the commercial adsorbent. The experimental equilibrium data were fitted to the Langmuir, Freundlich, Langmuir-Freundlich, Redlich-Peterson, and Toth models. Toth and Langmuir-Freundlich isotherms provided very good fittings for all of the resins over the temperature range studied, whereas the Langmuir and Redlich-Peterson equations were less accurate, although the average errors were, in general, below 10% with respect to the measured values.

Keywords: Adsorption, Amino-Acids, Aromatic, Aspartame, Bromine, Capacity, Equilibrium, Functional Groups, Isotherms, Models, Modified, Polystyrene Resins, Range, Resins, Saturation, Systems, Temperature

Fetterolf, M.L., Patel, H.V. and Jennings, J.M. (2003), Adsorption of Methylene blue and acid blue 40 on titania from aqueous solution.*Journal of Chemical and Engineering Data*, **48** (4), 831-835.

Full Text: [J\J Che Eng Dat48, 831.pdf](J/J%20Che%20Eng%20Dat48,%20831.pdf)

Abstract: Langmuir type adsorption was observed for two systems: Methylene blue (MB) on TX titania and acid blue 40 (AB40) on P25 titania at an ambient temperature of (23 +, - 2) degreesC and ambient pH initially at 4.6 +, - 0.2 for P25 titania and 7.8 +, - 0.2 for TX titania. Based on a Langmuir analysis, values for maximum surface coverage, N-max, and adsorption intensity, b, are 1.6×10-5 mol MB.g-1 and 3.6×104 L.mol-1, respectively, for TX titania. An N-max value of 5.0×10-5 mol AB40.g-1 was determined for P25 titania. The TX titania adsorption surface area is estimated to be 12 m2g-1 based on maximum adsorption of Methylene blue. Results of gel electrophoresis on both dyes at pH values of 4 and 9 indicate that Methylene blue remains cationic and acid blue 40 remains anionic in this pH range. Single-point adsorption experiments at selected pH values other than ambient were performed. Experimental evidence clearly indicates that electrostatic attraction is a reasonable explanation for the observed adsorption process in the MB, TX system. Although the evidence is less conclusive, electrostatic attraction may also influence the adsorption process of the AB40, P25 system.

Keywords: Adsorption, Dye Pollutants, Environmental pHotochemistry, Methylene Blue, Particles, pHotoassisted Degradation, pHotocatalytic Degradation, Surface, TiO2 Dispersions, TiO2-Assisted pHotodegradation, Visible-Light Irradiation, Zero Charge

Lee, J.W., Shim, W.G., Yang, M.S. and Moon, H. (2004), Adsorption isotherms of polar and nonpolar organic compounds on MCM-48 at (303.15, 313.15, and 323.15) K. *Journal of Chemical and Engineering Data*, **49** (3), 502-509.

Full Text: [J\J Che Eng Dat49, 502.pdf](J/J%20Che%20Eng%20Dat49,%20502.pdf)

Abstract: Adsorption equilibria of four nonpolar molecules (benzene, toluene, hexane, and cyclohexane) and two polar molecules (methanol and acetone) on mesoporous silicate MCM-48 were measured at (303.15, 313.15, and 323.15) K using a gravimetric technique. It was found that MCM-48 has a higher affinity to polar organic compounds than to nonpolar organics. A hybrid isotherm model composed of Langmuir isotherm and Sips equations was applied to fit the adsorption equilibrium data of nonpolar organics including surface adsorption and capillary condensation, while inhomogeneous Dubinin-Astakov (DA) isotherm was used to correlate those of polar organics. The proposed isotherms correlated the measured adsorption data well over the whole range at these experimental conditions.

Keywords: Carbon-Tetrachloride, Activated Carbon

Wang, C.M., Chang, K.S., Chung, T.W. and Wu, H.D. (2004), Adsorption equilibria of aromatic compounds on activated carbon, silica gel, and 13X zeolite. *Journal of Chemical and Engineering Data*, **49** (3), 527-531.

Full Text: [J\J Che Eng Dat49, 527.pdf](J/J%20Che%20Eng%20Dat49,%20527.pdf)

Abstract: The adsorption of volatile organic compounds (VOCs) on the activated carbon, silica gel, and type-13X synthetic zeolite were investigated by a gravimetric adsorption method. The sorbates (VOCs) include benzene, toluene, o-xylene, p-xylene, and m-xylene. The equilibrium isotherm data obtained from this study were fitted by the Freundlich equation. The standard deviations for the predicted adsorption isotherms in the activated carbon bed were from 0.44 to 0.92, and the standard deviations were from 0.25 to 4.79 in the silica gel bed and were from 0.12 to 0.87 in the 13X zeolite bed.

Cruz, A.J., Pires, J., Carvalho, A.P. and de Carvalho, M.B. (2004), Adsorption of acetic acid by activated carbons, zeolites, and other adsorbent materials related with the preventive conservation of lead objects in museum showcases. *Journal of Chemical and Engineering Data*, **49** (3), 725-731.

Full Text: [J\J Che Eng Dat49, 725.pdf](J/J%20Che%20Eng%20Dat49,%20725.pdf)

Abstract: To test the suitability of adsorbents such as activated carbons, zeolites, and other materials to adsorb acetic acid vapors that are liberated inside museum showcases and may destroy lead objects, the adsorption capacities at the saturation pressure and the isotherms of adsorption at lower pressures were determined. The results obtained show that the NaX zeolite in pellet form and the RB4 activated carbon are the best adsorbents. Additionally, they show that materials with sodium content exhibit an exchange process that may be very important, particularly in the case of NaX zeolite. Some of the parameters determined (saturation capacity, Henry constant, kinetic parameter) seem to be related in a simple manner (although there are adsorbents that do not agree with the general trend). However, a simple relation was not found between the specific surface area previously determined with nitrogen at 77 K and the acetic acid saturation capacity at room temperature.

Keywords: Aluminum-Pillared Clays

? Karadağ, D., Turan, M., Akgül, E., Tok, S. and Faki, A. (2007), Adsorption equilibrium and kinetics of Reactive Black 5 and reactive red 239 in aqueous solution onto surfactant-modified zeolite. *Journal of Chemical and Engineering Data*, **52** (5), 1615-1620.

Full Text: [2007\J Che Eng Dat52, 1615.pdf](2007/J%20Che%20Eng%20Dat52,%201615.pdf)

Abstract: The adsorption of Reactive Black 5 and Reactive Red 239 in aqueous solution on cetyltrimethylammonium bromide (CTAB)-zeolite was studied in a batch system. The natural zeolite and CTAB-modified zeolite were characterized by FIF-IR and SEM analysis. Experiments were performed at different conditions such as initial dye concentration, contact time, temperature, and pH. CTAB modification covered the zeolite surface with positive charges, and the adsorption capacity of zeolite increased. The adsorption capacity of Reactive Red 239 was found to be two times higher than Reactive Blue 5 due to the hydrophilicity of the dye molecules. The Langmuir and Freundlich adsorption models were applied to describe the equilibrium isotherms at different temperatures, and the Freundlich agrees very well with the experimental data. The pseudo-second-order model provided a very good fitting (R-2 > 0.992) for the two anionic dyes. The calculated maximum adsorption capacity (q(e,calcd)) increased with increasing initial dye concentration, but there is no linear relationship with pH and temperature. Thermodynamic parameters such as change in free energy (ΔG°), enthalpy (ΔH°), and entropy (ΔS°) were also determined.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Models, Analysis, Anionic, Anionic Dyes, Aqueous Solution, Azo Dyes, Batch, Batch System, Capacity, Cetyltrimethylammonium Bromide, Clinoptilolite, Color Removal, Concentration, Contact Time, CTAB, Diffusion, Dye, Dyes, Energy, Enthalpy, Entropy, Equilibrium, Equilibrium Isotherms, Experimental, Experimental Data, Fitting, Free Energy, Freundlich, G, Hydrophilicity, Isotherms, Kinetics, Langmuir, Linear, Linked Chitosan Beads, Model, Models, Modification, Natural, Natural Zeolite, Parameters, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Reactive Black 5, SEM, Sorption, Surface, Temperature, Temperatures, Time, Water, Zeolite

? El Mouzdahir, Y., Elmchaouri, A., Mahboub, R., Gil, A. and Korili, S.A. (2007), Adsorption of Methylene blue from aqueous solutions on a Moroccan clay. *Journal of Chemical and Engineering Data*, **52** (5), 1621-1625.

Full Text: [2007\J Che Eng Dat52, 1621.pdf](2007/J%20Che%20Eng%20Dat52,%201621.pdf)

Abstract: In this work, an equilibrium adsorption isotherm for the removal of a basic dye, Methylene Blue (MB), from aqueous solution on a natural Moroccan clay mineral has been investigated. Equilibrium data are mathematically modeled using the Freundlich and Langmuir adsorption models. The adsorption kinetics of MB has also been studied in terms of pseudo-first-order and pseudo-second-order. A maximum adsorption capacity of 135 mg.g-1 at equilibrium is achieved, indicating that the material could be used as a low-cost alternative in wastewater treatment for the removal of color and dyes.

Keywords: Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Kinetics, Adsorption Models, Aqueous Solution, Aqueous Solutions, Basic Dye, Basic-Dyes, Capacity, Cation-Exchange, Clay, Clay Mineral, Color, Dye, Dyes, Equilibrium, Equilibrium Adsorption, Equilibrium Adsorption Isotherm, Freundlich, Isotherm, Kinetics, Langmuir, Langmuir Adsorption, Mb, Methylene Blue, Mineral, Minerals, Models, Montmorillonite, Natural, Peat, Photocatalytic Degradation, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Removal, Solutions, Sorption, Treatment, Waste-Water, Wastewater, Wastewater Treatment

? Karadag, D., Akgul, E., Tok, S., Erturk, F., Kaya, M.A. and Turan, M. (2007), Basic and reactive dye removal using natural and modified zeolites. *Journal of Chemical and Engineering Data*, **52** (6), 2436-2441.

Full Text: [2007\J Che Eng Dat52, 2436.pdf](2007/J%20Che%20Eng%20Dat52,%202436.pdf)

Abstract: The adsorption of the dyes Basic Red 46 (BR46) and Reactive Yellow 176 (RY176) from aqueous solution onto natural and modified zeolites has been investigated. The surfactants cetyltrimethylammonium bromide (CTAB) and hexadecyltrimethylammonium bromide (HDTMA) were used to modify the zeolite surface, and Fourier transform infrared spectroscopy (FTIR) spectral analysis was used to confirm the surface modification. The effects of initial dye concentration, contact time, pH, temperature, ionic strength, and surfactant type on adsorption were studied in a batch system. BR46 adsorption onto natural zeolite increased to minor a extent with increasing pH, whereas pH did not significantly affect RY176 adsorption. Adsorption capacities of dyes increased with contact time, initial concentration, and temperature for both BR46 and RY176. The increase in ionic strength caused a decrease in adsorption of BR46 and an increase in adsorption of RY176. Adsorption of BR46 on natural zeolite is more favorable than RY176 on the CTAB and HDTMA modified zeolites. The adsorption of basic and reactive dyes was spontaneous and endothermic as concluded from thermodynamic assays.

Keywords: Aqueous-Solution, Anionic Dye, Fly-Ash, Activated Carbon, Adsorption, Surfactant, Clinoptilolite, Equilibrium, Sepiolite, Kinetics

? Azizian, S. (2008), Comments on “Adsorption Equilibrium and Kinetics of Reactive Black 5 and Reactive Red 239 in Aqueous Solution onto Surfactant-Modified Zeolite” (Karadağ, D.; Turan, M.; Akgül, E.; Tok, S.; Faki, A. *J. Chem. Eng. Data* 2007, *52*, 1615−1620). *Journal of Chemical and Engineering Data*, **53** (1), 322-323.

Full Text: [2008\J Che Eng Dat53, 322.pdf](2008/J%20Che%20Eng%20Dat53,%20322.pdf)

? Karadağ, D., Turan, M., Akgül, E., Tok, S. and Faki, A. (2008), Reply to comments by S. Azizian on J-Chem. Eng. Data 2007, 52, 1615-1620. *Journal of Chemical and Engineering Data*, **53** (1), 324-325.

Full Text: [2008\J Che Eng Dat53, 324.pdf](2008/J%20Che%20Eng%20Dat53,%20324.pdf)

Keywords: Aqueous-Solution, Adsorption, Kinetics, Sorption, Removal, Dye

? Basha, S. and Jha, B. (2008), Estimation of isotherm parameters for biosorption of Cd(II) and Pb(II) onto brown seaweed, *Lobophora variegata*. *Journal of Chemical and Engineering Data*, **53** (2), 449-455.

Full Text: [2008\J Che Eng Dat53, 449.pdf](2008/J%20Che%20Eng%20Dat53,%20449.pdf)

Abstract: The biosorption equilibrium isotherms of Cd(Il) and Pb(II) from aqueous solution onto both raw and treated biomass of Lobophora variegata were studied and modeled. To predict the biosorption isotherms and to determine the characteristic parameters for process design, 19 one-, two-, three-, four-, and five-parameter isotherm models were applied to experimental data. Results show that in general the accuracy of models to fit experimental data improves with the number of parameters. Biosorption isotherm modeling shows that the interaction of Cd(II) and Pb(II) with the L. variegata surface is localized to monolayer sorption. The interaction among biosorbed molecules is repulsive, and there is no association between them. Biosorption is carried out on energetically different sites and is an endothermic process. The five-parameter Fritz-Schluender model gives the most accurate fit with high R-2 (0.9960 to 0.9978), low standard error (SE) (0.0334 to 0.0129), and residual or sum of square error (SSE) (0.0066 to 0.0137) values to all experimental data in comparison to other models. The biosorption isotherm models fitted the experimental data in the order: Fritz-Schluender (five-parameter) > Toth (three-parameter) > Fritz-Schluender (four-parameter) > Langmuir (two-parameter) > Temkin (two-parameter).

Keywords: Dilute Aqueous-Solutions, Activated Carbon, Equilibrium Isotherm, Pretreated Biomass, Organic Solutes, Adsorption, Sorption, Models, Ions, Peat

? Liu, F.L., Wang, J.H., Li, L.Y., Shao, Y., Xu, Z.Y. and Zheng, S.R. (2009), Adsorption of direct yellow 12 onto ordered mesoporous carbon and activated carbon. *Journal of Chemical and Engineering Data*, **54** (11), 3043-3050.

Full Text: [2009\J Che Eng Dat54, 3043.pdf](2009/J%20Che%20Eng%20Dat54,%203043.pdf)

Abstract: Mesoporous carbon CMK-3 was prepared using a mesoporous silica SBA-15 as the template, and the adsorption of aqueous direct yellow 12 (DY-12) oil CMK-3 and commercial powdered activated carbon (PAC) was studied. X-ray diffraction, N-2 adsorption, and transmission electron microscopy results demonstrate that CMK-3 with ordered structure is a true replica of its template SBA-15. CMK-3 and PAC have comparable pore volumes, whereas CMK-3 mainly consists of mesopores, and PAC contains both micropores and mesopores. The adsorption of DY-12 over CMK-3 and PAC could be well-described by the Langmuir isotherm model. The maximum adsorption amounts of CMK-3 and PAC for DY-12 at 25°C were found to be (303.0 and 161.3) mg.g-1, respectively, indicative of a substantially higher adsorption capacity of CMK-3 compared to that of PAC. DY-12 adsorption processes over CMK-3 and PAC obey pseudosecond-order kinetics. For DY-12 adsorption on CMK-3, the rate constants were (2.82×10-4, 4.43×10-5, and 9.77×10-6) g.mg-1.s-1 at initial DY-12 concentrations of (17.7, 44.3, and 145) mg.dm-3, respectively. In the case of PAC, the rate constants were found to be (1.78×10-5, 9.8×10-7, and 6.7×10-7) g.mg-1.s-1 at initial concentrations of (17.7, 44.6, and 339) mg.dm-3, respectively, reflecting much lower adsorption rates over PAC than those over CMK-3. Furthermore, the intraparticle diffusion of DY-12 over CMK-3 and PAC was elucidated using the Weber-Morris model. The present results clearly verify the importance of mesopores in the adsorption of aqueous DY-12.

Keywords: Activated Carbon, Adsorption, Adsorption Capacity, Aqueous-Solution, Azo Dyes, Capacity, Carbon, Cmk-3, Congo Red, Diffusion, Direct Yellow 12, Electron Microscopy, Equilibrium, Fly-Ash, Intraparticle Diffusion, Isotherm, Isotherm Model, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Mesoporous, Mesoporous Silica, Model, Molecular-Sieves, N2, N2, N2 Adsorption, Nov, PAC, Pore Structure, Powdered Activated Carbon, Rate Constants, Rates, Reactive Dyes, Removal, SBA-15, Silica, Structure, Template, Transmission, X-Ray, X-Ray Diffraction

? Wu, Y.J., Zhang, L.J., Gao, C.L., Ma, J.Y., Ma, X.H. and Han, R.P. (2009), Adsorption of copper ions and methylene blue in a single and binary system on wheat straw. *Journal of Chemical and Engineering Data*, **54** (12), 3229-3234.

Full Text: [2009\J Che Eng Data54, 3229.pdf](2009/J%20Che%20Eng%20Data54,%203229.pdf)

Abstract: A natural wheat straw was used as adsorbent for removal of copper and methylene blue (MB) from aqueous solution. A batch system was applied to Study the behavior of Cu2+ and MB adsorption in single and binary systems oil wheat straw In the single Systems, there was no significant difference in the quantity of MB adsorbed onto wheat straw within a pH range of 4.0 to 10.0. But for Cu2+, the optimal pH is about 5. Kinetic studies indicate that Cu2+ and MB adsorption oil the wheat straw follows the Elovich equation. The Cu2+ adsorption isotherm follows the Langmuir and Redlich-Peterson models, while MB adsorption follows the Redlich-Peterson isotherm The adsorption capacities of Cu2+ and MB at 273 K and pH 5 are (7.05 and 60.66) mg.g-1 respectively In the binary system, Cu2+ and MB exhibited competitive adsorption The adsorption of Cu2+ or MB is considerably reduced with all increasing concentration of the other The quantity of Cu2+ adsorbed is more strongly influenced by MB due to the higher affinity of wheat straw for the latter. As wheat straw is easily obtained and cheap, it will be promising for removal of metal ions and dyes.

Keywords: Adsorbent, Adsorption, Adsorption Capacities, Adsorption Isotherm, Aqueous Solution, Aqueous-Solution, Batch, Batch System, Behavior, Biosorption, Competitive, Competitive Adsorption, Concentration, Copper, Cu2+, Dye Removal, Dyes, Elovich, Elovich Equation, Equilibrium, Fly-Ash, Humic-Acid, Ions, Isotherm, Kinetic, Kinetic Studies, Kinetics, Langmuir, Low-Cost Adsorbents, MB, Metal, Metal Ions, Methylene Blue, Models, Natural, Natural Zeolite, pH, Redlich-Peterson, Removal, Solution, Straw, Systems, Waste-Water

? Sharma, Y.C. (2010), Optimization of parameters for adsorption of Methylene blue on a low-cost activated carbon. *Journal of Chemical and Engineering Data*, **55** (1), 435-439.

Full Text: [2010\J Che Eng Dat55, 435.pdf](2010/J%20Che%20Eng%20Dat55,%20435.pdf)

Abstract: We prepared activated carbon by pyrolyzing all agro-waste, rice husk, in the presence of ZnCl2. The activated carbon displayed both microporous and mesoporous nature with a significant Surface area of 180.50 m2.g-1. Fourier transform infrared (FTIR) spectrograms of the activated carbon were recorded to determine the number and positions of the functional groups available oil its surface. The adsorption of methylene blue (MB) from its aqueous Solutions by rice husk activated carbon (RHAC) was studied. The removal of dye increased from (82.75 to 93.20) % with decreasing initial concentration of MB from (100 to 60) mg.L-1. The time of equilibrium was found to be 100 min. Higher removal was obtained at higher dose of adsorbent, and the removal increased from (86.75 to 99.83) % with increasing adsorbent dose from (0.40 to 0.60) g. The removal of methylene blue increased from (93.20 to 99.16) % with increasing temperature from (30 to 50) degrees C at 60 mg.L-1 MB concentration, 150 rpm, and 100 mu m particle size. Isotherm studies were conducted to know the capacity of the activated carbon. Langmuir and Freundlich isotherm equations were applied for the equilibrium data.

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorption, Agricultural Waste, Agrowaste, Aqueous-Solutions, Basic Dye, Capacity, Carbon, Cationic Dye, Concentration, Data, Dye, Dye Removal, Equilibrium, Freundlich, Freundlich Isotherm, FTIR, Functional Groups, Isotherm, Isotherm Equations, Langmuir, Malachite Green, MB, Mesoporous, Methylene Blue, Particle Size, Removal, Rice, Rice Husk, Rice-Husk, Size, Sorption, Surface, Temperature, Yellow, ZnCl2

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Full Text: [2010\J Che Eng Dat55, 1186.pdf](2010/J%20Che%20Eng%20Dat55,%201186.pdf)

Abstract: A viable and cost-effective technology was explored in this present task for removal of heavy metal ions Such as Cu2+, Ni2+, Zn2+, Cd2+, and Pb2+ from aqueous Solution using three fruit peels Such as orange peel (OP), lemon peel (LP), and banana peel (BP). The surface of the LP and lemon peel cellulose (LPC) was chemically modified. All these adsorbents were characterized by FT-IR, BET, and SEM. The widely used Langmuir adsorption isotherms were used to describe the adsorption equilibrium process. The adsorption capacity of metal ions Such as Cu2+ and Ni2+ Was found to be more than that of other metal ions. Upon comparison of the adsorbents, surface modified LPC (LPCACS) was found to show enhanced adsorption activity. A comparative Study of adsorption was carried Out with activated carbon (AC) also from which it was inferred that the order of the adsorption capacity is as follows: LPCACS > LPC > AC > LP.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Adsorption Isotherms, BET, Biosorption, Cadmium, Capacity, Carbon, Cd2+, Cellulose, Comparison, Cost-Effective, Cu2+, Electroplating Wastes, Equilibrium, FT-IR, FTIR, Heavy Metal, Heavy Metal Ions, Ions, Isotherms, Langmuir, Mar, Marine-Algae, Metal, Metal Ions, Modified, Ni2+, Pb2+, Physicochemical Environment, Recovery, Removal, Rice Husk, SEM, Sorption Isotherm, Sugar-Beet Pulp, Surface, Technology, Zn2+

? Qu, R.J., Zhang, Y., Sun, C.M., Wang, C.H., Ji, C.N., Chen, H. and Yin, P. (2010), Adsorption of Hg(II) from an aqueous solution by silica-gel supported diethylenetriamine prepared via different routes: Kinetics, thermodynamics, and isotherms. *Journal of Chemical and Engineering Data*, **55** (4), 1496-1504.

Full Text: [2010\J Che Eng Dat55, 1496.pdf](2010/J%20Che%20Eng%20Dat55,%201496.pdf)

Abstract: The kinetics, thermodynamics, and isotherms of Hg(II) ion adsorption onto silica-gel supported diethylenetriamine adsorbents, SG-HE-dD, SG-HO-dD, SG-HE-pD, and SG-HO-pD (where SG means silica-gel. HE, heterogeneous, HO, homogeneous, d, direct; p, protection, and D. diethylenetriamine), prepared by so-called heterogeneous-direct animation, homogeneous-direct amination, heterogeneous end-group protection, and homogeneous end-group protection methods, respectively, were investigated. The results showed that the adsorption processes of Hg(II) ions Followed well a pseudofirst-order model onto SG-HE-dD, SC-HO-dD, and SG-HE-pD, while a pseudosecond-order model was followed onto SG-HO-pD. Film diffusion might be dominated in the adsorption process of Hg(II) ions onto the four adsorbents Thermodynamic analysis revealed that the adsorption behaviors of Hg(II) ions onto the four adsorbents were endothermic processes, resulting in higher adsorption capacities at higher temperature The Langmuir, Freundlich, and Redlich Peterson models were employed to fit the isothermal adsorption The results revealed that the linear Langmuir. nonlinear Lanhmuir and nonlinear Redlich Peter son isotherm models are the best-fit models to predict the experimental data Mercury ions adsorbed on low adsorbents were desorbed effectively at about 5 % thiourea/0.1 mol . L-1 HNO3, and the adsorption capacity of the SG-HO-dD and SG-HO-pD adsorbents can still be maintained at the (98 and 95) % level at the fifth cycles, respectively.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Capacity, Agricultural Waste, Amination, Analysis, Capacity, Data, Derivatives, Diffusion, Endothermic, Experimental, Extraction, Film Diffusion, Freundlich, Heavy-Metal Ions, Hg(II), Hg(II) Ions, Ions, Isotherm, Isothermal, Isothermal Adsorption, Isotherms, Kinetics, L1, Langmuir, Mercury, Methods, Model, Models, Propane-1,3-Diamine, Protection, Pseudosecond-Order, Redlich-Peterson, Removal, Silica Gel, Silicagel, Solid, Liquid Interface, Sorption Isotherm, Temperature, Thermodynamic, Thermodynamic Analysis, Thermodynamics

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Full Text: [2010\J Che Eng Dat55, 2399.pdf](2010/J%20Che%20Eng%20Dat55,%202399.pdf)

Abstract: The adsorption of Co(II) and Mn(II) onto the 001 x 7 x 7 ion-exchange resin has been studied. Batch experiments were performed to study the effects of various parameters such as stirring speed, temperature, dosage of resin, and pH on the adsorption process. The adsorption capacity (K-F) for cobalt and manganese were calculated from the Freundlich adsorption isotherm. The adsorption of cobalt and manganese on the 001 x 7 x 7 ion-exchange resin followed the pseudosecond-order equation. The adsorption and desorption of Co(II) and Mn(II) onto the 001 x 7 x 7 ion-exchange resin were investigated by using a dynamic method. The effects of flow rate, temperature, and desorbant concentration were studied. The studies showed that this cation-exchange resin can be used as an efficient adsorbent material for the removal of cobalt and manganese from pure terephthalic acid (PTA) wastewater.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Isotherm, Aqueous-Solution, Capacity, Cation Exchange, Co(II), Cobalt, Concentration, Desorption, Dynamic, Experiments, Flow, Flow Rate, Freundlich, Freundlich Adsorption Isotherm, Ion Exchange, Ion Exchange Resin, Ion-Exchange, Ion-Exchange Resin, Ionexchange, Isotherm, Manganese, pH, Preconcentration, Recovery, Removal, Resin, Temperature, Wastewater

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Full Text: [2010\J Che Eng Dat55, 2662.pdf](2010/J%20Che%20Eng%20Dat55,%202662.pdf)

Abstract: Characterization and adsorption characteristics of *Cocos nucifera L*. activated carbon (CNAC) have been investigated. The activated carbon used in this study was prepared from the coir of *C. nucifera L*., commonly known as “coconut”. The activated carbon was characterized for surface groups and other parameters and was analyzed for pore size distribution. The surface texture of the adsorbent, the pore structure, and the number and position of the functional groups available on its surface for binding methylene blue (MB) were investigated by Fourier transform infrared spectra. X-ray diffraction studies confirmed the amorphous nature of the adsorbent. The activated carbon developed has been used for the removal of MB. Batch adsorption experiments were carried out for the removal of MB onto the activated carbon. The effect of contact time and initial concentration, adsorbent close, and temperature on the removal of the dye was investigated. A maximum removal of almost 100 % was achieved at 60 mg.L-1 of dye concentration by increasing the adsorbent dose from (3 to 7) g.L-1 Kinetic data were found to lit the first- and second-order kinetic equations, and the values of the rate constants were found to be 0.55.10-2 min-1 and 0.082 g. (mg. min)-1, respectively. The resultant equilibrium data were fitted to various isotherm equations. The adsorption capacity of the adsorbent was found to be 15.59 mg . g-1 at room temperature (30ºC).

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Capacity, Bagasse Pith, Basic Dye, Batch Adsorption, Binding, Capacity, Carbon, Cationic Dye, Characteristics, Characterization, Cocos Nucifera, Coir Pith, Concentration, Data, Distribution, Dye, Equilibrium, Experiments, First, Functional Groups, Isotherm, Isotherm Equations, Kinetic, Kinetic Equations, Low-Cost Adsorbent, MB, Methylene Blue, Model, Pore, Rate Constants, Removal, Room Temperature, Second Order, Second-Order, Size, Sorption, Structure, Surface, Surface Groups, Temperature, Water, X-Ray, X-Ray Diffraction

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Full Text: [2010\J Che Eng Dat55, 2848.pdf](2010/J%20Che%20Eng%20Dat55,%202848.pdf)

Abstract: This study investigates the adsorption of gallium-67, routinely used in nuclear medicine laboratories, in aqueous solution by using the waste of a rose-oil processing factory (rose residue). The experimental parameters were determined to be as follows: temperature, (10.0 to 40.0) ºC; pH, (2.0 to 10.0); stirring speed, (300 to 720) rpm; particles size, (0.15 to 1.40) mm; and adsorbent dose, (1.0 to 15.0) g.L-1. It was seen that the most important parameters were pH, temperature, particle size, and adsorbent dose. The adsorption mechanism of the rose residue was examined by comparing the Fourier transform infrared (FUR) spectra before and after adsorption. The ΔG and ΔH values were determined, and it was concluded that the absorption was endothermic and spontaneous. Absorption kinetics was studied, and it was observed that they fit a pseudo second-order model. As a result, it was found that the rose residue was a perfect absorbent for the adsorption of gallium-67.

Keywords: Absorbent, Absorption, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Mechanism, Aqueous Solution, Biosorption, Carbon, Dye, Endothermic, Experimental, Heavy-Metals, Isotherms, Kinetics, Mechanism, Medicine, Model, Nuclear Medicine, Particle Size, Particles, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Removal, Second Order, Second-Order, Second-Order Model, Size, Solution, Sorption, Temperature, Waste

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Full Text: [2010\J Che Eng Dat55, 3428.pdf](2010/J%20Che%20Eng%20Dat55,%203428.pdf)

Abstract: A 2(4-1)(IV) half-fractional factorial design was performed to identify significant variables for the biosorption of Cr(VI) by Elaeagnus tree leaves. A face-centered central composite design (FCCD) was carried out to find a suitable response surface relating all significant variables to R (removal) and q (sorption capacity). Simultaneous optimization of both responses (R and q) was carried out, and 80 % of the goal of desirability function was achieved. Simultaneous optimization of R and q and simple optimization of q was more favorable than that of R from an environmental and economical view. A kinetics study was performed by examining pseudofirst-order, second-order, and intraparticle diffusion kinetic models, and the best fit was obtained for the pseudosecond-order kinetics model with q(c) = (0.624 and 2.657) mg. g-1 for (10 and 50) mg . L-1 Cr(VI), respectively. Langmuir, Freundlich, and Dubinin - Radushkevich models were used for the equilibrium study. The equilibrium data had the best fit with the Langmuir isotherm. Biosorption mean free energy (E) was calculated to be 16.2 kJ. mol-1. Considering kinetics and equilibrium studies, one can suggest that adsorption onto the sites is the rate-limiting step and that biosorption goes through chemisorption mechanisms. Fourier transform infrared (FTIR) spectra were recorded to identify functional groups involved in the biosorption.

Keywords: Adsorption, Analytical-Chemistry, Aqueous-Solutions, Biosorption, Capacity, Chemisorption, Composite, Cr(VI), Data, Design, Diffusion, Divalent Metal-Ions, Energy, Environmental, Equilibrium, Equilibrium Studies, Freundlich, FTIR, Function, Functional Groups, Heavy-Metals, Hexavalent Chromium, Intraparticle Diffusion, Isotherm, Kinetic, Kinetic Models, Kinetics, Kinetics Model, L1, Langmuir, Langmuir Isotherm, Mechanisms, Methylene-Blue, Model, Modeling, Models, Optimization, Rate Limiting Step, Rate-Limiting Step, Removal, Response-Surface Methodology, Second Order, Second-Order, Sorption, Sorption Capacity, Surface, Waste-Water

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Full Text: [2010\J Che Eng Dat55, 3742.pdf](2010/J%20Che%20Eng%20Dat55,%203742.pdf)

Abstract: Nanoplates of MgO possessing the polar (III) facet as the primary surface were studied as adsorbents for dye pollutants removal from wastewater. The thickness of the MgO(III) nanoplates is (3 to 5) nm, with an average specific surface area (SSA) of 198 m2.g-1. Congo red and reactive brilliant red X3B are used as model azo dyes, and their adsorption is studied at different dye concentrations, solution pH, salt concentration, and temperatures in a batch reactor. The experimental results indicate that the MgO nanoplates with polar (III) surfaces exhibited much more favorable adsorption properties than a conventionally decomposition prepared MgO powder (CP-MgO, SSA = 30 m2.g-1) and activated carbon (SSA = 1500 m2.g-1) for Congo red solution with the initial concentration of 100 mg.L-1 in 30 min. The maximum adsorption capability of Congo red on MgO (111) nanosheets reached 131.3 mg.g-1 in 30 min, while the maximum adsorption capabilities of Congo red on CP-MgO and activated carbon were only (61.9 and 17.7) mg.g-1, respectively. Two common models, the Langmuir and Freundlich isotherms, are used to explicate the interaction of dye and MgO(III). The isotherm evaluations revealed that the Langmuir model attained better fits to the experimental equilibrium data than the Freundlich model. The maximum predicted adsorption capacities were (303.0 and 277.8) mg.g-1 for Congo red and reactive brilliant red X3B, respectively. In addition, adsorption kinetic data followed a pseudosecond-order rate for both dyes. Furthermore, compared to activated carbon, the adsorbent MgO(III) has the advantage in that it can be readily regenerated by a simple calcination process and reused without loss of activity. Therefore, it may be well suited for dealing with the removal of dyes from wastewaters.

Keywords: Acid Dye, Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Kinetic, Adsorption Properties, Aqueous-Solutions, Azo Dyes, Azo-Dyes, Basic-Dyes, Batch, Batch Reactor, Calcination, Carbon, Concentration, Congo Red, Congo-Red, Data, Decomposition, Dye, Dyes, Equilibrium, Experimental, Fly-Ash, Freundlich, Freundlich Model, Interaction, Isotherm, Isotherms, Kinetic, Langmuir, Langmuir And Freundlich Isotherms, Langmuir Model, Magnesium-Oxide, Model, Models, pH, Pollutants, Primary, Reactive Dye, Removal, Removal of Dyes, Salt, Salt Concentration, Solution, Specific Surface, Specific Surface Area, Surface, Surface Area, Surfaces, Wastewater, Wastewaters

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Full Text: [2010\J Che Eng Dat55, 3923.pdf](2010/J%20Che%20Eng%20Dat55,%203923.pdf)

Abstract: Carbonate hydroxyapatite (CHAP) was synthesized from domestic hen egg shells. The obtained CHAP was characterized by X-ray diffraction (XRD) and Fourier transform infrared spectroscopy and investigated as metal adsorption for Pb2+ from aqueous solutions. The effect of various parameters on the adsorption process such as contact time, solution pH, and temperature was studied to optimize the conditions for maximum adsorption. The results showed that the removal efficiency of Pb2+ by carbonate hydroxyapatite calcined at 600 degrees C (CHAPF) reached 99.78 %, with an initial Pb2+ concentration of 200 mg.L-1, pH = 3, and a solid/liquid ratio of 1 g.L-1. The equilibrium removal process of lead ions by CHAPF foam at pH = 3 was well described by the Langmuir isotherm model, with a maximum adsorption capacity of 500 mg.g-1 at (25 and 35)ºC. The removal mechanism of Pb2+ by the CHAPF varies, depending on the initial concentration of lead in the aqueous solution: the dissolution of CHAPF and precipitation of hydropyromorphite (Pb-10(PO4)6(OH)2) is dominant at low concentration [(20 to 200) mg.L-1], and the adsorption mechanism of Pb2+ on the CHAPF surface and ion exchange reaction between Ca2+ of hydroxyapatite and Pb2+ in aqueous solution is dominant at high concentration [(500 to 700) mg.L-1]. The thermodynamics of the immobilization process indicates an exothermic sorption process of Pb2+.

Keywords: Activated Carbon, Adsorption, Adsorption Capacity, Adsorption Mechanism, Animal Bones, Aqueous Solution, Aqueous Solutions, Aqueous-Solutions, Biosorbent, Calcined, Capacity, Carbonate, Concentration, Copper, Dissolution, Efficiency, Equilibrium, Exothermic, Foam, Heavy-Metals, Hydroxyapatite, Immobilization, Infrared Spectroscopy, Ion Exchange, Ion-Exchange, Ions, Isotherm, Isotherm Model, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Lead, Mechanism, Metal, Metal Adsorption, Model, Pb2+, pH, Precipitation, Removal, Removal Efficiency, Single-Metal, Solution, Solutions, Sorption, Sorption Process, Spectroscopy, Surface, Temperature, Thermodynamics, Waste, X-Ray, X-Ray Diffraction, XRD

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Full Text: [2010\J Che Eng Dat55, 4147.pdf](2010/J%20Che%20Eng%20Dat55,%204147.pdf)

Abstract: In this paper, a new kind of biosorbent containing the extractant Cyanex 272 was prepared by the method of solid-liquid grinding and found to be efficient in removing Pb(II) from aqueous solution, Orange peel (OP) biosorbents were characterized by SEM, FTIR, BET, and elemental analysis, which confirmed that carboxylic groups were introduced into the orange peel by chemical modification [citric acid (CO), saponification and citric acid (SCO)] and that Cyanex 272 was successfully immobilized on the orange peel (272OP, 272CO, and 272SCO). In addition, Cyanex 272 played an important role in the adsorption process, i.e., the maximum adsorption capacity (obtained from the Langmuir-Freundlich model) was improved, with the order of the adsorption capacities being 272SCO (1.30 mol.kg-1) > SCO (1.26 mol.kg-1) > 272CO (1.20 mol.kg-1) > 27200 (1.02 mol.kg-1) > CO (0.62 mol.kg-1), and the equilibrium time was shortened front 60 to 40 min for 272SCO. It was obvious that adsorption of Pb(II) strongly depends on pH. with the optimum pH range being 5.0-5.8 for all adsorbents, and the removal rate of Pb(II) by 272SCO could be as high as 100 %. The optimum solid/liquid ratio was 3.7 g.L-1 for an initial Pb(II) concentration of 0.002 mol.L-1. The kinetic equilibria could be explained as pseudo-second-order kinetic processes. The optimum desorption agent was found to be 0.1 mol.L-1 HCl. The adsorption capacity of 272SCO declined slightly after being recycled six fillies. After the sixth cycle, the adsorption rate of Pb(II) onto 272SCO was still 89.61 %.

Keywords: Adsorbents, Adsorption, Adsorption Capacities, Adsorption Capacity, Adsorption Rate, Agricultural Waste, Analysis, Aqueous Solution, Aqueous-Solutions, BET, Biosorbent, Biosorbents, Biosorption, Bis(2,4,4-Trimethylpentyl)Phosphinic Acid, Cadmium, Capacity, Carboxylic, Chemical, Chemical Modification, Citric Acid, Co, Concentration, Desorption, Equilibria, Equilibrium, FTIR, Immobilized, Kinetic, Langmuir-Freundlich, Metal-Ions, Model, Modeling, Modification, Modified, Orange Peel, Pb(II), pH, Phanerochaete-Chrysosporium, Pseudo Second Order, Pseudo-Second-Order, Rare-Earths, Removal, Role, Saponification, SEM, Solution, Synergistic Extraction

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Full Text: [2010\J Che Eng Dat55, 4343.pdf](2010/J%20Che%20Eng%20Dat55,%204343.pdf)

Abstract: Two chelating resins, porous cross-linked polystyrene modified with 2-amino-pyridine via a sulfoxide/ sulfone-containing spacer (PVBSO-AP and PVBSO2-AP), were synthesized. Their structures were characterized by a Fourier transform infrared spectrometer (FTIR), scanning electron microscopy (SEM), porous structure analysis, and elementary analysis. The results of SEM and pore analysis demonstrated that the two kinds of chelating resins maintained meso-macro porous structures. Some factors affecting the adsorption of Hg(II) on PVBSO-AP and PVBSO2-AP resins such as contact time, solution concentration, and pH were investigated. The results showed that the optimum pH ranges appeared at(4.0.(to 5.0) for PVBSO-AP and at (3.0 to 6.0) for PVBSO2-AP resin, and the times reaching equilibrium were (8 and 5) h for the two resins, respectively. The experimental equilibrium data of Hg(II) onto the two resins showed that linear Langmuir and nonlinear Redlich-Peterson isotherms were the best fitting isotherms to describe the experimental data. The selectivity of adsorption of Hg(II) on PVBSO-AP and PVBSO2-AP resins for Hg(II) were investigated in the binary ion systems. The results showed that the two resins can adsorb selectively HG(II) in the presence of Ni(II), Zn(II). and Pb(II), and three adsorption-desorption cycles demonstrated that the two resins are suitable for reuse without considerable changes in adsorption capacity.

Keywords: Adsorption, Adsorption Capacity, Adsorption-Desorption, Analysis, Aqueous-Solution, Capacity, Changes, Characterization, Chelating Resin, Chitosan Resin, Concentration, Cross-Linked, Data, Electron Microscopy, Equilibrium, Experimental, FTIR, Hg(II), Isotherms, Langmuir, Mercury(II), Metal-Binding Behavior, Modified, Ni(II), Pb(II), pH, Polystyrene, Redlich-Peterson, Removal, Resin, Resins, Reuse, Scanning Electron Microscopy, Selective Separation, Selectivity, SEM, Solution, Sorption, Structure, Systems, Tree Fern, Waste-Water, Zn(II)

? Ahmaruzzaman, M. and Gayatri, S.L. (2010), Activated tea waste as a potential low-cost adsorbent for the removal of p-nitrophenol from wastewater. *Journal of Chemical and Engineering Data*, **55** (11), 4614-4623.

Full Text: [2010\J Che Eng Dat55, 4614.pdf](2010/J%20Che%20Eng%20Dat55,%204614.pdf)

Abstract: The aim of this work was to determine the potential of activated tea waste (ATW) as a useful adsorbent for the removal of p-nitrophenol (p-NP) from aqueous systems. The study was realized using batch experiments with synthetic wastewater having a p-NP concentration of 1000 mg center dot L-1. The effects of pH, contact time, and presence of anions were investigated. An increase in the pH to above neutrality resulted in a decrease in the p-NP adsorption capacity. The adsorption process reached equilibrium within 5 h of contact time. The Freundlich, Langmuir, Temkin, Dubunin-Radushkevich, and Redlich-Peterson adsorption models were used for mathematical description of the adsorption equilibrium, and it was found that the experimental data fitted very well to the Langmuir isotherm. Batch adsorption studies, based on the assumption of a pseudo-first-order, pseudo-second-order, or intraparticle diffusion mechanism, showed that the kinetic data followed closely a pseudo-second-order rather than a pseudo-first-order mechanism. The adsorption capacity of ATW for the removal of p-NP was found to be 142.85 mg center dot g(-1). These results clearly indicate the efficiency of activated tea waste (ATW) as a low-cost adsorbent for treatment of wastewater containing p-NP.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Aqueous-Solutions, Basic Dye, Batch, Capacity, Carbon, Chemical Activation, Contact Time, Cr(VI) Adsorption, Data, Diffusion, Equilibrium, Fixed-Bed, Fly-Ash, Freundlich, Intraparticle Diffusion, Isotherm, Kinetic, Langmuir, Langmuir Isotherm, Low Cost Adsorbent, Low-Cost Adsorbent, Mechanism, Mixed Adsorbents, Models, pH, Phosphoric-Acid Activation, Process, Pseudo Second Order, Pseudo-Second-Order, Removal, Sorption, Temkin, Treatment, Waste, Wastewater

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Full Text: [2010\J Che Eng Dat55, 4650.pdf](2010/J%20Che%20Eng%20Dat55,%204650.pdf)

Abstract: Three polyamine-functionalized macroporous polystyrene-co-divinylbenzene beads prepared by ethylenediamine (EDA), diethylenetriamine (DETA), and triethylenetetramine (TETA) modification, respectively (called PS-FDA, PS-DETA, and PS-TETA), have been investigated as high-capacity chelating resins for Hg(II) ions. Their structures were characterized by elemental analysis, infrared spectroscopy, and porous analysis. PS-EDA, PS-DETA, and PS-TETA were found to be highly effective for the adsorption of Hg(II) ions, exhibiting uptake capacities of (1.55, 1.73, and 1.84) mmol of Hg(II) ions/g of adsorbent, respectively. Kinetic data indicated that the adsorption process achieved equilibrium within 10 h and followed a pseudo-second-order rate equation. The adsorption isotherm data fit the Frendlich model and its linearized form well, together with thermodynamic data indicating the spontaneous and endothermic nature of the process. Results of a desorption study showed that Hg(II) ions adsorbed onto PS-FDA, PS-DETA, and PS-TETA could be easily desorbed. PS-FDA, PS-DETA, and PS-TETA show excellent affinity for Hg(II) ions, removing them from mixed metal solutions at pH 2.0. The highest effectiveness of PS-TETA for the capture of Hg(II) ions is attributed to both the longer polyamine chain and the expansion capability of the polystyrene-co-divinylbenzene framework, which facilitates the accessibility of the binding sites.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherm, Analysis, Beads, Chitosan, Data, Desorption, Equilibrium, Gel Beads, Heavy-Metals, Hg(II), Infrared, Isotherm, Kinetic, Kinetics, Mercury Removal, Model, Modification, pH, Process, Pseudo Second Order, Pseudo-Second-Order, Removal, Separation, Sorption, Thermodynamic, Thermodynamics, Uptake

? Wang, Y.X., Liu, B.S. and Zheng, C. (2010), Preparation and adsorption properties of corncob-derived activated carbon with high surface area. *Journal of Chemical and Engineering Data*, **55** (11), 4669-4676.

Full Text: [2010\J Che Eng Dat55, 4669.pdf](2010/J%20Che%20Eng%20Dat55,%204669.pdf)

Abstract: Corncob, a widespread and inexpensive natural resource in China, was used to prepare activated carbon (AC) by chemical activation with potassium hydroxide (KOH). The adsorption equilibrium and kinetics of H-2, CH4, and CO2 on AC were investigated at different temperatures. Adsorption isotherms of H-2, CH4, and CO2 were correlated with the Langmuir and Freundich equations, and the heat of adsorption was determined. It was revealed that the Freundich adsorption equation was more apt to describe the adsorption procedure of H-2, CH4, and CO2 compared to the Langmuir equation. Two simplified kinetic models including pseudo-first-order and -second-order equations were used to evaluate the adsorption processes. The results indicated that the adsorption of H-2, CH4, and CO2 could be described properly by a pseudo-second-order equation. The kinetic parameters of this model were calculated and discussed.

Keywords: Activated Carbon, Activation, Adsorbents, Adsorption, Adsorption Equation, Adsorption Equilibrium, Adsorption Isotherms, Carbon, CH4, Chemical Activation, China, CO2, CO2 Capture, Corncob, Equilibria, Equilibrium, H-2, High-Pressure Adsorption, Hydrogen Storage Capacity, Isotherms, Kinetic, Kinetic Models, Kinetics, Koh, Langmuir, Langmuir Equation, Methane, Model, Models, N-2, Preparation, Processes, Pseudo Second Order, Pseudo-Second-Order

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Full Text: [2010\J Che Eng Dat55, 4677.pdf](2010/J%20Che%20Eng%20Dat55,%204677.pdf)

Abstract: Carbons were prepared from coffee residue using chemical activation with ZnCl2. Among five carbons prepared by varying the activating agent ratio (mass of ZnCl2/mass of coffee residue) from 0 % to 100 %, the one with an activation ratio equal to 25 % (AC 25 %) was the most effective sorbent showing the maximum phenol uptake (68 %). Consequently, all the adsorption experiments were achieved with the carbon having an activation ratio equal to 25 %. A comparative study of prepared activated carbon (AC 25 %) and a commercial activated carbon (CAC) was undertaken to determine their capacities for phenol removal. For each adsorbent-phenol system, a pseudosecond-order kinetic model described the adsorption kinetics accurately at all concentrations and temperatures for the two systems. The thermodynamics of the phenol-CAC and phenol-AC 25 % systems indicate an exothermic process. Phenol adsorption isotherms onto the prepared and commercial activated carbons have been studied. They display two plateaus. The degree of coverage of the surface of two carbons by the phenol molecules was calculated, and it was revealed that the second plateau, appearing at high concentrations, is assigned to the desorption of water molecules fixed on the surface oxygen groups of the activated carbons and the occupation of these sites by phenol molecules in excess in the treated solutions. The Langmuir, Freundlich, and Elovich models were tested.

Keywords: Activated Carbon, Activation, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Capacity, Carbon, Carbons, Chemical Activation, Classification, Commercial Activated Carbon, Desorption, Elovich, Equilibrium, Freundlich, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Methylene-Blue, Model, Models, Molecules, Oxygen, Phenol, Process, Removal, Residue, Sorbent, System, Thermodynamics, Uptake, Water

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Full Text: [2010\J Che Eng Dat55, 4808.pdf](2010/J%20Che%20Eng%20Dat55,%204808.pdf)

Abstract: The present work has successfully optimized the biosorption of selenite and selenate species using wheat bran in both batch and continuous column mode with the help of central composite design (CCD). In batch mode the parameters which were taken into account were pH, biomass dose, initial selenium concentration, and temperature, whereas in continuous mode bed height, flow rate, and initial selenium concentration were studied. A second-order polynomial regression model was used, and results showed high regression coefficients (R-2, that is, 97.65 To for both Se(IV) and Se(VI) in batch mode and 97.95 To and 97.61 To for Se(IV) and Se(VI), respectively, in continuous mode), indicating good agreement with experimental data. Low values of standard deviations were also obtained, showing the adequacy of the proposed regression models in both batch and continuous mode. Contour plots predicted the maximum uptake of Se(IV) (49.56 mu g.g(-1)) and Se(VI) (41.37 mu g.g(-1)) at pH 2, initial selenium concentration of 1000 mu g.L-1, temperature of 20 degrees C, and biomass dose of 20 g.L-1 in batch mode, whereas it was (73.05 and 58.29) mu g.g(-1) for Se(IV) and Se(VI) at a bed height of 25 cm, flow rate of 1.66 mL.min(-1), and initial selenium concentration of 1000 mu g.L-1 in continuous mode.

Keywords: Adsorbent, Batch, Batch Mode, Biomass, Biosorption, Bran, Central Composite Design, Composite, Data, Model, Models, Optimization, pH, Process Variables, Removal, Response-Surface Methodology, Second-Order, Selenate, Temperature, Uptake

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Full Text: [2010\J Che Eng Dat55, 5109.pdf](2010/J%20Che%20Eng%20Dat55,%205109.pdf)

Abstract: New-style adsorbents of p-tert-butyl-calix[4,6,8]arene-bonded silica gel-CnABS (C4ABS, C6ABS, C8ABS)-were prepared by bonding p-tert-butyl-calix[4,6,8]arene to the silica gel surface through the coupling reagent, 3-glycidoxypropyltrimethoxysilane. The products were characterized by FTIR, thermogravimetry, elemental analysis, and scanning electron microscopy. The adsorption of methylene blue from aqueous solution by CnABS was studied. Kinetic studies showed that the adsorption of the dye onto CnABS fit a first-order kinetic model. The equilibrium adsorption data were interpreted using the Langmuir and Freundlich models. The adsorption of methylene blue onto CnABS was better represented by the Langmuir equation. The saturation adsorption quantity monotonically increased with the number of phenolic units in the calixarene ring. The thermodynamic parameters for the adsorption reaction were calculated through a van’t Hoff analysis. The whole adsorption process was endothermic, which resulted in an increase of the adsorption quantity with a temperature increase. The new-style adsorbent of CnABS was regarded as a potential adsorbent to deal with dyes or organics in wastewaters.

Keywords: Adsorbent, Adsorbents, Adsorption, Analysis, Aqueous Solution, Aqueous-Solutions, Beta-Cyclodextrin Polymers, Coir Pith, Cost Activated Carbon, Data, Dye, Dye Removal, Dyes, Electron Microscopy, Endothermic, Equilibrium, First Order, First-Order Kinetic Model, Freundlich, FTIR, Gel, Kinetic, Kinetic Model, Kinetic Studies, Kinetics, Langmuir, Langmuir Equation, Metal-Ions, Methylene Blue, Model, Models, Nov, Organics, Performance Liquid-Chromatography, Potential, Saturation, Scanning Electron Microscopy, Silica, Silica Gel, Solution, Starch-Based Polymers, Stationary-Phase, Surface, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Thermogravimetry, Waste-Water, Wastewaters

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Full Text: [2010\J Che Eng Dat55, 5681.pdf](2010/J%20Che%20Eng%20Dat55,%205681.pdf)

Abstract: Sepiolite was used for the synthesis of the sepiolite-iron oxide system to obtain a sorbent suitable for the removal of Ni2+ from aqueous solution. The modified material, Fe-sepiolite, was characterized by X-ray diffraction analysis, Fourier transform infrared spectroscopy, differential thermal/thermogravimetric analysis, and point of zero charge (pH(pzc)) determination. The sorption experiments were performed as a function of the initial metal concentration, equilibration time, and temperature using the batch method. The Fe-sepiolite had a higher sorption capacity than the natural sepiolite sample due to a higher specific sorption and a higher ion exchange with Mg2+ ions from the sepiolite surface. Thermodynamic parameters, such as enthalpy, Gibbs energy, and entropy, were calculated from the temperature-dependent sorption isotherms, and these values showed that the sorption of Ni2+ onto sepiolites was endothermic. Pseudo-second-order kinetic models provide the best correlation of the experimental kinetic data.

Keywords: Adsorption, Analysis, Aqueous Solution, Batch, Batch Method, Bentonites, Capacity, Cd2+, Charge, Clinoptilolite, Concentration, Copper(II), Correlation, Data, Endothermic, Energy, Enthalpy, Entropy, Equilibration, Equilibrium, Experimental, Experiments, Function, Heavy-Metals, Infrared Spectroscopy, Ion Exchange, Ion-Exchange, Ions, Isotherms, Kaolinite, Kinetic, Kinetic Models, Metal, Models, Modified, Montmorillonite, Natural, Ni2+, Oxide, Point of Zero Charge, Pseudo-Second-Order, Removal, Sepiolite, Solution, Sorbent, Sorption, Sorption Capacity, Sorption Isotherms, Spectroscopy, Sr2+ Ions, Surface, Synthesis, Temperature, Thermodynamic, Thermodynamic Parameters, X-Ray, X-Ray Diffraction

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Full Text: [2010\J Che Eng Dat55, 5707.pdf](2010/J%20Che%20Eng%20Dat55,%205707.pdf)

Abstract: Sargassum muticum biomass was chemically modified to test its sorption capacity toward a model organic cation: methylene blue. Two different classes of treatments, specifically the esterification of the carboxylic acids and the extraction of the lipid fraction, have been applied. Chemical modification of the biomass increases the sorption capacity, especially if the lipid fraction is removed from the algae. The maximum dye uptake was obtained for biomass obtained after the extraction of the lipid fraction by means of acetone under reflux treatment, with a q(e) value of 860 mg.g(-1) from the Langmuir isotherm. Maximum uptakes were found in the pH range of 4 to 10. The equilibrium was achieved in (30 to 60) min, depending on the algal pretreatment. The pseudo-first-order empirical model can describe the process as a whole. Plots of the sorption capacity q(t) versus the square root of time, at the initial stages of the sorption process, fit the intraparticle diffusion equation, so an intraparticle diffusion coefficient of 5.46.10(-8) cm(2).s(-1) is obtained for methylene blue in chemically modified S. muticum. Specific surface areas of the involved biomaterials are calculated from maximum uptakes at equilibrium and critically analyzed.

Keywords: Acetone, Acid, Adsorption, Algae, Aqueous-Solution, Behavior, Biomass, Biomaterials, Capacity, Carboxylic, Cation, Chemical Modification, Diffusion, Diffusion Coefficient, Donnan, Dye, Dye Biosorption, Equilibrium, Esterification, Europe, Extraction, Intraparticle Diffusion, Isotherm, Langmuir, Langmuir Isotherm, Lipid, Methylene Blue, Model, Modification, Modified, Organic, pH, Pretreatment, Pseudo First Order, Pseudo-First-Order, Removal, Sargassum Muticum, Sargassum-Muticum, Sorption, Sorption Capacity, Sorption Process, Surface, Surface Areas, Treatment, Uptake, Value

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Full Text: [2010\J Che Eng Dat55, 5801.pdf](2010/J%20Che%20Eng%20Dat55,%205801.pdf)

Abstract: The adsorption reaction of 2-naphthalenesulfonic acid with the strong basic resin N201 was investigated experimentally with varying parameters (viz., the effects of pH, temperature, contact time, sodium sulfate, and fixed-bed column runs) and compared with the weakly basic resin D301. Results showed that the optimum initial pH for 2-naphthalenesulfonic acid adsorption by N201 was 2.4, and the equilibration time required was 2.5 h. The three single-component isotherms were analyzed with the Langmuir, Freundlich, and Redlich-Peterson equations. The Redlich-Peterson equation gave the lowest errors by use of the sum of the squares of the errors. The thermodynamic parameters (ΔG, AH, and ΔS) were also determined, and the adsorption process is more favored at low temperatures. The kinetics followed a pseudo-second-order rate equation very well. However, a dramatic decrease in adsorption capacity was observed for both resins upon addition of Na2SO4 into the 2-naphthalenesulfonic acid solution. The adsorption and stripping curves of 2-naphthalenesulfonic acid onto two resins was explored in fixed-bed column experiments. It was found that the dynamic adsorption capacity of N201 was higher than that of D301.

Keywords: Adsorption, Adsorption Capacity, Anion-Exchange Resins, Capacity, Carbon, Column, Column Experiments, Dynamic, Equilibration, Equilibrium, Errors, Experiments, Fixed Bed, Freundlich, Isotherms, Kinetics, Langmuir, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Redlich-Peterson, Resin, Resins, Sodium, Solution, Sorption, Stripping, Sulfate, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Weakly Basic Resin

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Full Text: [2011\J Che Eng Dat56, 450.pdf](2011/J%20Che%20Eng%20Dat56,%20450.pdf)

Abstract: Silica gel chemically modified by diethylenetriamine bis(methylene phosphonic acid) (denoted as SG-D-P) has been developed. A thermodynamics and kinetics investigation of SG-D-P for hte adsorption of Au(III) from aqueous solutions is reported in this work. The Langmuir and Freundlich isotherm models were applied to analyze the experimenta data, and the best interpretation for the experimental data was given by the Langmuir isotherm equation; the maximum adsorption capacity for Au(III) is 416.67 mg.g(-1) at 35ºC. The research results show that SG-D-P could reach the saturation adsorption capacity within 4h, and its excellent adsorption capacity for Au(III) was 499.22 mg.g-1 when the initial solution concentration was 2.0 mmol.L-1 at 35ºC. Its adsorption kinetics can be modeled by a pseudo second-order rate equation, and the thermodynamic parameters ΔG, ΔH, and ΔS are -21.18 kJ.mol-1, 16.59 kj.mol-1, and 122.86 J.K-1.mol-1, respectively.

Keywords: Adsorption, Aqueous-Solutions, Cu(II), Freundlich, Freundlich Isotherm, Gold(III), Isotherm, Kinetics, Langmuir, Langmuir Isotherm, Mesoporous Silica, Metal Ions, Modified, Removal, Resin, Silica, Sorption, Thermodynamic, Thermodynamic Parameters, Thermodynamics

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Full Text: [2011\J Che Eng Dat56, 1001.pdf](2011/J%20Che%20Eng%20Dat56,%201001.pdf)

Abstract: The equilibrium, kinetics, thermodynamics, and mechanism of two novel chelating resins with 3-aminopyridine and hydrophilic spacer arms (denoted as PS-DEG-3-AP and PS-TEG-3-AP) for Ag(I) were investigated in detail. The Boyd, Langmuir, Freundlich, and Dubinin-Radushkevich (D-R) models were applied to describe the adsorption of the resins for Ag(I). The saturated adsorption capacities of PS-DEG-3-AP and PS-TEG-3-AP for Ag(I) were (0.21 and 0.30) mmol.g(-1) at pH 4, respectively. The results showed that the adsorption processes were governed by film diffusion and followed the pseudo second-order model well. The Langmuir model was better than the Freundlich model to describe the isotherm process. The E values obtained from the D-R model indicated that the adsorption of Ag(I) ions onto the resins occurred by chemical ion exchange. The adsorption mechanism of the resins for Ag(I) was confirmed by X-ray photoelectron spectroscopy (XPS). The XPS results clarified that not only 3-aminopyridine but also S atoms existed in the spacer arm that could take part in the coordination with Ag(I). Five adsorption-desorption cycles were conducted for the reuse of the resins. The results indicated that these two resins were suitable for reuse without considerable change in adsorption capacity.

Keywords: Adsorbent, Adsorption, Equilibrium, Flotation, Freundlich, Heavy-Metals, Ion, Ion Exchange, Isotherm, Kinetic, Kinetics, Langmuir, Mechanism, Methacrylate, pH, Preconcentration, Removal, Resins, Selective Adsorption, Separation, Thermodynamic, Thermodynamics, Waste, XPS

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Full Text: [2011\J Che Eng Dat56, 1982.pdf](2011/J%20Che%20Eng%20Dat56,%201982.pdf)

Abstract: Five kinds of silica-gel adsorbents with functional groups of hydroxyl- or amino-terminated polyamines (SiO2-EA, SiO2-DEA, SiO2-EDA, SiO2-DETA, and SiO2-TETA), whose structures of functional groups were characterized according to the results of elemental analysis, were chosen to investigate the adsorption kinetics and isotherms toward Ag(I) and Hg(II). The results of the kinetics adsorption showed that all of the adsorption processes followed a pseudo-second-order model, suggesting that the five adsorbents can be applied in Ag(I) and Hg(II) removal from lower concentration solutions. Film diffusion might dominate in the adsorption process of Ag(I) and Hg(II) onto the five adsorbents. The linear and nonlinear Langmuir, Freundlich, and Redlich-Peterson models were employed to fit the isothermal adsorptions. The results revealed that all the above-mentioned isotherm models can be used to predict the experimental data. The relationship between the structure of functional groups and the adsorption mechanism is also discussed.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Kinetics, And Isotherms, Aqueous-Solutions, Chemical-Modification, Diethylenetriamine, Equilibrium, Film Diffusion, Freundlich, Heavy-Metal Ions, Isotherm, Isotherms, Kinetics, Langmuir, Mechanism, Nonlinear, Removal, Silica, Sorption Isotherm, Tree Fern

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Full Text: [2011\J Che Eng Dat56, 2407.pdf](2011/J%20Che%20Eng%20Dat56,%202407.pdf)

Abstract: We have investigated the adsorption behavior of two organophosphorus pesticides Monocrotophos and Chloropyrifos onto Acid-Treated Palm Shell Powder (APSP) prepared from palm shells (agro-waste). The effects of adsorbent dose, contact time, and concentration on adsorption were studied. The Freundlich and Langmuir isotherms were applied to the experimental equilibrium data. Monolayer adsorption capacities Q(m) for spectrophotometric ((52.63 and 51.098) mg.g-1 for Chloropyrifos and Monocrotophos, respectively) and for COD measurements ((14.25 and 11.57) mg.g-1 for Chloropyrifos and Monocrotophos, respectively), have been evaluated. The calculated thermodynamic parameters ΔH, ΔS, and ΔG prove that Monocrotophos adsorption on APSP was feasible, spontaneous, and exothermic under the examined conditions, while Chloropyrifos did not show any appreciable change with temperature. The pseudo-first-order, pseudo-second-order, and intraparticle diffusion kinetic models were used to describe the kinetic data and evaluation of rate constants. The results of this study, with good correlation between spectrophotometric and COD measurements, imply the potential use of APSP as a low-cost adsorbent for removal of Chloropyrifos and Monocrotophos from industrial wastewater and runoff water from agricultural soils.

Keywords: Adsorption, Advanced Oxidation Processes, Aqueous-Solutions, Biopurification Systems, Equilibrium, Fly-Ash, Freundlich, Freundlich and Langmuir Isotherms, Granular Activated Carbon, Industrial Wastewater, Isotherm, Isotherms, Kinetic, Kinetic Models, Kinetics, Langmuir, Low-Cost Adsorbent, Methyl Parathion Pesticide, Monolayer, Natural Organic-Substances, Pesticides, Removal, Sorption, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Wastewater, Water

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Full Text: [2011\J Che Eng Dat56, 1882.pdf](2011/J%20Che%20Eng%20Dat56,%201882.pdf)

Abstract: The adsorption of two basic dyes, namely, methylene blue (MB) and malachite green (MG), onto natural rice husk (NRH) and oxalic acid modified rice husk (MRH) was studied in a batch adsorption system. Factors influencing dyes adsorption such as the concentration of the adsorbate, the pH, the salt concentration, the temperature, and the contact time were investigated. The Langmuir and Freundich isotherms were used to fit the equilibrium data, and the results showed that the Langmuir isotherm exhibited a little better fit to the MG adsorption data by both adsorbents, while the Freundlich isotherm seemed to agree better with the MB adsorption. The kinetic experimental data were analyzed using three kinetic equations, via the pseudo-first-order equation, the pseudo-second-order equation, and the intraparticle diffusion model, to examine the mechanism of adsorption and the potential rate-controlling step. The mechanism of the process was found to be complex, consisting of both surface adsorption and pore diffusion. The values of the effective diffusion parameter, D-i, were estimated to be of the order of 10(-8) cm(2).s(-1), indicating that the intrapartide diffusion was not the rate-controlling step. Calculated thermodynamic parameters showed that the adsorption of MB and MG onto MRH was feasible, spontaneous, and endothermic. The removal capacities of NRH and MRH adsorbing dyes from aqueous solution were compared. By functionalizing, the adsorption capacity (q(e)) of rice husk for MB or MG was increased from (19.77 to 53.21) mg . g(-1) or (28.00 to 54.02) mg . g(-1) at 293 K, respectively. The carboxyl groups on the surface of the MRH were primarily responsible for the sorption of dyes. It is suggested that MRH may be suitable as an adsorbent material for adsorbing MB and MG from aqueous solutions.

Keywords: Activated Carbon, Adsorption, Agricultural By-Products, Aqueous Solution, Basic Dye, Batch Mode, Dyes, Equilibrium, Freundlich, Freundlich Isotherm, Isotherm, Isotherms, Kinetic, Langmuir, Langmuir Isotherm, Leaf Powder, Malachite Green Adsorption, Mechanism, Metal-Ions, Methylene Blue, Methylene-Blue Adsorption, Mg, Modified, Nonlinear Methods, pH, Removal, Sorption, Thermodynamic, Thermodynamic Parameters, Waste-Water

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Full Text: [2011\J Che Eng Dat56, 3053.pdf](2011/J%20Che%20Eng%20Dat56,%203053.pdf)

Abstract: Solid waste from olive oil production, the two-phase olive mill solid (OMS), was investigated for the removal of Pb(II) from aqueous solutions. This work focuses mainly on the kinetics of biosorption. The sorption kinetics was experimentally measured using stirred-batch systems under different initial concentrations and at varying solution temperatures. The pseudo-nth order kinetic model, pseudofirst-order kinetic model, pseudosecond-order kinetic model, and the Elovich equation were used to represent the kinetic data. The pseudosecond-order equation fitted the dynamic data very well under all the operating conditions. A contact time of approximately 60 min was required to reach the equilibrium. The results obtained for the effect of initial concentration on lead uptake by OMS showed that the equilibrium sorption capacity and the initial sorption rate increase as the initial metal concentration increases, while the kinetic constant of the process decreases. The effect of temperature on kinetic parameter values is less significant than the effect of lead concentration although a decrease on kinetic constant and initial sorption rate is produced as temperature rises, mainly at lower lead concentrations. Finally, the apparent activation energy of sorption was determined as -18.62 kJ.mol(-1) for an initial lead concentration of 10 mg.L(-1). The negative value of activation energy showed that the Pb(II) adsorption process by OMS may involve a nonactivated chemical adsorption or a physical adsorption.

Keywords: Aspergillus-Niger, Heavy-Metals, Equilibrium Biosorption, Activated-Sludge, Industry Waste, Pb(II) Ions, Biomass, Removal, Sorption, Water

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Suzuki, M. and Kawazoe, K. (1974), Batch measurement of adsorption rate in an agitated tank: Pore diffusion kinetics with irreversible isotherm. *Journal of Chemical Engineering of Japan*, **7** (5), 346-350.

Full Text: [1960-80\J Che Eng Jap7, 346.pdf](1960-80/J%20Che%20Eng%20Jap7,%20346.pdf)

Abstract: A simple technique is proposed to determine the intraparticle diffusivities of adsorbents from concentration change in an agitated tank. Pore diffusion and rectangular isotherm are assumed to derive the theoretical solutions, which are then compared with the experimental results. The theory gave a good prediction for the transient concentration profile in the tank. The effective diffusivities of 2 dodecylbenzene sulfonate in four different activated carbon particles are determined by the proposed technique.

Muraki, M., Iwashima, Y. and Hayakawa, Y. (1982), Rate of liquid-phase adsorption on activated carbon in the stirred tank. *Journal of Chemical Engineering of Japan*, **15** (1), 34-39.

Full Text: [1982\J Che Eng Jap15, 34.pdf](1982/J%20Che%20Eng%20Jap15,%2034.pdf)

Abstract: A method is developed to determine the dependence of surface diffusion coefficient on the amount adsorbed, derived for Freundlich adsorption isotherm, from adsorption rates in a finite bath. The adsorption rates on activated carbon of p-nitrophenol, benzoic acid and p-chIorophenol from dilute aqueous solutions are measured, where Freundlich adsorption isotherms are applicable, and the relations between surface diffusion coefficient and the amount adsorbed are determined for three adsorbates by this method. It is proved that the external mass transfer resistance in the stirred tank has a large influence on adsorption rate as well as intraparticle mass transfer resistance in finite bath adsorption. It is also clear from these relations that the ratio of activation energy for surface diffusion to adsorption energy is nearly equal to 0.5. The time-concentration curves predicted by this method coincide well with experimental data.

Notes: highly cited

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Full Text: [1983\J Che Eng Jap16, 470.pdf](1983/J%20Che%20Eng%20Jap16,%20470.pdf)

Abstract: Amethod for the calculation of effective pore size distribution from adsorption isotherms in molecular-sieve carbon is described. This method is more exact theoretically as well as practically than previously described methods. An average potential function has been determined inside the slit-like pores. With the help of this function the doubtful use of the Kelvin equation can be avoided at the scale of molecular dimensions. The method gives poor values for the larger pores but can be combined with the well-known Dollimore-Heal method at a pore size of 1.34 nm. Calculation is possible over a wide range of pore sizes. The calculation is shown through two examples from N2 isotherms at 77.4K

Notes: highly cited, IIsotherm

? Nitta, T., Shigetomi, T., Kurooka, M. and Katayama, T. (1984), An adsorption-isotherm of multi-site occupancy model for homogeneous surface. *Journal of Chemical Engineering of Japan*, **17** (1), 39-45.

Full Text: [1984\J Che Eng Jap17, 39.pdf](1984/J%20Che%20Eng%20Jap17,%2039.pdf)

? Goto, M. and Hirose, T. (1991), Modified Parabolic Profile Approximation of Intraparticle Concentration for Catalytic Chemical-Reaction and Adsorption. *Journal of Chemical Engineering of Japan*, **24** (4), 538-542.

Full Text: [1991\J Che Eng Jap24, 538.pdf](1991/J%20Che%20Eng%20Jap24,%20538.pdf)

Keywords: Adsorption, Approximation, Catalyst, Chemical Reaction, Diffusion, Effectiveness Factor, Linear Driving Force, Model, Parabolic Profile

? Kajiuchi, T., Park, J.W. and Moon, H.Y. (1993), Adsorption Control of Cellulase Onto Cellulose by Modification with Amphiphilic Copolymer. *Journal of Chemical Engineering of Japan*, **26** (1), 28-33.

Full Text: [1993\J Che Eng Jap26, 28.pdf](1993/J%20Che%20Eng%20Jap26,%2028.pdf)

Abstract: The effects of the hydrophilic and hydrophobic properties of cellulase on adsorption onto and desorption from two substrates were studied. Cellulase was modified with amphiphilic copolymers made of polyoxyalkylene glycol alkylallylether and maleic acid anhydride. The polyoxyalkylene glycol (PAG) consists of ethylene oxide (EO) and propylene oxide (PO), with an EO to PAG ratio ranging from 0 to 100%. A copolymer with a high concentration of EO is more hydrophilic. The hydrophilic or hydrophobic properties of modified cellulase were varied the degree of modification and the type of copolymer. As the hydrophilic property of a modified cellulase increases, the conversion of substrate increases while the quantity of adsorbed enzyme decreases. Cellulase modification with amphiphilic copolymer is very useful for controlling cellulase adsorption onto and desorption from a substrate and can improve the saccharification reaction.

Keywords: Adsorption, Cellulase, Components, Concentration, Conversion, Copolymer, Copolymers, Desorption, Enzymatic Hydrolysis, Enzymatic-Hydrolysis, Enzyme, Enzyme Adsorption, Ethylene, Hydrophilic, Hydrophilicity, Hydrophobicity, Made, Maleic Acid, Modification, Modified, Modified Cellulase, Po, Properties, Propylene, Propylene Oxide, Quantity, Reaction, Substrate

? Chang, Y.M. (1994), Heat and mass-transfer between gas and solid particles in transverse bed of aerated rotary kiln incinerator. *Journal of Chemical Engineering of Japan*, **27** (4), 443-448.

Full Text: [1994\J Che Eng Jap27, 443.pdf](1994/J%20Che%20Eng%20Jap27,%20443.pdf)

Abstract: Gas-solid contact efficiency of a transversely aerated rotary kiln incinerator has proven to be very high. The paper addresses an experimental method to obtain heat and mass transfer coefficients between gas and solid particles in the transverse bed of an aerated rotary kiln incinerator. It is found that the transfer coefficients are sensitive to aeration rate but not to rotation speed. Equations, which correlate the transfer coefficients and relative parameters, are proposed in terms of dimensionless groups to estimate the heat and mass transfer rate in the transverse bed of an areated rotary kiln incinerator. Furthermore, the temperature distribution in the transverse bed of such a rotary kiln is considered reasonably uniform, which is caused by well distributed inlet gas and solid mixing due to rotation.

Keywords: Heat Transfer, Mass Transfer, Transverse Aeration, Rotary Kiln, Incinerator, Drum

Suzuki, A., Seki, H. and Maruyama, H. (1994), An equilibrium study of adsorption of divalent metal ions onto a metal oxide adsorbent. *Journal of Chemical Engineering of Japan*, **27** (4), 505-511.

Full Text: [1994\J Che Eng Jap27, 505.pdf](1994/J%20Che%20Eng%20Jap27,%20505.pdf)

Abstract: Equilibrium adsorption behavior of divalent metal ions onto hydrous titanium(IV) oxide (HTO) was studied. A general equilibrium adsorption equation was derived from three simultaneous equilibrium reactions: (1) hydrolysis of metal ions to the hydroxides, (2) deprotonation of hydroxyl groups (adsorption sites) on HTO’s surface and (3) complexation of the hydroxides with the deprotonated sites. The theoretical equilibrium adsorption equation was confirmed by several experimental results under acidic or basic conditions using uranium, lead, cadmium and zinc ions as the adsorbates. It is demonstrated that two parameters within the equation provide information about the adsorption capacity and the selectivity of adsorbent for target metal ions. The HTO employed here had available sites of 7.15×10-4 mol-g-1 for all experiments. Metal ions were adsorbed preferentially on the HTO in the following sequence: Zn2+ < Cd2+ < Pb2+ < UO22+.

Keywords: Adsorption, Adsorption Isotherm, Available Adsorption Site, Cadmium, Divalent Metal Ion, Hydrous Titanium Oxide, Lead, Uranyl, Zinc, Water Interface, Hematite Particles, Model Systems, Uranium, Co(II), SiO2, TiO2

Suzuki, Y. and Takeuchi, Y. (1994), Uptake of a few divalent heavy metal ionic species by a fixed bed of hydroxyapatite particles. *Journal of Chemical Engineering of Japan*, **27** (5), 571-576.

Full Text: [1994\J Che Eng Jap27, 571.pdf](1994/J%20Che%20Eng%20Jap27,%20571.pdf)

Abstract: Breakthrough curves were measured for Cd2+, Cu2+ and Pb2+ in their single, binary and ternary nitrate aqueous solution systems using a fixed bed of hydroxyapatite particles in order to obtain volumetric mass transfer coefficients. Breakthrough curves for Pb2+ showed particular profiles depending on the pH of influent solutions in the bed. For the binary and ternary systems containing Pb2+, the curves for each ion showed that Pb2+ displaced not only calcium but also other co-existent ions which were already collected in the substrate. It was considered that Cd2+ and Cu2+ were collected in the vicinity of the internal surface of particles, but the uptake of Pb2+ occurred in the interior as well as at the internal surface of hydroxyapatite particles.

Keywords: Adsorption, Breakthrough Curve, Elution Curve, Fixed Bed, Heavy Metal Ions Removal, Hydroxyapatite, Ion Exchange, Mass Transfer

? Lancia, A., Karatza, D., Musmarra, D. and Pepe, F. (1996), Adsorption of mercuric chloride from simulated incinerator exhaust gas by means of Sorbalit (TM) particles. *Journal of Chemical Engineering of Japan*, **29** (6), 939-946.

Full Text: [1996\J Che Eng Jap29, 939.pdf](1996/J%20Che%20Eng%20Jap29,%20939.pdf)

Abstract: In this work the attention was focused on the use of Sorbalit(TM), a mixture of impregnated activated carbon and Ca(OH)2, for adsorption of mercuric chloride from flue gas of municipal solid waste incinerators. The study was performed in an apparatus at laboratory scale in which simulated flue gas at a given temperature and HgCl2 concentration flowed through a fixed bed of adsorbent material. The experimental results showed that the adsorbate loading at saturation depends on temperature in an unusual fashion: the saturation adsorbate loading decreases with T for 70 degrees less than or equal to T less than or equal to 150°C, but then increases for 150 degrees less than or equal to T less than or equal to 250°C. This result was interpreted by assuming that for T less than or equal to 150°C a process of physical adsorption takes place, while for T greater than or equal to 150°C the results fall in a “transition zone” between physical adsorption and chemical adsorption. The Langmuir parameters were evaluated for the “low” temperature results, and the differential equations modeling the adsorption phenomenon were integrated, leading to the evaluation of a kinetic parameter describing the breakthrough curves experimentally determined.

Keywords: Adsorption, Mercuric Chloride, Sorbalit(Tm), Heavy Metal Control, Waste Incineration, Flue-Gases, Emissions

? Morohashi, S., Takeda, K., Yamamoto, T., Hoshino, K. and Sasakura, T. (1996), Adsorption properties of trivalent metal ions onto hydrolyzed polyacrylamide gel. *Journal of Chemical Engineering of Japan*, **29** (6), 1060-1063.

Full Text: [1996\J Che Eng Jap29, 1060.pdf](1996/J%20Che%20Eng%20Jap29,%201060.pdf)

Keywords: Adsorption Properties, Hydrolyzed Polyacrylamide Gel, Trivalent Metal Ion, Dissociation Equilibrium, Hydrogen Ion Concentration, Shrinking

? Kondo, K., Nakagawa, S., Matsumoto, M., Yamashita, T. and Furukawa, I. (1997), Selective adsorption of metal ions on novel chitosan-supported sulfonic acid resin. *Journal of Chemical Engineering of Japan*, **30** (5), 846-851.

Full Text: [1997\J Che Eng Jap30, 846.pdf](1997/J%20Che%20Eng%20Jap30,%20846.pdf)

Abstract: A novel chitosan-supported sulfonic acid resin modified by propane sultone was prepared and the adsorption characteristics of metal ions are examined by using a crosslinked chitosan-supported sulfonic acid resin (PSC) and a crosslinked chitosan resin (CLC). In the low acidity region, the metalselectivity of PSC is similar to that of CLC. This suggested that the selectivity of PSC was attributed not to sulfonate group but to the chitosan matrix. The role of the sulfonate is believed to be enriching the metal concentration in the neighborhood of the chitosan matrix. At the same time, since the hydrogen ions is also enriched in a thin layer near the surface of the resin, the characteristic adsorption curves of PSC shift to the high pH region compared with those of CLC. The adsorption equilibrium constants of metal ion on PSC and CLC are evaluated. The maximum adsorption capacity for PSC in the case of adsorption of copper is 1.6 times that of CLC. On the other hand, in the high acidity region, the maximum adsorption capacity for PSC in the case of adsorption of palladium is lower than that for CLC because of steric hindrance.

Kawamura, Y., Yoshida, H., Asai, S. and Tanibe, H. (1998), Elution of Hg(II) adsorbed on highly porous polyaminated chitosan beads. *Journal of Chemical Engineering of Japan*, **31** (1), 115-118.

Full Text: [J\J Che Eng Jap31, 115.pdf](J/J%20Che%20Eng%20Jap31,%20115.pdf)

Abstract: Recovery of mercury(II) adsorbed on highly porous polyaminated chitosan (PEI-CS) appears to be technically feasible. Desorption experiments of Hg(II) from a PEI-CS packed column were carried out using sulfuric acid solutions of different concentrations at different temperatures. The peak of the elution curve is 250 mol/m3 when the concentration of H2SO4 in the eluent is 1000 mol/m3 at 308 K. The elution curve in PEI-CS is compared with that of Unicellex UR-120H, which is considered the best commercial chelate resin available in Japan for removal of Hg(II). The peak of the elution curve in UR-120H is about one eighth at the same concentration of PEI-CS. The equilibrium isotherm and the breakthrough curve for adsorption of Hg(II) are not affected after repeated cycles of adsorption and desorption.

Keywords: Mercury, Chitosan Beads, Waste Water Treatment, Recycle Process, Elution

Tani, K., Ohta, T., Nii, S. and Takahashi, K. (1998), Copper removal from dilute aqueous solution by extraction with counter-current multi-stage column. *Journal of Chemical Engineering of Japan*, **31** (3), 398-406.

Full Text: [J\J Che Eng Jap31, 398.pdf](J/J%20Che%20Eng%20Jap31,%20398.pdf)

Abstract: Copper was extracted by LIX84I-Shellsol 71 solution from a dilute aqueous solution with a five-stage mixer-settler extraction column. The effective removal of copper could be achieved by extraction with the multi-stage extraction column. The reaction rate of copper extraction by LIX84I was measured with a flat interface stirred vessel, and the rate is found to increase significantly by purification of the extractant, Simulation of the multistage counter-current extraction was carried out using the specific interfacial area determined from the dispersed phase holdup and the dispersed drop size. The mass transfer coefficients in the continuous and dispersed phases are estimated on the basis of the mass transfer around and within the rigid sphere. The simulated results agree with the observed ones when the reaction rate with the purified extractant is used. This indicates that the effect of surface active impurities on the extraction reaction rate might be reduced with an increase in the specific interfacial area. The simulation suggests that extraction with a high concentration of the extractant is effective for copper removal, but the effect of mass transfer resistance within the aqueous phase cannot be neglected with the increase in extractant concentration.

Keywords: extraction, multi-stage operation, mixer-settler column, copper removal, RATES

Morohashi, S., Takaoka, M., Yamamoto, T. and Hoshino, K. (1998), Adsorption properties of metal ions onto sodium polyacrylate gel. *Journal of Chemical Engineering of Japan*, **31** (4), 551-557.

Full Text: [J\J Che Eng Jap31, 551.pdf](J/J%20Che%20Eng%20Jap31,%20551.pdf)

Abstract: Adsorption properties of divalent and trivalent metal ions onto sodium polyacrylate gel are investigated over a range of pH of buffer solutions. It is considered that carboxyl groups in the gel combine with the metal ions according to their charge number stoichiometrically, and the adsorption mechanism is theoretically analyzed on the basis of dissociation equilibrium for monocarboxyl acid. Furthermore, it is found that the adsorption effectiveness factor, being intrinsic to metal ion species, fulfills an important role in order to elucidate the adsorption equilibrium. Consequently, the model equations, which allow quantitative consideration of the adsorption mechanism in these systems, can be derived as a function of the hydrogen ion concentration, which can readily be measured in the outer aqueous solution. The gel adsorption equilibrium of divalent and trivalent metal ions can be explained fairly well by the model.

? Matsumoto, M., Matsui, T. and Kondo, K. (1999), Adsorption mechanism of boric acid on chitosan resin modified by saccharides. *Journal of Chemical Engineering of Japan*, **32** (2), 190-196.

Full Text: [1999\J Che Eng Jap32, 190.pdf](1999/J%20Che%20Eng%20Jap32,%20190.pdf)

Abstract: This study aims to develop an environmentally-friendly resin for boron recovery. To this end, the adsorption characteristics of boron on chitosan resins chemically modified by saccharides are investigated for the purpose of the removal of boron from a boron mine and the desulfurizing equipment in coal-fired steam power stations, and compared with those of a commercial resin (Duolite ES371). First, chitosan derivatives incorporating saccharides were synthesized by reductive N-alkylation, and the products were crosslinked with ethylene glycol diglycidil ether. The resulting products (SMC resins) were found to exhibit dissolubility in acidic and basic solutions. From the adsorption experiment on the resins (SMC and Duolite resins), it is found that the adsorption mechanism is a complex formation between boron which exists as boric acid or borate in an aqueous solution and the vicinal diol groups of the branched saccharide. The apparent adsorption equilibrium constants of boric acid-diol complex and borate-diol salt complex are determined. The adsorption isotherms of boron correlate well with the Langmuir equation, and the order of the saturated adsorption capacity of boron on SMC resins corresponds to that of the degree of substitution on SMC resins.

Keywords: Adsorption, Adsorption Equilibrium, Adsorption Isotherms, Behavior, Boric Acid, Boron, Capacity, Chelate, Chelating Resins, Chitosan, Complex, Derivatives, Equilibrium, Ethylene, Experiment, Germanium(IV), Ions, Isotherms, Mechanism, Mine, Modified, Products, Recovery, Resins, Saccharides, Waste-Water

Kondo, K., Matsumoto, M. and Okamoto, K. (1999), Enhanced adsorption of copper(II) ion on novel amidoxime chitosan resin. *Journal of Chemical Engineering of Japan*, **32** (3), 217-222.

Full Text: [J\J Che Eng Jap32, 217.pdf](J/J%20Che%20Eng%20Jap32,%20217.pdf)

Abstract: A novel resin organized from an amidoxime derivative of chitosan is prepared and the adsorption characteristics of metal ions are examined. Metal ions are adsorbed by forming chelates coordinated by nitrogen atoms of primary amino groups and oxygen atoms of oxime groups. The amidoxime chitosan resin (AO-b-1) retards the adsorption of nickel ion compared with that on *N*-(sulfopropyl)chitosan (PSC), and the maximum adsorption capacity of copper ion on AO-b-1 is 1.6 times as much as that for PSC. The adsorption capacity of copper ion is further enhanced by alkali treatment of the resin. The amidoxime chitosan resin prepared here is found to be an excellent adsorbent with high adsorption capacity and selectivity for copper ions.

Keywords: Ion Exchange, Chitosan, Amidoxime Resin, Copper, Adsorption

Asprey, S.P. and Naka, Y. (1999), Mathematical problems in fitting kinetic models: Some new perspectives. *Journal of Chemical Engineering of Japan*, **32** (3), 328-337.

Full Text: [J\J Che Eng Jap32, 328.pdf](J/J%20Che%20Eng%20Jap32,%20328.pdf)

Abstract: Fitting kinetic data with kinetic rate expressions has been a challenge for many years. In hopes of providing some guidelines for tackling this problem, kinetic parameter estimation is revisited, covering such topics as data transformations, nonlinear single and multi-response techniques, optimization techniques, and parameter confidence measures. Among the optimization techniques discussed are direct and indirect methods, use of higher-order derivatives, and global optimization. New perspectives on statistical tests for model and parameter confidence are discussed, paying particular attention to exact, nonlinear methods and pointing out the distinct lack of these tests throughout the kinetics literature. In each section, either a single-site or a dual-site Langmuir-Hinshelwood (L-H) example model is shown for illustration of the aforementioned concepts.

Keywords: Kinetic Data Analysis, Non-Linear Parameter Estimation, Assessing Parameter Confidence, Optimization

Yamamoto, E., Katsurayama, K., Watanabe, F., Matsuda, H. and Hasatani, M. (2000), Heat and mass transfer characteristics in adsorption of water vapor for silica gel packed bed adsorber. *Journal of Chemical Engineering of Japan*, **33** (1), 12-18.

Full Text: [J\J Che Eng Jap33, 12.pdf](J/J%20Che%20Eng%20Jap33,%2012.pdf)

Abstract: Detailed study of heat and mass transfer inside a silica-gel packed bed, especially extraparticle diffusion for adsorption of water vapor, was carried out in a densely packed adsorbent bed, which normally prevails for realizing AHP technology. Experimental data for temperature and pressure distributions in the packed bed of adsorbent for adsorption of water vapor on silica gel is evaluated in terms of heat and mass transfer numerical calculation based on the model of water vapor transport which accounts for both heat and mass transfer of the interparticle void and the adsorbent particle. Subsequently, the effect of particle size and the rate of adsorption are discussed from the viewpoint of adsorption mechanism.

It is found that the model calculation was appropriate since the results were found to agree with the experimental values. For the experimental conditions, mean adsorption rate is found to increase with particle size under dp less than or equal to 500 μm, above which the adsorption drastically decreases with an increase in particle size, From this result, it is concluded that there is an optimum value of particle size relative to the bed height for attaining a maximum adsorptivity.

Keywords: Adsorption Heat Pump, Heat Transfer, Mass Transfer, Silica-Gel, Water Vapor, Generation Characteristics, Porous Adsorbents, Pump, Carbon, Equilibrium, Kinetics, Ethanol, Energy, Module

Nakano, Y., Tanaka, M., Nakamura, Y. and Konno, M. (2000), Removal and recovery system of hexavalent chromium from waste water by tannin gel particles. *Journal of Chemical Engineering of Japan*, **33** (5), 747-752.

Full Text: [J\J Che Eng Jap33, 747.pdf](J/J%20Che%20Eng%20Jap33,%20747.pdf)

Abstract: Tannin gel particles that have extremely high adsorption capacity for hexavalent chromium Cr(VI) have been developed by controlling gelation of Mimosa tannin extracted from the bark of plants. The gelation process is composed of two stages; partial gelation of Mimosa tannin by reaction with formaldehyde (cross-linking agent) and granulation by dispersing the partially gelated solution into a liquid mixture of decalin and a polyether nonionic surfactant with vigorous stirring. The structure of the tannin gel particles is controlled by a combination of operating conditions such as reaction time and temperature at both stages. The water content of the tannin gel particles that reflects their structure can be widely changed from 40 to 79% (wet basis), even for a constant composition of 23 g Mimosa tannin and 6 ml formaldehyde (37 wt%). It is found that it is very important to increase the water content without losing mechanical strength and supply a large amount of protons during adsorption for achievement of high adsorption capacity. The maximum adsorption capacity, 540 mg-Cr(VI)/(g-dry tannin gel) is obtained at a water content of 77.6% with an acidic solution of pH ≈ 2.0. Based on this knowledge, we propose a new system that generates little waste in removing and recovering hexavalent chromium.

Keywords: Tannin Gel, Chromium Recovery, Waste Water, Ion Exchange, Gelation

Chang, Y.Y., Lin, C.I. and Chen, H.K. (2001), Effect of acid activation on sesame oil bleaching by rice hull ash. *Journal of Chemical Engineering of Japan*, **34** (1), 1-6.

Full Text: [J\J Che Eng Jap34, 1.pdf](J/J%20Che%20Eng%20Jap34,%201.pdf)

Abstract: Sesame oil bleaching by acid-activated rice hull ash is examined. Lovibond color indices of sesame oils before and after bleaching by activated rice hull ash were determined to calculate the bleaching efficiency of the ash. Surface area meter and inductively coupled plasma-mass spectroscopy were employed to determine specific surface areas and average pore diameters as well as metallic contents of the rice hull ashes before and after acid activation, respectively. Effects of the following factors on bleaching efficiency have been studied; acid type, acid concentration, activation time, ashing temperature and ashing time. Experimental results indicate that rice hull ash activated by H2SO4 has relatively higher bleaching efficiency than that activated by H3PO4 or HCl. The increase in acid concentration or activation time did promote bleaching efficiency, though mildly. Acid activation might increase bleaching efficiency of rice hull ash from 0% to 43%. The effect of activation is found to be most significant when the ashing temperature is in the range of 673-773 K or the ashing time is over 1,800 s. The increase in bleaching efficiency by acid activation might be due to the increase of number of active site available for adsorption on the pore surface of the rice hull ash. Replacement of activated clay as an adsorbent to bleach sesame oil by acid activated rice hull ash is found to be promising.

Keywords: Acid Activation, Bleaching, Rice Hull Ash, Sesame Oil

Zhan, X.M. Miyazaki, A. and Nakano, Y. (2001), Mechanisms of lead removal from aqueous solutions using a novel tannin gel adsorbent synthesized from natural condensed tannin. *Journal of Chemical Engineering of Japan*, **34** (10), 1204-1210.

Full Text: [J\J Che Eng Jap34, 1204.pdf](J/J%20Che%20Eng%20Jap34,%201204.pdf)

Abstract: Condensed tannins are ubiquitous plant polyphenols and have many potential applications. A novel tannin gel adsorbent was synthesized from natural condensed tannin and its adsorption mechanisms and properties for lead (Pb) removal from aqueous solutions were investigated. It was found that lead could be removed through three adsorption mechanisms, i.e., ion exchange, hydrolytic adsorption and surface precipitation. When the initial concentration of lead was varied from 20 mg/l to 80 mg/l, ion exchange took place preferentially in the low pH range of 3.0 to 6.0, and the stoichiometric equation could be described as 2RH + Pb2+ = R2Pb + 2H+. On the other hand, when pH > 6.0, surface precipitation and hydrolytic adsorption took the predominant parts in the adsorption. The adsorption was notably affected by pH of solutions. The adsorption isotherm corresponding to the ion exchange predominating stage was correlated well to Langmuir Equation and the maximum removal capacity in the stage was 0.15-0.19 mmol Pb/g dry tannin gel adsorbent (30-40 mg Pb/g dry adsorbent). This study has the potential to develop an effective natural adsorbent for removal and recovery of heavy metals.

Keywords: Condensed Tannin, Hydrolytic Adsorption, Ion Exchange, Surface Precipitation, Tannin Gel Adsorbent

Wakao, N. (2001), A proposal of calculational model for pressure swing adsorption based on the pore diffusion. *Journal of Chemical Engineering of Japan*, **34** (11), 1443-1448.

Full Text: [J\J Che Eng Jap34, 1443.pdf](J/J%20Che%20Eng%20Jap34,%201443.pdf)

Abstract: A calculational model is proposed for the pore-diffusion based PSA. In principle the model is identical with that of the previous work on the surface-diffusion based PSA, except for the diffusion coefficient being inversely proportional to pressure. From the calculation for a methane-activated carbon system it is found that the increase in the intraparticle diffusion coefficient in the depressurization stage increases desorption, but a considerable desorption still occurs in the purge stage. In this work we also show that the maximal discharge of sorbate mass increases when the depressurization is accomplished in a short time. The process consisted of the adsorption, depressurization and purge stages is compared with the process having only the adsorption and purge stages in terms of the discharge of sorbate mass and the volume of gas leaving the column bottom.

Keywords: Adsorption, Pore Diffusion, Packed Bed, Computation, PSA, VSA

Yao, H., Saito, N., Mkilaha, I.S.N. and Naruse, I. (2002), Comparative study of lead and cadmium compounds capture by sorbents. *Journal of Chemical Engineering of Japan*, **35** (5), 401-408.

Full Text: [J\J Che Eng Jap35, 401.pdf](J/J%20Che%20Eng%20Jap35,%20401.pdf)

Abstract: Trace metal compounds, which are emitted from combustion systems such as waste incinerators, coal combustors, and so forth, enrich in fine particulates, usually formed during various stages of combustion. Owing to the difficulties of capturing fine particulates by conventional particulate dust collection systems, these are exhausted in the atmosphere. Fundamentals of the emission and control of trace metal compounds of lead and cadmium were studied at relatively low temperature (1073–1273 K), using a thermobalance. In order to capture these trace metal compounds, seven types of sorbent, namely alumina, silica, kaolin, limestone, scallop, zeolite and apatite, were used. As a result, the natural aluminosilicate materials like kaolin and zeolite were found to be effective in capturing lead and cadmium chemically. Although the presence of HCl decreases capture efficiencies, the products didn’t react with HCl. The types of kaolin had a little influence on the capture efficiency and processes in general. On the other hand, the calcium-based sorbents like limestone, scallop and apatite, could capture both the trace metals and chlorine. On the presence of HCl, the capture efficiencies of these sorbents decreased sharply. Both alumina and silica have low ability to capture trace metal compounds. Moreover, in reducing atmosphere, all sorbents showed low capture abilities since the products were reduced.

Keywords: Combustion, Fine Particulate, Trace Metal, Sorbent

Onyango, M.S., Matsuda, H. and Ogada, T. (2003), Sorption kinetics of arsenic onto iron-conditioned zeolite. *Journal of Chemical Engineering of Japan*, **36** (4), 477-485.

Full Text: [J\J Che Eng Jap36, 477.pdf](J/J%20Che%20Eng%20Jap36,%20477.pdf)

Abstract: Iron-conditioned zeolite was prepared and used in arsenic removal from groundwater at pH 7.8±0.2 and temperature 293±1 K. The effects of initial arsenic concentration and intermittent agitation were investigated in a batch reaction vessel. Kinetics analysis showed that the adsorption reaction between arsenic and the binding surfaces (probably hydrous ferric oxide) can be approximated by a pseudosecond order rate equation and that chemical reaction is the essential rate-control ling step. The rate constant, the equilibrium sorption capacity and the initial arsenic sorption rate were calculated. The initial arsenic uptake and equilibrium uptake increased with an increase in initial concentration. The intermittent agitation was superior in arsenic uptake, compared to continuous agitation. The external and intra-particle diffusion resistances to mass transfer slightly varied with an increase in initial arsenic concentration.

Keywords: Adsorption, Arsenic, Iron-Conditioned Zeolite, Groundwater, Liquid-Phase Adsorption, Activated Carbon, Aqueous-Solutions, Drinking-Water, Metal-Ions, Removal, Cadmium, Sorbents, Chitosan, Acid

? Ohe, K., Nagae, Y., Nakamura, S. and Baba, Y. (2003), Removal of nitrate anion by carbonaceous materials prepared from bamboo and coconut shell. *Journal of Chemical Engineering of Japan*, **36** (4), 511-515.

Full Text: [J\J Che Eng Jap36, 511.pdf](J/J%20Che%20Eng%20Jap36,%20511.pdf)

Abstract: The adsorption behavior of nitrate anion was investigated from aqueous solution using activated carbon (AC) prepared from coconut shells and charcoal (CB) prepared from bamboo. The adsorption of nitrate anions on these adsorbents exhibited maximum values in the region of equilibrium pH 2-4, and was explained by the adsorption of the Langmuir type. The adsorption capacity and the adsorption equilibrium constant for AC were 2.66×10-1 mmol.g-1 and 2.72 dm3mmol-1, respectively, and those for CB were 1.04×10-1 mmol.g-1 and 3.53 dm3mmol-1, respectively, at 303 K. The order of the adsorption capacity was the same as the order of their specific surface areas. This suggests that the specific surface area is one of the factors that determine the adsorption ability for nitrate anions. The theoretical curves calculated using these values were in good agreement with the experimental data. From the obtained thermodynamic parameters, it was found that the adsorption of nitrate anions on AC and CB contributes to the hydrophobic interaction.

Keywords: Activated Carbon, Adsorption, Bamboo, Charcoal, Nitrate Anion, Specific Surface Area

Onyango, M.S., Kojima, Y., Matsuda, H. and Ochieng, A. (2003), Adsorption kinetics of arsenic removal from groundwater by iron-modified zeolite. *Journal of Chemical Engineering of Japan*, **36** (12), 1516-1522.

Full Text: [J\J Che Eng Jap36, 1516.pdf](J/J%20Che%20Eng%20Jap36,%201516.pdf)

Abstract: This work involves the treatment of model groundwater containing arsenic with the use of chemically modified zeolite. A finite volume stirred tank reactor was used to study the effects of the variables; sorbent grain fraction and sorbent dose, on arsenic reaction kinetics. The results are modelled using the pseudo-second order and second-order reversible rate equations. Equilibrium arsenic uptake and residual sum of squares evaluated from the two models are compared. From them, the arsenic sorption onto the active sites is consistent with a pseudo-second order mechanism. The initial sorption rate which drives the uptake rate was found to be in the same order of magnitude for all the grain fractions but decreased with an increase in the sorbent dose. Furthermore, based on the pseudo-second order mechanism, Thiele moduli were determined and their values suggested that intraparticle diffusion may play a significant role in arsenic uptake.

Keywords: Arsenic, Bone Char, Carbon, Diffusion, Dyes, Equilibrium, Fractions, Groundwater, Iron-Modified Zeolite, Kinetics, Mechanism, Metal-Ions, Model, Models, Modified, Oxide, Peat, Reaction, Reaction Kinetics, Reactor, Second-Order Kinetics, Sites, Sorption, Sorption, Treatment, Uptake, Zeolite

Kanazawa, R., Yoshida, T., Gotoh, T. and Sakohara, S. (2004), Preparation of molecular imprinted thermosensitive gel adsorbents and adsorption/desorption properties of heavy metal ions by temperature swing. *Journal of Chemical Engineering of Japan*, **37** (1), 59-66.

Full Text: [J\J Che Eng Jap37, 59.pdf](J/J%20Che%20Eng%20Jap37,%2059.pdf)

Abstract: A gel adsorbent which adsorbs and/or desorbs specific heavy metal ions selectively by temperature swing was prepared by copolymerizing the chelating monomer, *N*-(4-vinyl)benzyl ethylenediamine (Vb-EDA) with *N*-isopropylacrylamide (NIPA) as thermosensitive component by using the molecule imprinting technique. Copper ion, Cu(II) was selected as a target ion in imprinting. The adsorption amount of Cu(II) ions on imprinted gel depended on the temperature, and the maximum amount was obtained at a specific temperature where the size of gel network corresponds to that memorized in the preparation of gel. The adsorption amount depended on the gel composition, namely, the concentrations of NIPA and cross-linker. The adsorption amount increased linearly with the increasing Vb-EDA content in the gel, and the slope was almost 1/2. This implies that one Cu(II) ion coordinates with two molecules of Vb-EDA. The adsorption amount was well described by the Langmuir isotherm formula. The adsorption and desorption could be done repeatedly by temperature swing. Furthermore, the selective adsorption of Cu(II) ions was confirmed by comparing the adsorption amounts of other metal ions, Ni(II), Zn(II) and Mn(II).

Keywords: Molecular Imprinting, Thermosensitive Gel, Selective Adsorption, Heavy Metal Ion, *N*-Isopropylacrylamide

Maeda, R., Hino, S., Matsumoto, M. and Kondo, K. (2004), Adsorption of lipase into admicelles on silica gel. *Journal of Chemical Engineering of Japan*, **37** (1), 109-112.

Full Text: [J\J Che Eng Jap37, 109.pdf](J/J%20Che%20Eng%20Jap37,%20109.pdf)

Abstract: In order to develop the admicellar system, lipase from *Candida rugosa* was immobilized into an admicellar system consisting of silica gel and nonionic surfactant, Triton X-100. Adsorption mechanism of lipase on the admicelles was different from bare silica gel. On bare silica, multilayer adsorption of lipase molecules was supposed due to a scarce affinity to the silica surfaces. On the other hand, in the case of admicelles, the adsorption isotherm of lipase was well correlated with the Langmuir model. Such transformation of isotherms was not observed in the case of lysozyme. These behaviors were explained by two aspects; electrostatic interaction due to the isoelectric point of both enzymes and surface charge of silica gel, and affinity originated in hydrophobicities of enzyme surface. From H.F.S. values, it was presumed that the surface of lipase from *Candida rugosa* was relatively hydrophobic and lysozyme had a rather hydrophilic surface. In addition, activity of lipase could be maintained in Triton X-100 layers on silica gel after washing by buffer solution.

Keywords: Silica Gel, Nonionic Surfactant, Admicelles, Adsorption, Lipase

Lee, C.H. and Lin, C.I. (2004), Kinetics of adsorption of phospholipids from hydrated and alkali-refined soy oil using regenerated clay. *Journal of Chemical Engineering of Japan*, **37** (6), 764-771.

Full Text: [J\J Che Eng Jap37, 764.pdf](J/J%20Che%20Eng%20Jap37,%20764.pdf)

Abstract: The adsorption kinetics of residual phospholipids from hydrated and alkali-refined soy oil with regenerated clay was studied by measuring the concentration change of phospholipids in the oils before and after adsorption with time. Experimental results indicated that the adsorption efficiency and regeneration efficiency of the regenerated clay was 69.3% and 91.3%, respectively. The adsorption rate was found to increase upon increasing the ratio of clay/oil, agitation speed or temperature. It was also found to increase by decreasing the particle diameter of the clay. The effects of the particle diameter of the clay and the ratio of clay/oil were significant while those of agitation speed and temperature were not. The empirical rate expression for the adsorption of phospholipids has been determined as

ln(*C*/*C*0) = –338.708exp(–4018/*RT*)*d*–0.953*r*0.564*s*0.231*t*0.1

Keywords: Adsorption Kinetics, pHospholipids, Regenerated Clay, Soy Oil

? Hossain, M.A., Kumita, M., Michigami, Y. and Mori, S. (2005), Kinetics of Cr(VI) adsorption on used black tea leaves. *Journal of Chemical Engineering of Japan*, **38** (6), 402-408.

Full Text: [2005\J Che Eng Jap38, 402.pdf](2005/J%20Che%20Eng%20Jap38,%20402.pdf)

Abstract: Kinetic investigations were carried out to evaluate the applicability of used black tea leaves (UBTLs) as a low-cost adsorbent to the removal of chromium(VI) from aqueous solutions. The effects of various kinetic parameters were investigated using a batch process. The adsorption of Cr(VI) on UBTLs occurs rapidly in the first day, followed by a slow process that requires more than 10 days to reach its equilibrium. The initial adsorption rate increases with increasing initial concentration of Cr(VI) in the solution and processing temperature. The adsorption kinetics follows Richie’s pseudo-second order rate equation better than the Lagergren’s pseudo-first order one. The rate constant of the pseudo-second order adsorption is affected by the processing conditions such as the initial Cr(VI) concentration, solution pH, temperature and foreign ions. The results of the kinetic experiments showed that the adsorption of Cr(VI) on UBTLs is an endothermic process and the activation energy of adsorption is 16.3 kJ mol-1.

Keywords: Adsorption, Chromium(VI), Used Black Tea Leaves, Kinetic Analysis, Rate Constant, Performance Liquid-Chromatography, Aqueous-Solution, UV-Detection, Removal, Sorption, Ions, Speciation, Cr(III), Peat, Lead

? Furukawa, S., Nishiumi, T., Aoyama, N., Nitta, T. and Nakano, M. (2005), A molecular simulation study on adsorption of acetone/water in mesoporous silicas modified by pore surface silylation. *Journal of Chemical Engineering of Japan*, **38** (12), 999-1007.

Full Text: [2005\J Che Eng Jap38, 999.pdf](2005/J%20Che%20Eng%20Jap38,%20999.pdf)

Abstract: Two types of molecular simulation techniques have been utilized to investigate surface modification effects on adsorption of acetone/water in mesoporous silicas with a hexagonal uniform pore structure: the NVT-ensemble Molecular Dynamics technique with the melt-quench algorithm for modeling a nonsilylated mesoporous silica (an 011 surface model) and a fully silylated mesoporous silica (an FS surface model), and the μ VT-ensemble Orientational-Bias Monte Carlo method for calculating adsorption isotherms. A good agreement was obtained between simulations and experiments for adsorption of pure acetone and water at 298 K on non-silylated and silylated mesoporous silicas. Equilibrium adsorption densities of the equi-fugacity mixture of acetone and water are calculated for the OH and FS surface models, by specifying either the gas or the liquid phase for the mixture. A considerably large separation factor, 7300, was obtained for the adsorption from a liquid mixture in the FS surface model, though the adsorption amount was rather small, which explains why the pervaporation through highly silylated mesoporous silica membranes was effective for separation of organic/water mixtures.

Keywords: 298 K, 298-K, Acetone, Adsorption, Adsorption Isotherms, Algorithm, Binary-Mixtures, Carbon-Dioxide, Computer-Simulation, Densities, Equilibrium, Hydrocarbons, Intermolecular Potential Functions, Isotherms, MCM-41, Membranes, Mesoporous Material, Methane, Model, Modeling, Models, Modification, Modified, Molecular Simulation, Monte Carlo, OH, Separation, Silica, Simulation, Structure, Surface, Surface Modification, Techniques, Water, Water

? Yang, Q.F., Lisitsin, D., Liu, Y.Q., David, H. and Semiat, R. (2007), Desupersaturation of RO concentrates by addition of coagulant and surfactant. *Journal of Chemical Engineering of Japan*, **40** (9), 730-735.

Full Text: [2007\J Che Eng Jap40, 730.pdf](2007/J%20Che%20Eng%20Jap40,%20730.pdf)

Abstract: One way for the reuse of reverse osmosis (RO) concentrates and thus increasing the water recovery is to recycle part of the brine concentrate to the feed, after precipitating the scaling salts such as CaSO4/CaCO3 held in solution by antiscalants. However, antiscalants impart considerable stability to the supersaturated solution. In the present study, desupersaturation of RO CaSO4 concentrate in the presence of antiscalants was studied by addition of coagulant polyaluminum chloride (PACI) and surfactant sodium dodecyl sulfate (SDS). Simulated experiments for testing the changes in antiscalant concentration were also conducted. The results indicated that under certain conditions, the above methods were effective for desupersaturation of RO concentrate. After the removal precipitation reactions, the calculated supersaturation ratio of the test solution deceased to about 1.0, which demonstrated that the test solution reached thermodynamic equilibrium. With respect to the removal of scaling salt, it was found to follow the second order kinetics. The removal of scaling salt was always accompanied by the adsorption precipitation of antiscalants. The ecomonic analyses show the proposed methods were feasible.

Keywords: Adsorption, Aqueous-Solution, Calcium-Sulfate Dihydrate, Coagulant, Concentrate, Crystal-Growth, Crystallization, Desalination, Desalination, Desupersaturation, Equilibrium, Kinetics, Performance, Precipitation Softening Caps, Pretreatment, Residual Aluminum, Reverse Osmosis, Surfactant, Water

? Chen, M.S., Liu, S.Y., Wu, W.W., Yang, F.L., Chen, J.Z. and Pan, B. (2010), Adsorption and release of phosphates in the case of Dianchi sediments. *Journal of Chemical Engineering of Japan*, **43** (10), 913-920.

Full Text: 2010\J Che Eng Jap43, 913.pdf

Abstract: Phosphate behavior is an important factor that controls the eutrophication of inland lakes. Dianchi Lake is the largest lake in southwest China, and it is divided into Caohai Lake (CL) and Waihai Lake (WL). Although the problem of eutrophication is more serious in CL than in WL, algal blooms are more frequent in the latter. In this study, phosphate-sediment interactions were studied with an emphasis on the differences between CL and WL sediments. A pseudo-second-order kinetic model could describe phosphate release kinetics well. The phosphate adsorption capacity of the CL sediments was thrice that of the WL sediments. Although phosphate release in these two lakes was comparable, the total phosphate concentration in the CL sediments was seven times that in WL sediments. Because phosphates and dissolved organic matter (DOM) compete for adsorption sites on the sediment particles, the presence of DOM results in a significant increase in phosphate release in both sediments. The results suggest that both endogenous and exogenous phosphates should be controlled in order to reduce algal bloom frequency in Dianchi Lake.

Keywords: Adsorption, Adsorption Capacity, Algae Blooming, Algal Bloom, Algal Blooms, Behavior, Capacity, China, Cl, Competitive Adsorption, Concentration, Dissolved, Dissolved Organic Matter, Eutrophication, Exchangeable Phosphate, Kinetic, Kinetic Model, Kinetics, Lake, Lakes, Model, Organic, Organic Matter, Organic-Matter, Particles, Phosphate, Phosphate Adsorption, Phosphates, Phosphorus, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Release, Sediment, Sediments, Soil, Sorption Characteristics

? Lin, C.I. and Wang, L.H. (2011), Adsorption of nickel (II) ion from aqueous solution using rice hull ash. *Journal of Chemical Engineering of Japan*, **44** (4), 278-285.

Full Text: [2011\J Che Eng J44, 278.pdf](2011/J%20Che%20Eng%20J44,%20278.pdf)

Abstract: Rice hull was calcined to rice hull ash (RHA) at 500ºC under 20 mL air s(-1) for 50 min. The RHA thus prepared has been found to adsorb nickel (II) ion from aqueous solution efficiently. Experimental results indicated that the rate of adsorption of nickel ion and the adsorption of nickel ion at equilibrium were increased upon decreasing RHA dosage. They were also increased with increasing initial nickel concentration or adsorption temperature. On the other hand, they were found to remain unchanged when the initial pH was increased from 2.3 to 5.6, or the stroke speed was changed in the range of 30-180 stoke min-1. The kinetic data obtained obeyed the pseudo-second-order rate equation. An empirical equation correlating the relationship between the adsorption of nickel ion and the adsorption time was also determined.

Keywords: Adsorption, Aqueous Solution, Ash, Design, Equilibrium, Fly-Ash, Husk Ash, Kinetic, Kinetics, Kinetics, Lead, Mechanism, Metal-Ions, Nickel, Nickel Ion, pH, Removal, Rice, Rice Hull Ash, Temperature, Waste-Water

# Title: Journal of Chemical Industry and Engineering

Full Journal Title: Journal fo Chemical Industry and Engineering

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Journal Country/Territory:

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Publisher Address:

Subject Categories:

: Impact Factor

? Lu, A.X., Jiao, L.M., Liao, X.P., Yao, K., Zhou, R.Q. and Shi, B. (2006), Ferric(III) immoblized collagen fiber and its adsorption for bacteria. *Journal of Chemical Industry and Engineering*, **57** (4), 886-891.

Full Text: [2006\J Che Ind Eng57, 886.pdf](2006/J%20Che%20Ind%20Eng57,%20886.pdf)

Abstract: novel adsorbent, ferric(III) immobilized collagen fiber, was prepared, and its adsorption behavior to bacteria was studied. Ferric was uniformly dispersed in collagen fiber mainly through chemical connection and could withstand the extraction of water. It was found that the ferric(III) immobilized collagen fiber exhibited high adsorption capacity to bacteria. The adsorption capacity to E. coli and S. aureus were 2.04×109 cfu·g-1 and 3.15×109 cfu·g-1 at 30°C when the adsorption experiments were carried out for 1 h and t heir initial concent ration were 1102×107 cfu ml-1 and 918×106 cfu ml-1 respectively. The adsorption isot herms could be described by the Freundlich equation. The adsorption capacity was influenced by cult ure age of the bacteria, but no considerable change was observed at varying temperat ure and pH. Further analysis indicated that the adsorption kinetics data could be well fit ted by t he p seudo-second-order rate model, and adsorption capacities calculated by the model were consistent with the actual measurements with error ≤2%. In addition, the quite fast adsorption rate of bacteria on ferric(III) immobilized collagen fiber was probably due to the fact that the adsorption process took place at the surface of adsorbent.

Keywords: Collagen Fiber, Ferric(III), Immobilization, Adsorption, E. coli, S. Aureus

# Title: Journal of Chemical Information and Computer Sciences

Full Journal Title: [Journal of Chemical Information and Computer Sciences](http://pubs3.acs.org/acs/journals/TOC.page?incoden=jcisd8&indecade=&involume=0&inissue=0)

ISO Abbreviated Title: J. Chem. Inf. Comput. Sci.

JCR Abbreviated Title:

ISSN: 0095-2338

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Windsor, D.A. (1975), Developing drug literatures. 1. Bibliometrics of baclofen and dantrolene sodium. *Journal of Chemical Information and Computer Sciences*, **15** (4), 237-241.

Full Text: [1960-80\J Che Inf Com Sci15, 237.pdf](1960-80/J%20Che%20Inf%20Com%20Sci15,%20237.pdf)

Abstract: The llteratures of two antlspastlc drugs, baclofen and dantrolene sodlum, were studied bibllometrlcally for their first decade and were found lo be generally slmllar. Baclofen had 93 papers and dantrolene sodlum had 70. About a quarter of the baclofen papers were in a foreign language, whereas almost all dantrolene sodlum papers were In English. Baclofen literature had a lower nonscholarly content, but the scholarly Increase, 5%, was the same for both. Both drugs had an average of 12 references per paper. The literatures of both drugs had a slmllar degree of internal coheslveness; almost half of their papers referred to other papers in the same drug collection. The first human paper for baclofen was the second publlshed; for dantrolene sodlum, it was the eleventh. The dlstrlbutlon of journals carrying papers on each of these drugs followed Bradford’s law. Two authors per paper was the average for each drug. The productlvlty of authors approximated Lotka’s law for both drugs. About two-thirds of the papers of both drugs had a drug-word In their titles. The literature of both drugs contalned about 15% legendary papers, typical of cllnlcal pharmacology. The most intense papers, 15 for baclofen and ll for dantrolene sodlum, were identifled, using citation, bibllographic coupling, and co-cltatlon frequencies. A generallzatlon predicts what might be expected from the literature of future antispastic drugs.

Windsor, D.A. (1978), Bibliometric problems associated with the patent literature. *Journal of Chemical Information and Computer Sciences*, **18** (1), 55-56.

Full Text: [1960-80\J Che Inf Com Sci18, 55.pdf](1960-80/J%20Che%20Inf%20Com%20Sci18,%2055.pdf)

Windsor, D.A. (1979), Using bibliometric analyses of patent literature for predicting the clinical fates of developing drugs. *Journal of Chemical Information and Computer Sciences*, **19** (4), 218-221.

Full Text: [1960-80\J Che Inf Com Sci19, 218.pdf](1960-80/J%20Che%20Inf%20Com%20Sci19,%20218.pdf)

Abstract: Certain bibliometric features of the early literatures of developing drugs can be used to predict their ultimate clinical fates. The chronological sequence of publications is expressed as a binary vector with 1 for a patent and 0 for a nonpatent. The decimal equivalents for standardized vector lengths provide scalar values for comparing one drug with another. To incorporate concordant patents, fuzzy subsets are employed; the number of attempts required to achieve transitive closure are the values for comparison. The methods involved are described using minoxidil as an example.

Osinga, M. (1980), Bibliometrics and the clinical fate of drugs. *Journal of Chemical Information and Computer Sciences*, **20** (3), 192.

Full Text: [1960-80\J Che Inf Com Sci20, 192.pdf](1960-80/J%20Che%20Inf%20Com%20Sci20,%20192.pdf)

Windsor, D.A. (1980), Bibliometrics and drugs. *Journal of Chemical Information and Computer Sciences*, **20** (4), 255.

Full Text: [1960-80\J Che Inf Com Sci20, 255.pdf](1960-80/J%20Che%20Inf%20Com%20Sci20,%20255.pdf)

Garfield, E. (1985), History of citation indexes for chemistry: A brief review. *Journal of Chemical Information and Computer Sciences*, **25** (3), 170-174.

Full Text: [1985\J Che Inf Com Sci25, 170.pdf](1985/J%20Che%20Inf%20Com%20Sci25,%20170.pdf)

Abstract: The *Science Citation Index (SCI)* was the first comprehensive citation index for chemistry. But its use in chemistry was not obvious, even though SCZ covers every important journal of chemistry. However, citation-based searching bypasses dependence on chemical nomenclature. Finding applications of synthetic methods and physical-chemical equations is simplified. These are fields where use of traditional indexing is difficult. An extension of citation indexing, co-citation clustering, is now also used for automatic hierarchical classification and mapping of literature. The value of citation indexes to the historian of chemistry will continue to increase as *SCI* coverage is extended back to include the pre-1955 literature.

? Lyon, W.S. (1986), Scientometrics with some emphasis on communication at scientific meetings and through the Invisible College. *Journal of Chemical Information and Computer Sciences*, **26** (2), 47-52.

Full Text: [1986\J Che Inf Com Sci26, 47.pdf](1986/J%20Che%20Inf%20Com%20Sci26,%2047.pdf)

Abstract: Scientometrics uses quantitative methods to investigate science as an information process. Studies were made of attendance and speakers at several scientific meeting series. Data from these and other investigations lead to the conclusion that “invisible colleges” exist within science and that advancement is often through interactions within these informal organizations. Studies have also been made of what happens to oral presentations (are they eventually published?) and how journals communicate with other journals. Such investigations aid in understanding the communication process in science.

Tsay, M.Y. (1989), Bibliometric study of the application of computers in synthetic organic, physical, inorganic, and analytical-chemistry literature abstracted by chemical abstracts in 1986. *Journal of Chemical Information and Computer Sciences*, **29** (3), 156-158.

Full Text: [1989\J Che Inf Com Sci29, 156.pdf](1989/J%20Che%20Inf%20Com%20Sci29,%20156.pdf)

Abstract: A bibliometric study of the application of computers in the analysis of chemistry, from 1984 to 1986, has been conducted. A total of 38 17 references in *CA Selects: Computers in Chemistry,* 1986, were analyzed by a personal computer. Most of the articles appeared as journal papers, which contributed about 87% of the total literature. The Bradford-Zipf law was applied to investigate the journal literature. Thirty core journals were identified. Seven of the top 10 journals are physics oriented. *Analytical Chemistry* and *Analytica Chimica Acta* are devoted entirely to the subject. The vast majority, 6032 of 6972 authors, contributed only one article. The leading authors and their productivity were also studied. English is the predominant language of articles on this subject.

Synge, R.L.M. (1990), 25 years of Science Citation Index: Some experiences. *Journal of Chemical Information and Computer Sciences*, **30** (1), 33-35.

Full Text: [1990\J Che Inf Com Sci30, 33.pdf](1990/J%20Che%20Inf%20Com%20Sci30,%2033.pdf)

Abstract: *Science Citation Index* (SCI) depends for intellectual content entirely on citations by authors, who are sometimes prodded by editors and referees. Its patchiness is therefore not surprising, but frequently it gives access to relevant and up-to-date documents not easily accessible by other means. Two contrasting “citation families” are described. The first family, dealing with the various ascorbic acid derivatives having C substitution at C-2, actually retrieved very nearly all the relevant documents (other than patent specifications) that were retrieved by a CAS ONLINE substructure search. Organic chemists are clearly careful authors. The second family, dealing with amino acid residues covalently bound in soil organic matter, yielded documents having surprisingly little overlap with those retrieved by using a carefully devised Boolean “profile” on the general subject index of *Chemical Abstracts.* This was only partly because SCI is beset by language-barrier problems to which *Chemical Abstracts* is immune. The SCI management might extend its journal coverage, but otherwise improvement can only come from a more serious attitude to placing references in primary publications. SCI remains a complement to, not a substitute for, other data-bases.

Kunz, M. (1993), About metrics of bibliometrics. *Journal of Chemical Information and Computer Sciences*, **33** (2), 193-196.

Full Text: [1993\J Che Inf Com Sci33, 193.pdf](1993/J%20Che%20Inf%20Com%20Sci33,%20193.pdf)

Abstract: It is shown that bibliometric incidence matrices can be treated as vectors in nm-dimensional space and characterized by statistics of their singular values. A case of a personal bibliography is demonstrated.

Keywords: Stationary Scientometric Distributions

Karki, M.M.S. and Garg, K.C. (1997), Bibliometrics of alkaloid chemistry research in India. *Journal of Chemical Information and Computer Sciences*, **37** (2), 157-161.

Full Text: [1997\J Che Inf Com Sci37, 157.pdf](1997/J%20Che%20Inf%20Com%20Sci37,%20157.pdf)

Abstract: This paper attempts at quantitative and qualitative assessment of alkaloid chemistry (a subgroup of organic chemistry) research in India as viewed through *Chemical Abstracts*. While focusing on World output *vis-a-vis* Indian output in terms of publications, this paper identifies the centers of excellence of alkaloid chemistry research, the research groups involved, and their channels of communication, besides studying the citedness of Indian work. Alkaloid chemistry research performed in India is found to be fairly collaborative and part of main stream science.

Pohl, L., Quoniam, L., Quazzotti, S. and Dou, H. (1997), Microlevel infometric investigation in phytochemistry. *Journal of Chemical Information and Computer Sciences*, **37** (5), 821-827.

Full Text: [1997\J Che Inf Com Sci37, 821.pdf](1997/J%20Che%20Inf%20Com%20Sci37,%20821.pdf)

Abstract: In this paper we present a computer-based methodology in answer to a specific question in the field of phytochemistry. This study, prompted by an academic question, was undertaken on a voluntary basis but may be used as an aid in a business decision. The study is divided into three parts: first describing the scientific background motivating this analysis, second, the method for collecting the data, and third, the statistical study of the data and analysis of the results. Throughout this paper it is shown how a practical question can be resolved by the use of information technology. The study was carried out by automating a series of data processes, from data collection and analysis to final presentation of the results in a user-friendly manner. Manual checking was completed after each step. The aim of the exercise was to identify chemists who are specialists in natural compounds for high-quality perfumes. We have divided the question into three subjects which characterise the abilities needed to comprehensively cover the field of natural high-quality perfumes. We based our analysis on the supposition that to be considered a “specialist” is related to the publication activity of scientific articles in the three different areas of competence. The main difficulty of this study was to find authors who wrote articles on the three subjects, but not necessarily in the same article. The orginality of the approach consists in data collection from several databases without downloading the bibliographic references.

Kostoff, R.N., Braun, T., Schubert, A., Toothman, D.R. and Humenik, J.A. (2000), Fullerene data mining using bibliometrics and database tomography. *Journal of Chemical Information and Computer Sciences*, **40** (1), 19-39.

Full Text: [2000\J Che Inf Com Sci40, 19.pdf](2000/J%20Che%20Inf%20Com%20Sci40,%2019.pdf)

Abstract: Database tomography (DT) is a textual database analysis system consisting of two major components: (1) algorithms for extracting multiword phrase frequencies and phrase proximities (physical closeness of the multiword technical phrases) from any type of large textual database, to augment (2) interpretative capabilities of the expert human analyst. DT was used to derive technical intelligence from a fullerenes database derived from the Science Citation Index and the Engineering Compendex. pHrase frequency analysis by the technical domain experts provided the pervasive technical themes of the fullerenes database, and phrase proximity analysis provided the relationships among the pervasive technical themes. Bibliometric analysis of the fullerenes literature supplemented the DT results with author/journal/institution publication and citation data. Comparisons of fullerenes results with past analyses of similarly structured near-earth space, chemistry, hypersonic/supersonic flow, aircraft, and ship hydrodynamics databases are made. One important finding is that many of the normalized bibliometric distribution functions are extremely consistent across these diverse technical domains and could reasonably be expected to apply to broader chemical topics than fullerenes that span multiple structural classes. Finally, lessons learned about integrating the technical domain experts with the data mining tools are presented.

Balaban, A.T. (2000), Fullerene research 1994-1996. A computer-generated cross-indexed bibliography of the journal literature By T. Braun, A. Schubert, G. Schubert, and L. Vasvári. Advanced series in fullerenes, Vol. 5. World Scientific Publishing Co.: Singapore. 1997. 517 pp. 57.00 Pounds Sterling. ISBN 981-02-3345-0. *Journal of Chemical Information and Computer Sciences*, **40** (4), 1074-1074.

Full Text: [2000\J Che Inf Com Sci40, 1074.pdf](2000/J%20Che%20Inf%20Com%20Sci40,%201074.pdf)

Onodera, N. (2001), A bibliometric study on chemical information and computer sciences focusing on literature of *JCICS*. *Journal of Chemical Information and Computer Sciences*, **41** (4), 878-888.

Full Text: [2001\J Che Inf Com Sci41, 878.pdf](2001/J%20Che%20Inf%20Com%20Sci41,%20878.pdf)

Abstract: A bibliometric approach was used to survey the state-of-the-art of research in the field of chemical information and computer sciences (CICS). By examining the *CA* database for the articles abstracted under the subsection “Chemical information, documentation, and data processing”, *Journal of Chemical Information and Computer Sciences* (*JCICS*) was identified to have been the top journal in this subsection for the last 30 years. Based on this result, *CA* subsections and controlled index terms given to *JCICS* articles were analyzed to see trends in subjects and topics in the CICS field during the last two decades. These analyses revealed that the subjects of research in CICS have diversified from traditional information science and computer applications to chemistry to “molecular information sciences”. The *SCISEARCH* database was used to grasp interdependency between *JCICS* and other key journals and also the international nature of *JCICS* in its publications and citedness.

Braun, T., Schubert, A. and Kostoff, R.N. (2002), A chemistry field in search of applications statistical analysis of U.S. fullerene patents. *Journal of Chemical Information and Computer Sciences*, **42** (5), 1011-1015.

Full Text: [2002\J Che Inf Com Sci42, 1011.pdf](2002/J%20Che%20Inf%20Com%20Sci42,%201011.pdf)

Abstract: The paper is examining the U.S. patenting activity on the application of fullerenes and shows that despite some pessimistic manifestations in this respect in the current literature there are many promising approaches regarding the pragmatic aspects of this field of chemistry.

Braun, T. (2003), The reliability of total citation rankings. *Journal of Chemical Information and Computer Sciences*, **43** (1), 45-46.

Full Text: [2003\J Che Inf Com Sci43, 45.pdf](2003/J%20Che%20Inf%20Com%20Sci43,%2045.pdf)

Abstract: In short, citation analysis has become a small cottage industry today. The legitimacy of its use for a variety of purposes has been established. In fact, that legitimacy has extended to the point where many suspect uses of citations are accepted without significant skepticism. Rarely, if ever. are these counts. which compare one individual with another, accompanied by a set of caveats, about the limits of such individual comparisons or the bases on which the comparisons are being made (Jonathan R. Cole). (Cole, J. R. A Short History of the Use of Citations as a Measure of the Impact of Scientific and Scholarly Work, Chapter 14. In The Web of Knowledge; Cronin, B., Atkins, H. B., Eds. ASIS Monograph Series. 2000 p 281.)

# Title: Journal of Chemical Information and Modeling

Full Journal Title: [Journal of Chemical Information and Modeling](http://pubs.acs.org/loi/jcisd8)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Li, H. and Willett, P. (2010), Bibliometric analysis of Chinese research on cyclization, MALDI-TOF, and antibiotics. *Journal of Chemical Information and Modeling*, **50** (1), 22-29.

Full Text: [2010\J Che Inf Mod50, 22.pdf](2010/J%20Che%20Inf%20Mod50,%2022.pdf)

Abstract: This paper reports a bibliometric analysis of the impact of research in China oil cyclization, MALDI-TOF, and antibiotics, comparing this research with that in the USA, Germany, and Japan. It is shown that the productivity of the Chinese research (in terms of numbers of publications) is growing rapidly; however, this growth has not, to date, been accompanied by an analogous growth in impact (in terms of citations to the published work). A citation analysis of national and international collaboration patterns shows that collaborative research does not invariably result in a larger number of citations; in part, at least, this is shown to be due to the dominant role played by the publications of the Chinese Academy of Sciences.

Keywords: Bibliometric, Bibliometric Analysis, Chemical-Abstracts, Chemistry Research, Chemoinformatics, China, Citation, Citation Analysis, Citations, Co-Authorship, Collaboration, Collaborative Research, Impact, Indicators, Patent Literature, Publications, Research, Science Fields, Scientific Collaboration, USA

? Al Jishi, R. and Willett, P. (2010), The *Journal of Chemical Documentation* and the *Journal of Chemical Information and Computer Sciences*: Publication and citation statistics. *Journal of Chemical Information and Modeling*, **50** (11), 1915-1923.

Full Text: [2010\J Che Inf Mod50, 1915.pdf](2010/J%20Che%20Inf%20Mod50,%201915.pdf)

Keywords: Bibliometric Analysis, Cambridge Structural Database, Chemoinformatics, Citation, Informetrics, Molecular Similarity, Sciences, Statistics

? Heneberg, P. (2011), On bibliometric analysis of Chinese research on cyclization, MALDI-TOF, and antibiotics: Methodical concerns. *Journal of Chemical Information and Modeling*, **51** (1), 1-2.

Full Text: [2011\J Che Inf Mod51, 1.pdf](2011/J%20Che%20Inf%20Mod51,%201.pdf)

Keywords: Bibliometric, Chinese

? Li, J.A. and Willett, P. (2011), Comments on “on bibliometric analysis of Chinese research on cyclization, MALDI-TOF, and antibiotics: methodological concerns”. *Journal of Chemical Information and Modeling*, **51** (1), 3.

Full Text: [2011\J Che Inf Mod51, 3.pdf](2011/J%20Che%20Inf%20Mod51,%203.pdf)

Keywords: Bibliometric, Chinese

# Title: Journal of Chemical Physics

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? Langmuir, I. (1933), An extension of the phase rule for adsorption under equilibrium and non-equilibrium conditions. *Journal of Chemical Physics*, **1** (1), 3-12.

Full Text: [-1959\J Che Phy1, 3.pdf](-1959/J%20Che%20Phy1,%203.pdf)

Abstract: An *adsorption field* is defined as a homogeneous part of a solid or liquid surface on which adsorption can occur. Inpresence of adsorbable components each field contains one or more *surface phases.* Adsorption experiments have demonstrated that in many casesall the intrinsic properties of an isolated surface phase arevariables characterized by *C*+1 degrees of freedom (*F*) where *C* is the number of components. If this *surface phase postulate*(S.P.P.) applies to each surface phase in a system, then, for a system in a state of complete equilibrium, *F* has the value *F*0 = *C*+*S* —*Pv*—*Ps*+2 where *S*, *Pv* and *Ps* are the numbers of fields, volume phases and surface phases, respectively. By considering the possible mechanisms, such as*interphase mobility* and *vapor interchange* by which equilibrium may beattained, this phase rule is extended to states of partialequilibrium, for example, cases where the surface phases and thevolume phases are at different temperatures. The effects of electricfields are considered. Non-equilibrium states, which may be divided into*steady states* and *transient states* are characterized by values of *F* greater than *F*0. Experiments on transients by which *F* can be determined may thus serve to determine *S* whenit is otherwise unknown. If the geometrical arrangement of the surface phases is known, such experiments serve to determine the *surface diffusion coefficient D,* or the phase boundary resistance todiffusion. The applicability of the S.P.P. depends on a certaindegree of *intraphase mobility* of the adatoms. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Langmuir, I. (1933), Oil lenses on water and the nature of monomolecular expanded films. *Journal of Chemical Physics*, **1** (11), 756-776.

Full Text: [-1959\J Che Phy1, 756.pdf](-1959/J%20Che%20Phy1,%20756.pdf)

Abstract: Ahigher hydrocarbon, such as tetradecane, on the surface of waterforms a circular lens. The condition for the formation ofsuch stable lenses is that the spreading coefficient *FS* = γ1 —γ2 —γ12 shall be negative. As thevolume of the oil lens is increased, the thickness *t*at the center slowly approaches a limiting value given by*t*∞2 =—2*Fs*ρ1/*g*ρ2(ρ1—ρ2). Equations are given by which *FS* can be accuratelydetermined from measurements of the radii of large lenses of known volume. The magnitude of the linear tension at the lens boundary is also calculated. Experiments with tetradecane on waterat 25°C give *FS* = —6.2 dynes cm—1 and γ = 26.9. When hydrophilic molecules are introduced into the interface between the lens and the water, they give a spreadingforce *F*12 which causes a decrease in — *FS* andin *t.* When *t <* 0.1 mm gravitational effects are negligible andthe lens degenerates into a *duplex film.* If such a film is confined by a movable barrier (piston), the force per unit length *F* exerted on the barrier is equalto *FS*. If the adsorbed molecules at the interface give a force *F*12 in accord with the gas laws, then(*F* — *F*0)(*a* — *a*0) = *kT* gives the equation of state of the duplex film, where *F*0 is thevalue of *FS* in the absence of hydrophilic substances. Itis shown that this equation applies to expanded oil filmson water and that these are properly regarded as duplexfilms although they are monomolecular. The presence of a kinkin the observed *F* — *a* curves is attributed to the sudden appearance of micelles, each containing β-molecules when *F*12 rises to a critical value. For the fatty acids ondilute HCl, β = 13. This small value is due to the crowding apart of the heads because of hydration.The esters show little or no hydration and β = 60. The heat of formation of the micelles in thefatty acids is found to be 5.5+0.24*n* kg cal. permole where *n* is the number of carbon atoms. Thevalues of *F*0 and *a*0 for various substances are determinedfrom data given by Adam. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: highly cited, MModel

? Avrami, M. (1939), Kinetics of phase change. I. General theory. *Journal of Chemical Physics*, **7** (12), 1103-1112.

Full Text: [-1959\J Che Phy7, 1103.pdf](-1959/J%20Che%20Phy7,%201103.pdf)

Abstract: The theory of the kinetics of phase change is developed with the experimentally supported assumptions that the new phase is nucleated by germ nuclei which already exist in the old phase, and whose number can be altered by previous treatment. The density of germ nuclei diminishes through activation of some of them to become growth nuclei for grains of the new phase, and ingestion of others by these growing grains. The quantitative relations between the density of germ nuclei, growth nuclei, and transformed volume are derived and expressed in terms of a characteristic time scale for any given substance and process. The geometry and kinetics of a crystal aggregate are studied from this point of view, and it is shown that there is strong evidence of the existence, for any given substance, of an isokinetic range of temperatures and concentrations in which the characteristic kinetics of phase change remains the same. The determination of phase reaction kinetics is shown to depend upon the solution of a functional equation of a certain type. Some of the general properties of temperature-time and transformation-time curves, respectively, are described and explained.

Notes: highly cited, MModel

? Avrami, M. (1940), Kinetics of phase change. II. Transformation‐time relations for random distribution of nuclei. *Journal of Chemical Physics*, **8** (2), 212-224.

Full Text: [-1959\J Che Phy8, 212.pdf](-1959/J%20Che%20Phy8,%20212.pdf)

Abstract: Following upon the general theory in Part I, a considerable simplification is here introduced in the treatment of the case where the grain centers of the new phase are randomly distributed. Also, the kinetics of the main types of crystalline growth, such as result in polyhedral, plate‐like and lineal grains, are studied. A relation between the actual transformed volume V and a related extended volume V1 ex is derived upon statistical considerations. A rough approximation to this relation is shown to lead, under the proper conditions, to the empirical formula of Austin and Rickett. The exact relation is used to reduce the entire problem to the determination of V1 ex, in terms of which all other quantities are expressed. The approximate treatment of the beginning of transformation in the isokinetic range is shown to lead to the empirical formula of Krainer and to account quantitatively for certain relations observed in recrystallization phenomena. It is shown that the predicted shapes for isothermal transformation‐time curves correspond well with the experimental data.

Notes: highly cited, MModel

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Full Text: [-1959\J Che Phy9, 177.pdf](-1959/J%20Che%20Phy9,%20177.pdf)

Abstract: The theory of the preceding papers is generalized and the notation simplified. A cluster of molecules in a stable phase surrounded by an unstable phase is itself unstable until a critical size is reached, though for statistical reasons a distribution of such clusters may exist. Beyond the critical size, the cluster tends to grow steadily. The designation “nuclei” or “grains” is used according as the clusters are below or above the critical size. It is shown that a comprehensive description of the phenomena of phase change may be summarized in Phase Change, Grain Number and Microstructure Formulas or Diagrams. giving, respectively. the transformed volume, grain, and micro- structure densities as a function of time, temperature, and other variables. To facilitate the deduction of formulas for these densities the related densities of the “extended” grain population are introduced. The extended population is that system of interpenetrating ‘volumes that would obtain if the grains granulated and grew through each other without mutual interference. The extended densities are much more readily derivable from an analysis of the fundamental processes of granulation and growth. It is shown that, under very general circumstances, the densities of the actual grain population may be expressed simply in terms of the extended population.

Jura, G. and Harkins, W.D. (1943), A new adorption isotherm which is valid over a very wide range of pressure. *Journal of Chemical Physics*, **11** (9), 430-431.

Full Text: [-1959\J Che Phy11, 430.pdf](-1959/J%20Che%20Phy11,%20430.pdf)

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Full Text: [-1959\J Che Phy12, 112.pdf](-1959/J%20Che%20Phy12,%20112.pdf)

Notes: highly cited

Hill, T.L. (1946), Statistical mechanics of multimolecular adsorption. I. *Journal of Chemical Physics*, **14** (4), 263-267.

Full Text: [-1959\J Che Phy14, 263.pdf](-1959/J%20Che%20Phy14,%20263.pdf)

Abstract: Cassie’s statistical treatment of multimolecular adsorption on a free surface, leading to the BET equation, is criticized and corrected. The method is generalized to include adsorption when the maximum number of layers of adsorbate is restricted. The isotherm equation obtained is the same as that found by Brunauer, Emmett, and Teller for this case, rather than the equation proposed by Pickett. The BET equation, though not completely satisfactory, is apparently the correct equation for the particular model used. Real improvements in the theory should follow from refinements in the model rather than from modifications in the treatment of the BET model. A more refined model is proposed and the general method of using it is discussed. The BET model is shown to be a crude special case of the model suggested here, but it has the advantage of presenting no mathematical difficulties. Preliminary results, based on improved models, indicate that a somewhat refined multimolecular adsorption theory is capable of predicting capillary condensation for suitable values of parameters, thus suggesting that the ideas of multimolecular adsorption and capillary condensation are not really in conflict, as is generally assumed. Further discussion is deferred to a subsequent paper. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Hill, T.L. (1946), Theory of multimolecular adsorption from a mixture of gases. *Journal of Chemical Physics*, **14** (4), 268-275.

Full Text: [-1959\J Che Phy14, 268.pdf](-1959/J%20Che%20Phy14,%20268.pdf)

Abstract: By making use of the evaporation-condensation properties of liquid mixtures, the Brunauer-Emmett-Teller theory of multimolecular adsorption is extended to mixtures of gases. No satisfactory experimental data are available at the present time with which to test the theory. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Hill, T.L. (1946), Statistical mechanics of multimolecular adsorption. II. Localized and mobil adsorption and absorption. *Journal of Chemical Physics*, **14** (7), 441-453.

Full Text: [-1959\J Che Phy14, 441.pdf](-1959/J%20Che%20Phy14,%20441.pdf)

Abstract: It is shown that the transition from localized to mobile adsorption (in the first adsorbed layer) takes place at rather low temperatures for potential barriers of around 1000 cal./mole or less, so that localized physical adsorption should be a very rare phenomenon at the temperatures usually employed in adsorption experiments. Since the BET (and Langmuir) isotherm actually assumes localized adsorption, a new approximate isotherm equation is derived here on the basis of a mobile first layer obeying a two-dimensional van der Waals’ equation. This isotherm is in semiquantitative agreement with the two-dimensional phase changes observed by Jura and co-workers, and by earlier workers, at very low pressures. The localized-mobile transition in the absorption of hydrogen by metals is mentioned briefly. The relationships between (1) the two-dimensional equation of state of a monolayer, (2) the adsorption isotherm of the monolayer, and (3) the ordinary three-dimensional equation of state of the gas being adsorbed are discussed in some detail. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Ward, A.F.H. and Tordai, L. (1946), Time-dependence of boundary tensions of solutions I. The role of diffusion in time-effects. *Journal of Chemical Physics*, **14** (7), 453-461.

Full Text: [-1959\J Che Phy14, 453.pdf](-1959/J%20Che%20Phy14,%20453.pdf)

Abstract: The variation of surface tension of solutions with time has in some cases, where the change is over within a few seconds or less, been explained on the basis of diffusion. This paper attempts a rigorous mathematical analysis of the role that diffusion might play in such time-effects. The limitations of diffusion theories which have been proposed previously are discussed. A general theory of diffusion to the surface is derived, which allows for back-diffusion and which makes no special assumptions of a physical nature. It is possible to use Fick’s equation to calculate the total amount of solute which diffuses from a semi-infinite bulk solution into the surface if the concentration immediately under the surface is known at various times throughout the process. It is shown how the latter information may be deduced from the variation of surface tension with time together with final equilibrium values of surface tension. The methods of this theory are applied to analyze recent data on time-effects of short duration. It is concluded that even in cases where the variation of the surface tension is over in less than a second the rate-determining process is not diffusion. Even for these very rapid changes one is therefore led to assume the existence of an activation barrier which determines the rate of adsorption. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: IIsotherm

Livingston, H.K. (1947), The relationship between the Brunauer-Emmett-Teller adsorption isotherm and the new isotherm of Jura and Harkins. *Journal of Chemical Physics*, **15** (9), 617-624.

Full Text: [-1959\J Che Phy15, 617.pdf](-1959/J%20Che%20Phy15,%20617.pdf)

Abstract: Values for the surface pressure and area of molecules adsorbed on solid surfaces can be calculated from the adsorption equation of Brunauer-Emmett-Teller. Over a wide pressure range these calculated values are in approximate agreement with the two-dimensional equation of state for vapor-condensed films. Since the adsorption equation of Jura and Harkins was derived from this same equation of state, it is concluded that for a great many experimental isotherms, the mathematical agreement between the two adsorption equations is so good that extremely accurate experimental work would be necessary to determine which equation was more nearly correct.The Brunauer-Emmett-Teller equation gives calculated curves on Gregg-type plots that agree qualitatively with those reported by Gregg for multi-layer adsorptions. Surface-area values obtained from these curves by Gregg’s X-point method are generally considerably higher than those that would be obtained by the method of Brunauer-Emmett-Teller.The limiting area occupied by a molecule (i.e., in a mono-molecular layer) as calculated by the method of Harkins and Jura appears to decrease with decreasing energies of adsorption (i.e., decreasing values of c in the Brunauer-Emmett-Teller isotherm). It is suggested that this decrease is artificial, rather than real, and results from the assumption that the constant a in the two-dimensional equation of state does not vary with changes in the nature of the solid adsorbent.It is not possible at the present time to suggest that one of the isotherms is to be preferred to the other on theoretical grounds. In general, preference should be given to the one which fits experimental data over the broader pressure range. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: highly cited, IIsotherm

Halsey, G. and Taylor, H.S. (1947), The adsorption of hydrogen on tungsten powders. *Journal of Chemical Physics*, **15** (9), 624-630.

Full Text: [-1959\J Che Phy15, 624.pdf](-1959/J%20Che%20Phy15,%20624.pdf)

Abstract: An analysis of the extensive experimental data of Frankenburg on the adsorption of hydrogen by metallic tungsten powder between –194 and 750°C has been made, using the Fowler-Guggenheim treatment of adsorption phenomena as the mode of approach. It has not been found possible to interpret the data in terms of interaction between the adsorbed species on a *uniform* adsorbent surface. It is shown that the experimental data can be interpreted on the basis of a non-uniform surface without interaction, the heterogeneity of the surface being specified in terms of an exponential distribution of sites given by the distribution function *N* = *ce*–χ/χ*m*, where χ represents the energy difference between the lowest energy state of the gas and the lowest energy of the adsorption complex. Such a distribution function yields the experimentally observed relation *d* ln*p/d* lnθ = constant at constant temperature. Such a heterogeneity isespecially significant in the case of tungsten metal which hithertohas been treated as an essentially uniform surface. The quantity χ*m* has been found to vary with the temperature. Thesignificance of this variation has been briefly explored. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: IIsotherm

Sips, R. (1948), On the structure of a catalyst surface. *Journal of Chemical Physics*, **16** (5), 490-495.

Full Text: [-1959\J Che Phy16, 490.pdf](-1959/J%20Che%20pHy16,%20490.pdf); [J\J Che Phy16, 490.pdf](J/J%20Che%20Phy16,%20490.pdf)

Abstract: A method is described which makes it possible to calculate rigorously the distribution of the adsorption energies of the sites of a catalyst surface when the adsorption isotherms are known, if the adsorption is localized and there are no interactions. This method is applied to a Freundlich isotherm, and also to a new theoretical isotherm which reduces to the Freundlich type for small pressures, but exhibits saturation for large pressures. It is shown that this isotherm corresponds to a distribution function which differs very little from a Gaussian one. The case of atomic adsorption of gases is also considered. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: highly cited, IIsotherm

? Halsey, G. (1948), Physical adsorption on non-uniform surfaces. *Journal of Chemical Physics*, **16** (10), 931-937.

Full Text: [-1959\J Che Phy16, 931.pdf](-1959/J%20Che%20pHy16,%20931.pdf)

Abstract: Analysisof adsorption on a uniform surface using the quasi-chemical theoryof interaction shows that the hypotheses of the BET theory lead to substantially no adsorption beyond the first layer if*E*2 = *EL*, and stepwise isotherms if *E*1>*E*2>*E*3>···>*EL*. For the monolayer adsorption of gases on silver, platinum, and steel, the heterogeneous nature of the adsorbing surface is clearly indicated. Cooperative adsorption on the non-uniform surface is treated, and the cooperative analog of the Freundlich equation derived. The typical multi-layer isotherm is shown to be composed of three regions: non-cooperative adsorption on a strongly heterogeneous surface; cooperative adsorption on a still heterogeneous surface; and cooperative multi-layer adsorption induced by small van der Waals perturbations some distance from the surface.The isotherm *p/p*0 = exp{—*a*/θ*r*} is derived and shown to be a good representation ofadsorption data that conform to the BET Type I, II, or III shapes. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

Notes: highly cited

Hill, T.L. (1949), Statistical mechanics of adsorption. V. Thermodynamics and heat of adsorption. *Journal of Chemical Physics*, **17** (6), 520-535.

Full Text: [-1959\J Che Phy17, 520.pdf](-1959/J%20Che%20Phy17,%20520.pdf)

Abstract: The thermodynamics of an adsorbate on an inert adsorbent is discussed in some detail. Heats of adsorption are given particular attention in an attempt to clarify and extend the available methods in this field. It is found that the true equilibrium ΔH=TΔS of adsorption for adsorbate molecules is given by



where [openphi] is the two-dimensional spreading pressure.The relation of the work of Rowley and Innes to the present paper is considered. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

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Full Text: [-1959\J Che Phy21, 714.pdf](-1959/J%20Che%20Phy21,%20714.pdf)

Abstract: Expressions for thermodynamic equilibrium constants are set up for the ion-exchange equilibria of models defined in terms of operational variables. Formulas summarizing the methods for the computation of the requisite activity coefficients are given. In particular, the effects of the solvent, which is considered as an independently variable component, are taken explicitly into account.

Notes: highly cited

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Full Text: [-1959\J Che Phy26, 1087.pdf](-1959/J%20Che%20Phy26,%201087.pdf)

Abstract: A general method, suitable for fast computing machines, for investigating such properties as equations of state for substances consisting of interacting individual molecules is described. The method consists of a modified Monte Carlo integration over configuration space. Results for the two‐dimensional rigid‐sphere system have been obtained on the Los Alamos MANIAC and are presented here. These results are compared to the free volume equation of state and to a four‐term virial coefficient expansion.

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Full Text: [-1959\J Che Phy22, 96.pdf](-1959/J%20Che%20Phy22,%2096.pdf)

Abstract: The available mathematical solutions for fixed-bed concentration histories apply primarily to one-component systems in adsorption and to two-component systems in ion exchange. Thomas has developed explicit general relations for the saturation of an adsorbent bed initially free of saturating component by a fluid phase containing only this component; as well as for the converse elution situation. These results are extended here to cases of mixed binary feeds (in ion exchange), and cases of columns that are uniformly partially saturated prior to the run under study. New definitions of the dimensionless parameters that characterize the sorption processes render the existing numerical framework applicable for evaluating this broadened range of operating conditions. From the theoretical standpoint, these new parameters clarify the mathematical interrelationships between adsorption and ion exchange, between saturation and elution, and between sorption of trace components and sorption of gross or bulk components. A method is suggested for calculating physical-adsorption operations which do not conform to Langmuir isotherms.Calculation procedures based upon this approach are illustrated by an idealized but representative example. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

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Keii, T. (1956), Relation between adsorption isotherm and adsorption rate equation. *Journal of Chemical Physics*, **25** (6), 1283-1284.

Full Text: [-1959\J Che Phy25, 1283.pdf](-1959/J%20Che%20Phy25,%201283.pdf)

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Full Text: [-1959\J Che Phy27, 702.pdf](-1959/J%20Che%20Phy27,%20702.pdf)

Abstract: The isotherm corresponding to monolayer adsorption and the equation of state of a monolayer at a liquid interface are derived. As previously, we replace the number of segments per chain actually deposited, by an average value, which is proportional to t½ (t total number of segments) and depends on chain flexibility. This introduces a considerable simplification. However, a previous overcounting of configurations on the surface is eliminated. This affects primarily the results at low surface coverage and leads to the anticipated limiting laws. The isotherms differ considerably, although not as much as for rigid macromolecules of equal chain length, from the Langmuir type. The change in surface tension in solution as a function of bulk concentration, molecular weight, and solvent power is calculated. ©1957 American Institute of Physics

Coekelbergs, R., Frennet, A., Lienard, G. and Resibois, P. (1963), On the kinetics of chemisorption. *Journal of Chemical Physics*, **39** (3), 585-591.

Full Text: [1960-80\J Che Phy39, 585.pdf](1960-80/J%20Che%20pHy39,%20585.pdf);[J\J Che Phy39, 585.pdf](J/J%20Che%20Phy39,%20585.pdf)

Abstract: The kinetics of chemisorption are analyzed by aid of a very simple model. Due account is taken of the role played by geometrical factors (resulting from the finite size of the molecules) whereas both possible modifications of the activation energy with surface coverage and dissociation on the surface are neglected. The physical aspects of the model are discussed. Some exact numerical results as obtained by the Monte Carlo method are given. The mathematical formulation of the problem is made, yielding an approximate kinetic equation where steric effects are taken account of. The possibility is discussed for this model to be generalized in a more complete theory as well as its interest for further studies in the field of elementary heterogeneous catalytic reactions. ©1963 American Institute of Physics

Gileadi, E. and Conway, B.E. (1963), Kinetic theory of adsorption of intermediates in electrochemical catalysis. *Journal of Chemical Physics*, **39** (12), 3420-3430.

Full Text: [1960-80\J Che Phy39, 3420.pdf](1960-80/J%20Che%20Phy39,%203420.pdf)

Abstract: The behavior of adsorbed intermediates in consecutive electrochemical reactions is discussed in terms of the steady-state rate equations, and a comparison with results obtained using the quasiequilibrium assumption is made. The adsorption pseudocapacitance vs potential plot is shown to be symmetrical only when the quasiequilibrium assumption is made, namely when the ratio of specific rate constants for the desorption step (which is rate determining) and initial ion-discharge step, is exceedingly small. The C—V relationship is calculated for three types of mechanism: (i) discharge followed by atom—atom recombination, (ii) discharge followed by first-order decomposition, (iii) discharge followed by ion—atom desorption; cases for activated and nonactivated adsorption conditions are distinguished. Deviations from the symmetrical quasiequilibrium behavior are shown to depend on the kinetic pathway and, for a particular mechanism, are larger the larger is the value of the Temkin parameter r (defined by the rate of change of apparent standard free energy of adsorption of the intermediate with coverage). For a given value of r, these deviations are shown to be largest for the pathway when discharge is followed by ion—atom desorption, and smallest for the case when discharge is followed by a first-order decomposition step. Further, for any one mechanism, conditions of nonactivated adsorption lead to larger deviations than for the case when activated adsorption occurs. ©1963 American Institute of Physics

Cope, F.W. (1964), Eye melanin free radical kinetics and mechanism in relation to Roginsky-Zeldovich (or Elovich) equation and adsorption of oxygen by semiconductors. *Journal of Chemical Physics*, **40** (9), 2653-2656.

Full Text: [1960-80\J Che Phy40, 2653.pdf](1960-80/J%20Che%20Phy40,%202653.pdf)

Abstract: Eyemelanin free radical decay was previously shown to conform toan equation derived from a postulate that the rate-limiting stepwas electron conduction across the liquid—solid interface at the surfaceof the melanin particle. It is shown here that thisequation closely approximates the Roginsky—Zeldovich (or Elovich) equation for oxygenadsorption on inorganic semiconductor solids, which provides two convenient graphicalcriteria for this type of kinetics. Because the behavior ofcharge carriers is essentially similar in liquids and solids, itis believed that this derivation of the Roginsky—Zeldovich (or Elovich)equation is also applicable to phenomena at solid—solid interfaces ininorganic semiconductors. The similarity between the kinetics of melanin freeradicals and semiconductor oxygen adsorption, together with previous experimental dataindicating a dependence of melanin radical concentration on oxygen concentration, suggests that the eye melanin free radical process may involveoxygen adsorption with electron transfer across the surface of themelanin particle. ©1964 *American Institute of Physics*

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Full Text: [1960-80\J Che Phy43, 539.pdf](1960-80/J%20Che%20Phy43,%20539.pdf)

Abstract: A detailed treatment of the conformations of a one-dimensional polymer molecule adsorbed to a surface is given. The average number of contacts of the chain with the surface, the end-to-end length, and the distribution of segments ρ(z) with respect to distance z from the surface are computed as functions of the chain length (N) of the polymer and the attractive energy of the surface. Both theoretical and Monte Carlo calculations are used. A transition is found at an attractive energy of kT ln 2. For attractive energies less than this value, the average number of contacts of the chain with the surface approaches a finite value as N approaches infinity, while the end-to-end length vaires as N½. However, above the transition the number of contacts is proportional to N and the end-to-end length is independent of N. The distribution of segments ρ(z) also shows a marked change as we go through the transition. The one-dimensional model is shown to correspond to the projection of a three-dimensional model on the direction normal to the surface. Therefore, these results are believed to represent the distribution normal to the surface for real systems. ©1965 American Institute of Physics

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Full Text: [1960-80\J Che Phy43, 1184.pdf](1960-80/J%20Che%20Phy43,%201184.pdf)

Abstract: A multilayer physical-adsorption-isotherm theory is developed; it assumes that a gas atom cannot be physically adsorbed in an upper layer unless there is a triangular array of three adsorbed atoms in the layer below forming a site for adsorption. Neighbor interactions via Lennard-Jones intermolecular potentials are included in the calculation of the adsorption energy. The resultant isotherm is linear for low coverages, indicates a horizontal interaction correction to the Langmuir adsorption isotherm when there is only first-layer coverage, and may yield a series of steps for sufficiently low temperature. Numerical adsorption isotherms for He on glass at 4.28° and 77°K are presented. The former isotherm exhibits distinctive steps when each layer is condensed, whereas the latter isotherm is quite smooth. ©1965 American Institute of Physics

Misra, D.N. (1970), New adsorption isotherm for heterogeneous surfaces. *Journal of Chemical Physics*, **52** (11), 5499-5501.

Full Text: [1960-80\J Che Phy52, 5499.pdf](1960-80/J%20Che%20Phy52,%205499.pdf)

Abstract: A general method is proposed to obtain adsorption isotherms for heterogeneous surfaces from the arbitrary energy distribution functions if the Langmuir isotherm represents the individual homotattic sites. The method is limited to the temperature dependent distribution functions only. It is observed that the number of distribution functions, yielding physically meaningful isotherms, is extremely restricted on mathematical grounds. The method yields only one adsorption isotherm that is new and simple; the corresponding distribution function, however, seems to be more characteristic of homogeneous surfaces having a strictly limited energy distribution rather than that of heterogeneous surfaces with a wide variation of distributive energies. ©1970 American Institute of Physics

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Full Text: [1960-80\J Che Phy60, 1046.pdf](1960-80/J%20Che%20Phy60,%201046.pdf)

Abstract: Adsorption kinetics and coverage dependence of work function changes and decomposition spectra are determined for ethylene on W(110), W(100), W(112), and W(111) planes using flash desorption and Kelvin probe work function techniques. The appearance of gaseous H2 from ethylene decomposition was found to be rate limited by the ethylene decomposition reaction and in some cases by desorption from separate hydrogen binding sites present on the surface. Adsorption was found to occur on all four faces with near unity sticking probabilities with adsorption kinetics proportional to the number of available sites at any given coverage. Work function measurements show that the work function decreased monotonically over the coverage range with saturation values of –1.1, –0.48, –0.46, and –0.44 eV for the (110), (100), (112), and (111) planes, respectively. These results are explained in terms of the chemical and physical implications drawn from the structures of the ethylene surface complexes. For di-σ adsorbed ethylene, the structures of these complexes, assuming minimal strain in the molecule, are determined by the metal-metal spacings available at the surface. In the course of this investigation it was necessary to study hydrogen adsorption on the four planes using the same techniques. These results are discussed in light of values reported in the literature where available. From the work function data and information in the literature the interaction of hydrogen with these four planes can be divided into two cases: induced heterogeneity on the (110) and (100) planes, and site heterogeneity on the (211) and (111) planes. The assumption of one hydrogen atom adsorbed per two missing nearest neighbor tungsten atoms is shown to be in quantitative agreement with the maximum coverages of hydrogen on all four planes. ©1974 American Institute of Physics

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Full Text: [1960-80\J Che Phy60, 4854.pdf](1960-80/J%20Che%20Phy60,%204854.pdf)

Abstract: A general kinetic formulation is given for the adsorption, desorption, and skating of adatoms formed by the dissociative adsorption of a diatom onto a general, two-dimensional lattice. This formulation is then specialized to include only irreversible adsorption without skating or desorption. This problem is solved exactly for the linear array and is solved by successive approximations for primitive lattices of three, four, and sixfold symmetry. For practical purposes, results, which are in satisfactory agreement with limiting results, could be obtained by an analysis limited to the first and second shells of sites around a given site. Limiting fractional surface coverages, which are due to isolated, empty sites surrounded by filled sites, are given for all lattices. Results agree well with Monte Carlo experiments on square lattices. Results for irreversible adsorption without skating are readily adaptable to the problem of irreversible desorption without skating. ©1974 American Institute of Physics

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Full Text: [1960-80\J Che Phy66, 2322.pdf](1960-80/J%20Che%20Phy66,%202322.pdf)

Abstract: An isothermal decompression technique has been used to measure the pressure at which homogeneous nucleation of bubbles occurs in solutions of nitrogen in ethyl ether. Droplets of the ethyl ether-nitrogen solution were suspended in a host liquid by flowing the host liquid at a rate which just countered the buoyancy of the droplets. The system was then decompressed until nucleation occurred. The presence of the dissolved nitrogen in the ethyl ether was observed to raise the pressure at which nucleation occurred. The extent of the increase corresponds closely with that which has been previously predicted.

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Full Text: [1960-80\J Che Phy67, 229.pdf](1960-80/J%20Che%20Phy67,%20229.pdf)

Abstract: To determine the diffusion coefficient of a gas in a liquid the usual procedure is to expose the liquid interface for a period of time. measure the amount of gas absorption. and from this infer the diffusion coefficient. The usual assumption to make at the liquid-gas interface is that equilibrium is established immediately upon exposure of the liquid to the gas. This assumption has led to the illogical consequence of the inferred diffusion coefficient depending upon the period of time for which the liquid interface is exposed to the gas. We use the Einstein expression for the probability of a transition in a system to derive an expression for the rate of gas absorption. When this derived rate is used to infer the diffusion coefficient. the same value is found from experimental techniques with extreme values of the exposure time. The accuracy of the predicted gas absorption rate supports the view that the Einstein relation is not limited to predicting fluctuations about an equilibrium state.

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Full Text: [1960-80\J Che Phy71, 1038.pdf](1960-80/J%20Che%20Phy71,%201038.pdf)

Abstract: The adsorption isotherm of a gas in the presence of a solid surface is discussed in terms of the interaction energy of gas molecules with one another and with the solid surface. (AIP) The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

? Ward, C.A., Findlay, R.D. and Rizk, M. (1982), Statistical rate theory of interfacial transport. I. Theoretical development. *Journal of Chemical Physics*, **76** (11), 5599-5605.

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Abstract: After assuming that the transport of molecules between phases at thermal equilibrium results primarily from single molecular events, the expression for the rate of molecular transport between phases is developed by using a first order perturbation analysis of the Schrooinger equation and the Boltzmann definition of entropy. This leads to an Einstein-type relation with the constant of proportionality being the average rate of exchange between microscopic states of different molecular distributions. A hypothesis is introduced which leads to the conclusion that this exchange rate is unchanged as the system moves through the molecular distributions leading to equilibrium, and to it being equal to the molecular rate of exchange between phases in the final equilibrium state. This allows a complete expression for the rate of molecular transport between phases to be developed. The validity of the hypothesis can be examined by comparing the predictions that follow from the derived rate expressions with the available experimental data. This comparison is reported in subsequent parts of this work.

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Full Text: [J\J Che Phy87, 6725.pdf](J/J%20Che%20Phy87,%206725.pdf)

Abstract: Aninvestigation of the temperature programmed desorption (TPD) of CO andD2 from Ni(111) has been carried out. It has beenshown that a differential method for the extraction of thekinetic parameters, threshold temperature programmed desorption (TTPD), can be appliedwith accuracy near the limit of zero coverage. In thislimit, agreement is found between integral and differential methods forkinetic parameter evaluation. The factors which limit the applicability of TTPD are explored and a method to verify its properapplication is presented. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

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Full Text: [J\J Che Phy91, 4401.pdf](J/J%20Che%20Phy91,%204401.pdf)

Abstract: Mostof the adsorption experiments of proteins on solid surfaces areinterpreted with the Langmuir kinetic equation. We show that thisequation does not accurately describe the surface exclusion effect. Wepropose improvements in two limiting cases; (i) the particles, onceadsorbed, can diffuse rapidly on the surface; (ii) the particlescan neither diffuse on the surface, nor desorb from it;the so called random sequential adsorption (RSA) model. In thelast case, we compare our results with computer simulations. The Journal of Chemical Physics is copyrighted by The American Institute of Physics.

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Full Text: [J\J Che Phy94, 5751.pdf](J/J%20Che%20Phy94,%205751.pdf)

Abstract: Neutron diffraction, in conjuction with substitution of deuterium (D) for hydrogen (H), has been used to determine the structure of interlayer water in sodium- and nickel-substituted vermiculites. We have measured the intensities of the (00l) Bragg reflections as a function of relative humidity and H/D content, up to l = 30. Difference analysis has then been used to obtain separate density profiles, rho(z), for both the hydrogen atoms and the oxygen atoms plus the clay sheets. Ni-vermiculite was studied at 84% relative humidity, while Na-vermiculite was studied at both 88% and 30% relative humidity. At these values the layer spacings are 14.40, 14.96, and 11.78 angstrom, respectively. We find that each interlayer nickel ion is coordinated octahedrally to 6.0 water molecules. All of these water molecules are oriented to form a strong hydrogen bond to the adjacent clay surface. We also find that extra water is located close to the clay layers. This additional water is situated within the hexagonal rings of SiO4 and AlO4- tetrahedra, which comprise the clay surfaces. In the 14.96 angstrom phase of Na-vermiculite there are an average of 4.9 interlayer water molecules per cation. About half of these water molecules are oriented to form a hydrogen bond to one of the clay surfaces. Additional water is found close to the clay surface, occupying the same hexagonal ring sites as in 14.40 angstrom Ni-vermiculite. In the 11.78 angstrom phase of Na-vermiculite there are an average of 2.1 water molecules per interlayer cation. The oxygen atoms of these interlayer water molecules are found close to halfway between the layers, while the hydrogen atoms are directed towards one of the adjacent clay sheets.

Keywords: X-Ray, Diffraction

June, D. and Franses, E.I. (1991), Interactions of charged Langmuir monolayers with dissolved ions. *Journal of Chemical Physics*, **95** (11), 8486-8493.

Full Text: [J\J Che Phy95, 8486.pdf](J/J%20Che%20Phy95,%208486.pdf)

Abstract: Dissociation of protons from fatty acid Langmuir monolayers causes competitive adsorption of other counterions and partial charge neutralization. A new equilibrium model incorporating surface electrochemical and thermodynamic features is presented. The Stern-Gouy-Chapman equations are used, along with a modified Langmuir isotherm in which ion activities in the mixed surface monolayer instead of concentrations are employed. A two-dimensional lattice model with Flory-Huggins interaction parameters chi-ij is invoked to obtain the activities of the ions in the monolayer. The competitive adsorption of ions to fatty acid monolayers is either “ideal” (chi-ij = 0), or nonideal, depending on the ions mixing behavior with protons. Previous electrochemical models apply only for ideal adsorption, which appears to occur for Cd2+ and Ca2+. The nonideal adsorption is characterized successfully by the use of the above interaction parameters. Ba2+ ions show negative deviations from ideal adsorption, i.e., they adsorb less than expected for ideal adsorption in the presence of H+ ions. In contrast, Pb2+ ions show positive deviations from ideal adsorption. The influence of ions on surface electrochemical properties of the monolayer is also calculated from the theory.

Keywords: Blodgett Films, X-Ray, Divalent-Cations, Water-Interface, Acid Monolayers, Arachidic Acid, Metal-Ions, Spectroscopy, Adsorption, Membranes

Adriani, P.M. and Chakraborty, A.K. (1993), Dynamics of relaxation at strongly interfacting polymer-solid interfaces: Effects of chain architecture. *Journal of Chemical Physics*, **98** (5), 4263-4274.

Full Text: [J\J Che Phy98, 4263.pdf](J/J%20Che%20Phy98,%204263.pdf)

Abstract: The relaxation dynamics of a polymer chain strongly adsorbed to a solid surface are simulated via a kinetic Ising model that includes chain connectivity constraints (steric hindrance, rotational strain, and configurational entropy). The two polymer architectures examined consist of one or two chemisorbing functional groups per segment. In both architectures, the chemisorbed polymer chain is trapped in nonequilibrium conformational states at low temperatures, but relaxes to equilibrium at higher temperatures with stretched exponential (KWW) relaxation kinetics. The average relaxation time for the two pendant group architecture has a strongly non-Arrhenius temperature dependence that obeys the Vogel-Fulcher law. In contrast, average relaxation times for the one pendant group architecture cannot be described b the Vogel-Fulcher law.

Keywords: Kinetic Ising-Model, Glass-Transition, Adsorption, Adhesion, Aluminum

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Full Text: [J\J Che Phy103, 2216.pdf](J/J%20Che%20Phy103,%202216.pdf)

Abstract: A new approach for deriving the equation of state is developed. It is shown that the integral in the compressibility equation is identical to the isotherm for Gibbs adsorption in radial coordinates. The Henry, Langmuir, and Frumkin adsorption isotherms are converted into equations of state. It is shown that using Henry’s law gives an expression for the second virial coefficient that is identical to the result from statistical mechanics. Using the Langmuir isotherm leads to a new analytic expression for the hard-sphere equation of state which can be explicit in either pressure or density. The Frumkin isotherm results in a new equation of state for the square-well potential fluid. Conversely new adsorption isotherms can be derived from equations of state using the compressibility equation. It is shown that the van der Waals equation gives an adsorption isotherm equation that describes both polymolecular adsorption and the unusual adsorption behavior observed for supercritical fluids.

Aranovich, G.L. and Donohue, M.D. (1996), Adsorption on surfaces with molecular-scale heterogeneities. *Journal of Chemical Physics*, **104** (10), 3851-3859.

Full Text: [J\J Che Phy104, 3851.pdf](J/J%20Che%20Phy104,%203851.pdf)

Abstract: Ono-Kondo lattice model for the density gradient near a surface is applied to surfaces where the adsorbate-adsorbent interactions are not homogeneous. While solving the general equations would be quite complex, relatively simple solutions can be obtained for periodic surfaces such as a checkerboard. It is shown that the adsorption behavior on surfaces with molecular-scale heterogeneities is very different from adsorption on surfaces where the surface heterogeneities are much larger than the size of the adsorbent molecules.

Matsuyama, A., Umemoto, K. and Kato, T. (1996), Adsorption-induced surface ordering on solutions of rigid-rodlike molecules. *Journal of Chemical Physics*, **105** (4), 1594-1600.

Full Text: [J\J Che Phy105, 1594.pdf](J/J%20Che%20Phy105,%201594.pdf)

Abstract: A simple model is developed to describe the adsorption and the surface ordering in solutions of rigid-rodlike molecules. We focus here on the planar adsorption of the rigid rods restricting the orientations to two mutually orthogonal directions which are both parallel to the surface. When the bulk concentration increases, the adsorbed amount is increased and the adsorption isotherm has a kink at a bulk concentration phi (c), where the second-order isotropic-nematic transition (INT) takes place in a surface. Further increasing concentration, the adsorbed amount jumps at a bulk critical concentration phi (IN), where the first-order INT takes place in the bulk phase. For various values of the axial ratio of the rigid rods, the solvent conditions and the adsorption energy, we examine the adsorption isotherms, the surface tensions and the surface ordering. We also discuss the co-occurrences between the adsorption phenomena and the phase separation of a surface phase.

Aranovich, G.L. and Donohue, M.D. (1996), A new model for lattice systems. *Journal of Chemical Physics*, **105** (16), 7059-7063.

Full Text: [J\J Che Phy105, 7059.pdf](J/J%20Che%20Phy105,%207059.pdf)

Abstract: A new model. is derived for lattice systems (lattice gas and binary mixtures of monomers). This model is based on a generalization to three dimensions of the Ono-Kondo equations for the density profile near a flat surface. The internal energy is calculated and compared with previous models. Unlike many previous theories, this new model has the correct limiting behavior at infinite dilution, at high densities, when the interchange energy goes to zero and for the lattice gas. In addition, it displays the correct behavior for systems with very strong interactions (such as hydrogen bonds) in that it predicts that the energy saturates to a constant value at a low density. For one-component, monomer systems, the new theory also describes simulation data for square-well (off-lattice) molecules better than previous theories.

Talbot, J. (1997), Molecular thermodynamics of binary mixture adsorption: A scaled particle theory approach. *Journal of Chemical Physics*, **106** (11), 4696-4706.

Full Text: [J\J Che Phy106, 4696.pdf](J/J%20Che%20Phy106,%204696.pdf)

Abstract: We examine the thermodynamic properties of two-dimensional fluid mixtures of hard convex particles using scaled particle theory (SPT). Analytic expressions are obtained for the excess area, Gibbs free energy and excess entropy of a binary mixture. For typical fluid densities and for a range of area and perimeter ratios of the two species the fluid mixtures exhibit small negative deviations from ideality. The excess quantities are smaller than the corresponding bulk (three dimensional) mixtures which offers some explanation for the success of the ideal adsorbed solution (IAS) theory. According to the SPT, binary mixtures of hard particles are stable for all compositions and no fluid-fluid demixing transition is possible. The SPT equations are used to examine the adsorption equilibrium between an ideal bulk phase and an adsorbed phase. Adsorption isotherms and selectivities are computed fdr a range of area and perimeter ratios, equilibrium constant ratio and bulk mole fraction. Unlike the widely used multicomponent Langmuir equations, the selectivity computed from the SPT isotherms exhibits strong sensitivity to these parameters. The selectivity of the smaller species always increases with increasing bulk pressure which may lead to a selectivity reversal. Finally, we discuss systems where the adsorbed molecules can adopt various orientations with respect to the surface normal.

Lado, F. (1997), Molecular theory of a charged particle in a polarizable nonpolar liquid. *Journal of Chemical Physics*, **106** (11), 4707-4713.

Full Text: [J\J Che Phy106, 4707.pdf](J/J%20Che%20Phy106,%204707.pdf)

Abstract: A generalization of liquid state theory that treats internal degrees of freedom on the same mathematical footing as orientational degrees of freedom is used to calculate the Maxwell field of a charged particle ina fluid of polarizable nonpolar molecules. The polarizable fluid is modeled by Lennard-Jones molecules with classical Drude oscillators. The electric field E(r) of the charged impurity is given in terms of a screening function that yields the correct dielectric constant at large r and can be computed using standard procedures for the pair correlation function of classical liquid state theory. Sample numerical results using the hypernetted-chain approximation are compared with simulation. (C) 1997 American Institute of Physics.

Keywords: Polar

Aranovich, G.L., Hocker, T., Wu, D.W. and Donohue, M.D. (1997), Nonrandom behavior in multicomponent lattice mixtures: Effects of solute size and shape. *Journal of Chemical Physics*, **106** (24), 10282-10291.

Full Text: [J\J Che Phy106, 10282.pdf](J/J%20Che%20Phy106,%2010282.pdf)

Abstract: A new lattice theory is proposed to describe nonrandom behavior for multicomponent mixtures of monomers, for mixtures of monomers interacting with a polymer, and for mixtures of monomers at a surface. Based on concepts first proposed by Ono and Kondo, this new approach allows one to derive local densities around each species taking into account molecular interactions as well as molecular geometry and lattice structure. This approach can be used to describe a number of very different systems in the framework of a single model. The generalizations presented here are rigorous in that no assumptions beyond those of the original (binary) theory are needed in order to treat multicomponent mixtures of molecules of different sizes and shapes.

Parks, E.K., Nieman, G.C., Kerns, K.P. and Riley, S.J. (1999), The thermodynamics of nitrogen adsorption on nickel clusters: Ni19-Ni71. *Journal of Chemical Physics*, **108** (9), 3731-3739.

Full Text: [J\J Che Phy108, 3731.pdf](J/J%20Che%20Phy108,%203731.pdf)

Abstract: Equilibrium constants for the chemisorption reactions of molecular nitrogen with nickel clusters Ni-n have been determined as a function of temperature for n = 19 to 71. Van’t Hoff analysis of the data yields standard-state changes in reaction enthalpy and entropy. These changes are related to what is known about nickel cluster structure and the nature of the cluster-N2 interaction. In general, the adsorption energy is highest for the smallest clusters studied, reaching values twice those for N2 adsorption on bulk nickel surfaces. In many cases, there is a correlation between enthalpy and entropy: high adsorption energy is accompanied by a large change in entropy, and vice versa. These effects are discussed in terms of the configurational entropy of reaction and the frequencies of the frustrated translational and rotational motions of the adsorbed N2 molecules. (C) 1998 American Institute of Physics.

Keywords: Molecular Nitrogen, Chemisorbed Molecules, Ionization-Potentials, Lateral Interactions, Cobalt Clusters, Chemical Probes, Metal-Surfaces, Ni(110), N2

Notes: highly cited

? Wang, Q.Y. and Johnson, J.K. (1999), Molecular simulation of hydrogen adsorption in single-walled carbon nanotubes and idealized carbon slit pores. *Journal of Chemical Physics*, **110** (1), 577-586.

Full Text: J Che Phy110, 577.pdf

Abstract: The adsorption of hydrogen gas into single-walled carbon nanotubes (SWNTs) and idealized carbon slit pores is studied by computer simulation. Hydrogen-hydrogen interactions are modeled with the Silvera-Goldman potential. The Crowell-Brown potential is used to model the hydrogen-carbon interactions. Calculations include adsorption inside the tubes, in the interstitial regions of tube arrays, and on the outside surface of isolated tubes. Quantum effects are included through implementation of the path integral formalism, Comparison with classical simulations gives an indication of the importance of quantum effects for hydrogen adsorption. Quantum effects are important even at 298 K for adsorption in tube interstices. We compare our simulations with experimental data for SWNTs, graphitic nanofibers, and activated carbon. Adsorption isotherms from simulations are in reasonable agreement with experimental data for activated carbon, but do not confirm the large uptake reported for SWNTs and nanofibers. Although the adsorption potential for hydrogen in SWNTs is enhanced relative to slit pores of the same size, our calculations show that the storage capacity of an array of tubes is less than that for idealized slit pore geometries, except at very low pressures. Ambient temperature isotherms indicate that an array of nanotubes is not a suitable sorbent material for achieving DOE targets for vehicular hydrogen storage. (C) 1999 American Institute of Physics. [S0021-9606(99)70301-6].

Keywords: Activated Carbon, Adsorption, Crystalline Ropes, Fullerene Tubules, Gas, Graphite, H2, Isotherms, Methane, Microtubules, Phase, Storage

Hocker, T., Aranovich, G.L. and Donohue, M.D. (1999), Monolayer adsorption of nonrandom mixtures. *Journal of Chemical Physics*, **111** (3), 1240-1254.

Full Text: [J\J Che Phy111, 1240.pdf](J/J%20Che%20Phy111,%201240.pdf)

Abstract: A model for monomers on a lattice is presented based on local density calculations that were first proposed by Ono and Kondo in 1947 and recently generalized by Aranovich, Donohue, and co-workers. The model allows one to describe the adsorption behavior of molecules at a surface (or interface), and the phase behavior of adsorbed molecules, as well as of molecules in the bulk on the basis of short-range ordering in two and three dimensions. While there are prior lattice theories that predict nonrandom behavior for arbitrary lattice coordination numbers, the derivation of adsorption models from these theories is usually based on ideal fluid behavior in the bulk. However, the new adsorption model presented here is consistent in that molecular behavior in the bulk as well as in the adsorbed surface layer is based on identical assumptions. This is accomplished by calculating the total free energy of the system; the corresponding adsorption model follows through minimization of the free energy. This procedure is also used for deriving a new adsorption equation based on the quasi-chemical approximation to the Ising problem. Results from this equation are very similar to those obtained from the equation based on Ono-Kondo theory. When compared with lattice Monte Carlo computer simulations, the new adsorption models based on nonrandom mixing consistently show better agreement than those based on random behavior. For simplicity, the discussion of results is restricted to single-component systems. However, thenew adsorption model based on Ono-Kondo theory is applicable tosystems of arbitrary numbers of components without introducing any further assumptions.

Denesyuk, N.A. and Erukhimovich, I. Ya. (2000), Adsorption of a correlated random copolymer chain at a liquid-liquid interface. *Journal of Chemical Physics*, **113** (9), 3894.

Full Text: [J\J Che Phy113, 3894.pdf](J/J%20Che%20Phy113,%203894.pdf)

Abstract: Theoretical study of adsorption of an ideal correlated random copolymer chain at a liquid-liquid interface (ICRC-LL) is presented in this paper. Introduction of a certain referent system (a homopolymer chain in external attracting field) allows us to develop a principle of free energy calculation for ICRC-LL and to construct its phase diagram. Exponentially decaying (short-range) and oscillating correlations are considered in parallel that reveals easier adsorption for the first type of correlations. It is shown that chains with short-range and oscillating correlations undergo continuous (second-order) adsorption transition. For both types of correlations the transition temperature diverges when composition of a chain becomes symmetric. © 2000 American Institute of Physics.

Notes: highly cited

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Full Text: [2000\J Che Phy113, 9901.pdf](2000/J%20Che%20Phy113,%209901.pdf)

Abstract: A modification of the nudged elastic band method for finding minimum energy paths is presented. One of the images is made to climb up along the elastic band to converge rigorously on the highest saddle point. Also, variable spring constants are used to increase the density of images near the top of the energy barrier to get an improved estimate of the reaction coordinate near the saddle point. Applications to CH4 dissociative adsorption on Ir(111) and H-2 on Si(100) using plane wave based density functional theory are presented. (C) 2000 American Institute of Physics. [S0021-9606(00)71246-3].

Keywords: Transition-State Theory, Molecular-Dynamics, Dissociative Adsorption, Diffusion, Mechanisms, Systems

Notes: highly cited

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Full Text: [2000\J Che Phy113, 9978.pdf](2000/J%20Che%20Phy113,%209978.pdf)

Abstract: An improved way of estimating the local tangent in the nudged elastic band method for finding minimum energy paths is presented. In systems where the force along the minimum energy path is large compared to the restoring force perpendicular to the path and when many images of the system are included in the elastic band, kinks can develop and prevent the band from converging to the minimum energy path. We show how the kinks arise and present an improved way of estimating the local tangent which solves the problem. The task of finding an accurate energy and configuration for the saddle point is also discussed and examples given where a complementary method, the dimer method, is used to efficiently converge to the saddle point. Both methods only require the first derivative of the energy and can, therefore, easily be applied in plane wave based density-functional theory calculations. Examples are given from studies of the exchange diffusion mechanism in a Si crystal, Al addimer formation on the Al(100) surface, and dissociative adsorption of CH4 on an Ir(111) surface. (C) 2000 American Institute of Physics. [S0021-9606(00)70546-0].

Keywords: Dissociative Adsorption, Molecular-Dynamics, Diffusion, Systems, Mechanisms

Baxter, R.J. and Hu, P. (2002), Insight into why the Langmuir-Hinshelwood mechanism is generally preferred. *Journal of Chemical Physics*, **116** (11), 4379-4381.

Full Text: [J\J Che Phy116, 4379.pdf](J/J%20Che%20Phy116,%204379.pdf)

Abstract: In heterogeneous catalysis, the two main reaction mechanisms which have been proposed are the Langmuir-Hinshelwood and the Eley-Rideal. For the vast majority of surface catalytic reactions, it has been accepted that the Langmuir-Hinshelwood mechanism is preferred. In this study, we investigate catalytic CO oxidation on Pt(111). It is found that reaction barriers for Langmuir-Hinshelwood mechanisms actually tend to be higher than those for Eley-Rideal ones. An explanation is presented as to why it is still more probable for the reaction to proceed via the Langmuir-Hinshelwood mechanism, despite its higher reaction barrier. (C) 2002 American Institute of Physics.

Keywords: Density-Functional Theory, Co Oxidation, Catalytic-Oxidation, Oxygen-Atoms, Dynamics, Pt(111), Ni(111)

? Zhao, X., Outlaw, R.A., Wang, J.J., Zhu, M.Y., Smith, G.D. and Holloway, B.C. (2002), Thermal desorption of hydrogen from carbon nanosheets. *Journal of Chemical Physics*, **124** (19), Article No. 194704.

Full Text: [2006\J Che Phy124, 194704.pdf](2006/J%20Che%20pHy124,%20194704.pdf)

Abstract: Carbon nanosheets are a unique nanostructure that, at their thinnest configuration, approach a single freestanding graphene sheet. Temperature desorption spectroscopy (TDS) has shown that the hydrogen adsorption and incorporation during growth of the nanosheets by radio frequency plasma-enhanced chemical vapor deposition are significant. A numerical peak fitting to the desorption spectra (300-1273 K) via the Polanyi-Wigner equation showed that desorption followed a second order process, presumably by the Langmuir-Hinshelwood mechanism. Six peaks provide the best fit to the TDS spectra. Surface desorption activation energies were determined to be 0.59, 0.63, and 0.65 eV for the external graphite surface layers and 0.85, 1.15, and 1.73 eV for desorption and diffusion from the bulk. In contrast to TDS data from previously studied a-C:H films [Schenk et al. J. Appl. Phys. 77, 2462 (1995)], a greater amount of hydrogen bound as sp(2) hybridized carbon was observed. A previous x-ray diffraction study of these films has shown a significant graphitic character with a crystallite dimension of L-a=10.7 nm. This result is consistent with experimental results by Raman spectroscopy that show as-grown carbon nanosheets to be crystalline as commercial graphite with a crystallite size of L-a=11 nm. Following TDS, Raman data indicate that the average crystallite increased in size to L-a=15 nm. (c) 2006 American Institute of Physics.

Keywords: C-H Films, Polycyclic Aromatic-Hydrocarbons, Chemical-Vapor-Deposition, Graphite Surface, Bond-Energies, Adsorption, Recombination, Deuterium, Erosion, Model

? Woldeghebriel, H. and Kshirsagar, A. (2007), How cationic gold clusters respond to a single sulfur atom. *Journal of Chemical Physics*, **127** (22), Article No. 224708.

Full Text: [2007\J Che Phy127, 224708.pdf](2007/J%20Che%20Phy127,%20224708.pdf)

Abstract: Results describing the interaction of a single sulfur atom with cationic gold clusters (Au-n(+), n=1-8) using density functional theory are described. Stability of these clusters is studied through their binding energies, second order differences in the total energies, fragmentation behavior, and atom attachment energies. The lowest energy structures for these clusters appear to be three dimensional right from n=3. In most cases the sulfur atom in the structure of AunS+ is observed to displace the gold atom siting at the peripheral site of the Au-n(+) cluster. The dissociation channels of AunS+ clusters follow the same trend as Au-n(+) cluster, based on the even/odd number of gold atoms in the cluster, with the exception of Au3S+. This cluster dissociates into Au and Au2S+, signifying the relative stability of Au2S+ cluster regardless of having an odd number of valence electrons. Clusters with an even number of gold atoms dissociate into Au and Aun-1(S)(+) and clusters with an odd number of gold atoms dissociate into Au-2 and Aun-2(S)(+) clusters. An empirical relation is found between the conduction molecular orbital and the number of atoms in the AunS+ cluster. (c) 2007 American Institute of Physics.

Keywords: Ab-Initio, Adsorption, Au, Au-N(+), Chemistry, Gold, Interaction, Molecules, Monolayers, Nanoclusters, Silver

# Title: Journal of Chemical Research. Miniprint.

([J. Chem. Research (M)](http://haly.ingentaselect.com/vl=16061839/cl=15/nw=1/rpsv/catchword/rsc/13645552/contp1-1.htm))

Adams, H., Bailey, N.A., Bastida, R., Fenton, D.E., Ho, Y.S. and Hempstead, P.D. (1992), The reaction of 2,6-bis (2-formylphenoxymethyl)pyridine and bis (2-aminoethyl)ether in the presence and absence of metal-cations-the crystal-structure of a (1+1) macrocyclic product. *Journal of Chemical Research. Miniprint.*, 190-191.

Adams, H., Fenton, D.E., Ho, Y.S., Najera, B.A. and Rodriguez de Barbarin, C.O. (1997), Crystal structures of two derivatives of 2,6-bis (formylphenoxymethyl) pyridine. *Journal of Chemical Research. Miniprint.*, **6** (3), 1237-1245.

Full Text: J Che Res-S6, 1237

Adams, H., Fenton, D.E., Ho, Y.S., Najera, B.A. and Rodriguez de Barbarin, C.O. (1997), The X-ray crystal structures of two derivatives of 2,6-bis{[2-(dimethoxymethyl)phenoxy]methyl}pyridine. *Journal of Chemical Research. Miniprint.*, **6**, 188-189.

Full Text: [J\J Che Res-S6, 188.pdf](J/J%20Che%20Res-S6,%20188.pdf)

Abstract: The X-ray crystal structures of 2,6-bis{[2-dimethoxymethyl]phenoxy}methyl}pyridine and 2,6-bis{[2-(hydroxymethyl)phenoxy]methyl}pyridine are reportred.

# Title: Journal of Chemical Research-S

(J. Chem. Research (S))

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Adams, H., Bailey, N.A., Bastida, R., Fenton, D.E., Ho, Y.S. and Hempstead, P.D. (1992), The reaction of 2,6-bis(2-formylphenoxymethyl)pyridine and bis(2-aminoethyl)ether in the presence and absence of metal-cations-the crystal-structure of a [1+1] macrocyclic product. *Journal of Chemical Research-S*, **6**, 190-191.

Keywords: Ligands

Adams, H., Fenton, D.E., Ho, Y.S., Najera, B.A. and Rodriguez de Barbarin, C.O. (1997), The X-ray crystal structures of two derivatives of 2,6-bis{[2-(dimethoxymethyl)phenoxy]methyl}pyridine. *Journal of Chemical Research-S*, **6**, 1237-1251.

Full Text: [J\J Che Res-S6, 188.pdf](J/J%20Che%20Res-S6,%20188.pdf)

Abstract: The X-ray crystal structures of 2,6-bis{[2-dimethoxymethyl]phenoxy}methyl}pyridine and 2,6-bis{[2-(hydroxymethyl)phenoxy]methyl}pyridine are reportred.

# Title: Journal of the Chemical Society

Full Journal Title: [Journal of the Chemical Society](http://www.rsc.org/Publishing/Journals/C3/Article.asp?Type=CurrentIssue)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

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: Impact Factor

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Full Text: [-1959\J Ame Che Soc83, 380.pdf](-1959/J%20Ame%20Che%20Soc83,%20380.pdf)

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Full Text: [-1959\J Ame Che Soc87, 740.pdf](-1959/J%20Ame%20Che%20Soc87,%20740.pdf)

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Full Text: [-1959\J Ame Che Soc91, 1683.pdf](-1959/J%20Ame%20Che%20Soc91,%201683.pdf)

Abstract: The results of recent work on adsorption have been expressed by either of the two following formulae, which are applicable to gases or solutions:- (1) /b x///b m/ = beta c/sup 1//b p/ / = beta [(/b a/-/b x/)//b v/]/sup 1//b p/ /;(2) lambda = nu //b m/.log /b a//(/b a-x/) = /b a/(/b a// nu)/sup -1/n/ [compare Freundlich, Abstract No. 1907A01234], where /b x/ is the amount of substance adsorbed, /b a/ the total amount of that substance, (/b a-x/)/ nu = /b c/ its concentration in the fluid phase, /b m/ the weight of adsorbing substance, and lambda, beta, alpha, /b p/, and /b n/ are constants. The author shows that there are serious disadvantages inherent in the use of the lambda -formula, whereby an equilibrium is referred to a parameter /b a// nu with which it has no apparent connection. This expression, introduced to represent the amount of adsorption, does not lead to any definite number characteristic of each set of substances, and moreover, its results are irreconcilable with each other and with experiment.

Keywords: Adsorption, Equilibrium, Lead

? Davis, O. (1907), Adsorption of iodine by carbon. *Journal of the Chemical Society*, **91** (2), 1666-1688.

Full Text: [-1959\J Ame Che Soc91, 1666.pdf](-1959/J%20Ame%20Che%20Soc91,%201666.pdf)

Abstract: The author describes investigations on the adsorption of iodine, dissolved in various organic solvents, by means of charcoal (animal, sugar, and cocoanut). The effect of temperature on the amount of adsorption is found to be very small, but that of time is well marked. The adsorption, although rapid at first, proceeds slowly for lengthened periods after a “surface equilibrium” has been maintained, proving that both surface action and diffusion are concerned in the mechanism of adsorption. The adsorbing values of animal and sugar carbon are roughly the same, whilst that of cocoanut carbon is much less than these. The amount of adsorption is not independent of the nature of the adsorbing surface for identical surface area, but is specific, depending on the nature of the solvent and the adsorbing solvent.

Keywords: Adsorption, Carbon, Diffusion, Mechanism, Temperature

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Full Text: [-1959\J Ame Che Soc97, 196.pdf](-1959/J%20Ame%20Che%20Soc97,%20196.pdf)

Abstract: Becquerel has shown [see Abstracts Nos. 1900A02166 and 1902A00460] that when barium is precipitated as sulphate in a uranium solution the photographic activity of the latter is removed by the barium sulphate: this activity is due to UrX. The adsorption of UrX has now been investigated quantitatively, and evidence obtained of a definite partition coefficient between the UrX in the barium sulphate and in the solution.

Keywords: Adsorption, Solution

? Findlay, A. and Creighton, H. (1910), The influence of colloids and fine suspensions on the solubility of gases in water. Part I. Solubility of carbon dioxide and nitrous oxide. *Journal of the Chemical Society*, **97** (1), 536-561.

Full Text: [-1959\J Ame Che Soc97, 536.pdf](-1959/J%20Ame%20Che%20Soc97,%20536.pdf)

Abstract: The solubility of CO/sub 2/ in water is increased by the addition of ferric hydroxide, silicic acid or gelatin, but is decreased by dextrin, arsenious sulphide, starch, albumen, and glycogen;powdered silica produces a slight increase of solubility, and charcoal a large increase when the pressure is increased. In the case of nitrous oxide the solubility is decreased by ferric hydroxide, starch, glycogen, gelatin, and albumen;silicic acid and suspended silica produce a small increase, whilst suspended charcoal produces a large increase at higher pressures. A remarkable feature of the observations is the existence in many cases of a minimum of solubility at intermediate pressures;this points to the existence of two opposing actions, /b e.g./, an “adsorption” causing an increase of solubility at higher pressures, and some other factor causing a decrease: the nature of this second factor is very uncertain, but the polymerisation of the gas condensed by the colloid is discussed as a possible interpretation.

Keywords: Carbon, Solubility, Water

? Findlay, A. and Shen, B. (1912), The influence of colloids and fine suspensions on the solubility of gases in water. Part II. Solubility of carbon dioxide and of hydrogen. *Journal of the Chemical Society*, **101** (2), 1459-1468.

Full Text: [-1959\J Ame Che Soc101, 1459.pdf](-1959/J%20Ame%20Che%20Soc101,%201459.pdf)

Keywords: Water

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Full Text: [-1959\J Ame Che Soc103, 636.pdf](-1959/J%20Ame%20Che%20Soc103,%20636.pdf)

Keywords: Water

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Full Text: [-1959\J Ame Che Soc105, 291.pdf](-1959/J%20Ame%20Che%20Soc105,%20291.pdf)

Keywords: Water

Notes: highly cited

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Full Text: [-1959\J Ame Che SocDEC, 3299.pdf](-1959/J%20Ame%20Che%20SocDEC,%203299.pdf)

Keywords: Ion Exchange, Structure

? Reichenberg, D., Pepper, K.W. and Mccauley, D.J. (1951), Properties of ion-exchange resins in relation to their structure. Part II. Relative affinities. *Journal of the Chemical Society*, (FEB), 493-499.

Full Text: [-1959\J Ame Che SocFEB, 493.pdf](-1959/J%20Ame%20Che%20SocFEB,%20493.pdf)

Keywords: Ion Exchange, Structure

Notes: highly cited

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Full Text: [-1959\J Ame Che SocAUG, 3129.pdf](-1959/J%20Ame%20Che%20SocAUG,%203129.pdf)

Keywords: Ion Exchange, Structure

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Full Text: [-1959\J Ame Che SocMAR, 844.pdf](-1959/J%20Ame%20Che%20SocMAR,%20844.pdf)

Keywords: Cations, Ion Exchange, Structure

Notes: highly cited

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Keywords: Ion Exchange, Structure

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Full Text: [-1959\J Ame Che SocDEC, 4360.pdf](-1959/J%20Ame%20Che%20SocDEC,%204360.pdf)

Keywords: Adsorption, Aluminium, Mechanism, Surfaces

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Full Text: [-1959\J Ame Che SocDEC, 4375.pdf](-1959/J%20Ame%20Che%20SocDEC,%204375.pdf)

Keywords: Adsorption, Protein, Surfaces

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Keywords: Ion Exchange, Structure

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Full Text: [-1959\J Ame Che SocJUN, 1272.pdf](-1959/J%20Ame%20Che%20SocJUN,%201272.pdf)

Keywords: Adsorption, Cellulose, Polymers

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Full Text: [-1959\J Ame Che SocOCT, 4304.pdf](-1959/J%20Ame%20Che%20SocOCT,%204304.pdf)

Keywords: Adsorption, Cellulose

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Keywords: Adsorption, Dyes, Protein

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Full Text: [-1959\J Ame Che SocFEB, 535.pdf](-1959/J%20Ame%20Che%20SocFEB,%20535.pdf)

Keywords: Adsorption, Alumina, Mechanism, Surfaces

Notes: highly cited

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Full Text: [1960-80\J Ame Che SocJAN, 58.pdf](1960-80/J%20Ame%20Che%20SocJAN,%2058.pdf)

Keywords: Adsorption, Alumina, Mechanism

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Keywords: Adsorption

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Full Text: [1960-80\J Ame Che SocNOV, 4495.pdf](1960-80/J%20Ame%20Che%20SocNOV,%204495.pdf)

Keywords: Adsorption, Alumina, Dyes, Mechanism

# Title: Journal of the Chemical Society

Full Journal Title: [Chemical Communications](http://www.rsc.org/Publishing/Journals/C3/Article.asp?Type=CurrentIssue)

Full Journal Title: [Journal of the Chemical Society](http://www.rsc.org/Publishing/Journals/C3/Article.asp?Type=CurrentIssue)

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ISSN:

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Language:

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Subject Categories:

: Impact Factor

Ockrent, C. (1932), Selective adsorption by activated charcoal from solution containing two organic acids. *Journal of the Chemical Society*, **1**, 613-630.

Full Text: [-1959\J Che Soc1, 613.pdf](-1959/J%20Che%20Soc1,%20613.pdf)

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Full Text: [-1959\J Che Soc2, 1467.pdf](-1959/J%20Che%20Soc2,%201467.pdf)

Notes: KKinetics

Maxted, E.B. and Moon, C.H. (1936), The kinetics of the adsorption of hydrogen and of deuterium by platinum. *Journal of the Chemical Society*, **2**, 1542-1546.

Full Text: [-1959\J Che Soc2, 1542.pdf](-1959/J%20Che%20Soc2,%201542.pdf)

Maxted, E.B. and Evans, H.C. (1939), The relative effect of inhibitants on adsorption and on catalytic activity. Part II. *Journal of the Chemical Society*, **2**, 1750-1754.

Full Text: [-1959\J Che Soc2, 1750.pdf](-1959/J%20Che%20Soc2,%201750.pdf)

Abstract: The effect of a catalyst poison on the velocity of adsorption of hydrogen by a hydrogenation catalyst, on the one hand, and on its activity for catalytic hydrogenation, on the other, has been found to be very similar throughout the whole of the poisoning graph. The correspondence found in Part I for early stages of poisoning thus extends also to later stages.

Addison, C.C. (1944), The properties of freshly formed surfaces. Part II. The rate of adsorption of isoamyl alcohol at the air-water surface. *Journal of the Chemical Society*, **2**, 252-256.

Full Text: [-1959\J Che Soc2, 252.pdf](-1959/J%20Che%20Soc2,%20252.pdf)

Abstract: The vibrating-jet technique has been applied to the study of the rate at which surface equilibrium of isoamyl alcohol-water mixtures is established. Dynamic tensions at surface ages of the order of 10-2 second are recorded for various concentrations, and the velocity at which adsorbate molecules migrate to the surface is calculated.

Addison, C.C. (1944), The properties of freshly formed surfaces. Part III. The mechanism of adsorption, with particular reference to the sec.-Octyl alcohol-water system. *Journal of the Chemical Society*, **2**, 477-480.

Full Text: [-1959\J Che Soc2, 477.pdf](-1959/J%20Che%20Soc2,%20477.pdf)

Addison, C.C. (1945), The properties of freshly formed surfaces. IV. The influence of chain length and structure on the static and the dynamic surface tensions of aqueous-alcoholic solutions. *Journal of the Chemical Society*, (MAR-), 98-106.

Full Text: [-1959\J Che Soc MAR, 98.pdf](-1959/J%20Che%20Soc%20MAR,%2098.pdf)

Abstract: The vibrating-jet technime already described has been applied to the measurement of both static and dynamic surface tensions of aqueous solutions of alcohols containing from one to eight carbon atoms. The static tensions at high concentration have been used to evaluate the Szyszkowski constants, and the work of adsorption has been deduced from the static tensions at great dilution. Dynamic surface tensions are recorded for aqueous solutions of n-amyl, n-hexyl, n-heptyl, and n-octyl alcohols over a range of surface ages, and the migrational velocity has been shown to increase with increasing chain length. Branching of the carbon chain (as in isoamyl or tevt.-hexyl alcohol) or alteration in the position of the hydroxyl group (as in sec.-octyl alcohol) appears to reduce the migrational velocity, and possible reasons for this are discussed.

Addison, C.C. (1945), The properties of freshly formed surfaces. Part V. A velocity-time equation for adsorption to dynamic surfaces. *Journal of the Chemical Society*, (MAY), 354-359.

Full Text: [-1959\J Che Soc MAY, 354.pdf](-1959/J%20Che%20Soc%20MAY,%20354.pdf)

Abstract: The dynamic surface tensions of aqueous solutions of n-alcohols reported in Part IV (this vol., p. 98) have been used to determine the true velocities of migration to the surface over the full time required for equilibrium. The velocity (v) and surface age (t) are shown to be related by the equation ZI = ante-ak\*; n and k are functions of chain length but are independent of concentration. At infinite dilution a is independent of chain length, and is a direct function of concentration. Hence the surface behaviour of alcohols having chain lengths outside the experimental range can be predicted. The distance travelled by the adsorbate molecules, obtained by integration of the exponential equation, agrees closely with that deduced directly from Gibbs’s equation, and provides support for the adsorption mechanism proposed. The results can be used to assess the probable constancy of the migrational velocity at concentrations lower than those which can be studied experimentally.

Addison, C.C. (1946), The properties of freshly formed surfaces. Part VI. The influence of temperature and concentration on the dynamic and static surface tensions of aqueous decoic acid solutions. *Journal of the Chemical Society*, (JUL), 579-585.

Full Text: [-1959\J Che Soc JUL, 579.pdf](-1959/J%20Che%20Soc%20JUL,%20579.pdf)

Abstract: The solubility in water of decoic acid at 20” has been found by a surface tension method to be 0.0050%, and the static surface tension of the saturated solution is 40.2 dynes/cm. at 20°C. The vibrating jet shows no appreciable fall in tension from the pure water value at any concentration, and a modified drop-weight method has been employed to measure the time required for the accumulation of the adsorbed layer of decoic acid. Diffusion has been found to proceed over periods from about 10 seconds up to several minutes depending on concentration. These times are greatly in excess of that normally attributed to the diffusion process, but are in accord with the times forecast by the general equation given in Part V. Diffusion equilibrium is followed by a very slow fall in the static surface tension. Measurements have been carried out over the temperature range 10- 40°C. Both dynamic and static surface tensions show an unusually large increase with temperature, particularly in the more dilute solutions, although the duration of the diffusion process is insensitive to temperature.

Since the fall in concentration in the surface layer of an expanding drop due to expansion of the surface cannot be replenished immediately by diffusion of decoic acid from the bulk, the tension varies with the rate of expansion of the drop. Temperature changes have a negligible effect on the tension at an expanding surface, in sharp contrast to the effect at a non-expanding surface.

Glueckauf, E. (1947), Theory of chromatography. Part II. Chromatograms of a single solute. *Journal of the Chemical Society*, (OCT), 1302-1308.

Full Text: [-1959\J Che Soc OCT, 1302.pdf](-1959/J%20Che%20Soc%20OCT,%201302.pdf)

Abstract: Chromatograms of single solutes, in particular the case of sigmoid isotherms, are treated theoretically and measured experimentally. The form of the chromatograms resulting from the different isotherms and the movement of their characteristic points are shown and calculated (see Figs. 1-6). Adsorption and exchange isotherms can be calculated from chromatographic elution curves (see Figs. 7 and 9). Comparison of an isotherm, determined in this way, with directly determined equilibrium values shows a good agreement (see Fig. 5). and the chromatographic method gives a much larger number of points for less experimental work.

? Coates, J.I. and Glueckauf, E. (1947), Theory of chromatography. Part III. Experimental separation of two solutes and comparison with theory. *Journal of the Chemical Society*, (OCT), 1308-1314.

Full Text: [-1959\J Che Soc OCT, 1308.pdf](-1959/J%20Che%20Soc%20OCT,%201308.pdf)

Abstract: The results obtained in Part I (Proc. Roy. SOC., 1946, A, 186, 35) for chromatograms of two solutes are summarised in Tables I-V, giving the features and movements of the important parts of binary chromatograms (see Fig. 1) at various stages of the development. The results are given both for the general case and for the special case of the Langmuir isotherm. uantitative elution experiments is shown for a chromatographic separation of Cu++ and Mn++ on Zeo-karb H.I. (see Fig. 2, 3, and 4), the exchange of which follows approximately an isotherm of the Langmuir type.

Glueckauf, E. and Coates, J.I. (1947), Theory of chromatography. Part IV. The influence of incomplete equilibrium on the front boundary of chromatograms and on the effectiveness of separation. *Journal of the Chemical Society*, (OCT), 1315-1321.

Full Text: [-1959\J Che Soc OCT, 1315.pdf](-1959/J%20Che%20Soc%20OCT,%201315.pdf)

Abstract: It is shown that in the chromatographic column, under the usual working conditions, complete local equilibrium is not obtained. A theory is developed for the effect of incomplete equilibrium on chromatographic boundaries, and the form of observed boundaries agrees with those calculated. On decrease of grain size and flow velocity, equilibrium becomes more complete, and then some chromatographic separations can be effected with ease which are impossibIe by the usual methods; c.g., the separation of nickel and cobalt ions on alumina.

? Glueckauf, E. (1947), Theory of chromatography. Part V. Separation of two solutes following a Freundlich isotherm. *Journal of the Chemical Society*, (OCT), 1321-1329.

Full Text: [-1959\J Che Soc OCT, 1321.pdf](-1959/J%20Che%20Soc%20OCT,%201321.pdf)

Abstract: An attempt is made to predict the behaviour during chromatographic separation of solutes following individually a Freundlich isotherm ac = qn. A method is shown for the graphical solution of the fundamental chromatographic equation dq2/dc2 = dq2/dc2, which makes it possible to calculate the distribution of solutes in binary chromatograms for any type of isotherm. It is shown that in the case of Freundlich isotherms two essentially different types of chromatogram must be expected (see Figs. 4 and 6). In order to obtain complete separability into two adjoining bands the condition must be fulfilled that the molar phase ratio at the point of separation of the bands



If the leading solute has the lower value of n, ie., if n1 < n2, this can always be achieved by working at low enough concentrations. If this condition is not fulfilled, solute 2 cannot be obtained pure, but can only be enriched. Pure solute 1 can always be obtained, though in the latter case not quantitatively. Chromatographic separation is the easier the smaller the ratio n1/n2 of the Freundlich exponent.

Addison, C.C. and Hutchinson, S.K. (1948), The properties of freshly-formed surfaces. Part VII. The application of the vertical-plate technique to the study of soluble films at air-liquid and liquid-liquid interfaces. *Journal of the Chemical Society*, (JUL), 930-936.

Full Text: [-1959\J Che Soc JUL, 930.pdf](-1959/J%20Che%20Soc%20JUL,%20930.pdf)

Abstract: The vertical-plate method, applied by previous workers to the study of insoluble monolayers, has been adapted for soluble-film measurements. In addition to single determinations of surface or interfacial tension, the method is suitable for time studies of short duration. The simple apparatus described is readily assembled, the essential features being a thin platinum plate and torsion wire. The procedure for ensuring zero contact angle is given. An accurate relation between the movement of the plate and the change in tension is calculated, and the theoretical calibration curves compared with those obtained experimentally. Advantages, and possible errors, arising from the wetting of the plate above the meniscus are discussed. Vertical-plate measurements involve the minimum of surface expansion during a determination, and the method has been developed with the object of comparing the results with those obtained at expanding surfaces (following papers).

Addison, C.C., Bagot, J. and McCauley, H.S. (1948), The properties of freshly-formed surfaces. Part VIII. Expansion of soluble films of decoic acid at the air-water interface. *Journal of the Chemical Society*, (JUL), 936-942.

Full Text: [-1959\J Che Soc JUL, 936.pdf](-1959/J%20Che%20Soc%20JUL,%20936.pdf)

Abstract: The theoretical tensions operating at the surface of drops expanding at known rates have been calculated from (a) the surface tensions of decoic acid solutions at stationary (ie., non-expanding) surfaces recorded in Part VI (J., 1946, 579) and (b) measurements of the volume-surface area relation for expanding drops. These calculations assume that the surface activity of an adsorbed molecule is not influenced by expansion of the surface, and the calculated values of tension are appreciably lower than those ‘actually observed. Possible reasons for the decrease in surface activity of a soluble film during expansion of the surface are discussed. Change in orientation of the adsorbed molecules provides the most satisfactory explanation of the effect, which is common to other long-chain adsorbates.

Addison, E. and Hutchinson, S.K. (1948), The properties of freshly-formed surfaces. Part IX. Expansion of soluble films of sodium dodecyl sulphate at air-water and toluene-water interfaces. *Journal of the Chemical Society*, (JUL), 943-948.

Full Text: [-1959\J Che Soc JUL, 943.pdf](-1959/J%20Che%20Soc%20JUL,%20943.pdf)

Abstract: The deduction in Part VIII (preceding paper), that the surface activity of adsorbed longchain molecules is decreased on expansion of the surface, is supported experimentally by measurements of the surface tension of aqueous solutions of sodium dodecyl sulphate at both stationary surfaces (by the vertical-plate method) and expanding surfaces (by the drop-weight method). Differences (up to 10 dynesjcm.) occur at all concentrations below 0 . 0 2 ~, and are attributed to disorientation of the adsorbed molecules during surface expansion. Interfacialtension measurements against toluene show similar differences for solutions below 0.006rv1, but at higher concentrations surface expansion has no influence on the behaviour of the surface film. This is consistent with the anchoring effect of the toluene phase on the carbon chains, and a suitable explanation is again possible on the basis of disorientation.

Addison, C.C. and Elliott, T.A. (1949), The properties of freshly formed surfaces. Part X. A new contracting liquid-jet technique for the study of soluble films at small surface ages. *Journal of the Chemical Society*, (NOV), 2789-2805.

Full Text: [-1959\J Che Soc NOV, 2789.pdf](-1959/J%20Che%20Soc%20NOV,%202789.pdf)

Abstract: A new liquid-jet method is described which enables the simultaneous measurements of surface tension and surface age to be made over time ranges not hitherto accessible. A quantitative study of the following aspects is presented: (a) application to pure liquids or ideal solutions of constant surface tension; (b) application to the study of dynamic surface tensions of aqueous solutions; (c) factors (such as surface expansion) which influence the range of applicability of the method.

Addison, C.C. and Hutchinson, S.K. (1949), The properties of freshly formed surfaces. Part XI. Factors influencing surface activity and adsorption rates in aqueous decyl alcohol solutions. *Journal of the Chemical Society*, (DEC), 3387-3395.

Full Text: [-1959\J Che Soc DEC, 3387.pdf](-1959/J%20Che%20Soc%20DEC,%203387.pdf)

Abstract: The solubility of decyl alcohol in water has been determined, and previous quantitative studies of the surface activity of aqueous solutions of straight-chain alcohols have now been extended to the decyl alcohol-water system. The paper gives a review of the main features of the system. The significance of surface tensions, as measured by the vertical-plate, pendantdrop, and expanding-drop methods, is discussed critically. Dynamic tensions have been measured over a range of concentration; the adsorption rates are found to be in satisfactory agreement with predicted values and from these rates the energy barrier to adsorption has been evaluated. An attempt is made to consider individually the various factors which determine the magnitude of this energy barrier.

Addison, C.C. and Hutchinson, S.K. (1949), The properties of freshly formed surfaces. Part XII. An experimental study of the desorption process with particular reference to aqueous decyl alcohol solutions. *Journal of the Chemical Society*, (DEC), 3395-3403.

Full Text: [-1959\J Che Soc DEC, 3395.pdf](-1959/J%20Che%20Soc%20DEC,%203395.pdf)

Abstract: Desorption from soluble films of decyl alcohol has been found to be sufficiently slow to be measurable by the vertical-plate technique. An excess of alcohol in the film, beyond the equilibrium value, has been obtained by two methods : (a) by pouring the solution into a trough having small surface area, and (b) by spreading a film of decyl alcohol on the surface. Desorption rates have been found to depend on surface excess and temperature rather than on the bulk concentration of solute. As chain lcngth decreases, the desorption rates increase; at chain lengths below C, desorption is too rapid to be measurable by these techniques. The sensitivity of desorption rates of decyl alcohol to temperature is probably responsible for a unique change in the sign of the temperature coefficient which is observed with the equilibrium surface tensions,

Addison, C.C. and Hutchinson, S.K. (1949), The properties of freshly formed surfaces. Part XIII. The compressibility of soluble films of decyl and other alcohols. *Journal of the Chemical Society*, (DEC), 3404-3406.

Full Text: [-1959\J Che Soc DEC, 3404.pdf](-1959/J%20Che%20Soc%20DEC,%203404.pdf)

Abstract: The influence of compression rate on the compressibility of soluble films of decyl (and lower) alcohols has been studied by using the vertical-plate method together with a trough and rapidly moving barrier. Both equilibrium and non-equilibrium surfaces have been studied in order to assess the relative significance of surface excess and bulk concentration. Desorption from a compressed monolayer has been found to be almost instantaneous.

Addison, C.C. and Hutchinson, S.K. (1949), The properties of freshly formed surfaces. Part XIV. Further studies of the influence of surface expansion on soluble films of long-chain compounds. *Journal of the Chemical Society*, (DEC), 3406-3411.

Full Text: [-1959\J Che Soc DEC, 3406.pdf](-1959/J%20Che%20Soc%20DEC,%203406.pdf)

Abstract: Investigations on the effect of surface expansion on the properties of soluble films reported in earlier parts of this series have been extended by measurements of the surface tension, at expanding surfaces, of solutions of decyl alcohol and decoic acid over the full concentration range. The latter method, in conjunction with the vertical plate, gives a continuous record of the tension during surface expansion. Both methods indicate that at high solute concentration there is close agreement between measured and predicted values, thus confirming the methods of calculation given in Part VIII (J., 1948, 936). Discrepancies which occur in dilute solution only are attributed to the greater ease with which disorientation can occur in the surface film as the area per molecule increases. The low values observed for the temperature coefficient of surface tension at expanding surfaces of dilute decyl alcohol solutions support this view.

Addison, C.C. and Elliott, T.A. (1950), The properties of freshly formed surfaces. Part XV. The application of the contracting liquid-jet technique to the measurement of tensions at liquid-liquid interfaces. *Journal of the Chemical Society*, (NOV), 3090-3096.

Full Text: [-1959\J Che Soc NOV, 3090.pdf](-1959/J%20Che%20Soc%20NOV,%203090.pdf)

Abstract: An experimental technique is described for the production and measurement of a stable contracting jet of carbon tetrachloride flowing into water. The technique should be applicable to any pair of immiscible liquids of different densities. The method given in Part X (J., 1948, 2789) for the calculation of surface tension at various positions along the surface of a liquid→air jetshas been extended to the calculation of liquid-liquid interfacial tensions.

Addison, C.C. and Elliott, T.A. (1950), The properties of freshly formed surfaces. Part XVI. Dynamic tensions of xodium dodecyl sulphate solutions at the surface of liquid→air and liquid→liquid contracting jets. *Journal of the Chemical Society*, (NOV), 3096-3103.

Full Text: [-1959\J Che Soc NOV, 3096.pdf](-1959/J%20Che%20Soc%20NOV,%203096.pdf)

Abstract: The variations in tension at the surface of contracting jets of (u) sodium dodecyl sulphate solution flowing into air, and (b) carbon tetrachloride flowing into aqueous solutions of sodium dodecyl sulphate, have been determined by the methods given in Parts X (J., 1949, 2789) and XV (preceding paper). The tension changes are related to the rapid changes in surface area which occur at the jet surface, and alter in character as well as degree with increasing concentration of solute. The measurements are unique in that the rates of surface expansion are equal to, or may exceed, the rates of adsorption from bulk solution, so that the recorded tensions represent the balance between these two factors.

Addison, C.C. and Elliott, T.A. (1950), The properties of freshly formed surfaces. Part XVII. The measurement of surface and interfacial tensions of solutions, employing stationary waves on a vertical jet. *Journal of the Chemical Society*, (NOV), 3103-3109.

Full Text: [-1959\J Che Soc NOV, 3103.pdf](-1959/J%20Che%20Soc%20NOV,%203103.pdf)

Abstract: The paper describes an experimental technique developed for the formation and measurement of the stationary waves produced when a vertical jet of water or aqueous solution strikes a barrier, and the method of calculating surface tension from wave lengths and jet diameters is discussed. The influence of surface tension on the formation and measurement of waves has been studied, and the technique has been extended to the measurement of waves on a jet of carbon tetrachloride flowing into water and aqueous solutions.

Jones, D.C. (1951), The adsorption isotherm of Langmuir and of Brunauer, Emmett, and Teller for multilayers where n = 3. *Journal of the Chemical Society*, (JUN), 1464-1467.

Full Text: [-1959\J Che Soc JUN, 1464.pdf](-1959/J%20Che%20Soc%20JUN,%201464.pdf)

Abstract: An analysis of the adsorption isotherm of Langmuir and of Brunauer, Emmett, and Teller for multilayers, where the number of such layers is limited to 3, is made. The isotherms are shown to change from Typk I through IV and V and then to VA as the values of G change from just greater than 2.16 to ca. 0.25. Three is thus the smallest value of n where all the known isotherm types for a limited number of multilayers can be encountered as c varies. At high values of c (c > 1000) the change of adsorption type from I to IV again occurs in this case. The x/(V/V,) against x curves are analysed, especially in relation to approximations which hold at low values of x.

Jones, D.C. and Birks, E.W. (1951), The adsorption isotherm of Langmuir and of Brunauer, Emmett, and Teller for multilayers where n is 2. *Journal of the Chemical Society*, (APR), 1127-1130.

Full Text: [-1959\J Che Soc APR, 1127.pdf](-1959/J%20Che%20Soc%20APR,%201127.pdf)

Abstract: An analysis of the adsorption isotherm of Langmuir and of Brunauer, Emmett, and Teller (B.E.T.) for multilayers where the number of such layers is limited to two is made. The realisable isotherms show interesting changes of type as σl/σ2 or c reaches certain critical values, σ1 and σ2 being the relative lives of adsorbed molecules in the first and second layers respectively: the B.E.T. assumption, that σ2 = σliquid, need not be made in this case. For c = 4 the isotherm is a rectangular hyperbola, passing through the origin and therefore, for this case, bilayer adsorption on this model gives an isotherm of the same form as that given by the Langmuir monolayer equation. Deviations from the hyperbola occur as c >< 4 and the deviations are simply related to the value of c.

Addison, C.C. and Litherland, D. (1953), The properties of freshly formed surfaces. Part XVIII. Dynamic surface potentials and the adsorption process: Molecular orientation in soluble films of decyl alcohol. *Journal of the Chemical Society*, (APR), 1143-1150.

Full Text: [-1959\J Che Soc APR, 1143.pdf](-1959/J%20Che%20Soc%20APR,%201143.pdf)

Abstract: The adsorption of long-chain alcohols at a fresh water surface results in a rapid change of surface potential as well as of surface tension. An apparatus is described for the study of continuous changes in potential at fresh surfaces. Experiments on decyl alcohol solutions are recorded in which the rates of adsorption are sufficiently slow to enable rates of change of tension and potential to be compared. When concentration equilibrium between the surface and bulk solution is established, the surface tension shows no further change, but surface potential values show further pronounced changes which are interpreted as reflecting the rate of orientation of the disoriented film produced immediately adsorption is complete. When the soluble film has reached orientation equilibrium, the adsorption of additional solute (by further additions to bulk solution) disorients the film, and the influence of surface excess on rate of disorientation is considered. Unlike surface tension, which is relatively insensitive to changes in orientation, the surface potential of a solution depends as much on the condition of the adsorbed film as on the surface excess.

Addison, C.C. and Litherland, D. (1953), The properties of freshly formed surfaces. Part XIX. Dynamic surface potentials and the desorption process: The spreading of decyl alcohol films. *Journal of the Chemical Society*, (APR), 1150-1155.

Full Text: [-1959\J Che Soc APR, 1150.pdf](-1959/J%20Che%20Soc%20APR,%201150.pdf)

Abstract: When a film of decyl alcohol is spread on water, the adsorbed molecules are disoriented, and the subsequent variations in surface potential reflect the changes in molecular orientation as well as concentration in the adsorbed film. Similar measurements of potential changes during desorption into decyl alcohol solutions show that the extent of molecular disorientation produced in a spread film is determined by the rate of desorption from the film. Changes in potential produced on compression of an adsorbed film, and during subsequent desorption, are compared with those produced by spreading.

Addison, C.C. and Litherland, D. (1953), The properties of freshly formed surfaces. Part XX. An examination of the use of dynamic surface potentials in the study of adsorption rates. *Journal of the Chemical Society*, (APR), 1155-1159.

Full Text: [-1959\J Che Soc APR, 1155.pdf](-1959/J%20Che%20Soc%20APR,%201155.pdf)

Abstract: The discrepancy between the dynamic surface tensions of aqueous solutions of isoamyl and sec.-octyl alcohols, measured by Addison (Parts II and III, J., 1944, 252, 477) from the dimensions of an oscillating jet of solution, and those deduced by Posner and Alexander (Trans. Fuvaduy Soc., 1949, 45, 651) from measurements of surface potentials along the liquid jets has been investigated. Measurements of the change in surface potential with time for solutions of these alcohols show that the disorientation potentials operative during and immediately after completion of the adsorption process differ considerably from the equilibrium orientation potentials of these solutions. When Posner and Alexander’s potential measurements are translated into dynamic surface tensions by use of the disorientation potential-tension relation characteristic of the jet surface, the dynamic tensions determined by the two methods are in close agreement.

Addison, C.C. and Elliott, T.A. (1953), The properties of freshly formed surfaces. Part XXI. The influence of chain length and structure on the surface potentials of aqueous solutions of alcohols. *Journal of the Chemical Society*, (APR), 1159-1167.

Full Text: [-1959\J Che Soc APR, 1159.pdf](-1959/J%20Che%20Soc%20APR,%201159.pdf)

Abstract: Orientation and disorientation surface potentials have been measured for aqueous solutions of ethyl, n-propyl, rt-butyl, n-amyl, and rt-hexyl alcohols. When the equilibrium (orientation) potentials A V, are plotted against surface excess I’ for the C,-C, alcohols, the points lie on a common line. The constant value of the measured dipole moment (p = 223 mD) indicates that the tilt of the dipole to the surface is independent of chain length over this range. Hexyl and higher alcohols show some deviation; possible reasons for this are considered. The disorientation produced by adsorption (AVd - AVO) is studied as a function of chain length and surface excess. For any given surface excess, disorientation increases with chain length up to C,, after which the effect diminishes. The results are interpreted on the basis of the temporary displacement of the dipole from the orientation position, and the disorientation of associated water molecules in the surface. The degree of disorientation produced by further adsorption to a surface carrying an equilibrium film has been studied. For dilute solutions of the shorter-chain alcohols (e.g., Iz-propyl), the disorientation is no more than that equivalent to the increment in r. At the higher I? values given by longer-chain alcohols the disorientation is diminished by mutual interference in the film. The curiously slow rate of orientation of a disoriented film is also discussed. The influence of chain structure on surface potential is considered in the light of results for isobutyl, isoamyl, tert.-butyl, and tert.-amyl alcohols. tert.-Butyl alcohol (p = 460 mD) is unique in that its symmetrical structure renders its vertical orientation to the surface highly probable. On this assumption, the angle of tilt of the dipole to the vertical (0) is calculated, the value to be attributed to the dielectric constant E in the application of the Helmholtz equation AV = 4mp is deduced, and this value of E employed in the calculation of 0 for the straight-chain alcohols.

Surface potential and tension measurements for ethylene glycol and for butane-1 : 3-diol are presented for comparison with the monohydric alcohols. Each compound gives the same value (ca. 850 mD) for the total dipole moment.

Perrin, D.D. (1960), The hydrolysis of copper(II) ion. *Journal of the Chemical Society*, 3189-3196.

Full Text: [1960-80\J Che Soc, 3189.pdf](1960-80/J%20Che%20Soc,%203189.pdf)

Abstract: Copper(II) ion is hydrolysed to form polynuclear compIexes of the type, Cun(OH)2n-2++. The acid dissociation constant, \*β22, corresponding to the formation of Cu2(OH)2++, has been obtained as a function of temperature and of ionic strength, and \*β34 has been calculated for 20°C. The assumption that, for all complexes bigger than Cu2(OH)2++, the formation constant, K, is the same for the successive addition of each Cu(OH)2 “link” provides a quantitative and consistent interpretation of the pH values obtained when dilute solutions of copper(II) ion are titrated with alkali. Mononuclear complexes such as CuOH+ are not present in appreciable amounts in these solutions.

Notes: highly cited (> 1000), IIsotherm

Giles, C.H., MacEwan, T.H., Nakhwa, S.N. and Smith, D. (1960), Studies in adsorption. Part XI. A system of classification of solution adsorption isotherms, and its use in diagnosis of adsorption mechanisms and in measurement of specific surface areas of solids. *Journal of the Chemical Society*, **60**, 3973-3993.

Full Text: [1960-80\J Che Soc60, 3973.pdf](1960-80/J%20Che%20Soc60,%203973.pdf)

Abstract: Isotherms for adsorption of organic solutes are divided into four main classes, according to the nature of slope of the initial portion of the curve, and thereafter into sub-groups.

The main classes are: (i) S Curves, indicative of vertical orientation of adsorbed molecules at the surface. (ii) L Curves, the normal or “Langmuir” isotherms, usually indicative of molecules adsorbed flat on the surface, or, sometimes, of vertically oriented adsorbed ions with particularly strong intermolecular attraction. (iii) H Curves (‘I high affinity’) (commencing at a positive value on the “concentration in solid” axis), often given by solutes adsorbed as ionic micelles, and by high-affinity ions exchanging with lowaffinity ions. (iv) C Curves (“constant partition”), linear curves, given by solutes which penetrate into the solid more readily than does the solvent.

The sub-groups of these classes are arranged according to the shape of the parts of the curves farther from the origin, and the significance of plateaux and changes of slope are described. Thus, if the adsorbed solute molecules in the monolayer are so oriented that the new surface they present to the solution has low attraction for more solute molecules, the curve has a long plateau; if they are oriented so that the new surface has high attraction for more solute, the curve rises steadily and has no plateau.

The choice of solutes for reliable measurement of specific surface areas is very restricted. It is suggested that p-nitrophenol may be one of the best compounds for this purpose.

Keywords: Adsorption, Adsorption Isotherms, Classification, Isotherms, Measurement

? Giles, C.H., Greczek, J.J. and Nakhwa, S.N. (1961), Studies in adsorption. Part XIII. Anomalous (endothermic) effects of adsorption on inorganic solids. *Journal of the Chemical Society*, (JAN), 93-95.

Full Text: [1960-80\J Che Soc JAN, 93.pdf](1960-80/J%20Che%20Soc%20JAN,%2093.pdf)

Abstract: The adsorption of two dyes from water on to inorganic surfaces is found to be apparently endothermic, saturation adsorption rising with temperature. Both dyes are associated in aqueous solution, From a dissociating solvent (methanol) the adsorption is normal, the amount sorbed falling with rise in temperature. The anomalous adsorption from water is considered to be the result of partial dissociation at the substrate surface.

Adsorption of dye as micelles appears to occur even from methanol, and it is suggested that association takes place at the moment of adsorption.

? Barrer, R.M. and Perry, G.S. (1961), Sorption of mixtures, and selectivity in alkylammonium montmorillonites. Part II. Tetramethylammonium montmorillonite. *Journal of the Chemical Society*, (MAR), 850-858.

Full Text: [1960-80\J Ame Che Soc MAR, 850.pdf](1960-80/J%20Ame%20Che%20Soc%20MAR,%20850.pdf)

Abstract: The sorption of various mixtures of pairs of hydrocarbons of different structural types has been examined in tetramethylammonium montmorillonite. Selectivities vary with the total amount sorbed, the composition of the feed mixtures, and the temperature, and for hydrocarbon pairs of appropriate type can become very large. The affinity decreases in the sequence benzene > n-heptane, n-hexane > cyclohexane > iso-octane. The influence has been studied of varying amounts of these hydrocarbons upon the c-spacing of the clay. All the hydrocarbons are intercalated, and in order to explain the selectivities, sorption capacities of the clay and orientations of interlamellar sorbate, not only the intersheet spacing and molecular configuration, but also the distances between the interlamellar organic ions must be taken into account.

? Giles, C.H., Easton, I.A. and McKay, R.B. (1964), Mechanism of adsorption of cationic dyes by alumina, and a note on heat changes in solution adsorption. *Journal of the Chemical Society*, (NOV), 4495-4503.

Full Text: [1960-80\J Che Soc NOV, 4495.pdf](1960-80/J%20Che%20Soc%20NOV,%204495.pdf)

A range of cationic dyes has been applied to (alkaline) chromatographic alumina powder. The nature of the adsorption has been interpreted from the shape of the adsorption isotherms, the ease of desorption, the effect of temperature on the equilibrium, and the ‘‘coverage factor,” ix., the factor by which the maximum adsorption exceeds the theoretical value for a monolayer of flatwise close-packed molecules. In most cases adsorption occurs by ion exchange of ionic micelles of dye, giving coverage factors > unity and the dye is completely desorbable by water alone. Rhodamine 6GB, which has hydrogen-donor groups, is adsorbed edgewise in a vertically close-packed monolayer, and is not completely desorbed by water; it thus appears to be held to the surface by hydrogen bonds; another hydrogenbonding solute, p-nitrophenol, is also not completely desorbable. The triphenylmethane dyes show anomalous effects with rise in temperature : the amount adsorbed increases considerably. As the temperature approaches b. p. a marked change in adsorption occurs: adsorption of monodisperse dye molecules, oriented edge-on, appears to replace adsorption of ionic dye micelles. This can be exothermic, temperature-independent (“athermic”), or endothermic, and it is shown that the sign and magnitude of the change can depend upon the nature of association of the solute on adsorption.

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? Agnihotr, V.G. and Giles, C.H. (1972), Cellulose-dye adsorption process - Study by monolayer method. *Journal of the Chemical Society-Perkin Transactions 2*, **15**, 2241-2246.

Full Text: [1960-80\J Che Soc-Per Tra 2,15, 2241.pdf](1960-80/J%20Che%20Soc-Per%20Tra%202,15,%202241.pdf)

Abstract: The reactions of monolayers of cellulose, spread from Cadoxen solvent, with a variety of solutes in the aqueous phase have been studied by measurement of film expansion, compressibility, and viscosity, with a view to elucidating the mechanism of dye adsorption by cellulose. Refractometry measurements of bulk solutions have also been used. Phenol has no effect on the film, but urea expands it. Cationic dyes, e.g., Methylene Blue, associate weakly with the monolayer to give a mixed film of high compressibility. Anionic dyes slightly expand the film, without change in its compressibility or viscosity. This expansion is almost identical for monoazo-dyes with little affinity for cellulose in bulk, as it is for bisazo-dyes, with similar molecular width, but of high cellulose affinity. A direct dye with a wider molecule causes greater film expansion, approximately proportionate to this increased width. This evidence suggests face to-face association of cellulose and anionic dye molecules parallel to the cellulose chain. Refractometry, but not the other tests, reveals weak complexing, probably of an acid-base type, between cellulose and amino-groups in dyes. This is the only dye-cellulose force identified. Dye adsorption by cellulose in bulk is explained by this and other recent work, e.g., the known tendency of the dye to escape from aqueous solution, causes it to concentrate at the cellulose-water interface. There it becomes aligned parallel to the cellulose chains possibly by hydrophobic bonding with glucosidic >CH groups. It then associates to form multilayers or three-dimensional aggregates. This process occurs more readily with long narrow planar molecules and is assisted in technical practice by the presence of excess of neutral inorganic salt in the dye - bath.

Keywords: Adsorption

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Journal of the Chemical Society, Faraday Transactions (1990-1996)

Journal of the Chemical Society, Faraday Transactions I: Physical Chemistry in Condensed Phases (1972-1989)

Journal of the Chemical Society, Faraday Transactions II: Molecular and Chemical Physics (1972-1989)

Transactions of the Faraday Society (1905-1971)

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Compton, R.G. and Pritchard, K.L. (1990), Kinetics of the langmuirian adsorption of CuII ions at the calcite water interface. *Journal of the Chemical Society-Faraday Transactions*, **86** (1), 129-136.

Full Text: [1990\J Che Soc-Far Tra86, 129.pdf](1990/J%20Che%20Soc-Far%20Tra86,%20129.pdf)

Abstract: A novel technique is presented which allows the kinetic parameters relating to the adsorption/desorption of copper(l1) ions at the calcite/water interface to be determined. The new method utilises a double-channel electrode in which an Iceland Spar crystal forms part of one wall of the rectangular duct through which solution flows. Two copper electrodes are located immediately upstream and downstream of the crystal and flush with its surface. The downstream electrode is potentiostatted throughout the experiment at a value corresponding to the transport controlled reduction of CuII to Cu0. The potential of the upstream electrode is stepped from a value at which no current flows to one at which the electrode dissolves forming CuII, which then flows over the crystal to the detector electrode. Analysis of the current-time transient on this electrode permits the deduction of the adsorptionfdesorption kinetics of CuII at the crystal surface.

Parsons, R. and Peat, R. (1993), Adsorption of pentaerythritol at the mercury/aqueous sodium fluoride interphase. *Journal of the Chemical Society-Faraday Transactions*, **89** (2), 181-186.

Full Text: [1993\J Che Soc-Far Tra89, 181.pdf](1993/J%20Che%20Soc-Far%20Tra89,%20181.pdf)

Abstract: The adsorption of pentaerythritol [2,2-bis(hydroxymethyl)propane-1,3-Diol] at mercury from aqueous NaF has been studied using measurements of double-layer capacity and electrocapillary curves. The concentration dependence of the adsorption can be represented by a Frumkin isotherm with a repulsive interaction parameter. Its behaviour is compared with that of other polyhydroxy compounds.

Keywords: Water Interface

? Sprang, T. and Boddenberg, B. (1995), Coadsorption of xenon and carbon-monoxide in cadmium-exchanged zeolite-Y studied with 129Xe NMR-spectroscopy. *Journal of the Chemical Society-Faraday Transactions*, **91** (3), 555-558.

Full Text: [1995\J Che Soc-Far Tra91, 555.pdf](1995/J%20Che%20Soc-Far%20Tra91,%20555.pdf)

Abstract: The adsorption isotherm and Xe-129 NMR chemical shifts of xenon in 68% cadmium-exchanged zeolite NaY in the presence of carbon monoxide were measured. The data obtained can be explained quantitatively in terms of ideal binary adsorption on cation sites.

Keywords: Density Dependence, Chemical-Shifts

? Richards, M.D. and Pope, C.G. (1996), Adsorption of Methylene blue from aqueous solutions by amorphous aluminosilicate gels and zeolite X. *Journal of the Chemical Society-Faraday Transactions*, **92** (2), 317-323.

Full Text: [1996\J Che Soc-Far Tra92, 317.pdf](1996/J%20Che%20Soc-Far%20Tra92,%20317.pdf)

Abstract: Methylene Blue adsorption isotherms from aqueous solution at 25°C, and diffuse reflectance spectra of the adsorbed dye have been used to examine aluminosilicate gels and zeolite X formed during hydrothermal synthesis. These techniques require little sample pretreatment, and during the measurements the dye cannot penetrate significantly into the zeolite X pore system and so are particularly relevant for examining the external surfaces of fragile solid materials. Despite this, characteristic changes were observed in these properties after the same ageing times as changes in the bulk phase sensitive properties of XRD, FTIR and water adsorption capacity occurred. Dye molecule aggregation at gel surfaces was indicated by the isotherm shape, although the spectra were like those for monomers in solution, whereas spectra, but not isotherm shape, suggested aggregation on zeolite X. Spectral variation with surface concentration could not be described for either system on the basis of surface aggregation, and unique spectra for monomeric and associated species. Nucleation gel and seed-crystal preparations were also studied, and had properties distinct from both amorphous gel and well crystallised zeolite.

Keywords: Adsorption, Adsorption Capacity, Adsorption Isotherms, Ageing, Aggregation, Amorphous, Aqueous Solution, Capacity, Colloidal Silica, Concentration, Dye, FTIR, Gel, Gels, Hydrothermal Synthesis, Isotherm, Isotherms, Materials, Measurements, Methylene Blue, Pretreatment, Properties, Reflectance, Surface, Surfaces, Synthesis, Techniques, Water, Water Adsorption, XRD, Zeolite

Lee, C.K. and Chiang, A.S.T. (1996), Adsorption of aromatic compounds in large MFI zeolite crystals. *Journal of the Chemical Society-Faraday Transactions*, **92** (18), 3445-3451.

Full Text: [1996\J Che Soc-Far Tra92, 3445.pdf](1996/J%20Che%20Soc-Far%20Tra92,%203445.pdf)

Abstract: Very large (180×40×40 µm3) and well defined crystals have been used ina gravimetric system to investigate the adsorption of aromatic compounds in MFI (silicalite) zeolite. The isotherms and isosteric heats of adsorption (Qst) were reported for future comparison with various adsorption models. Three types of phase transition were found. Isotherms of p-xylene showed a sharp step rise from ca. 4 to 8 molecules uc-1. A clear phase boundary could be outlined. Adsorbed benzene behaved as a dual-phase system in the range between 4.6 and 6 molecules uc-1. There were more phase transitions above 6 molecules uc-1but it was not possible to outline the phase boundary. Molar entropy changes of 210 and 180 J mol-1K-1 were found for the observed p-xylene-MFI and benzene-MFI phase transitions. For ethylbenzene and toluene, a dual-phase region was also observed but the transition was less pronounced. Isosteric heats, calculated from isotherms, showed a complex variation with loading and a strong dependence on temperature. It was also found that the adsorption kinetics are strongly influenced by the previous adsorption history. For freshly calcined samples the uptake rate was relatively fast. However, re-calcination after the adsorption of *p*-xylene created a diffusion barrier inside the crystalline material and subsequent adsorption of other aromatic compounds became much slower and displayed two-step kinetics.

Keywords: Para-Xylene, Computer-Simulation, Powder Diffraction, Framework Symmetry, Diffusion-Barriers, Benzene System, P-Xylene, MAS NMR, Silicalite, ZSM-5

# Title: Journal of the Chemical Society-Faraday Transactions I

(J. Chem. Soc., Faraday Trans. I)

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Journal of the Chemical Society, Faraday Transactions I: Physical Chemistry in Condensed Phases (1972-1989)

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? Barthome, D. and Ha, B.H. (1973), Adsorption of benzene and cyclohexane on faujasite-type zeolites. II. Adsorption site efficiency and zeolite field influence at high coverage. *Journal of the Chemical Society-Faraday Transactions I*, **69** (12), 2158-2165.

Primet, M., Basset, J.M. and Mathieu, M.V. (1974), Infra-red determination of the isotherm of hydrogen adsorption on a Pt/Al2O3 catalyst. *Journal of the Chemical Society-Faraday Transactions I*, **70** (2), 293-298.

Abstract: Of the various forms of hydrogen adsorbed on platinum only hydrogen weakly and reversibly adsorbed is detected by an infra-red band at 2120 cm–1. The preparation of a well dispersed sample of Pt/Al2O3 catalyst containing 10 % platinum allows us to determine accurately the hydrogen adsorption isotherm of this weakly adsorbed species. Only a dissociative Langmuir model fits the experimental results in the pressure range of 10–1 to 700 Torr and temperature range of 27 to 95°C. The heat of adsorption (–5×104 J mol–1) and the isosteric heat of adsorption are in good agreement with previous calorimetric data.

? Oakes, J. (1976), Thermally denatured proteins - nuclear magnetic-resonance, binding isotherm and chemical modification studies of thermally denatured bovine serum-albumin. *Journal of the Chemical Society-Faraday Transactions I*, **72**, 228-237.

Aharoni, C. and Ungarish, M. (1976), Kinetics of activated chemisorption. Part I: The non-Elovichian part of the isotherm. *Journal of the Chemical Society-Faraday Transactions I*, **72**, 400-408.

Full Text: [J\J Che Soc-Far Tra72, 400.pdf](J/J%20Che%20Soc-Far%20Tra72,%20400.pdf) [J\J Che Soc-Far Tra72, 400-1.pdf](J/J%20Che%20Soc-Far%20Tra72,%20400-1.pdf) [J\J Che Soc-Far Tra72, 400-2.pdf](J/J%20Che%20Soc-Far%20Tra72,%20400-2.pdf)

Abstract: The kinetics of activated chemisorption are described by plots of the time *t* against the reciprocal of the rate of adsorption *Z* = (d*q*/d*t*)–1. The parameter *t*0 of the Elovich equation *q* = (1/*b*) ln *ab*+(1/*b*) ln (*t*+*t*0) where *a, b* and *t*0 are constants is estimated from the plot of *t* against *Z*. The plot of *q* against log(*t*+*t*0) is convex towards the *q* axis at low *t* indicating that the Elovich equation is not obeyed in that range. The “combined model” of Aharoni and Tompkins predicts a curvature in the wrong direction and is inapplicable without modification.

Hsu, C.C., Rudzinski, W. and Wojciechowski, B.W. (1976), A new isotherm for multilayer adsorption on heterogeneous surfaces. *Journal of the Chemical Society-Faraday Transactions I*, **72**, 453-465.

Abstract: An overall adsorption isotherm consisting of a modified BET local isotherm and a Maxwellian adsorption energy distribution is proposed. This isotherm is shown to give excellent agreement with experimental data obtained over a wide range of pressures on heterogeneous adsorbents but is no better than the simple BET isotherm for Aerosil and graphite. The reasons for these observations and the meaning of the parameters obtained are discussed.

Aharoni, C. and Ungarish, M. (1977), Kinetics of activated chemisorption. Part 2: Theoretical models. *Journal of the Chemical Society-Faraday Transactions I*, **73**, 456-464.

Full Text: [J\J Che Soc-Far Tra73, 456.pdf](J/J%20Che%20Soc-Far%20Tra73,%20456.pdf) [J\J Che Soc-Far Tra73, 456-1.pdf](J/J%20Che%20Soc-Far%20Tra73,%20456-1.pdf)

Abstract: In activated chemisorption the plot of the reciprocal of the rate *Z*=(d*q*/d*t*)–1 against the time *t* is convex towards the *Z* axis at low *t* and concave at high *t*. This condition is satisfied if both the energy of activation, *Et* and the number of available sites, *Nt* decrease with the coverage *q* and if d2*Et*/d*q*2 < 0. Two models are considered: (*a*) A homogeneous surface model in which *Et* decreases proportionally to log *q* and *Nt* proportionally to *q*.(*b*) A model based on a heterogeneous surface comprising regions of different activation energies *E* and different heats of adsorption *H*, with *E* proportional to *H*. The activation energy at any region decreases logarithmically with the local coverage in that region. The total number of available sites decreases mainly because the low energy sites attain equilibrium during the adsorption run.

McKay, G., Turner, J.M.C. and Zaré, F. (1977), Comparison of mechanisms of thermal decompositions of 2,2’-azoisobutane and azoisopropane. *Journal of the Chemical Society-Faraday Transactions I*, **73**, 803-816.

Abstract: The gas phase pyrolyses of 2,2’-azoisobutane and azoisopropane have been investigated in the temperature range 471–573 K. The products of 2,2’-azoisobutane (AIB) decomposition result from the following elementary reactions. AIB [graphic omitted] 2t-C4H9+ N2(1), 2t-C4H9 [graphic omitted] iC4H10+ iC4H8(2), 2t-C4H4 [graphic omitted] 2,2,3,3-tetramethylbutane (3)The disproportionation-combination rate constant ratio, *k*d/*k*c, for t-butyl radicals has been determined as 2.60 ± 0.04 in the temperature range 483 to 515 K.In addition to the corresponding reactions (1) to (3) involving isopropyl radicals, azoisopropane (AIP) decomposition involves the abstraction reaction, iC3H7+ AIP [graphic omitted] C3H8+ AIP (4). In the temperature range, 518–573 K, *k*a is given by the expression, log10*k*a/(*k*c)½/cm3/2 mol–½ s–½= 5.26 ± 0.22 –(41.64 ± 2.31) kJ mol–12.303 ***R****T*, and the disproportionation-combination rate constant ratio for isopropyl radicals has been found to fall from 0.52 at 518 K to 0.49 at 573 K.

Crickmore, P.J. and Wojciechowski, B.W. (1977), Kinetics of adsorption on energetically heterogeneous surfaces. *Journal of the Chemical Society-Faraday Transactions I*, **73**, 1216-1223.

Abstract: Rate models for adsorption and desorption on a non-uniform surface are derived using the “Extent of Reaction Effect” which describes the behaviour of large systems of parallel reactions. When the rate models and the resulting isotherm are fitted to data taken from the literature, very good agreement is found between the fitted model and the data. The new isotherm also provides an explanation for cases where physisorption is observed to follow Langmuir’s dissociative chemisorption isotherm.Extensions of our rate model are presented for the case where a precursor state exists. This approach leads to two well-established isotherms: the Freundlich isotherm and the “generalized Freundlich” isotherm proposed by Sips.

Notes: MModel

Ritchie, A.G. (1977), Alternative to the Elovich equation for the kinetics of adsorption of gases on solids. *Journal of the Chemical Society-Faraday Transactions I*, **73** (10), 1650-1653.

Full Text: [J\J Che Soc-Far Tra I73, 1650.pdf](J/J%20Che%20Soc-Far%20Tra%20I73,%201650.pdf)

Abstract: The Elovich equation has long been used to describe the kinetics of adsorption of gases on solids. It is shown here that many results which have been fitted to this equation can be more satisfactorily described in terms of the simple theory of adsorption on specific sites on the surface of a solid.

Aharoni, C. and Ungarish, M. (1977), Kinetics of activated chemisorption. Part 3. Amount and distribution of adsorbate at varying temperatures and pressures. *Journal of the Chemical Society-Faraday Transactions I*, **73** (12), 1943-1950.

Full Text: [J\J Che Soc-Far Tra73, 1943.pdf](J/J%20Che%20Soc-Far%20Tra73,%201943.pdf) [J\J Che Soc-Far Tra73, 1943-1.pdf](J/J%20Che%20Soc-Far%20Tra73,%201943-1.pdf)

Abstract: The heterogeneous-surface model applied in Part 2 to the kinetics, is now applied to the effects of temperature and pressure on the amount adsorbed. It predicts isobars with a maximum that is displaced towards higher temperatures at higher pressures. The low-temperature, pseudo-equilibrium isotherms obey the Freundlich equation. Increase in temperature or decrease in pressure produce desorption followed by readsorption. Temperature-programmed desorption gives one peak when heating is slow and two peaks when heating is rapid. When isotopes are successively adsorbed, the isotope adsorbed last is desorbed at lower temperature. The distribution of the adsorbate, according to the regions of various energy on the adsorbent, depends on temperature, pressure and time and is given by a discontinuous function with a maximum.

Aharoni, C. and Ungarish, M. (1978), Kinetics of activated chemisorption. Part 4. Differential heat of adsorption. *Journal of the Chemical Society-Faraday Transactions I*, **74** (6), 1507-1516.

Abstract: A model previously applied to the kinetics of chemisorption and to adsorption at true and apparent equilibrium, is applied to the differential heats of adsorption. The measurable function, heat-coverage, differs from the enthalpy against site distribution. When the differential heat of adsorption is measured continuously, at constant pressure and increasing time, it increases with coverage. When it is measured stagewise with stages at increasing pressures, it decreases with coverage. In both cases it increases with temperature.

Viswanathan, B. (1979), On Ritchie’s equation for the analysis of kinetics of adsorption of gases on solids. *Journal of the Chemical Society-Faraday Transactions I*, **75** (2), 477-478.

Gałuszka, J. (1979), General approach to processing of kinetic adsorption data: But-1-ene+zeolite NaH-Y system. *Journal of the Chemical Society-Faraday Transactions I*, **75** (5), 1016-1022.

Abstract: The isothermal rate equation of adsorption has been modified and solved numerically. Its three parameters were evaluated from the nonlinear regression using the CERN-library programs. The kinetic data for the but-1-ene + zeolite NaH-Y system, which caused discontinuities in the Elovich plots, were successfully fitted to the proposed equation. The physical meaning of this equation and its parameters are discussed on the basis of the same experimental data. Some suggestions about the but-1-ene transformation mechanism are made.

Conway, B.E. and Novak, D.M. (1979), Chloride ion adsorption effects in the recombination-controlled kinetics of anodic chlorine evolution at Pt electrodes. *Journal of the Chemical Society-Faraday Transactions I*, **75** (11), 2454-2472.

Abstract: The role of chloride ion adsorption in the anodic Cl2-evolution reaction at Pt electrodes in aqueous chloride solutions is examined for a range of Cl– ion concentrations. A new method of testing the applicability of a recombination-controlled mechanism is given. It enables both the rate constant of the rate-controlling recombination step and the quasi-equilibrium constant of the prior Cl– discharge/Cl\* electrosorption step to be evaluated quantitatively as a function of Cl– concentration.It is shown that the Cl2-evolution process at Pt is recombination-controlled over a wide-range of Cl– ion concentrations. Despite the approach of the anodic current–potential relation towards limiting-current behaviour, consistent with recombination-controlled kinetics, the limiting current densities are dependent on Cl– ion concentration. It is suggested that this is due to (*a*) effects of specifically adsorbed Cl– ion on the Cl\* recombination rate constant and (*b*) changes of state of the Pt anode surface due to competitive effects of Cl– ion adsorption on the extent of surface oxidation of the Pt surface on which the catalytic recombination of discharged Cl\* takes place in aqueous medium. These two factors complicate the interpretation of reaction orders in [Cl–] for the Cl2 evolution reaction since both specific adsorption effects and the competitive effects in surface oxidation have to be taken into account in relating rates to Cl– ion concentration.

Koga, O., Onishi, T. and Tamaru, K. (1980), Adsorption and decomposition of isopropyl alcohol over zinc oxide: Infrared and kinetic study. *Journal of the Chemical Society-Faraday Transactions I*, **76** (1), 19-29.

Abstract: The adsorption of isopropyl alcohol and acetone on zinc oxide was studied by an infrared technique which revealed that isopropyl alcohol is dissociatively adsorbed at room temperature to form zinc alcoholate and hydroxyl group on the surface, while the adsorption of acetone takes place in its enolic form. When adsorbed isopropyl alcohol was heated to 363 K, the zinc alcoholate species changed gradually to acetone adsorbed in its enolic form, which further desorbed at higher temperatures as acetone, being replaced by the attacking isopropyl alcohol.The behaviour of the adsorbed species during decomposition of isopropyl alcohol on zinc oxide was studied in more detail, leading to the overall reaction mechanism described by eqn (V).

? Vincent, B., Young, C.A. and Tadros, T.F. (1980), Adsorption of small, positive particles onto large, negative particles in the presence of polymer. Part 1. Adsorption isotherms. *Journal of the Chemical Society-Faraday Transactions I*, **76** (3), 665-673.

Abstract: Equilibrium adsorption isotherms have been determined, at 25°C, for the adsorption of small, positively-charged polystyrene latex particles onto large, negatively-charged polystyrene latex particles as a function of ionic strength and also in the presence of poly(vinyl alcohol)(PVA) of molar mass 24 000 or alkyl ethylene oxide condensates. The contrasting effects of PVA and the non-ionic surfactants are discussed.The adsorption isotherms are also correlated with electrophoretic mobility data for the large particles in the presence of varying concentrations of the small, oppositely-charged particles.

Vincent, B., Jafelicci, M., Luckham, P.F. and Tadros, T.F. (1980), Adsorption of small, positive particles onto large, negative particles in the presence of polymer. Part 2. Adsorption equilibrium and kinetics as a function of temperature. *Journal of the Chemical Society-Faraday Transactions I*, **76** (3), 674-682.

Abstract: The effect of temperature, over the range 30–50°C, on the adsorption isotherms of small, positive particles onto large, negative particles, in the presence of poly(vinyl alcohol), has been studied. The kinetics of adsorption have also been investigated, again as a function of temperature, and a theoretical analysis of the kinetics is presented.

Ungarish, M. and Aharoni, C. (1981), Kinetics of chemisorption: Deducing kinetic laws from experimental data. *Journal of the Chemical Society-Faraday Transactions I*, **77** (5), 975-985.

Full Text: [J\J Che Soc-Far Tra77, 975.pdf](J/J%20Che%20Soc-Far%20Tra77,%20975.pdf) [J\J Che Soc-Far Tra77, 975-1.pdf](J/J%20Che%20Soc-Far%20Tra77,%20975-1.pdf)

Abstract: The kinetics of chemisorption have been inadequately represented in the literature by second-order equations and by Elovich equations. The conditions at which non-valid equations become apparently applicable are discussed. Assumed isotherms are often congruent to the experimental one at a limited range of coverage and predict a correct value for the rate d*q*/d*t* and for the change of rate d2*q*/d*t*2 in that range; however, they have been applied beyond the range of validity by using plotting procedures that allow the location of the region of congruency to be adjusted and the effect of data outside this region to be attenuated. The second-order rate equation *q*∞/(*q*∞–*q*) = *αt*+ 1 where *q*∞ and *α* are constants, is congruent to the Elovich equation when *q* ≈ 0.5*q*∞. Reciprocally, the Elovich equation *q* = *c*+(1/*b*)ln *t* where *b* and *c* are constant, is indistinguishable from a second-order equation when *q ≈* 2/*b*. Both equations can be fitted at certain conditions to data obeying the equation *q* = *kt*1/*v* where *k* and *v* are constants. Differential analysis shows that the experimental isotherms generally obey a complex function for which *z* = (d*q*/d*t*)–1 is sigmoid.

? Aharoni, C. and Suzin, Y. (1982), Application of the Elovich equation to the kinetics of occlusion. Part 1. Homogeneous microporosity. *Journal of the Chemical Society-Faraday Transactions I*, **78** (8), 2313-2320.

Abstract: Some properties of the equations for the kinetics of occlusion, obtained by integrating Fick’s equation, are examined. The plot of the reciprocal of the rate *z*=(d*vt*/d*t*)–1 against the time *t* is sigmoid and has an inflexion point at *t*=*t*p. When *t* does not differ greatly from *t*p the kinetics are approximated by an Elovich equation *vt*=*A*+(1/*b*)ln(*t*/*t*p+*t*r) where *A*, *b* and *t*r are constants independent of the diffusion coefficient and length of the diffusion path and determined by the geometry of the particles.

? Aharoni, C. and Suzin, Y. (1982), Application of the Elovich equation to the kinetics of occlusion. Part 2. Analysis of experimental-data from the literature. *Journal of the Chemical Society-Faraday Transactions I*, **78**, 2321-2327.

Abstract: The Elovichian approximation and the parabolic approximation (see Part 1) have been applied to data on the kinetics of occlusion found in the literature. The data refer to occlusion of a gas, a liquid and solutes by zeolites, active carbon and a cation-exchange resin. The adsorbents were either spherical particles or powders. The equation for occlusion by ‘slabs’, *i.e.* parallel diffusion paths, is found to be applicable in all cases; the equation for occlusion by ‘spheres’, *i.e.* convergent diffusion paths, is not applicable.

? Aharoni, C. and Suzin, Y. (1982), Application of the Elovich equation to the kinetics of occlusion. Part 3. Heterogeneous microporosity. *Journal of the Chemical Society-Faraday Transactions I*, **78**, 2329-2336.

Abstract: A model is considered in which occlusion takes place in parallel in an array of micropores with different coefficients of diffusion. The rate equation for occlusion in a pore is approximated by a parabolic or by an exponential equation, and the rate for the overall process is obtained by summing the rates in the pores. The plot of *Vt*/V∞ against ln *t*, where *Vt* and *V*∞ are the amounts sorbed at times *t* and infinity, respectively, is sigmoid and has an intermediate part with greatest slope. The slope of this intermediate part is related to the heterogeneity of the system. If *v*E(*E*) is constant, where *E* is the energy of activation for diffusion and *v*E the pore volume for an energy between *E* and *E*+ d*E*, the reciprocal of the slope is equal to the difference between the highest and lowest *E* divided by *RT*. If *E* is constant the slope is close to 0.2.

Ungarish, M. and Aharoni, C. (1983), Various equations for the kinetics of chemisorption derived from a common model. *Journal of the Chemical Society-Faraday Transactions I*, **79** (1), 119-125.

Full Text: [J\J Che Soc-Far Tra79, 119.pdf](J/J%20Che%20Soc-Far%20Tra79,%20119.pdf)

Abstract: The assumptions used in previous work (*J. Chem. Soc., Faraday Trans. 1*, 1977, 73, 456 and 1943) are applied to the case in which the surface or any patches on the surface attain high coverages. New equations for the non-Elovichian parts of the isotherm are derived. In the pre-Elovichian range at the beginning of the process d*q*/d ln *t* increases with *t*, at first proportionally to a fractional power of *t* and later proportionally to the logarithm of *t*(*q* is the amount adsorbed and *t* the time). In the post-Elovichian range at the end of the process d*q*/d ln *t* decreases with *t*, the decrease is first parabolic and later exponential. The Elovich equation with d*q*/d ln *t* constant is obeyed between these two ranges.

Borówko, M. and Jaroniec, M. (1983), Association effects in adsorption from multicomponent solutions on solids and liquid adsorption chromatography. *Journal of the Chemical Society-Faraday Transactions I*, **79** (2), 363-372.

Abstract: The theory of adsorption from multicomponent liquid mixtures on heterogeneous solid surfaces involving association of components in the bulk phase is developed. This theoretical treatment is applied to describing liquid adsorption chromatography with a mixed mobile phase. The influence of association of molecules in the bulk phase on the distribution coefficient is studied.

? Sircar, S. (1983), Linear-driving-force model for non-isothermal gas-adsorption kinetics. *Journal of the Chemical Society-Faraday Transactions I*, **79** (4), 785-796.

Cortés, J. and Araya, P. (1986), The Dubinin-Radushkevich-Kaganer equation. *Journal of the Chemical Society-Faraday Transactions I*, **82** (8), 2473-2479.

Abstract: The Dubinin–Radushkevich–Kaganer (DRK) model is discussed in general in terms of the replacement of Polanyi’s concept of an adsorption space by a bidimensional concept that leads to a relation between that model and the adsorptive energy distribution. Since the model assumes a Rayleigh distribution, it is found that the usual criteria of the experimentalists, such as the adaptation of the DRK equation to the experimental data, are not sufficient. These general ideas are illustrated with simulations of some representative cases of actual laboratory situations.

Painter, D. Hall, D.G. and Wyn-Jones, E. (1988), Kinetic and equilibrium studies at the solid-liquid interface. *Journal of the Chemical Society-Faraday Transactions I*, **84** (3), 773-784.

Abstract: Binding isotherms and kinetic measurements associated with the adsorption of the surfactant sodium hexadecyl sulphate onto polystyrene latex particles at two latex concentrations are reported. The surfactant monomer concentrations were estimated *in situ* for all dispersions from e.m.f. measurements of a cell containing a surfactant ion-selective electrode. Both isotherms are of the classical B.E.T. type. At low surfactant concentration the initial portions of the isotherms (region I) can be fitted by the Langmuir equation and do not depend on the concentration of latex particles. At higher concentrations (region II) the isotherms diverge. Bound surfactant–counter-ion interactions could be responsible for the difference between the binding isotherms. The kinetic data were measured with the pressure jump relaxation technique and revealed a single relaxation process in region II only. The observed relaxation times decrease with increasing surfactant concentration. Application of linear phenomenological theory to the combined equilibrium and kinetic data shows clearly that the adsorption rate coefficient increases with increasing amount of bound surfactant and that the desorption rate is proportional to the amount bound in region II. The rate coefficients measured for the two dispersions agree reasonably well. These findings are consistent with the formation of hemimicelle type aggregates. Application of the Aniansson–Wall kinetic treatment associated with monomer–aggregate exchange to region II gives a linear plot for each solution, but the agreement between the desorption rate coefficients is worse than that obtained using the phenomenological approach.

# Title: Journal of the Chemical Society-Faraday Transactions II

(J. Chem. Soc., Faraday Trans. II)

Journal of the Chemical Society, Faraday Transactions (1990-1996)

Journal of the Chemical Society, Faraday Transactions 1: Physical Chemistry in Condensed Phases (1972-1989)

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Jaroniec, M. (1977), Statistical thermodynamics of mixed-gas adsorption. Localized monolayer adsorption on heterogeneous surfaces. *Journal of the Chemical Society*-*Faraday Transactions II*, **73** (7), 933-942.

Abstract: The generalized integral adsorption isotherm and main thermodynamic functions for localized monolayer adsorption of gas mixtures on heterogeneous solid surfaces have been derived on the basis of statistical thermodynamics. Two-component adsorption systems have been discussed in detail.

? Bezus, A.G., Kiselev. A.V., Lopatkin. A.A. and Du, P.Q. (1978), Molecular statistical calculation of thermodynamic adsorption characteristics of zeolites using atom-atom approximation. I. adsorption of methane by zeolite NAX. *Journal of the Chemical Society*-*Faraday Transactions II*, **74** (2), 367-379.

Jaroniec, M. (1978), General formulation of kinetics of mixed-gas adsorption on heterogeneous solid-surfaces. *Journal of the Chemical Society*-*Faraday Transactions II*, **74** (7), 1292-1300.

Abstract: The concept of a multiple intergral which represents equilibirum adsorption isotherms of multi-component gas mistures on energetically heterogeneous solid surfaces has been applied to describe the kinetics of monolayer adsorption. Using the multiple integral, the analystical expressions for kinetic isotherms and adsorption rates of gas mixtures on heterogeneous solid surfaces have been derived.

? Hazlett, J.D., Hsu, C.C. and Wojciechowski, B.W. (1979), Is the Jovanovic isotherm theoretically valid. *Journal of the Chemical Society-Faraday Transactions II*, **75**, 602-605.

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# Title: Journal of the Chemical Society-Transactions

Full Journal Title: Journal of the Chemical Society-Transactions

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

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Journal Country/Territory:

Language:

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Subject Categories:

: Impact Factor

? Mcbain, J.W. (1907), Adsorption formulae. *Journal of the Chemical Society-Transactions*, **91**, 1683-1687.

Full Text: J Che Soc-Tra91, 1683

Keywords: Adsorption

# Title: Journal of the Chemical Society A -Inorganic Physical Theoretical

Full Journal Title: Journal of the Chemical Society A -Inorganic Physical Theoretical

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Subject Categories:

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? Gregg, S.J. and Ramsay, J.D. (1970), Adsorption of carbon dioxide by magnesia studies by use of infrared and isotherm measurements. *Journal of the Chemical Society A -Inorganic Physical Theoretical*, (17), 2784-??.

# Title: Journal of the Chemical Society of Pakistan

Full Journal Title: [Journal of the Chemical Society of Pakistan](http://jcsp.org.pk/jcspConAbs.htm)

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JCR Abbreviated Title: J Chem Soc Pakistan

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Publisher Address: Hej Res Inst Chem Univ Karachi, 75270 Karachi, Pakistan

Subject Categories:

Chemistry: Impact Factor 0.190, 132/140 (2009)

? Qadeer, R., Hanif, J., Saleem, M. and Afzal, M. (1992), Adsorption of samarium on activated charcoal from aqueous solution. *Journal of the Chemical Society of Pakistan*, **14** (2), 91-96.

Full Text: [1992\J Che Soc Pak14, 91.pdf](1992/J%20Che%20Soc%20Pak14,%2091.pdf)

Abstract: Adsorption of samarium on activated charcoal has been studied as a function of shaking time, pH, concentration of adsorbate and temperature. Wavelength dispersive X-ray fluorescence spectrometer was used for measuring samarium concentration. Samarium adsorption obeys the Langmuir isotherm. DELTA H(o) and DELTA S(o) were calculated from the slope and intercept of plot 1nK(D) VS 1/T. The influence of different cations and anions on samarium adsorption has been examined. The adsorption of other metal ions on activated charcoal has been studied under optimum condition to check its selectivity for samarium. Consequently samarium was removed from the aqueous solutions containing Cs, Sr, Nd, Zn, Cu, Co, Rb and Pr. More than 98% of adsorbed samarium on activated charcoal can be recovered with 50 ml of 3 M HNO3 solution.

Keywords: Mo(110) Surface, Zirconium, Behavior, Sm

? Iqbal, M.J. and Hussain, M. (1993), Thermodynamics of adsorption of dyes on activated silica-gel. *Journal of the Chemical Society of Pakistan*, **15** (2), 93-96.

Full Text: [1993\J Che Soc Pak15, 93.pdf](1993/J%20Che%20Soc%20Pak15,%2093.pdf)

Abstract: A quantitative treatment pertaining to the study of thermodynamics Of adsorption of sulphorhodamine-B, acid red-4 and acid green-25 on activated silica gel through the evaluation of the Gibbs free energy, DELTAG, as a function Of temperature is presented. The DELTAG values are computed by employing the Gibbs adsorption equation by making use of the areas under the m-1nCs curves. The enthalpy, DELTAH, and the entropy, DELTAS, has also been calculated. The results are discussed in terms of the nature of the adsorbates.

? Qadeer, R. and Hanif, J. (1993), Adsorption of uranium in the presence of different cations on activated-charcoal. *Journal of the Chemical Society of Pakistan*, **15** (4), 227-230.

Full Text: [1993\J Che Soc Pak15, 227.pdf](1993/J%20Che%20Soc%20Pak15,%20227.pdf)

Abstract: The adsorption of uranium in the presence of different cations namely Cd2+, Zn2+, La3+, Y3+, Sc3+ on activated charcoal from aqueous solution was studied at room temperature 23±0.2-degrees-C. Their effect on uranium adsorption has been correlated with the ionic potential, z/r of cations. It was observed that die cations with larger (z/r) reduced the uranium adsorption more than the cation with smallest (z/r) value. The Langmuir and Dubinin-Radushkevich (D-R) isotherm equations have been applied to the data and the values of parameters of these isotherm equations were evaluated. The mean energy of adsorption, E was also calculated from the adsorption energy constant, K’ values determined from D-R isotherm equation. Wavelength dispersive X-ray fluorescence spectrometer was used for measuring uranium concentration in solutions.

Keywords: Aqueous-Solutions

? Saleem, M., Afzal, M., Mahmood, F. and Hameed, A. (1994), Thermodynamics of adsorption of Rhodamine-B and Nile Blue sulfate on alumina from aqueous-solutions. *Journal of the Chemical Society of Pakistan*, **16** (2), 83-86.

Full Text: [1994\J Che Soc Pak16, 83.pdf](1994/J%20Che%20Soc%20Pak16,%2083.pdf)

Abstract: Adsorption of the cationic dyes: Rhodamine B and Nile Blue Sulphate, from their aqueous solutions, on alumina was investigated. The adsorption of the dyes was found to decrease with the increase in temperature of the solutions. The adsorption isotherms obtained at different temperatures were found to obey the Langmuir isotherm equation. Free energy, entropy and enthalpy of the adsorption were calculated from the isotherms and the values, obtained for these thermodynamic parameters, were interpreted. The thermodynamic data indicate that the adsorption of these dye molecules on alumina is more favourable at high temperature.

Keywords: Heats, Gel

? Qadeer, R., Hanif, J. and Hanif, I. (1995), Kinetics of strontium ions adsorption on activated-charcoal from aqueous solutions. *Journal of the Chemical Society of Pakistan*, **17** (2), 74-77.

Full Text: [1995\J Che Soc Pak17, 74.pdf](1995/J%20Che%20Soc%20Pak17,%2074.pdf)

Abstract: Batch kinetics of strontium ions adsorption on the activated charcoal from aqueous solutions was studied within me temperature rang 283-313K. It is observed that the hydrolyzed strontium diffuses into the micropores of the activated charcoal and the film diffusion, with an activation energy 6.80 kJ/mol, is the rate determining step.

? Qadeer, R., Hanif, J., Saleem, M. and Afzal, M. (1995), Kinetics and thermodynamics of some metal-ions adsorption on activated-charcoal from aqueous solutions. *Journal of the Chemical Society of Pakistan*, **17** (2), 82-86.

Full Text: [1995\J Che Soc Pak17, 82.pdf](1995/J%20Che%20Soc%20Pak17,%2082.pdf)

Abstract: The kinetics and thermodynamics of metal ions (Sr2+, Sm3+, Gd3+, Th4+ and UO22+) adsorption from aqueous solutions on activated charcoal have been investigated. The adsorption process of metal ions proceeds via two stages, the first stage is rather fast followed by a much slower om Bangham equation was applied to study the kinetics of metal ions adsorption. It is observed that the diffusion of metal ions into the micropores of the activated charcoal controls the kinetics of the adsorption process. Various thermodynamic quantities, ΔH, ΔS, ΔG, were computed from equilibrium constant, k(c) values. The results show that the adsorption of the metal ions on activated charcoal is an endothermic process.

Keywords: Selective Adsorption

? Akhtar, J., Durrani, S.K., Chughtai, N.A. and Shahid, K.A. (1997), Physicochemical studies of zirconia and magnesia doped zirconia ceramic powder. *Journal of the Chemical Society of Pakistan*, **19** (2), 93-103.

Full Text: [1997\J Che Soc Pak19, 93.pdf](1997/J%20Che%20Soc%20Pak19,%2093.pdf)

Abstract: Spherical fine zirconia (ZrO2) and 9 mol % magnesia doped zirconia (MgO-ZrO2) ceramic powders (diameter of similar to 0.2 mm) have been synthesized from a hydrothermally treated sol of zirconium and magnesium salts by spray pyrolysis. The results revealed that synthesized powders can be sintered into uniformly sized fine grained ceramic of > 97% theoretical density at temperature as low as 1100°C. The phases, purity, crystallite size, agglomeration structure, particle size, specific surface area, pore size distribution and porosity of ZrO2 and MgO-ZrO2 ceramics were measured by XRD, SEM, N2-gas adsorption and Hg-diffusion techniques. The results of X-ray diffraction and scanning electron microscopy showed that the ZrO2 and MgO-ZrO2 remained amorphous up to 700°C, but on increasing the heat treatment temperature to around 1200°C for 8 hrs. monoclinic crystals were obtained. Thermogravimetric (TG) and differential scanning calorimetric (DSC) techniques were used to measure the burnout temperatures and enthalpy (Delta H) of polyvinyl alcohol (PVA) and methylcellulose (MC) polymers used as binders. Burnout of these polymers is 100% in an oxidizing atmosphere; 90% burnout was achieved in an inert atmosphere.

Keywords: Methylcellulose Polymers, Alkoxides

? Haq, I.U., Akhtar, K., Iqbal, K. and Arshia, S.F. (1998), Effect of phosphate enrichment on the metal adsorption properties of hydrous iron oxide. *Journal of the Chemical Society of Pakistan*, **20** (2), 99-109.

Full Text: [1998\J Che Soc Pak20, 99.pdf](1998/J%20Che%20Soc%20Pak20,%2099.pdf)

Abstract: Effect of phosphate enrichment on the metal adsorption properties of hydrous iron oxide was investigated in aqueous electrolyte solutions. pHosphate enrichment caused progressive decrease in the point of zero charge of the oxide which resulted an increase in its adsorption capacity towards Cu(II), Cd(II), and Ni(II) ions. Mechanism of adsorption of these metal ions was monitored from the alkalimetric titrations and adsorption measurements performed simultaneously in the same medium Both sets of experiments indicated that the affinity of these metals for the phosphate-free and phosphate-enriched surfaces followed the order, ie. Cu(II) > Cd(II) > Ni(II).

? Rauf, M.A., Ikram, M. and Rauf, N. (2001), Spectrophotometric studies of the complexation of Hg2+, Ag+ and VO2+ with pyrocatecol violet. *Journal of the Chemical Society of Pakistan*, **23** (3), 136-138.

Full Text: [2001\J Che Soc Pak23, 136.pdf](2001/J%20Che%20Soc%20Pak23,%20136.pdf)

Abstract: Pyrocatechol violet (PV) has been used as reagent for complexation studies with Hg2+, Ag+ and VO2+ by spectroscopic method. The spectra of the complexes were monitored under optimized conditions, The values of stability constants for the Hg2+, Ag+ and VO2+ complexes with PV were found to be of the order of 7.2×106, 1.9×104 and 2.0×1013 respectively.

? Rauf, M.A., Ikram, M. and Rauf, N. (2002), Infrared spectral studies of propanoic acid in various solvents. *Journal of the Chemical Society of Pakistan*, **24** (1), 25-27.

Full Text: [2002\J Che Soc Pak24, 25.pdf](2002/J%20Che%20Soc%20Pak24,%2025.pdf)

Abstract: Effects of various solvents on the infrared spectra of propanoic acid were studied. Fundamental vibrations nu (O-H) delta (O-H) and nu (C-O) were investigated with respect to solvent change. The nu (C=O) vibration was also studied in a binary mixture of carbon tetrachloride and acetonitrile. Results were interpreted in terms of solute-solvent interactions.

Keywords: Stretching Bands

? Mustafa, S., Dilara, B., Naeem, A., Rehana, N. and Murtaza, S. (2003), Temperature effect on the sorption of alkaline earth metal cations on SiO2 surface. *Journal of the Chemical Society of Pakistan*, **25** (3), 188-192.

Full Text: [2003\J Che Soc Pak25, 188.pdf](2003/J%20Che%20Soc%20Pak25,%20188.pdf)

Abstract: The sorption of Ca2+ and Mg2+ ions on the silica was studied as a function of concentration and temperature. The extent of sorption of the metal cations was found to increase with the increase in both the concentration and temperature of the system. It was found that the Ca2+ ion with its smallest hydrated radii was able to reach the surface easily and was held more strongly as compared to Mg2+ ion. The sorption of metal cations was accompanied by the release of H+ to the bulk phase. The sorption data fitted the linear form of the Langmuir equation. The positive values of DeltaH for the uptake of the metal ions on SiO2 showed their sorption mechanism to be endothermic in nature. Both the positive AS and negative DeltaG values confirmed the spontaneous nature of the sorption process.

Keywords: Aqueous-Solution, Adsorption, Ions, Silica, Cadmium, Oxides

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Full Text: [2004\J Che Soc Pak26, 82.pdf](2004/J%20Che%20Soc%20Pak26,%2082.pdf)

Abstract: In this study, the removal of Zn(II) and Pb(II) ions from aqueous solution by Calabrian pine (Pinus brutia Ten) bark wastes was investigated at different temperatures and concentrations at fixed pH. The amounts of Zn(II) and Pb(II) ions adsorbed onto the bark increased with increasing concentration. As temperature increased, the amount of Zn(II) ions adsorbed increased partially, and the amount of Pb(II) ions decreased slightly. The time required for the adsorption equilibrium of Zn(II) ions was found to be greater than that of Pb(II) ones. When reached adsorption equilibrium, approximate percentages of the metal ions removed by the bark were 64-74 for Zn(II) ions and 58-87 for Pb(II) ions at the concentrations studied, respectively. For both metal ions, kinetics studies showed that adsorption process followed the pseudo-second order kinetic model. While adsorption isotherm of Zn(II) ions obeyed both Langmiur and Freundlich models, that of Pb(II) ions did not follow the both models. Furthermore, the obtained thermodynamic parameters demonstrated that adsorption process was endothermic for Zn(II) ions and exothermic for Pb(II) ions.

Keywords: Adsorption, Aqueous-Solution, Biosorption, Copper(II), Cu(II), Equilibrium, Lignin, Metals, Recovery, Sorption

? Bangash, F.K. and Manaf, A. (2004), Kinetics of removal of dye (Basic blue 3) from aqueous solution by activated charcoal prepared from the wood of *Brausonitia papyrifera* (Paper Mulberry). *Journal of the Chemical Society of Pakistan*, **26** (2), 111-115.

Full Text: [2004\J Che Soc Pak26, 111.pdf](2004/J%20Che%20Soc%20Pak26,%20111.pdf)

Abstract: The use of activated charcoal (M-76) prepared from low cost wood of Brausonitia paypyrifera. (Paper Mulberry), for the removal of dye Basic blue3 (BB3) from aqueous solution was investigated. The linear applicability of Langergren equation points towards pseudo-first order rate expression. Activation energy of adsorption were also determined. The results indicate that Brausonitia papyripera could be employed as low cost alternative to commercial activated carbon in wastewater treatment for the removal of basic dyes.

Keywords: Activated Carbon, Adsorption, Carbon, Rice-Husk, Temperature, Wood

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Full Text: [2009\J Che Soc Pak31, 876.pdf](2009/J%20Che%20Soc%20Pak31,%20876.pdf)

Abstract: Copper is an essential nutrient, but it is toxic at high intake levels. The presence of copper(II) ions causes serious toxicological concerns, it is usually known to deposit in brain, skin, liver, pancreas and myocardium. In this work the ability of turmeric to remove copper(II) ions from aqueous solution was studied. Adsorption of metals ions by turmeric powder may be used as a natural remedy for sequestration of toxic metals which are ingested through daily food intake. It was found that adsorption increased with increasing contact time, pH, temperature, adsorbent dose. The equilibrium data were satisfactorily described by Freundlich isotherm model. Adsorption of Cu(II) by turmeric powder was followed by pseudo 2(nd) order kinetics.

Keywords: Adsorbent, Adsorbent Dose, Adsorption, Adsorption of Metals, Aqueous Solution, Biosorption, Brain, Cadmium, Copper, Copper(II), Cu, Curcumin, Data, Equilibrium, Food, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Heavy-Metals, Ions, Isotherm, Isotherm Model, Karachi, Kinetics, Liver, Metals, Model, Natural, Nutrient, Pancreas, Ph, Removal, Sequestration, Skin, Solution, Temperature, Toxic, Toxic Metals, Vegetables, Waste-Water, Work

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Full Text: [2010\J Che Soc Pak32, 259.pdf](2010/J%20Che%20Soc%20Pak32,%20259.pdf)

Abstract: Industrial waste constitutes the major source of various kinds of pollution in natural water and toxicity from heavy metals has been reported worldwide. The presence of arsenic in water is major problem these days. High arsenic concentrations have been reported recently from the USA, China, Chile, Bangladesh, Taiwan, Mexico, Argentina, Poland, Canada, Hungary, Japan and India. Arsenic pollution also has emerged as a serious public health concern in Pakistan also. The presence of metal in drinking water is of special concern because of its persistence and toxicity. Different adsorbents are used to remove arsenic from water. In present review paper arsenic contamination, its toxicity and its removal from drinking water using different adsorbents is described.

Keywords: Adsorbents, Adsorption, Aqueous-Solutions, Argentina, Arsenic, Arsenic Contamination, Bangladesh, Biosorption, Canada, Chile, China, Contamination, Drinking Water, Drinking-Water, Goethite, Health, Heavy Metals, Hungary, India, Ions, Japan, Metal, Metals, Mexico, Natural, Oxide-Coated Sand, Pakistan, Persistence, Pollution, Public, Public Health, Removal, Review, Sorption, Source, Taiwan, Toxicity, Tree Fern, USA, Waste, Waste-Waters, Water

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Full Text: [2010\J Che Soc Pak32, 419.pdf](2010/J%20Che%20Soc%20Pak32,%20419.pdf)

Abstract: Use of alumina for the removal of industrially important dyes namely, methylene blue, methyl blue, bromophenol blue, malachite green, eriochrome black-T, phenol red and methyl violet from aqueous media at different shaking times, temperatures and pH values has been investigated. The adsorption data was fitted to both the pseudo-first-order and pseudo-second-order kinetic models and calculated values of amount adsorbed at equilibrium (*q*e,) by pseudo-second-order equations were found to be in good agreement with the experimental values. The negative values of ΔH and ΔG indicates that the adsorption is exothermic and spontaneous, respectively. The adsorption data was fitted to Freundlich, BET., Dubinin-Radushevich (D-R) and Langmuir isotherms and their corresponding adsorption parameters for each were calculated. The dyes were found to be chemisorbed onto alumina.

Keywords: Activated Silica-Gel, Adsorbents, Adsorption, Alumina, Bagasse-Fly-Ash, Bentonite, BET, Carbon, Data, Dyes, Equilibrium, Equilibrium Isotherm Analyses, Exothermic, Experimental, Freundlich, Heavy-Metal, Isotherms, Kinetic, Kinetic Models, Kinetics, Langmuir, Langmuir Isotherms, Malachite Green, Media, Methyl Violet, Methylene Blue, Methylene-Blue, Models, pH, Phenol, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Removal, Thermodynamics, Waste-Water

? Adetuyi, A.O. and Jabar, J.M. (2011), Kinetic and thermodynamic studies of indigo adsorption on some activated bio-solids. *Journal of the Chemical Society of Pakistan*, **33** (2), 158-165.

Full Text: [2011\J Che Soc Pak33, 158.pdf](2011/J%20Che%20Soc%20Pak33,%20158.pdf)

Abstract: The performances of five activated bio-solids adsorbents on adsorption of Indigo from its dyeing effluent were studied using their thermo-kinetics equilibrium data. The results were compared with the commercial powder carbon as standard. The adsorbents were prepared from cattle bone carbon, algae carbon, water lettuce carbon, elephant grass carbon and crab shell carbon. The activated cattle bone has the highest monolayer adsorption capacity among the bio-solids. The adsorption kinetics of all the adsorbents conformed to the pseudo-second order kinetics, with good correlation. Also, the thermodynamics parameters of the adsorption process fitted very well with the experimental data. The standard Gibb’s free energy change (Delta G(o)) for all the adsorption reaction was negative, indicating the spontaneity of the process.

Keywords: Adsorption, Adsorption Kinetics, Carbon, Degradation, Dyes, Kinetic, Kinetics, Photocatalysis, Polyester Fibers, Pseudo-Second Order, Pseudo-Second-Order, Removal, Thermodynamic, Waste-Water

? Feroze, N., Ramzan, N., Khan, A. and Cheema, I.I. (2011), Kinetic and equilibrium studies for Zn(II) and Cu(II) metal ions removal using biomass (rice husk) ash. *Journal of the Chemical Society of Pakistan*, **33** (2), 139-146.

Full Text: [2011\J Che Soc Pak33, 139.pdf](2011/J%20Che%20Soc%20Pak33,%20139.pdf)

Abstract: Heavy metal ions have the severe hazardous effects on human health even were present in traces in waste water. Conventional methods are not economical for the removal of low level concentration of these ions. The present research reports the adsorption of Cu and Zn ions from aqueous solutions at low concentration range (5-100 mg, L) in batch systems using Rice Husk Ash as an adsorbent, which is abundantly available as agricultural waste. The present study emphasizes on the experimental development of the optimum parameters such as equilibrium time, pH and initial concentration. Equilibrium data obtained have been fitted to the Langmuir, Freundlich, Tempkin and Dubinin - Radushekevich (DR) adsorption isotherms. Freundlich isotherm best fits the experimental results. Kinetic modeling of first order and pseudo-second order showed that the pseudo-second order equation was the most appropriate for the description of Zn (II) and Cu (II) adsorption by Rice Husk Ash.

Keywords: Adsorption, Aqueous-Solution, Biomass, Biosorption, Chlorella-Vulgaris, Copper, Development, Heavy Metal Ions, Ions, Isotherm, Kinetic, Nickel(II) Ions, Pseudo-Second Order, Pseudo-Second-Order, Research

? Zahoor, M. (2011), Effect of agitation speed on adsorption of imidacloprid on activated carbon. *Journal of the Chemical Society of Pakistan*, **33** (3), 305-312.

Full Text: [2011\J Che Soc Pak33, 305.pdf](2011/J%20Che%20Soc%20Pak33,%20305.pdf)

Abstract: The adsorptive characteristics of imidacloprid on powdered activated carbon were described. The adsorption experiments were carried out as function of time, initial concentration and agitation speed. The equilibrium data fits well to Langmuir adsorption isotherm, while the kinetic data fits well to Pseudo second order kinetic model. The kinetic experiments were carried out at 200, 250, 300 and 350 rpm and it was found that the equilibrium time increases with increase in initial concentration and decreases with increase in agitation speed. This is due to the increased turbulence and as a consequence, the decrease boundary layer thickness around the adsorbent particles as a result of increasing the degree of mixing. At 300rpm the adsorption capacity was maximum and beyond this there was no significant increase in adsorption capacity. Weber intraparticle diffusion model was used to describe the adsorption mechanism. It was found that both the boundary layer and intraparticle diffusion for both adsorbents played important role in the adsorption mechanisms of the adsorbate. The effects of temperature and pH on adsorption were also studied. It was found that the adsorption capacity of the adsorbent decreases with increase in temperature. There was no significant change in adsorption from pH 2 to 8, however at high pH a decrease in adsorption of imidacloprid on activated carbon was observed.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherm, Aqueous-Solution, Bagasse Fly-Ash, Carbon, Degradation, Diffusion, Dye, Endosulfan, Equilibrium, Imidacloprid, Isotherm, Kinetic, Kinetic Model, Langmuir, Langmuir Adsorption Isotherm, Mechanism, Oxidation, Pesticides, pH, Powdered Activated Carbon, Pseudo-Second-Order, Removal, Sugar-Industry Waste, Temperature, Water

? Ahmad, H.B., Aleem, M., Anwar, T., Ashiq, M.N. and Yousaf, M. (2011), Comparative studies for the adsorption of remazol blue on rice husk, saw dust and charcoal. *Journal of the Chemical Society of Pakistan*, **33** (4), 449-453.

Full Text: [2011\J Che Soc Pak33, 449.pdf](2011/J%20Che%20Soc%20Pak33,%20449.pdf)

Abstract: Rice husk and saw dust are attempted as alternate adsorbents to charcoal for the removal of reactive dye, namely remazol brilliant blue from aqueous media. The adsorption of remazol brilliant blue has been studied onto rice husk, saw dust and charcoal at different shaking times, adsorbent dosage, temperatures and pH values and their results are compared. The adsorption data was fitted to Freundlich and Langmuir isotherms and corresponding adsorption parameters for each were calculated. Pseudo first and second order kinetic models were used to calculate the amount adsorbed at equilibrium (q(e)). The calculated values of q(e) for pseudo-second order equation were found to be in good agreement with those of experimental values. The monolayer capacity (V(m)) for rice husk (0.699 mg g-1) is greater than that for charcoal (0.074 mg g-1) and saw dust (0.114 mg g-1). It is concluded that rice husk is found better adsorbent for the removal of remazol brilliant blue as compared to charcoal and saw dust.

Keywords: Activated Carbon, Adsorbent, Adsorption, Aqueous-Solutions, Bagasse-Fly-Ash, Equilibrium Isotherm Analyses, Freundlich, Langmuir, pH, Reactive Dyes, Removal, Waste-Water, Wood

# Title: Journal of Chemical Technology and Biotechnology

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Engineering, Chemical: Impact Factor: 1.018, 17/110 (1999); Impact Factor: 0.883, 20/117 (2000); Impact Factor 0.970, 25/123 (2001); Impact Factor 0.981, 28/126 (2002); Impact Factor 0.979, 33/119 (2003); Impact Factor 0.899, 43/116 (2004); Impact Factor 0.981, 43/116 (2005); Impact Factor 2.045, 27/128 (2009)

Gray, M.J. and Malati, M.A. (1979), Adsorption from aqueous solution by δ-manganese dioxide I. adsorption of the alkaline-earth cations. *Journal of Chemical Technology and Biotechnology*, **29**, 127-134.

Full Text: [1960-80\J Che Tec Bio29, 127.pdf](1960-80/J%20Che%20Tec%20Bio29,%20127.pdf)

Abstract: The adsorption isotherms of M2+ ions (M = Mg, Ca, Sr or Ba) were determined at pH 7.0 and at different temperatures. The adsorbent, δ-MnO2, was converted to the K+ form prior to adsorption and about 1.5 mol K+ ions were released per mol of M2+ ions adsorbed. The adsorption capacity at a given temperature increased in the series: Mg2+ < Ca2+ < Sr2+ < Ba2+. This was explained by an ion exchange mechanism between hydrated ions: K+ ions in the outer Helmholtz layer and M2+ ions in the bulk of the solution. The radii of the hydrated ions decreased in the series: Mg2+ > Ca2+ > Sr2+ > Ba2+. The adsorption of M2+ ions at pH values below the point of zero charge (pH 3.3) was significant for Mg2+ ions only. Although adsorption was not strictly reversible, the results fitted the Langniuir isotherm and ‘apparent heats of adsorption’, Q, were calculated. The endothermic heats (Q=20, 18, 11 and 5 kJ mol-1 for Mg2+, Ca2+, Sr2+ and Ba2+ adsorption respectively) indicated positive entropy contributions which are expected for the adsorption mechanism suggested. The decrease in Q down the alkaline-earth group was correlated to the entropy effects and to the hydration numbers of the cations.

Gray, M.J. and Malati, M.A. (1979), Adsorption from aqueous solution by δ-manganese dioxide II. adsorption of some heavy metal cations. *Journal of Chemical Technology and Biotechnology*, **29**, 135-144.

Full Text: [1960-80\J Che Tec Bio29, 135.pdf](1960-80/J%20Che%20Tec%20Bio29,%20135.pdf)

Abstract: The adsorption isotherms of M2+ ions (M2+=Ni2+, Co2+, Cd2+, Zn2+ and Mn2+) on the Kf-form of δ-MnO2, at pH 6 and at different temperatures, fitted the Langmuir equation and an apparent heat of adsorption, Q, was found to be -78, -33, -34, -19 and -15 kJ mol-1 respectively. The adsorption capacity of δ-MnO2 increased in the series: Ni2+ < Co2+ < Cd2+ ≅ Zn2+ < Mn2+. This was nearly the order of decrease in the radii, r’, of the hydrated ions, estimated from hydration enthalpies. An ionexchange mechanism between hydrated Kf ions in the outer Helmholtz layer and hydrated M2+ ions in the solution, suggests positive entropy contributions which offset the endothermic Q. The proposed mechanism is in agreement with the observed sequence of adsorption capacity and with the decrease in Q in the above series, except for Co2+ adsorption (possibly complicated by the oxidation of Co2+ byδ-MnO2). The adsorption of the cations is probably accompanied by the exchange with Mn ions from the solid. There was evidence of specific adsorption below the point of zero charge (pH 3.3). The adsorption isotherms of Mnz+ ions at pH 7 were higher than those at pH 6 and Q was found to be - 19 kJ mol-l. As the ionic strength increased, the adsorption isotherm of Mn2+ ions at pH 7 and 298 K shifted to lower values. Adsorption isotherms of Cu(II) ions at pH 3.5 and of Fe(III) at pH 2 represent specific adsorption and Q was found to be -74 and -13 kJ mol-1 respectively.

? Aharoni, C., Sideman, S. and Hoffer, E. (1979), Adsorption of phosphate ions by collodion-coated alumina. *Journal of Chemical Technology and Biotechnology*, **29** (7), 404-412.

Full Text: [1960-80\J Che Tec Bio29, 404.pdf](1960-80/J%20Che%20Tec%20Bio29,%20404.pdf)

Abstract: The kinetics and the equilibrium adsorption of phosphate by collodion-coated alumina granules were investigated. Collodion-coated alumina can serve as a sorbent for phosphates in the treatment of hyperphosphatemic patients by haemoperfusion. The collodion coating lowers the surface area available for adsorption. The kinetics of adsorption were investigated by experiments in which the initial phosphate concentration, the quantity of sorbent and the grain size of sorbent were varied. The rate of adsorption is proportional to tα-1 where *t* is time and α is around 0.7.

McKay, G. and Poots, V.J.P. (1980), Kinetics and diffusion processes in color removal from effluent using wood as an adsorbent. *Journal of Chemical Technology and Biotechnology*, **30** (6), 279-292.

Full Text: [J\J Che Tec Bio30, 279.pdf](J/J%20Che%20Tec%20Bio30,%20279.pdf)

Abstract: The rates of adsorption of a basic dye, Astrazone Blue, and an acidic dye, Telon Blue, on wood have been studied. The rate controlling step is mainly intraparticle diffusion, although a small resistance due to a boundary layer is experienced. The activation energies for the adsorption of Astrazone Blue and Telon Blue on wood are 16.8 kJ mol-1 and 9.6 kJ mol-1, respectively. The diffusion coefficients vary from 6×10-13 cm2 s-1 to 18×10-13 cm2 s-1 for Astrazone Blue at 18°C and from 3×10-13 cm2 s-1 to 8×10-13 cm2 s-1 for Telon Blue at 18°C. The variation in diffusivities is attributed to boundary layer effects.

? Prasad, R., Gupta, A.K. and Bajpai, R.K. (1980), Adsorption of streptomycin on ion exchange resins: Equilibrium and kinetic studies. *Journal of Chemical Technology and Biotechnology*, **30** (6), 324-331.

Full Text: [1960-80\J Che Tec Bio30, 324.pdf](1960-80/J%20Che%20Tec%20Bio30,%20324.pdf)

Abstract: Equilibrium and kinetic studies of streptomycin adsorption from aqueous solutions of streptomycin sulphate were carried out using four weakly acidic ion exchange resins: Indion 236 [Ion Exchange (India) Ltd], Amberlite IRC-50 (Rohm and Haas Co, USA), KB-2 and KWP2 (both Russian resins), initially in the sodium form. The maximum amounts of streptomycin taken up by the exchangers were about 1640, 1560, 2050 1400 mg g-1 dry resin (sodium form), respectively. The rate of adsorption of the antibiotic was highest with the ion-exchanger KB-2, and lowest with KB4-PZ. The initial diffusivity values calculated for the four exchangers at a temperature of 9°C were 2.87×10-8, 1.87×10-8, 3.42×10-8 and 0.468×10-8 cm2 s-1, respectively.

McKay, G. and McConvey, I.F. (1981), The external mass transfer of basic and acidic dyes on wood. *Journal of Chemical Technology and Biotechnology*, **31** (7), 401-408.

Full Text: [1981\J Che Tec Bio31, 401.pdf](1981/J%20Che%20Tec%20Bio31,%20401.pdf)

Abstract: The parameters affecting the initial adsorption rates of Astrazone Blue dye (Basic Blue 69) on to wood have been dudied. A simple model has been proposed to determine the external mass transfer coefficients and these have been compared with values obtained using a more complex procedure. The external mass transfer coefficient, β, has been shown to vary linearly with agitation and initial dye concentration using log-log coordinates; furthermore β is independent of particle size. The effect of temperature has been studied and the activation energy for the process is 44±2 kJ mol-1. Similar correlations were Qbtained for the adsorptiqn of Telon Blue dye (Acid Blue 25) on wood. Using log-log correlations, the external mass transfer coefficient was found to vary with (rev min-1)0.04, C0-0.27; and a small dependence on particle size was also observed. The activation energy for the external mass transfer process was 25±2 kJ mol-1.

Farag, K., Perineau, F., Gaset, A. and Molinier, J. (1981), Adsorption of metal cations on wool carbonizing waste. Part 1. Adsorption isotherms. *Journal of Chemical Technology and Biotechnology*, **31** (10), 597-601.

Full Text: [1981\J Che Tec Bio31, 597.pdf](1981/J%20Che%20Tec%20Bio31,%20597.pdf)

Abstract: The adsorption of various metal ions (Hg2+, Ag+, Ni2+, Cr3+, A13+, Zn2+ and Pb2+) on wool carbonising waste has been investigated to assess its possible use as an adsorbent in water pollution control. Isotherms show that few metal ions (Hg2+, Ag+ and Ni2+) are adsorbed satisfactorily by this material. Moreover, the adsorption capacity of the plant material within the carbonising waste is higher than that of the keratin fraction. Equations fitting the experimental data can be used for the design of processing units.

Perineau, F., Farag, K., Gaset, A. and Constant, G. (1981), Adsorption of metal-cations on wool carbonizing waste. Part 2. Adsorption mechanisms. *Journal of Chemical Technology and Biotechnology*, **31** (10), 602-608.

Full Text: [1981\J Che Tec Bio31, 602.pdf](1981/J%20Che%20Tec%20Bio31,%20602.pdf)

Absract: In order to elucidate the mechanisms of adsorption of Hg2+, Ag2+, Ni2+, Cr3+, Al3+, Zn2+ and Pb2+ on wool carbonising waste, the possible role of the various ionisable groups (-SH, -SO3H, -OSO3H, -COOH and -NH2) of the substrate has been considered together with the corresponding solubility products and dissociation constants of the metal salts thus formed.

McKay, G. (1981), Design models for adsorption systems in wastewater treatment. *Journal of Chemical Technology and Biotechnology*, **31** (12), 717-731.

Full Text: [1981\J Che Tec Bio31, 717.pdf](1981/J%20Che%20Tec%20Bio31,%20717.pdf)

Absract: The application of mathematical models to the design of adsorption systems as a method of purifying wastewaters is considered. The design of batch, fixed-bed, pulsedbed, moving-bed and fluidised-bed systems for effluent treatment is discussed. A brief review of the wide range of industrial effluents and adsorbents that may be utilized in such systems is considered. Reactivation procedures are presented and the principles of minimising design costs by optimising design are given.

McKay, G. (1982), Adsorption of dyestuffs from aqueous solution with activated carbon. I: Equilibrium and batch contact time studies. *Journal of Chemical Technology and Biotechnology*, **32** (8), 759-772.

Full Text: [1982\J Che Tec Bio32, 759.pdf](1982/J%20Che%20Tec%20Bio32,%20759.pdf)

Absract: The ability of one activated carbon to remove dyestuffs from aqueous solutions has been investigated. The range of dyestuffs includes acidic, basic, disperse and direct dyes, and several factors have been studied, namely, agitation, initial dye concentration, adsorbent concentration, adsorbent particle-size range, dye solution temperature, pH of solution and salt concentration.

McKay, G. (1982), Adsorption of dyestuffs from aqueous solution with activated carbon. II: Column studies and simplified design models. *Journal of Chemical Technology and Biotechnology*, **32** (8), 773-780.

Full Text: [1982\J Che Tec Bio32, 773.pdf](1982/J%20Che%20Tec%20Bio32,%20773.pdf)

Absract: The design of batch contact and fixed-bed adsorption systems has been discussed. A simplified design model (the Bed-Depth Service Time model) has been proposed and tested. The effects of bed depth, dye flow rate and carbon particle size, for the adsorption of Telon Blue and Deorlene Yellow, have been correlated with this design procedure.

Bye, G.C., McEvoy, M. and Malati, M.A. (1982), Adsorption of copper(II) ions from aqueous solution by five silica samples. *Journal of Chemical Technology and Biotechnology*, **32** (8), 781-789.

Full Text: [1982\J Che Tec Bio32, 781.pdf](1982/J%20Che%20Tec%20Bio32,%20781.pdf)

Absract: Samples of BDH precipitated silica, Degussa TKW (non-porous) and Crosfield xerogels [A (mesoporous), B (mesoporous) and C (microporous)] were characterized by chemical analysis, by Coulter particle-size analysis, by electron microscopy and by their BET surface area. The point of zero charge, determined by potentiometric acid/alkali titration, was at pH 2.8-2.9 for all samples. The surface charge density for the non-porous sample was lower than that for the porous samples. The results of the initial rate of exchange of the silicas with tritiated water suggested an exchange with the physically held water, which is lost at 393 K. The adsorption isotherms of Cu(II), determined by atomic absorption spectrophotometry at pH 6 and 323 K, followed the Langmuir equation. The limiting adsorption capacity decreased in the order: precipitated silica > B > A > C > TK900. This order could not be correlated with the BET nitrogen surface area or the pore volumes of the samples. However, the order was the same as the Na+ content of the silicas. Desorption runs established that adsorption was not reversible, in fact desorption was significant at equilibrium concentrations approaching zero. An apparent endothermic heat of adsorption of Cu(II) on precipitated silica, calculated from the data of the Langmuir isotherms at different temperatures, was 23 kJ mol-1. The increase in the adsorption of Cu(II) as the pH increased may be ascribed to the adsorption of hydrolysed species. From the Grahame equation, the estimated free energy of specific adsorption of Cu(II) on precipitated silica near the point of zero charge was -13 kJ mol-1.

Rivera-Utrilla, J., Ferro-García, M.A. and Mingorance, M.D. and Bautista-Toledo, I. (1986), Adsorption of lead on activated carbons from olive stones. *Journal of Chemical Technology and Biotechnology*, **36** (2), 47-52.

Full Text: [1986\J Che Tec Bio36, 47.pdf](1986/J%20Che%20Tec%20Bio36,%2047.pdf)

Absract: Studies on the adsorption of lead on activated carbons from aqueous solutions are described. Olive stones have been used as raw material to prepare the activated carbon samples. The porous texture and the chemical nature of the surface of the carbon samples were studied. The adsorption yield as a function of pH, salinity and presence of different cations has been investigated. The results obtained by using these activated carbons have been compared with those corresponding to a commercial activated carbon. All samples show a high adsorption capacity against lead ions.

McKay, G. and Bino, M.J. (1987), Adsorption of pollutants on to activated carbon in fixed beds. *Journal of Chemical Technology and Biotechnology*, **37** (2), 81-93.

Full Text: [1987\J Che Tec Bio37, 81.pdf](1987/J%20Che%20Tec%20Bio37,%2081.pdf)

Absract: The adsorption of certain pollutants, namely phenol, p-chlorophenol, sodium dodecyl sulphate and mercuric ions, on to activated carbon has been studied using fixed bed systems. There are three main methods of contacting in solidlliquid adsorption systems, namely batch, fixed bed and fluidized bed systems. In fixed bed adsorption the adsorption rate is determined on the basis of adsorption equilibrium (unfavourable, linear, favourable or completely irreversible) and the controlling mechanism (external film mass transport, internal pore diffusion, internal solid phase diffusion or longitudinal diffision). One or more of the previous transport mechanisms may be rate controlling depending on the solute-adsorbent system. For an adsorbent like activated carbon which is highly porous both external transport and pore diffusion will be very important. An adsorption model, based on external mass transport and internal pore diffusion, has been applied to the systems to predict theoretical breakthrough curves. These curves have then been compared with experimental data and using a ‘best fit’ technique, an effective pore diffusion coefficient can be determined for each sorbatecarbon system.

Key Words: Adsorption, Pollutants, Activated Carbon, Fixed Beds

McKay, G., Otterburn, M.S. and Aga, J.A. (1987), Pore diffusion and external mass transport during dye adsorption on to Fuller’s earth and silica. *Journal of Chemical Technology and Biotechnology*, **37** (4), 247-256.

Full Text: [1987\J Che Tec Bio37, 247.pdf](1987/J%20Che%20Tec%20Bio37,%20247.pdf)

Abstract: The adsorption of dyes on to Fuller’s earth and silica has been studied. A mass transfer model has been developed to describe the adsorption process based on external mass transfer and internal pore diffusion. Theoretical concentration decay curves have been predicted using the model and compared with experimental decay curves.

Keywords: Dye Adsorption, Pore Diffusion, Fuller’s Earth, Silica

Gómez-Jiménez, L., García-Rodríguez, A., López-González, J.D., Navarrete-Guijosa, A. (1987), Study of the kinetics of the adsorption by activated carbons of 2,4,5-trichlorophenoxyacetic acid from aqueous-solution. *Journal of Chemical Technology and Biotechnology*, **37** (4) 271-280.

Full Text: [1987\J Che Tec Bio37, 271.pdf](1987/J%20Che%20Tec%20Bio37,%20271.pdf)

Abstract: The kinetics of the adsorption of 2,4,5-trichlorophenoxyacetic acid by activated carbons from an aqueous solution has been studied at several temperatures (10°C to 50°C). The activated carbons used were Merck (No. 2514) and one prepared from almond shells (C-A-14). The adsorption process seems to be of the order two and the desorption of the order one. The thermodynamic functions for the formation of the activated complex have also been calculated.

Keywords: Kinetics, Adsorption, Pesticides, Activated Carbons

Kumar, S., Upadhyay, S.N. and Upadhya, Y.D. (1987), Removal of phenols by adsorption on fly ash. *Journal of Chemical Technology and Biotechnology*, **37** (4), 281-290.

Full Text: [1987\J Che Tec Bio37, 281.pdf](1987/J%20Che%20Tec%20Bio37,%20281.pdf)

Abstract: Adsorption of phenol and cresol and their mixtures from aqueous solutions on activated carbon and fly ash has been investigated. The effects of contact time and initial solute concentration have been studied and isotherm parameters are evaluated. The Freundlich isotherm has been found to be more suitable for all the systems investigated.

Keywords: Adsorption, Activated Carbon, Cresol, Fly Ash, Phenol

Khare, S.K., Panday, K.K., Srivastava, R.M. and Singh, V.N. (1987), Removal of Victoria Blue from aqueous solution by fly ash. *Journal of Chemical Technology and Biotechnology*, **38** (2), 99-104.

Full Text: [1987\J Che Tec Bio38, 99.pdf](1987/J%20Che%20Tec%20Bio38,%2099.pdf)

Abstract: The use of fly ash for the removal of victoria blue (CI26,44045) from aqueous solution at different concentrations and pH has been investigated. The process follows first order adsorption rate expression and the rate constant was found to be 1.70×10-2 min-l at a victoria blue concentration of l.0×10-4 M and 25°C. The uptake of victoria blue by fly ash is diffusion controlled and the value of mass transfer coefficient is 1.25×10-5 cm sec-1. The equilibrium data fit well in the Langmuir model of adsorption. Maximum removal was noted atpH 8.0. Low desorption of dye from adsorbent surface indicates that the process may not be essentially a reversible one.

Keywords: Fly Ash, Victoria Blue, Adsorption, Diffusion, Mass Transfer Coefficient, pH, Desorption

McKay, G., Blair, H.S. and Grant, S. (1987), Desorption of copper from a copper-chitosan complex. *Journal of Chemical Technology and Biotechnology*, **40** (1), 63-74.

Full Text: [1987\J Che Tec Bio40, 63.pdf](1987/J%20Che%20Tec%20Bio40,%2063.pdf)

Abstract: Chitosan, a high molecular weight polymer, has the ability to sorb metals and form chitosan-metal complexes. A complex using copper has been prepared and its desorption characteristics have been studied. The slow release of copper is of potential use in anti-fouling paints and therefore the desorption of copper has been studied under various environmental conditions. Desorption rates were high in distilled water but low in sea water, and after further comparative tests with commercial marine paints, it was concluded that coppetwhitosan complexes are not as effective as the cuprous oxide anti-fouling agent currently used in marine paint formulations.

Keywords: Chitosan-Copper Ions, Desorption, Anti-Fouling Agent

Singh, A.K., Singh, D.P., Panday, K.K. and Singh, V.N. (1988), Wollastonite as adsorbent for removal of Fe(II) from water. *Journal of Chemical Technology and Biotechnology*, **42** (1), 39-49.

Full Text: [1988\J Che Tec Bio42, 39.pdf](1988/J%20Che%20Tec%20Bio42,%2039.pdf)

Abstract: Wollastonite was used as an adsorbent for the removal of Fe(II) at different experimental conditions. The extent of removal is favourable at low concentration and low temperature. Maximum adsorption was noted at pH 4.0. The batch adsorption kinetics has been described by a jrst order rate expression, and the surface mass transfer coeficients and diffusion coefficients have been calculated at different temperatures. The intraparticle transport of Fe(II) within the pores of wollastonite is found to be the rate limiting step. The applicability of the Langmuir isotherm for the present system has been tested at different temperatures. Thermodynamic parameters indicate the exothermic nature of Fe(II) adsorption on wollastonite. The variation of adsorption with pH has been explained on the basis of interaction of iron species with negatively charged constituents of adsorbent.

Keywords: Wollastonite, Fe(II), Adsorption, Kinetics, Langmuir Isotherm, Pore Diffusion, Surface Complexation

Martin, A.M. and Manu-Tawiah, W. (1989), Study on the acid hydrolysis of peat: Composition of the extracts from sphagnum peat. *Journal of Chemical Technology and Biotechnology*, **45** (3), 171-179.

Full Text: [1989\J Che Tec Bio45, 171.pdf](1989/J%20Che%20Tec%20Bio45,%20171.pdf)

Abstract: Peat and its derived products, such as peat extracts or hydrolysates, offer a variety of possibilities as raw materials for the development of chemical and biochemical processes. Utilised as a fermentation substrate, peat extracts could provide a variety of nutrients to culture media, besides carbohydrates. In this work, Sphagnum peat moss and its extract produced by H2SO4 hydrolysis were analysed for total carbohydrates, reducing sugars, nitrogen, lipids, ash, amino acids and minerals. The results are discussed and compared with previous data.

Keywords: Acid Extract, Chemical Composition, Sphagnum Peat

Allen, S.J., McKay, G. and Khader, K.Y.H. (1989), Equilibrium adsorption isotherms for basic dyes onto lignite. *Journal of Chemical Technology and Biotechnology*, **45** (4), 291-302.

Full Text: [1989\J Che Tec Bio45, 291.pdf](1989/J%20Che%20Tec%20Bio45,%20291.pdf)

Abstract: The adsorption of two basic dyes in aqueous solutions onto lignite is reported. The adsorption equilibrium isotherms are recorded for the dyes in single component solution. The isotherms are plotted to obtain the Freundlich constants, the Langmuir constants, and the Redlich-Peterson constants.

Keywords: Adsorption, Isotherm, Lignite, Equilibrium, Dyes

McKay, G. and Al-Duri, B. (1990), Study of the mechanism of pore diffusion in batch adsorption systems. *Journal of Chemical Technology and Biotechnology*, **48** (3), 269-285.

Full Text: [1990\J Che Tec Bio48, 269.pdf](1990/J%20Che%20Tec%20Bio48,%20269.pdf)

Abstract: In this study the film-pore difision model was applied to describe system transport kinetics of three basic dye-carbon systems, namely Basic Blue 69, Basic Red 22 and Basic Yellow 21. The mass transfer parameters evaluated were the external mass transfer coeficient kf (cm s-l) and the effective dgfisivity Deff (cm2s-1). A single kf value was sufficient to describe each dye system: these were 0.15×10-2, 0.20×10-2 and 0.5×10-2 cm s-1 for BB69, BR22 and BY21, respectively. The effective dgfisivity was found to have values much larger than those of pore diffusivities calculated from liquid dgfisivities and its value decreased with increasing initial dye concentration. This was attributed to the effect of surface diffusion, hence pore dflusivity was exchanged by the effective pore diffusivity in the model. The present model was solved by the exponential curve fit technique; results were expressed in the form of experimental and theoretical Sherwood Numbers compared in terms of the residual.

Keywords: Basic Dyes, Batch, Adsorption, Mass Transfer

Nassar, M.M. and El-Geundi, M.S. (1991), Comparative cost of color removal from textile effluents using natural adsorbents. *Journal of Chemical Technology and Biotechnology*, **50** (2), 257-264.

Full Test: [1991\J Che Tec Bio50, 257.pdf](1991/J%20Che%20Tec%20Bio50,%20257.pdf)

Abstract: A number of low-cost materials (natural clay, bagasse pith and maize cob) have been used as adsorbents for dyestuffs (Astrazon Blue, Maxilon Red and Telon Blue) in aqueous solutions. The adsorption capacity for each dye-adsorbent system has been determined. The relative costs of dye removal were reported based on adsorption capacity only. The following results were found. First, the relative cost of the removal of Astrazon Blue using natural clay, bagasse pith and maize cob was found to be only 1.7%, 3.9% and 4.1% that of carbon respectively. Second, the relative cost of the removal of Maxilon Red using natural clay, maize cob and bagasse pith was found to be only 2.4%, 8.3% and 10.3% that of carbon respectively. Last, the relative cost of the removal of Telon Blue using maize cob, natural clay and bagasse pith was found to be only 2.9%, 3.0% and 5.2% that of carbon respectively.

Keywords: Natural Clay, Bagasse Pith, Maize Cob, Dyestuffs, Adsorption Capacity, Relative Cost, Aqueous-Solutions, Equilibrium, Adsorption, Dyestuffs, Hardwood, Dyes

Pollard, S.J.T., Sollars, C.J. and Pery, R. (1991), A low cost adsorbent from spent bleaching earth. I. The selection of an activation precedure. *Journal of Chemical Technology and Biotechnology*, **50** (2), 265-275.

Full Test: [1991\J Che Tec Bio50, 265.pdf](1991/J%20Che%20Tec%20Bio50,%20265.pdf)

Abstract: The conversion of a spent filter cake from the edible oil industry to a heterogeneous clay-carbon adsorbent is reported. Chemical and physical activation procedures have been applied and the resulting materials screened by carbon content and aqueous phenol uptake. Full adsorption isotherms are plotted for sorbents with high phenol capacities and their adsorptive behaviour is modelled to the Freundlich and Langmuir isotherms.

Keywords: Spent Bleaching Earth, Soybean Oil, Activation, Adsorption, phenol, Isotherm, Agricultural By-Products, Montmorillonite, Carbon, Cadmium, Removal

? Pollard, S.J.T., Sollars, C.J. and Pery, R. (1991), A low-cost adsorbent from spent bleaching earth. II. Optimization of the zinc-chloride activation procedure. *Journal of Chemical Technology and Biotechnology*, **50** (2), 277-292.

Full Test: [1991\J Che Tec Bio50, 277.pdf](1991/J%20Che%20Tec%20Bio50,%20277.pdf)

Abstract: A set of optimised preparative parameters has been established for the zinc chloride activation of spent bleaching earth. Continuous volumetric nitrogen adsorption and aqueous phase phenol isotherms are used to characterise a range of adsorbents prepared using the rotary furnace. A structural model is proposed for these clay-carbon materials and the key factors affecting their adsorptive capacity are discussed.

Keywords: Spent Bleaching Earth, Adsorption Hysteresis, Microporosity, phenol, 4-Nitrophenol, Active Char, Physisorption, Sorption, Carbons

Yadava, K.P., Tyagi, B.S. and Singh, V.N. (1991), Effect of temperature on the removal of lead(II) by adsorption on china clay and wollastonite. *Journal of Chemical Technology and Biotechnology*, **51** (1), 47-60.

Full Test: [1991\J Che Tec Bio51, 47.pdf](1991/J%20Che%20Tec%20Bio51,%2047.pdf)

Abstract: The removal of Pb(II) from aqueous solution by adsorption on china clay and wollastonite is an attractive process. The amount of Pb(II) removed by adsorption is highly dependent on the temperature of the adsorbate solution and favours low temperature. The equilibrium times were noted, i.e. 90 min for china clay and 120 min for wollastonite. The various rate parameters of the adsorption process have been determined at different temperatures. The activation energies were determined and found to be -5.345 kJ mol-1 and -8.730 kJ mol-1 for Pb(II)-china clay and Pb(II)-wollastonite systems, respectively. The adsorption isotherm was measured experimentally at various temperatures. The negative values of enthalpy change (DELTA-H = -77.95 kJ mol-1 and -16.40 kJ mol-1 for china clay and wollastonite, respectively) indicate the exothermic nature of the adsorption processes for both systems. The isosteric heats of the adsorption process have been determined at various surface coverages of the adsorbents used. The various thermodynamic parameters have been calculated to elucidate the mechanism involved in the adsorption process.

Keywords: Adsorption, China Clay, Wollastonite, Activation Energy, Adsorption Isotherm, Heat of Adsorption, Thermodynamic Parameters, Heavy-Metal Cations, Fly-Ash, Aqueous-Solution, Adsorbents, Silica, Water, Color

Okieimen, F.E., Okundia, E.U. and Ogbeifun, D.E. (1991), Sorption of cadmium and lead ions on modified groundnut (*Arachis hypogea*) husks. *Journal of Chemical Technology and Biotechnology*, **51** (1), 97-103.

Full Test: [1991\J Che Tec Bio51, 97.pdf](1991/J%20Che%20Tec%20Bio51,%2097.pdf)

Abstract: The removal of cadmium and lead ions from aqueous solutions by groundnut husks modified by reaction with EDTA (% N = 12.05) was examined by equilibrium sorption studies at 29-degrees-C. The maximum metal ion binding capacity of the EDTA-modified husk determined from the sorption isotherm from solutions of pH 6.8 was found to be 0.36 mmol g-1 and 0.19 mmol g-1 for Cd(II) and Pb(II) ions, respectively. It was found that the rate of sorption was particle-diffusion controlled, and the particle-diffusion control rate coefficient was determined to be of the order of 10-2 min-1.

Keywords: Aqueous-Solutions, Binding, Cadmium, Capacity, Cd(II), Control, Edta, EDTA-Modified Groundnut Husk, Equilibrium, Heavy-Metal Ions, Ion, Isotherm, Lead, Lead Ions, Modified, Modified Cellulosic Materials, Pb(II), pH, Poly(4-Vinyl Pyridine), Rate Coefficient, Reaction, Removal, Sorption

Aksu, Z. and Kutsal, T. (1991), A bioseparation process for removing lead(II) ions from waste-water by using *C. Vulgaris*. *Journal of Chemical Technology and Biotechnology*, **52** (1), 109-118.

Full Test: [1991\J Che Tec Bio52, 109.pdf](1991/J%20Che%20Tec%20Bio52,%20109.pdf)

Abstract: Biosorption of heavy metals by microbial cells has been recognized as a potential alternative to existing technologies for removing heavy metals from industrial waste waters. Many aquatic microorganisms, such as algae, can take up dissolved metals from their surroundings to their cells. In this study, the adsorption of lead(II) ions was investigated in a single-staged batch reactor. *Chlorella vulgaris*, a green alga, was used as the sorbent. The sorption phenomenon was expressed by the Freundlich adsorption isotherm and this expression was used for the calculation of residual or adsorbed metal ion concentration at equilibrium (Ceq or Cx, eq) at a given ‘volume of waste water containing heavy metal ion/quantity of alga (V0/X0)’ ratio in a single-staged batch reactor. Experimental Ceq and Cx, eq values were compared to calculated ones. Applications in waste water treatment for lead(II) removal have been suggested.

Keywords: Lead(II) Biosorption, Single-Staged Batch Reactor, Biosorption

Zhou, J.L. and Kiff, R.J. (1991), The uptake of copper from aqueous solution by immobilized fungal biomass. *Journal of Chemical Technology and Biotechnology*, **52** (3), 317-330.

Full Text: [2001\J Che Tec Bio52, 317.pdf](2001/J%20Che%20Tec%20Bio52,%20317.pdf)

Abstract: The removal of cupric ions from aqueous solution by a biosorption column in which the *Rhizopus arrhizus* fungal biomass was immobilized in reticulated foam biomass support particles was studied. Solution pH was found to be crucial to copper uptake, with the optimum range being 6.7-7.0. The removal efficiency was usually higher at low influent copper concentration and long residence time. The presence of other cations and anions inhibited copper uptake in the following order: for the cations, Mn2+ >> Zn2+ > Cd2+ > Mg2+ > Ca2+; for the anions, EDTA >> SO42->> Cl-. The biosorption process was fully reversible and regenerated columns showed undiminished performance.

Keywords: Biosorption, Copper, Fungal Immobilization, Regeneration, *Rhizopus-arrhizus* Biomass, Biosorption, Adsorption

? Tsezos, M. and Deutschmann, A.A. (1992), The use of a mathematical model for the study of the important parameters in immobilized biomass biosorption. *Journal of Chemical Technology and Biotechnology*, **53** (1), 1-12.

Full Text: [1992\J Che Tec Bio53, 1.pdf](1992/J%20Che%20Tec%20Bio53,%201.pdf)

Abstract: It has been shown that the immobilized, inactive mycelia of Rhizopus arrhizus are preferential to native biomass for use in the biosorption of metal ions. A kinetic mass transfer model for the description of the biosorption of metal ions by immobilized biomass from aqueous solution in a batch reactor, has been developed. The present work examines in detail the ability of this kinetic model to describe well the response of the biosorption system to changes caused by variations in the experimental conditions and the properties of the immobilized biomass as well as the parametric sensitivity of the model to process related parameters. It was shown that the immobilized biomass particle size, the initial solute concentration, the maximum immobilized biomass uptake capacity and mass transport coefficients are significant parameters that affect the model results.

Keywords: Biosorption, Immobilized, Biomass, Metals, Ions, Kinetics, Modeling, Bioaccumulation, *Rhizopus-Arrhizus*, Uranium, Mechanism

? Singh, D.B., Rupainwar, D.C. and Prasad, G. (1992), Studies on the removal of Cr(VI) from waste-water by feldspar. *Journal of Chemical Technology and Biotechnology*, **53** (2), 127-131.

Full Text: [1992\J Che Tec Bio53, 127.pdf](1992/J%20Che%20Tec%20Bio53,%20127.pdf)

Abstract: The efficacy of feldspar in the removal of Cr(VI) from representative waste-water from a plating industry has been investigated in a completely mixed batch reactor at different concentrations, rate of agitation and particle size. The data obey the Langmuir isotherm for the present system and the process of uptake follows first-order kinetics. The maximum removal (91%) was observed at 40-degrees-C and pH 2.5 with initial concentration of 19.23 µmol dm-3 Cr(VI) and 40 g dm-3 feldspar. The process involves both film and pore diffusion to different extents. Column studies have also been carried out using a certain concentration of waste-water. More than 92% recovery has been achieved and the column can be used for 10 cycles before regeneration. The present technique seems to be quite attractive.

Keywords: Feldspar, Cr(VI), Adsorption, Dynamics, Column, Adsorption

Namasivayam, C. and Yamuna, R.T. (1992), Removal of Congo Red from aqueous solution by biogas waste slurry. *Journal of Chemical Technology and Biotechnology*, **53** (2), 153-157.

Full Text: [1992\J Che Tec Bio53, 153.pdf](1992/J%20Che%20Tec%20Bio53,%20153.pdf)

Abstract: Removal of Congo Red was carried out using biogas waste slurry as adsorbent at different concentrations of dye, adsorbent dosage, agitation time and pH. The process follows the first-order rate expression. The equilibrium data fit well in the Freundlich model of adsorption. Maximum removal of dye, 95%, was observed in the pH range 2.3-9.4. Desorption of Congo Red showed that it is solubilised in 50% acetic acid to the extent of 6% and the remainder appears to be chemically complexed irreversibly to the adsorbent. Low desorption of dye from the adsorbent surface in water indicates that the process may not be, essentially, a reversible one.

Keywords: Dye Adsorption, Biogas Waste Slurry, pH, Desorption, Adsorbents, Equilibrium, Dyes

Al-Duri, B., Khader, Y. and McKay, G. (1992), Prediction of binary component isotherms for adsorption on heterogeneous surfaces. *Journal of Chemical Technology and Biotechnology*, **53** (4), 345-352.

Full Text: [1992\J Che Tec Bio53, 345.pdf](1992/J%20Che%20Tec%20Bio53,%20345.pdf)

Abstract: The adsorption of three basic dyes onto peat has been studied as single and bisolute equilibrium isotherms. The Freundlich equilibrium isotherm, suitable for heterogeneous adsorption systems has been selected to describe the single component data. Furthermore, the extended Freundlich formula for binary systems has been used to describe binary system equilibrium. A very good agreement is obtained between experiment and theory. The dyes under investigation are: Basic Blue 3, Basic Red 22 and Basic Yellow 21 in their single phases and binary solutions, respectively, all onto peat.

Keywords: Adsorption, Binary Systems, Isotherms, Extended, Freundlich, Heterogenous, 2 Dissolved Organics, Activated Carbon, Competitive Adsorption, Equilibria

Uddin, M.S., Hidajat, K., Lim, B.G. and Ching, C.B. (1992), Interfacial mass transfer in stripping of phenylalanine in a liquid-liquid extraction process. *Journal of Chemical Technology and Biotechnology*, **53** (4), 353-357.

Full Text: [1992\J Che Tec Bio53, 353.pdf](1992/J%20Che%20Tec%20Bio53,%20353.pdf)

Abstract: Stripping of L-phenylalanine from organic phase containing ALIQUAT 336 (tri-octyl-methyl-ammonium chloride) as complexing agent was studied using a stirred transfer cell. The study investigated the effects of concentration of the stripping agent, potassium chloride, in strip solution and temperature on mass transfer rates. A two-film model based on organic and aqueous phases mass transfer resistances was proposed to estimate mass transfer coefficients and it predicted adequately the experimental time-concentration data at different conditions studied. A comparison of mass transfer coefficients for stripping and previously published results on extraction for the same system was made.

Keywords: Stripping, pHenylalanine, Liquid Liquid Extraction, Mass Transfer Coefficient

Allen, S., Brown, P., McKay, G. and Flynn, O. (1992), An evaluation of single resistance transfer models in the sorption of metal ions by peat. *Journal of Chemical Technology and Biotechnology*, **54** (3), 271-276.

Full Text: [1992\J Che Tec Bio54, 271.pdf](1992/J%20Che%20Tec%20Bio54,%20271.pdf)

Abstract: The adsorption of Pb2+, Cd2+, Cu2+, Zn2+ and Al3+ onto peat has been studied using a system of standardised batch adsorbers under equilibrium and transient rate conditions. Models based on the assumption of a single external mass transfer resistance to adsorption have been developed to attempt to predict the concentration decay curves obtained experimentally, for several variable system parameters, under transient batch conditions. In this instance the single resistance is taken as that of film diffusion of the sorbate through the liquid film surrounding the sorbent particle. Two methods of determining the external mass transfer coefficient have been used, one based on the Weber model and the other on the Furusawa-Smith model. Equilibrium data have been analysed and shown to conform to a linear Langmuir plot. The decay curves predicted by the models represented the experimental data very well, particularly at high sorbent masses. Under these conditions film diffusion appears to be the rate controlling step in the adsorption of metal ions by the peat. At low sorbent loadings, however, the influence of internal mass transfer is evident.

Keywords: Adsorption, Copper, Peat, Mass Transfer Coefficient, Single External Resistance, Intraparticle Mass-Transport, Soil Organic-Matter, Humic Acid, Adsorption, Pb2+-Ions, Kinetics, Exchange, Slurries

Balköse, D. and Baltacioğlu, H. (1992), Adsorption of heavy metal cations from aqueous solutions by wool fibers. *Journal of Chemical Technology and Biotechnology*, **54** (4), 393-397.

Full Text: [1992\J Che Tec Bio54, 393.pdf](1992/J%20Che%20Tec%20Bio54,%20393.pdf)

Abstract: Adsorption of metal cations by kivircik wool from aqueous NiCl2, CuCl2, ZnCl2, CdCl2, HgCl2 and Pb(NO3)2 solutions at 25-degrees-C and 50-degrees-C was investigated using atomic absorption spectroscopy. A fiber diffusion controlled adsorption rate model was used to predict the effective diffusion coefficients of metal ions in wool. It has been shown that wool is a potential adsorbent for removing toxic metal ions from contaminated water.

Keywords: Adsorption, Diffusion, Metal Cations, Wool, Atomic Absorption, Water Treatment

Al-Duri, B. and McKay, G. (1992), Pore diffusion: Dependence of the effective diffusivity on the initial sorbate concentration in single and multisolute batch adsorption systems. *Journal of Chemical Technology and Biotechnology*, **55** (3), 245-250.

Full Text: [1992\J Che Tec Bio55, 245.pdf](1992/J%20Che%20Tec%20Bio55,%20245.pdf)

Abstract: The present work studies the intraparticle diffusivity in batch adsorption systems as a function of the initial sorbate concentration. The systems under investigation are basic dyes, namely Basic Blue 69, Basic Red 22 and Basic Yellow 21 and their binary and ternary combinations, all adsorbing onto activated carbon Filtrasorb 400. They study is based on the film-pore diffusion model and the output is a combination of the external mass transfer coefficient, kf and the effective diffusivity, Deff that yields congruent experimental and theoretical kinetic data.

It has been found the Deff varies with Co in an exponential decay function. Furthermore, Deff values undergo a general reduction in the multisolute systems compared to the single component systems. Also, the relative diffusion rates in the multisolute systems are found to change such that Deff of the slower diffuser is enhanced and that Deff of the faster diffuser is inhibited.

Keywords: Adsorption, Multicomponent, Effective Diffusivity, Concentration, Activated Carbon, Surface-Diffusion, Phase Adsorption, Mass-Transfer, Coefficients, Kinetics, Phenols

? Gergova, K., Petrov, N. and Minkova, V. (1993), A comparison of adsorption characteristics of various activated carbons. *Journal of Chemical Technology and Biotechnology*, **56** (3), 77-82.

Full Text: [1993\J Che Tec Bio56, 77.pdf](1993/J%20Che%20Tec%20Bio56,%2077.pdf)

Abstract: The physico-chemical characteristics of activated carbons obtained from different agricultural by-products by pyrolysis in a stream of water vapor have been investigated. It was established that under the same conditions of treatment the physico-chemical and adsorption characteristics of activated carbons depend on the composition of the initial raw materials. Activated carbon obtained from apricot stones has the best properties. It is characterized by a large specific surface area and micropores volume and high iodine and Methylene blue adsorption activity. The activated carbons produced from cherry stones and grape seeds are characterized by predominating meso- and macropores structure. It can be supposed this is related to the larger content of lignin in those materials.

Keywords: Activated Carbon, Agricultural By-Products, Pore Structure, Adsorption Activity

? Gonzálezpradas, E., Villafranca-Sánchez, M. and Gallegocampo, A. (1993), Influence of the physical-chemistry properties of an acid-activated bentonite in the bleaching of olive oil. *Journal of Chemical Technology and Biotechnology*, **57** (3), 213-216.

Full Text: [1993\J Che Tec Bio57, 213.pdf](1993/J%20Che%20Tec%20Bio57,%20213.pdf)

Abstract: The bleaching process at 90-degrees-C of an olive oil from Jaen (Spain) using natural bentonite and bentonite acid treated with H2SO4 (over a concentration range between 0.50 M and 5.00 M) has been studied. The bleaching capacities of the bentonite samples were calculated by applying the Freundlich equation to the experimental data points corresponding to the bleaching process. The bleaching capacities (KF parameter) range from 2.5×10-7 for non-treated bentonite up to 0.85 for 2.50 M H2SO4 treated bentonite. The bleaching capacity of the 5.00 M H2SO4 treated bentonite (KF = 0.81) is less than that of the 2.50 M H2SO4 treated bentonite.

Keywords: Bleaching, Activated Clay, Adsorption, Olive Oil

Lin, S.H. (1993), Adsorption of disperse dye by powdered activated carbon. *Journal of Chemical Technology and Biotechnology*, **57** (4), 387-391.

Full Text: [1993\J Che Tec Bio57, 387.pdf](1993/J%20Che%20Tec%20Bio57,%20387.pdf)

Abstract: An investigation is presented of the effectiveness of powdered activated carbon (PAC) on the removal of chemical oxygen demand (COD) and color of disperse dye and the effect of PAC particle size on the treatment efficiency. There is no simple chemical or biological treatment capable of adequately removing the color and organic matter from textile wastewaters. It was found from experimental data using various sizes of PAC particle that the equilibrium COD removal was rapidly reached in most situations. As particle mesh size decreased, the COD removal efficiency increased. In addition, it was found that the multilayer Brunauer-Emmett-Teller isotherm fitted the adsorption data significantly better than the monolayer Freundlich and Langmuir isotherms. The initial adsorption rate data were used in a simplified mass transfer model to estimate the mass transfer coefficient of the adsorption process.

Keywords: Adsorption, BET Isotherm, Disperse Dye, Powdered Activated Carbon, Equilibrium, Dyestuffs, Hardwood

Notes: highly cited

? Mattuschka, B. and Straube, G. (1993), Biosorption of metals by a waste biomass. *Journal of Chemical Technology and Biotechnology*, **58** (1), 57-63.

Full Text: [1993\J Che Tec Bio58, 57.pdf](1993/J%20Che%20Tec%20Bio58,%2057.pdf)

Abstract: The binding of several metals by waste biomass of Streptomyces noursei was investigated. With respect to the binding capacity, the following order was observed: Ag > Cr > Pb > Cu much greater than Zn > Cd > Co > = Ni. The sorption of metal ions increased with the increasing initial concentration of metal. The adsorption equilibrium of copper, lead and chromium sorption, and silver sorption at low concentration can be described by the Freundlich and Langmuir models. The possibilities for desorbing the metals from loaded biomass and the repeated use of biomass were investigated. The influence of various ions in water on metal sorption was tested. The metal capacity and selectivity of metal binding by biomass are important qualities for practical use.

Keywords: Biosorption, Waste Biomass, Streptomycetes, Copper, Silver, Chromium, Lead, Selective Accumulation, Heavy-Metals, Recovery, Copper

Lin, S.H. (1993), Adsorption of disperse dye by various adsorbents. *Journal of Chemical Technology and Biotechnology*, **58** (2), 159-163.

Full Text: [1993\J Che Tec Bio58, 159.pdf](1993/J%20Che%20Tec%20Bio58,%20159.pdf)

Abstract: Laboratory investigations of C.I. Disperse Red 60 adsorption on molecular sieves, activated alumina, granular activated carbon (GAC), diatomite and sawdust were conducted in this study. The effectiveness of those adsorbents for pollutant removal and color reduction of disperse dye was examined and compared with that of powdered activated carbon (PAC). It was found that the activated alumina has only 61 % COD removal efficiency in comparison with that of PAC while those of molecular sieves, GAC and diatomite are much lower. In terms of color removal, activated alumina and molecular sieves are as effective as PAC while GAC, diatomite and sawdust are much less effective. The monolayer Langmuir isotherm was found to represent well the measured adsorption data and the constant parameters of the adsorption isotherm were determined for all adsorbents. The simplified mass transfer model proposed previously was also used for estimating the mass transfer coefficients using the initial adsorption data for several adsorbents.

Keywords: Activated Alumina, Adsorption, Diatomite, Disperse Dye, Granular Activated Carbon, Langmuir Isotherm, Molecular Sieve, Equilibrium, Effluents, Dyestuffs, Hardwood

? Kesraouiouki, S., Cheeseman, C.R. and Perry, R. (1994), Natural zeolite utilization in pollution-control: A review of applications to metals effluents. *Journal of Chemical Technology and Biotechnology*, **59** (2), 121-126.

Full Text: [1994\J Che Tec Bio59, 121.pdf](1994/J%20Che%20Tec%20Bio59,%20121.pdf)

Abstract: This paper assesses the potential of natural zeolite utilization as a low-cost ion-exchange and sorbent material in pollution control and recovery of metals. The improvement of the purity of natural zeolites coupled with their chemical modification capabilities in order to provide specific properties may provide a cost-effective alternative for the treatment of heavy metal contaminated soil and water. The application of natural zeolites in industrial pollution control is becoming important and the level of technical effort is increasingly expanding. The extent of application is unlikely to be related solely to their low cost, but also to improved properties and performance characteristics, which will advance the practical implementation of natural zeolites’ technology.

Keywords: Natural Zeolites, Utilization, Pollution Control, Removal, Heavy Metals, Heavy-Metals, Removal

González Pradas, E., Villafranca Sánchez, M., Cantón Cruz, F., Socías Viciana, M. and Fernández Pérez, M.F. (1994), Adsorption of cadmium and zinc from aqueous solution on natural and activated bentonite. *Journal of Chemical Technology and Biotechnology*, **59** (3), 289-295.

Full Text: [1994\J Che Tec Bio59, 289.pdf](1994/J%20Che%20Tec%20Bio59,%20289.pdf)

Abstract: A study of the adsorption of Cd and Zn ions on natural bentonite heat-treated at 110 or at 200°C and on bentonite acid-treated with H2SO4 from aqueous solutions at 30°C. The adsorption isotherms corresponding to Cd and Zn can be classified as H and L types of the Giles classification, respectively. This classification indicates that the samples have a high and a medium affinity for Cd and Zn ions, respectively. The experimental data points were fitted to the Langmuir equation to determine the adsorption capacities and the apparent equilibrium constants of the samples. The values of these parameters for the heat-treated natural samples were higher than those corresponding to the acid-treated values. The removal efficiency was calculated for each sample.

Keywords: Metal Cations, Removal, Adsorption, Activated Clay, Bentonite, Sorption

Budinova, T.K., Gergova, K.M., Petrov, N.V. and Minkova, V.N. (1994), Removal of metal ions from aqueous solution by activated carbons obtained from different raw materials. *Journal of Chemical Technology and Biotechnology*, **60** (2), 177-182.

Full Text: [1994\J Che Tec Bio60, 177.pdf](1994/J%20Che%20Tec%20Bio60,%20177.pdf)

Abstract: The authors investigated the adsorption of Pb2+, Cu2+, Zn2+ and Cd2+ from aqueous solution at 293 K by activated carbons obtained from different sources. Excess metals in municipal water supplies can have a harmful effect on the human physiology and other biological systems. The activated carbons were obtained from apricot stones, coconut shells and lignite coal. The carbons were prepared by water vapor pyrolysis of the raw materials. The influence of the solution pH on the adsorption processes was examined. The presence of other metal ions in the solution was found to decrease the adsorption of each of the ions. The selective adsorption of the metal ions was observed, but the ions preferentially adsorbed did not completely prevent other ions being adsorbed.

Singh, B.K. and Rawat, N.S. (1994), Comparative sorption kinetic studies of phenolic compounds on fly ash and impregnated fly ash. *Journal of Chemical Technology and Biotechnology*, **61** (1), 57-65.

Full Text: [1994\J Che Tec Bio61, 57.pdf](1994/J%20Che%20Tec%20Bio61,%2057.pdf)

Abstract: The factors affecting the rate processes involved in the removal of phenolic compounds, e.g. initial phenol concentration, particle size, impregnation of fly ash (IFA), pH and temperature have been studied. The removal rate of phenols varied in the order *p*-nitrophenol > *m*-nitrophenol > *o*-nitrophenol > *p*-cresol > phenol > *m*-cresol > *o*-cresol. The process followed first order rate kinetics. The sorption data generally fit the Lagergren equation and the intraparticle diffusion rate equation from which adsorption rate constants, diffusion rate constants and diffusion coefficients were determined. Intraparticle diffusion was found to be the rate-limiting step. These kinetic parameters were compared for various phenols under different conditions using fly ash (FA) and impregnated fly ash (IFA).

Keywords: Sorption, Kinetics, Phenols, Fly Ash, Impregnated Fly-Ash, Diffusion, Activated Carbon, Removal, Adsorbents, Adsorption

? Girgis, B.S., Khalil, L.B. and Tawfik, T.A.M. (1994), Activated carbon from sugar-cane bagasse by carbonization in the presence of inorganic acids. *Journal of Chemical Technology and Biotechnology*, **61** (1), 87-92.

Full Text: [1994\J Che Tec Bio61, 87.pdf](1994/J%20Che%20Tec%20Bio61,%2087.pdf)

Abstract: Dried ground bagasse, impregnated with 50% inorganic acids and carbonized at 500-degrees-C, showed the sequence H3PO4 > H2SO4 > HCl > HNO3, with respect to the efficiency of activation. Treatment with phosphoric acid of various concentrations (30-50 wt%) was followed by carbonization at 300-500-degrees-C for 3 h. Pore structure parameters were determined from the low-temperature adsorption of nitrogen, by applying the BET and alpha(s) methods. Activated carbons obtained at low temperatures are essentially microporous with a low degree of mesoporosity. At higher temperatures products of higher surface area and total pore volume with developed mesoporosity and low microporosity are formed. An increase in the period of carbonization leads to a small decrease in both surface area and pore volume. Activated carbons with surface areas > 1000 m2 g-1 and mean pore dimensions around 2.0 nm, suitable for various purposes, are thus obtained.

Keywords: Sugarcane Bagasse, Activated Carbon Production, Holm Oak Wood, Adsorption-Isotherms, Plots

Singh, B.K. and Rawat, N.S. (1994), Comparative sorption equilibrium studies of toxic phenols on flyash and impregnated flyash. *Journal of Chemical Technology and Biotechnology*, **61** (4), 307-317.

Full Text: [1994\J Che Tec Bio61, 307.pdf](1994/J%20Che%20Tec%20Bio61,%20307.pdf)

Abstract: In the present study, the sorption of toxic phenols, which include phenol, o-cresol, m-cresol, p-cresol, o-nitrophenol, m-nitrophenol and p-nitrophenol, has been investigated. The influences of various factors, such as particle size, impregnation of flyash (IFA), pH and temperature on the sorption capacity have been studied. Equilibrium modelling has been carried out using Langmuir and Freundlich isotherm equations and constants have been calculated under different conditions. Thermodynamic studies have also been carried out and values of standard free energy (Delta G degrees), enthalpy (Delta H degrees) and entropy (Delta S) calculated.

Keywords: Sorption, Fly-Ash, Impregnated Fly-Ash, phenols, Langmuir and Freundlich Isotherms, Natural Adsorbents, Aqueous-Solutions, Acid Dye, Removal, Adsorption, Ash, Cations

Allen, S.J. and Brown, P.A. (1995), Isotherm analyses for single component and multi-component metal sorption onto lignite. *Journal of Chemical Technology and Biotechnology*, **62** (1), 17-24.

Full Text: [1995\J Che Tec Bio62, 17.pdf](1995/J%20Che%20Tec%20Bio62,%2017.pdf)

Abstract: The authors describe the adsorption by lignite of the 3 metal ions copper, cadmium and zinc in single-and multicomponent mixtures in aqueous solutions. In recent years, the public has become increasingly aware of the long-term toxic effects of water containing dissolved metal ions. To address this issue, single-component saturation uptake and multicomponent uptakes were compared. The isotherms demonstrated a competitive uptake, with copper being preferentially adsorbed by the lignite in multicomponent solutions. The isotherms were plotted so that the Langmuir constants, the Freundlich constants and the Redlich-Peterson constants could be obtained. It was found that lignite possessed an affinity for the metal ions. This makes its use as an adsorbent a possible alternative to the use of more expensive activated carbons.

Keywords: Adsorption, Heavy Metals, Lignite, Equilibrium Isotherms, Solute Adsorption-Isotherm, Aqueous-Solutions, General Treatment, Basic-Dyes, Classification

Allen, S.J., Khader, K.Y.H. and Bino, M. (1995), Electroxidation of dyestuffs in waste waters. *Journal of Chemical Technology and Biotechnology*, **62** (2), 111-117.

Full Text: [1995\J Che Tec Bio62, 111.pdf](1995/J%20Che%20Tec%20Bio62,%20111.pdf)

Abstract: An electrochemical oxidation cell is used to reduce the concentrations of organic dyes and chemical oxygen demand in an aqueous effluent. The importance of the presence of an electrolyte is recorded and the effects of changing both electrolyte concentration and initial dye concentration are reported. The rate of the electrooxidation process is shown to be a pseudo-first-order kinetic process with the rate constant being affected by both the electrolyte concentration and the dye concentration. The use of different electrolytes is reported.

Keywords: Electrooxidation, Dyestuff, Waste Waters, Adsorption, Oxidation

Juang, R.S. and Lin, H.C. (1995), Metal sorption with extractant-impregnated macroporous resins. 1. Particle diffusion kinetics. *Journal of Chemical Technology and Biotechnology*, **62** (2), 132-140.

Full Text: [1995\J Che Tec Bio62, 132.pdf](1995/J%20Che%20Tec%20Bio62,%20132.pdf)

Abstract: Kinetic measurements of the sorption of copper ions from aqueous sulfate solutions, with di (2-ethylhexyl)phosphoric acid-impregnated Amberlite XAD macroporous resins in a finite bath by a batch-contact time method, are presented. Extractant-impregnated resins are the mew separation media. A modified shrinking-core mechanism, which considers reversibility of sorption, is used to determine that the sorption of copper is controlled by particle diffusion. A stricter model, based on Fick’s law, is then applied to justify the applicability of the modified shrinking-core model to the present sorption systems. The effective particle diffusivity is found to have an order of 10-12, which agrees with values obtained for chelating ion-exchange processes.

Keywords: Particle Diffusion Kinetics, Copper Sorption, Extractant-Impregnated Resin, Di(2-Ethylhexyl)pHosphoric Acid, Modified Shrinking-Core Model, Aqueous Sulfate-Solutions, Tri-N-Octylamine, Ion-Exchange, Macromolecular Resin, Divalent Metals, Di-(2,4,4-Trimethylpentyl)phosphinic Acid, Organophosphorus Acids, Separation, Copper, Model

Juang, R.S. and Lin, H.C. (1995), Metal sorption with extractant-impregnated macroporous resins. 2. Chemical reaction and particle diffusion kinetics. *Journal of Chemical Technology and Biotechnology*, **62** (2), 141-147.

Full Text: [1995\J Che Tec Bio62, 141.pdf](1995/J%20Che%20Tec%20Bio62,%20141.pdf)

Abstract: A study of the sorption rates of zinc ions from aqueous sulfate solutions with di (2-ethylhexyl)phosphoric acid-impregnated Amberlite XAD macroporous resins. It was found, using a provable modified shrinking-core model, that the sorption process was initially controlled by a combined chemical reaction and particle diffusion process. A rigorous model, based on Fick’s law, was used to evaluate the kinetic parameters and describe the sorption process. For the sorption processes controlled by both chemical reaction and particle diffusion, a method based on the current kinetic model is suggested to simultaneously determine the rate constant and the effective particle diffusivity.

Keywords: Chemical Reaction and Particle Diffusion Kinetics, Zinc Sorption, Extractant-Impregnated Resin, Di(2-Ethylhexyl)pHosphoric Acid, Aqueous Sulfate-Solutions, Liquid-Filled Pores, Ion-Exchange, Acid, Copper, Model, Zinc

López, F.A., Perez, C., Sainz, E. and Alonso, M. (1995), Adsorption of Pb2+ on blast furnace sludge. *Journal of Chemical Technology and Biotechnology*, **62** (2), 200-206.

Full Text: [1995\J Che Tec Bio62, 200.pdf](1995/J%20Che%20Tec%20Bio62,%20200.pdf)

Abstract: An evaluation of the applicability of blast furnace sludge, generated during the purification of blast furnace gases, as an adsorbent to remove heavy metals from industrial effluents is presented. The influence of residence time and temperature on the adsorption efficiency of the sludge is studied for the particular case of Pb2+ The adsorption data, which fit the Langmuir equation well, show that the blast furnace sludge has a high adsorption capability, up to 80 mgPb per g dried sludge at saturation. The order of magnitude of the adsorption enthalpy, calculated from the apparent equilibrium constant, indicates that the adsorption of Pb2+ on the sludge is of a physical nature. XPS and EDAX analysis suggest that the physical adsorption process partially occurs through ionic exchange between Pb2+ and other ions such as Ca2+. Techniques exist for the recovery of metallic iron and either metallic lead or lead oxide from the sludge. The rendering of sludge into pellets, followed by their controlled heating, allows not only the extraction of these metals, but also makes use of the coke within the sludge. These techniques are clearly interesting alternatives to the dumping of this toxic and hazardous waste.

Keywords: Adsorption, Adsorption Isotherm, Heavy Metals, Blast Furnace Sludge, Sorption, Goethite, Cations, Oxides, Metals, Ions, pH

? Hashim, M.A., Chu, K.H. and Tsan, P.S. (1995), Effects of ionic strength and pH on the adsorption equilibria of lysozyme on ion exchangers. *Journal of Chemical Technology and Biotechnology*, **62** (3), 253-260.

Full Text: [1995\J Che Tec Bio62, 253.pdf](1995/J%20Che%20Tec%20Bio62,%20253.pdf)

Abstract: The effects of ionic strength and pH on adsorption of lysozyme to three strong cation exchangers have been studied. Adsorption equilibrium data obtained using the batch techniques corresponded well to the Langmuir isotherm. Ionic strength had a considerable influence on the isotherms. In all cases, the maximum binding capacity of the three exchangers decreased while the apparent dissociation constant increased with increasing ionic strength. The maximum binding capacity also decreased while the apparent dissociation constant was not significantly affected by an increase in pH. It was found that the three exchangers exhibited different levels of binding capacity under identical solution conditions. This was shown to be caused by variation in the arrangement and distribution of charged groups. However, the ion-exchange matrix had little effect on the apparent dissociation constant.

Keywords: Protein Adsorption, Ion-Exchange, Equilibrium Isotherm, Proteins, Chromatography, Adsorbents, Behavior, Albumin

Leusch, A., Holan, Z.R. and Volesky, B. (1995), Biosorpyion of heavy metals (Cd, Cu, Ni, Pb, Zn) by chemically-reinforced biomass of marine algae. *Journal of Chemical Technology and Biotechnology*, **62** (3), 279-288.

Full Text: [1995\J Che Tec Bio62, 279.pdf](1995/J%20Che%20Tec%20Bio62,%20279.pdf)

Abstract: Particles of two different sizes (0.105-0.295 mm and 0.84-1.00 mm diameter) of two marine algae, Sargassum fluitans and Ascophyllum nodosum, were crosslinked with formaldehyde (FA), glutaraldehyde (GA) or embedded in polyethylene imine (PEI), followed by glutaraldehyde crosslinking. They were used for equilibrium sorption uptake studies with cadmium, copper, nickel, lead and zinc. The metal uptake by larger particles (0.84-1.00 mm) was higher than that by smaller particles (0.105-0.295 mm). The order of adsorption for S. fluitans biomass particles was Pb > Cd > Cu > Ni > Zn, for A. nodosum copper and cadmium change places. Uptakes of metals range from qmax = 378 mgPb g-1 for S. fluitans (FA, big particles), to qmax = 89 mgZn g-1 far S. fluitans (FA, small particles) as the best sorption performance for each metal. Generally, S. fluitans is a better sorbent material for a given metal, size and modification, although there were several exceptions in which metalsorption by A. nodosum was higher. The metal uptake for different chemical modifications showed the order GA > FA > PEI. A comparison of different sorption models revealed that the Langmuir sorption model fitted the experimental data best.

Keywords: Cadmium, Copper, Nickel, Lead, Zinc, Biosorption, Sagassum Fluitans, Ascophyllum Nodosum, Particle Size, Cross-Linked Biomass, Langmuir Isotherms, Fungal Biomass, Brown-Algae, Sorption, Cadmium, Lead

Yeh, R.Y.L. and Thomas, A. (1995), Color removal from dye wastewaters by adsorption using powdered activated carbon: Mass-transfer studies. *Journal of Chemical Technology and Biotechnology*, **63** (1), 48-54.

Full Text: [1995\J Che Tec Bio63, 48.pdf](1995/J%20Che%20Tec%20Bio63,%2048.pdf)

Abstract: Color removal from synthetic dye wastewater which typically emanates from the Taiwan textile industry has been studied using powdered activated carbon (PAC) as an adsorbent. The CIE colorimetric system has been used in the measurement of color for the treatment of disperse-red-60 dye wastewater. The effect of contact time, dye concentrations and PAC dosage on color and color removal has been investigated. A film-pore double resistance diffusion model for mass transfer has also been used in this study to determine the effective diffusivity, Deff, for the adsorption of disperse-red-60 dye wastewater to PAC.

Keywords: Pore Diffusion, Batch, Solutes, Powdered Activated Carbon, Dye Waste-Water, Film-Pore Diffusion Model

? Yeh, R.Y.L. and Thomas, A. (1995), Color-difference measurement and color removal from dye wastewaters using different adsorbents. *Journal of Chemical Technology and Biotechnology*, **63** (1), 55-59.

Full Text: [1995\J Che Tec Bio63, 55.pdf](1995/J%20Che%20Tec%20Bio63,%2055.pdf)

Abstract: Pollution from textile mills is a problem of formidable dimensions and color removal is the most perplexing problem facing environmental engineers designing appropriate treatment facilities for textile wastewaters. The CIE colorimetric system has been used in this study to measure the color in the treatment of disperse-red-60 dye wastewater using different adsorbents. The color removal is determined by using the CIE 1976 L\*a\*b\* (CIELAB) color difference equation. The effect of contact time and dosage on color and color removal has been investigated for various adsorbents, namely, powdered activated carbon, granular activated carbon, activated alumina, molecular sieves and diatomite.

Keywords: Powdered Activated Carbon, Dye Waste-Water, Activated Alumina, Molecular Sieves, Natural Adsorbents, Acid Dye, Equilibrium, Adsorption

Suen, S.Y. (1996), A comparison of isotherm and kinetic models for binary-solute adsorption to affinity membranes. *Journal of Chemical Technology and Biotechnology*, **65** (3), 249-257.

Full Text: [J\J Che Tec Bio65, 249.pdf](J/J%20Che%20Tec%20Bio65,%20249.pdf)

Abstract: Using 5 of the most popular isotherm models, single-solute isotherms for pepsin and chymosin adsorption to affinity membranes were fitted. Because adsorption is an essential and dominant mechanism in chromatographic techniques, a better understanding of adsorption can help to significantly improve those techniques. The single-solute Langmuir isotherm was found to be the best 2-parameter model, although the 3-parameter models gave even better fitting. By comparing experimental binary-solute adsorption isotherms with 4 different types of binary-solute Langmuir models, it was found that the difference in the saturation capacities affected the adsorption equilibrium. In addition, it was found that the 3 types of binary-solute Langmuir models were converted into the kinetic form and used to calculate the association rate constants of pepsin and chymosin from experimental data.

Keywords: Binary-Solute, Adsorption Isotherm, Adsorption Kinetics, Association Rate Constant, Affinity Membrane, Multicomponent Adsorption, Chromatography, Equilibrium, Prediction

Orumwense, F.F.O. (1996), Removal of lead from water by adsorption on a kaolinitic clay. *Journal of Chemical Technology and Biotechnology*, **65** (4), 363-369.

Full Text: [J\J Che Tec Bio65, 363.pdf](J/J%20Che%20Tec%20Bio65,%20363.pdf)

Abstract: The possible use of kaolinitic clay, Giru day, from Nigeria as an adsorbent for the removal of lead from water was investigated. Studies were carried out as a function of contact times, concentrations, temperatures and pH. The kinetics of adsorption as well as adsorption isotherms at different temperatures were equally studied. The results show that lead removal is favoured by low concentration, high temperature and acidic pH. The reasons for these observations are adduced.

Keywords: Adsorption, Lead Removal, Kaolinite, Drinking Water

Juang, R.S. and Lee, S.H. (1996), Column sorption of divalent metals from sulfate solutions by extractant-impregnated macroporous resins. *Journal of Chemical Technology and Biotechnology*, **66** (2), 153-159.

Full Text: [J\J Che Tec Bio66, 153.pdf](J/J%20Che%20Tec%20Bio66,%20153.pdf)

Abstract: The authors used extractant-impregnated macroporous resins to investigate the column sorption of zinc and copper ions from single aqueous sulfate solutions at 298 K. Extractant-impregnated resin is excellent for the separation and recovery of species from dilute solutions as it bridges the gap between solvent extraction and resin ion exchange processes. Di (2-ethylhexyl)phosphoric acid was used as the extractant. Breakthrough curves were obtained as a function of feed flow rate, feed pH and metal concentration in the feed solution, extractant concentration in the resin phase and the type of resin. It was found that the feed pH and the resin type are important in determining the shape of the breakthrough curve. The saturated capacity for a given type of resin bed increased under conditions of higher feed pH, higher concentrations of metal and extractant and lower feed flow rate.

Keywords: Column Sorption, Extractant-Impregnated Resin, Di(2-Ethylhexyl)pHosphoric Acid, Copper, Zinc, Tri-N-Octylamine, Macromolecular Resin, Di-(2, 4, 4-Trimethylpentyl)pHosphinic Acid, Organophosphorus Acids, Aqueous-Solution, Separation, Recovery, Copper, Zinc

Marshall, W.E. and Johns, M.M. (1996), Agricultural by-products as metal adsorbents: Sorption properties and resistance to mechanical abrasion. *Journal of Chemical Technology and Biotechnology*, **66** (2), 192-198.

Full Text: [J\J Che Tec Bio66, 192.pdf](J/J%20Che%20Tec%20Bio66,%20192.pdf)

Abstract: Defatted rice bran, soybean and cottonseed hulls were evaluated for their sorption properties and resistance to mechanical abrasion in consideration of their potential use as commercial metal adsorbents. These by-products were evaluated using both laboratory prepared solutions and metal plating wastewater for their ability to adsorb Zn(II) and/or Cu(II) and Ni(II). Extrusion stabilized, pilot plant-prepared brans had greater adsorption capacities and adsorption efficiencies than expander stabilized, commercially available bran. All rice brans possessed low mechanical abrasion resistance in batch applications. NaOH and HCl washed soybean and cottonseed hulls had generally higher adsorption efficiencies than water-washed (control) hulls, but had higher or lower adsorption capacities, respectively, than water-washed hulls. Heat-treated cottonseed and soybean hulls had lower adsorption properties than water-washed hulls. Unlike rice bran, both soybean and cottonseed hulls were found to have high mechanical abrasion resistance in batch applications. Reuse of hulls after one adsorption/desorption (sorption) cycle resulted in a large decrease in adsorption capacity which classified hulls as single-use adsorbents when desorbed with HCl.

Keywords: Soybean Hulls, Cottonseed Hulls, Adsorption, Metals, Abrasion Resistance, Wastewater, Removal, Cadmium, Fibers, Hull, Ions

Marzal, P., Seco, A., Gabaldón, C. and Ferrer, J. (1996), Cadmium and zinc adsorption onto activated carbon: Influence of temperature, pH and metal/carbon ratio. *Journal of Chemical Technology and Biotechnology*, **66** (3), 279-285.

Full Text: [J\J Che Tec Bio66, 279.pdf](J/J%20Che%20Tec%20Bio66,%20279.pdf)

Abstract: The adsorption characteristics of cadmium and zinc onto a granular activated carbon were studied. Cadmium and zinc removals increased on raising pH and temperature and decreased on raising the molar metal/carbon ratio. The adsorption processes were modelled using the surface complex formation (SCF) Triple Layer Model (TLM) with an overall bidentate species. A dependence of the SCF constant on pH, the molar metal/carbon ratio and temperature was observed and a correlation for log Kads was determined. The SCF model successfully predicted cadmium and zinc removals.

Keywords: Activated Carbon, Adsorption, Cadmium, Metal/Carbon Ratio Effect, pH Effect, Temperature Effect, Triple Layer Model, Zinc, Etal

Nath, S. and Chand, S. (1996), Mass transfer and biochemical reaction in immobilized cell packed-bed reactors: Correlation of experiment with theory. *Journal of Chemical Technology and Biotechnology*, **66** (3), 286-292.

Full Text: [J\J Che Tec Bio66, 286.pdf](J/J%20Che%20Tec%20Bio66,%20286.pdf)

Abstract: A quantitative analysis of mass transfer combined with biochemical reaction and correlation of experiment with theory is carried out for immobilized *cell* packed bed reactors for the first time. Experimental data on flow rates and pseudo first-order rate constants, kps, for the continuous bioconversion of sugars to ethanol in an immobilized cell reactor using *Saccharomyces cerevisiae* cells on activated bagasse chips has been analyzed and compared with theory. Theoretically, first-order reaction kinetics was considered and various external film diffusion models of the type *j*D = *K Re*-(1-*n*) evaluated. The effects of external film diffusion in immobilized cell reactors have been quantified. Various mass transfer correlations were systematically tested and the mass transfer correlation *j*D = 5.7 *Re*-0.59 correctly predicted experimental data. Use of this correlation is recommended to quantify external him diffusion effects for the continuous bioconversion of sugars to ethanol in immobilized cell packed bed reactors. Finally, the mass transfer coefficient, *k*m, was calculated as a function of the mass velocity, *G* and the Reynolds number, *Re*. This study will be of use in making realistic engineering estimates of the effect of external mass transfer on the observed reaction rates in immobilized cell bioreactors.

Keywords: Immobilized Cells, Immobilized Cell Reactors, Performance, Reaction, Mass Transfer, External Film Diffusion, Mass Transfer Coefficient, Mass Transfer Correlation, Sugars, Ethanol, Saccharomyces Cerevisiae, *Saccharomyces-Cerevisiae*, Ethanol Fermentation, Process Parameters, Dynamic-Response, Whole Cells, Bioconversion, Perturbations, Performance, Bioreactor, Sugars

? Miland, E., Smyth, M.R. and Fagain, C.O. (1996), Phenol removal by modified peroxidases. *Journal of Chemical Technology and Biotechnology*, **67** (3), 227-236.

Full Text: [1996\J Che Tec Bio67, 227.pdf](1996/J%20Che%20Tec%20Bio67,%20227.pdf)

Abstract: Horseradish peroxidase (HRP) catalyses the oxidation of toxic aromatic compounds, especially phenols, in the presence of hydrogen peroxide. Reaction products polymerise to form insoluble precipitates which readily separate from aqueous solution, unlike their monomeric precursors. High-temperature phenol-containing gas liquors (produced from coal conversion processes) or effluent from bleach plants of kraft mills can substantially affect the stability of enzymes such as HRP and thus their oxidation capabilities. Apparent inactivation of peroxidase during high temperature polymerisation reactions is mainly due to unfolding of the protein backbone. The catalytic lifetime of HRP at high temperatures can be extended by chemical modification of lysine epsilon-amino groups using succinimides. The bifunctional, ethylene glycol bis-succinimidyl succinate (EG-NHS) and the monofunctional, acetic acid N-hydroxysuccinimide ester (AA-NHS) were used. The extent of stabilisation is dependent on the nature and concentration of the reagent used. The optimum pH for phenol removal is 9.0 (8.0 for 4-chlorophenol) for both native and modified forms of the enzyme; the optimum molar ratio of hydrogen peroxide and phenolic substrate is around 1.0. The effects of peroxide and enzyme concentration on the polymerisation reaction were investigated. HRP derivatives significantly reduced the oxidation reaction time at 70°C.

Keywords: Peroxidase, Succinimide, Phenols, Enzymatic Polymerisation, Precipitation, Horseradish-Peroxidase, Catalyzed Polymerization, Waste-Water, Precipitation, Inactivation, 4-Chlorophenol, Optimization, Oxidation, Kinetics, Glycol

Philip, C.A. and Girgis, B.S. (1996), Adsorption characteristics of microporous carbons from apricot stones activated by phosphoric acid. *Journal of Chemical Technology and Biotechnology*, **67** (3), 248-254.

Full Text: [J\J Che Tec Bio67, 248.pdf](J/J%20Che%20Tec%20Bio67,%20248.pdf)

Abstract: Crushed apricot stone shells were impregnated with varying H3PO4 acid concentrations (20-50 wt%), followed by carbonisation at 573-773 K. The products were characterised by nitrogen gas adsorption. Analysis of the nitrogen isotherms by the DR and alpha(s) methods proved that most of the obtained carbons are highly microporous, with high surface areas (greater than or equal to 1000 m2 g-1) and very low mesoporosity. Increasing acid concentration, at 573 and 673 K, increases surface area and pore volume, whereas at 733 K a small decrease in both parameters appears at higher H3PO4 concentrations. Whole apricot stones produce activated carbon of inferior porous characteristics. Development of the extensive pore structure was described in light of the effect of K3PO4 on the lignocellulosic mataerial during carbonization.

Keywords: Activated Carbon, Apricot Stones, Texture, pHosphoric Acid, Isotherms, Coals, Plots

Seco, A., Marzal, P., Gabaldón, C. and Ferrer, J. (1997), Adsorption of heavy metals from aqueous solutions onto activated carbon in single Cu and Ni systems and in binary Cu-Ni, Cu-Cd and Cu-Zn systems. *Journal of Chemical Technology and Biotechnology*, **68** (1), 23-30.

Full Text: [J\J Che Tec Bio68, 23.pdf](J/J%20Che%20Tec%20Bio68,%2023.pdf)

Abstract: Single copper and nickel adsorption from aqueous solutions onto a granular activated carbon is reported. Metal removals increase on raising pH and temperature and decrease on raising the initial metal concentration at constant carbon dose. The adsorption processes are modelled using the surface complex formation (SCF) Triple Layer Model (TLM) with an overall surface bidentate species. A dependence of the SCF constant on pH, initial molar metal/carbon ratio and temperature is observed and a correlation for log *K*ads, is determined. The SCF model successfully predicts copper and nickel removals in single metalsolutions. Adsorption in the binary metalsystems copper-nickel, copper-cadmium and copper-zinc is also reported, showing competitive adsorption effects.

Keywords: Activated Carbon, Adsorption, Heavy Metals, Surface Complex Formation, Triple Layer Model, Water

Wang, R.C., Kuo, C.C. and Shyu, C.C. (1997), Adsorption of phenols onto granular activated carbon in a liquid-solid fluidized bed. *Journal of Chemical Technology and Biotechnology*, **68** (2), 187-194.

Full Text: [J\J Che Tec Bio68, 187.pdf](J/J%20Che%20Tec%20Bio68,%20187.pdf)

Abstract: The adsorption of phenol, p-chlorophenol and p-nitrophenol onto granular activated carbon (GAG) in a liquid-solid fluidized-bed adsorber has been studied. The effects of particle sizes of activated carbon (0.937, 1.524 mm), liquid flow rate (1.2, 2.0, 4.0 dm3 min-1), initial phenol concentrations (1.12×10-4 5.88×10-4 mol dm-3) and activated carbon mass (75, 150, 300 g) were investigated. The isotherm data were analysed by using the well-known isotherm equations to realize the adsorption characteristics of granular activated carbon. The model, which takes into account the external mass transfer with film-surface diffusion, surface adsorption equilibrium and internal mass transfer, was employed to fit the experimental data of the breakthrough curve. The model agreed with the experimental results very well when the Langmuir isotherm was employed and can be used for design and parametric studies.

Keywords: Adsorption, Granular Activated Carbon, Isotherm Equation, Liquid-Solid Fluidized Bed, Aqueous-Solutions, Equilibrium, Dyestuffs, Solutes, Model

Notes: highly cited

? Seddon, K.R. (1997), Ionic liquids for clean technology. *Journal of Chemical Technology and Biotechnology*, **68** (4), 351-356.

Full Text: [1997\J Che Tec Bio68, 351.pdf](1997/J%20Che%20Tec%20Bio68,%20351.pdf)

Abstract: The use of room-temperature chloroaluminate(III) ionic liquids, specifically 1-butylpyridinium chloride-aluminium(III) chloride and 1-ethyl-3-methylimidazolium chloride-aluminium(III) chloride, as solvents for clean synthesis and catalytic processes, particularly those applicable to clean technology, is becoming widely recognised and accepted. The design principles for room-temperature ionic liquids, some of their properties, and the rationale for using these neoteric solvents, are discussed here, and an indication of the scope of these solvents for future industrial processes is given.

Keywords: Ionic Liquids, Molten Salts, Clean Technology, Clean Synthesis, Neoteric Solvents, Chloroaluminates(III), Electrical Conductivities, Phase-Transitions, Chloroaluminate, Chloride, Spectroscopy, Viscosities, Chemistry, Densities, Existence, Solvents

Allen, S.J., Whitten, L.J., Murray, M., Duggan, O. and Brown, P. (1997), The adsorption of pollutants by peat, lignite and activated chars. *Journal of Chemical Technology and Biotechnology*, **68** (4), 442-452.

Full Text: [J\J Che Tec Bio68, 442.pdf](J/J%20Che%20Tec%20Bio68,%20442.pdf)

Abstract: The ability of peat, lignite and activated chars made from peat and lignite to adsorb dyes and metals from wastewater and NO2 from air was investigated. Equilibrium isotherms were determined to assess the maximum adsorption capacity of the adsorbents for the pollutants. Kinetic studies for the adsorption of dyes and metal ions onto the adsorbents were undertaken in agitated batch adsorbers. Mass transport models were tested to predict the concentration decay curves in batch adsorbers. The models tested were single resistance models based on the assumption of a single external mass transfer coefficient and two resistance models which included an internal diffusion coefficient and an external mass transfer coefficient. The surface phenomena which influence the extent and the rate of uptake have been studied. The equilibrium capacity data conform to Langmuir plots. A previously proposed model was used to evaluate the external single resistance mass transfer model and was successfully applied to predict the adsorption of metal ions in single component systems under batch conditions. It has been shown that the assumption of negligible intraparticle diffusion is valid and that external him diffusion is the rate limiting step in describing the adsorption processes at high sorbent loadings. The same type of result is not observed for the adsorption of coloured organic matter onto peat where the sorption processes cannot be successfully modelled by use of a single resistance model and a two resistance model incorporating internal diffusion is required. The surface phenomena which influence the extent and the rate of uptake of NO2 have been studied. The type of chars produced and the activation processes affect the adsorption. As activation increases, micropore volume and surface area increase and the maximum capacity of the adsorbent increases. Surface area alone is not the only parameter which affects equilibrium uptake.

Keywords: Mass-Transfer, Diffusion, Carbon, Dyestuffs, Models, Phase, Adsorption, Isotherms, Batch, Peat, Lignite, Activated Carbons

Šafařík, I., Nymburská, K. and Šafaříková, M. (1997), Adsorption of water-soluble organic dyes on magnetic charcoal. *Journal of Chemical Technology and Biotechnology*, **69** (1), 1-4.

Full Text: [J\J Che Tec Bio69, 1.pdf](J/J%20Che%20Tec%20Bio69,%201.pdf)

Abstract: Magnetic charcoal was prepared by entrapment of fine charcoal particles into the structure of magnetic iron oxides. This adsorbent can efficiently adsorb a variety of organic compounds. For the adsorption experiments water soluble organic dyes belonging to the triphenylmethane, heteropolycyclic and azodye groups were used as model compounds. Maximum adsorption capacities ranged between 10 and 20 mg of dyes per 1 cm3 of the sedimented adsorbent; this corresponds to 132.5-265 mg of dyes per 1 g of the dried adsorbent.

Keywords: Magnetic Charcoal, Adsorption, Organic Dyes, Separations

Ali, A.A.H. and El-Bishtawi, R. (1997), Removal of lead and nickel ions using zeolite tuff. *Journal of Chemical Technology and Biotechnology*, **69** (1), 27-34.

Full Text: [J\J Che Tec Bio69, 27.pdf](J/J%20Che%20Tec%20Bio69,%2027.pdf)

Abstract: The capacity of Jordanian zeolite tuff for the removal of lead and nickel ions from aqueous solutions has been investigated under different conditions, namely zeolite particle size, initial solution pH, initial metal ion concentration, slurry concentration and solution temperature. Equilibrium data obtained have been found to fit both the Langmuir and Freundlich adsorption isotherms. It has been found that this zeolite (phillipsite) tuff is an efficient ion exchanger for removing both lead and nickel ions. Its removal capability is considerably higher for lead ions than for nickel ions under all conditions tested; however, the actual exchange capacities are far below the theoretical values. The finer the zeolite particles used, the higher the metal exchange capacity. An initial solution pH of 4.0 is favourable for obtaining high metal removal.

Keywords: Metal-Ions, Heavy Metals, Lead, Nickel, Zeolite, Ion Exchange, Sorption, Equilibrium Isotherms

Lee, C.K., Low, K.S. and Chung, L.C. (1997), Removal of some organic dyes by hexane-extracted spent bleaching earth. *Journal of Chemical Technology and Biotechnology*, **69** (1), 93-99.

Full Text: [J\J Che Tec Bio69, 93.pdf](J/J%20Che%20Tec%20Bio69,%2093.pdf)

Abstract: The removal of some organic dyes from aqueous solution by hexane-extracted spent bleaching earth, a waste material from the palm oil industry, was investigated. It was noted that the material had better affinity for basic than acid dyes. Various parameters affecting the removal process were studied, These were pH, initial dye concentration, sorbent dosage, temperature and agitation rate in the batch process. Experimental data show that both the boundary layer and intraparticle diffusion effect play important roles in the rate of dye removal. Maximum sorption capacities for some basic and acid dyes studied compare favourably with those reported using other low-cost sorbents.

Keywords: Natural Adsorbents, Color Removal, Adsorption, Cost, Equilibrium, Dyestuffs, Basic Dyes, Acid Dyes, Hexane-Extracted Spent Bleaching Earth, Sorption

González-Pradas, E., Villafranca-Sánchez, M., Gallego-Campo, A., Ureña-Amate, D. and Socías-Viciana, M. (1997), Removal of 1,1’-dimethyl-4,4’bipyridyl dichloride from aqueous solution by natural and activated bentonite. *Journal of Chemical Technology and Biotechnology*, **69** (2), 173-178.

Full Text: [J\J Che Tec Bio69, 173.pdf](J/J%20Che%20Tec%20Bio69,%20173.pdf)

Abstract: The sorption of 1,1’-dimethyl-4,4’bipyridilium dichloride (paraquat) on bentonite desiccated at 110°C untreated, and acid-treated with H2SO4 solutions over a concentration range between 0.25 M and 1.00 M, from aqueous solution at 30°C has been studied by using batch experiments. In addition, column experiments were carried out with the bentonite sample treated with the 1.00 M H2SO4 solution [B-A(1.00)] by using two aqueous solutions of paraquat of different concentrations (C = 29.40 mg dm-3 and C = 65.38 mg dm-3). The experimental data points have been fitted to the Langmuir equation in order to calculate the sorption capacities (Xm) of the samples; Xm values range from 1.35×105 mg kg-1 for the sample acid-treated with 0.375 M H2SO4[B-A(0.375)] up to 1.96×105 mg kg-1 for the untreated bentonite [B-N]. The removal efficiency (R) has also been calculated; R values ranging from 44.61% for the [B-A(0.375)] sample up to 67.23% for B-N. The batch experiments show that the natural bentonite is more effective than the acid-treated bentonite in relation to sorption of paraquat. The column experiments show that the B-A(1.00) sample might be reasonably used in removing paraquat, the column efficiency increasing from 37.55% for the C = 65.38 mg dm-3 aqueous solution of paraquat up to 66.58% for the C = 29.40 mg dm-3 one.

Keywords: Paraquat, Bentonite, Adsorption, Removal, Adsorption, Acid

McKay, G. and Porter, J.F. (1997), Equilibrium parameters for the sorption of copper, cadmium and zinc ions onto peat. *Journal of Chemical Technology and Biotechnology*, **69** (3), 309-320.

Full Text: [J\J Che Tec Bio69, 309.pdf](J/J%20Che%20Tec%20Bio69,%20309.pdf)

Abstract: This paper details a study into the sorption of three divalent metal ions-namely cadmium, copper and zinc-onto peat, in single component, binary and ternary systems. The Langmuir Freundlich and Redlich-Peterson equilibrium isotherms for each metal ion in each system have been determined and correlated. The Langmuir isotherms have been found to have the highest regression correlation coefficients.

Keywords: Sphagnum Moss Peat, Activated Carbon, Aqueous-Solutions, Waste-Water, Adsorption, Removal, Dyestuffs, Multicomponent Adsorption, Isotherms, Peat, Metal Ions

Singh, V.K. and Tiwari, P.N. (1997), Removal and recovery of chromium(VI) from industrial waste water. *Journal of Chemical Technology and Biotechnology*, **69** (3), 376-382.

Full Text: [J\J Che Tec Bio69, 376.pdf](J/J%20Che%20Tec%20Bio69,%20376.pdf)

Abstract: Carbon slurry, generated as a waste material in a naphtha-based ammonia plant of the Fertilizer Corporation of India, Gorakhpur, has been used as an adsorbent for the removal of Cr(VI) from aqueous solution at different experimental conditions. The removal was favoured at low pH, with maximum removal at pH 2.5. The effects of concentration and temperature have also been reported. Batch adsorption kinetics have been described by the Lagergren equation. The applicability of the Langmuir isotherm for the present system has been tested at different temperatures. Thermodynamic parameters indicate the endothermic nature of Cr(VI) adsorption on carbon slurry, Recovery of adsorbed chromium for reuse has also been reported in the present study.

Keywords: Carbon Slurry, Cr(VI), Adsorption, Langmuir Isotherm, Kinetics, Thermodynamics, Parameters, Lagergren Equation

Zaror, C.A. (1997), Enhanced oxidation of toxic effluents using simultaneous ozonation and activated carbon treatment. *Journal of Chemical Technology and Biotechnology*, **70** (1), 21-28.

Full Text: [J\J Che Tec Bio70, 21.pdf](J/J%20Che%20Tec%20Bio70,%2021.pdf)

Abstract: Chemical oxidation and adsorption are feasible options to treat toxic effluents; however, the lack of empirical design data impairs their implementation at industrial scale. This paper reports experimental results on a detoxification system based on enhanced oxidation using ozone in the presence of activated carbon. The study focuses on four representative model toxic phenolic compounds, i.e. 3-chlorophenol, 4-chlorophenol, 2-methoxyphenol, and pyrocatachol. The experimental system consisted of a 1.5 dm3 stirred reactor and an ozonizer with a mean production capacity of 0.1 mmol O3 s-1 from pure oxygen. Adsorption and absorption processes were studied in the absence and presence of chemical reactions at pH 2, within the temperature range 15-35°C and solid/liquid ratio 005-0005 w/w. Results showed that all these contaminants are readily oxidized by ozone, with a pseudo-second order rate constant in the range 0.02-0.08 mmol-1 dm3 s-1 at pH 2 and temperature 15-35°C. Fast phenolic oxidation reactions at the gas-liquid interphase increased the ozone absorption rate by a factor of 3-10, as compared with physical absorption only. The presence of activated carbon during ozonation significantly improved ozone selectivity. Adsorption isotherms and ozone self-decomposition data are also reported.

Keywords: Waste Treatment, Ozone, Activated Carbon, Toxic Effluents, Mass Transfer, Kinetics, Ozone, Water, Adsorption, Removal, Decomposition, Kinetics

Bossrez, S., Remacle, J. and Coyette, J. (1997), Adsorption of nickel on *Enterococcus hirae* cell walls. *Journal of Chemical Technology and Biotechnology*, **70** (1), 45-50.

Full Text: [J\J Che Tec Bio70, 45.pdf](J/J%20Che%20Tec%20Bio70,%2045.pdf)

Abstract: The metal affinity of *Enterococcus* hirae cell walls and the relation to the chemical composition of the wall constituents were investigated, by studying the nickel absorption on purified cell walls of *Enterococcus* hirae mutants. The strains of *Enterococcus* hirae are characterised by their penicillin resistance, the mother strains ATCC9790, the penicillin-sensitive mutant AS21 and the penicillin-resistant mutant R40 present an MIC (minimum inhibitory concentration of penicillin) of 1-2, 0.075 and 80µgcm-3, respectively. Preliminary results showed that the penicillin-resistant cell wall (R40) had more affinity for nickel than the others. The maximum amount of fixed nickel average 2.03 µmol of Ni mg-1 of R40 cells walls, 1.06 µmol of Ni mg-1 of AS21 cell walls and 0.96 µmol of Ni mg-1 of ATCC cell walls. The Scatchard model showed at least two types of nickel fixation sites, with low and high affinity respectively, and a negative cooperativity between sites. Application of the BET isotherm implies a multilayer adsorption process in which one layer does not need to be completely saturated before the succeeding ones. The potentiometric titration curve showed the proton affinity distribution of the cell walls. Two protonation constants were obtained, one at pH 4.5 which corresponded to the pKa of a weak acid, and one at pH 7.2 which corresponded to the pKa of the couple of H2PO4-/HPO42-.

Keywords: Penicillin Resistance, Biosorption, Nickel, Peptidoglycan, *Bacillus-Subtilis*, *Escherichia*-Coli, Binding, Peptidoglycan, Cadmium, Metals, Ions

Gyliene, O., Šalkauskas, M. and Juškenas, R. (1997), The use of organic acid as precipitants for metal recovery from galvanic solutions. *Journal of Chemical Technology and Biotechnology*, **70** (1), 111-115.

Full Text: [J\J Che Tec Bio70, 111.pdf](J/J%20Che%20Tec%20Bio70,%20111.pdf)

Abstract: The abundance of metal ions in galvanic waste solutions enables these solutions to be used for recovery of metals as well as complexing agents such as citrate and tartrate. The addition of oxalic acid to solutions containing complexing agents precipitates pure metal oxalate or mixtures of metal oxalate and tartrate or citrate, the product depending on pH and concentration of components. The addition of oxalic acid to the rinsing bath after electroplating precipitates the most of the metals such as Cu(II), Zn(II) and Pb(II).

Keywords: Citrate, Tartrate, Oxalate, Metal Ions, Precipitation

Tsezos, M., Georgousis, Z. and Remoudaki, E. (1997), Ionic competition effects in a continuous uranium biosorptive recovery process. *Journal of Chemical Technology and Biotechnology*, **70** (2), 198-206.

Full Text: [J\J Che Tec Bio70, 198.pdf](J/J%20Che%20Tec%20Bio70,%20198.pdf)

Abstract: Immobilized *Rhizopus arrhizus* biomass was studied in a continuous sorptionand desorption mode in order to identify factors that affect the long term uraniumbiosorptive uptake capacity performance of the immobilized biomass.Laboratory-scale continuous operation pilot plant experiments were performedusing synthetic uranyl nitrate and industrial uranium mine leachate solutions.Analysis of the liquid solutions indicated that the immobilized *Rhizopus arrhizus* biomass successfully recovered all of the uranium from the dilute (less than 500 mgU dm-3) solutions. All uranium can subsequently be eluted, yielding highlyconcentrated uranium eluates. The immobilized *Rhizopus arrhizus* biomassmaintained its uranium biosorptive uptake capacity over 12 successive sorption-elution cycles when synthetic uranyl nitrate solutions were used. However, whenused with mine leachate solutions, an 18% reduction in the uranium biosorptiveuptake capacity occurred within the first four adsorption-elution cycles. Spectralanalysis indicated that, during continuous use and reuse, the immobilized biomassretained its structural integrity. EDAX, scanning and transmission electronmicroscopic techniques employed on the microbial biomass suggested that thepresence of aluminium interferes with the uranium biosorption process. Spectralanalysis also indicated that the presence of silicon enhances the negative effect ofthe presence of aluminium on the uranium biosorptive uptake capacity of theimmobilized *Rhizopus arrhizus* biomass particles.

Keywords: Immobilized Biomass, *Rhizopus-arrhizus*, Metals, Accumulation, Equilibrium, Mechanism, Fungi, Biosorption, Uranium, Immobilized, Biomass, Ionic Competition, Aluminium, Silicon

Aksu, Z., Açikel, Ü. and Kutsal, T. (1997), Application of multicomponent adsorption isotherms to simultaneous biosorption of iron(III) and chromium(VI) on *C. Vulgaris*. *Journal of Chemical Technology and Biotechnology*, **70** (4), 368-378.

Full Text: [J\J Che Tec Bio70, 368.pdf](J/J%20Che%20Tec%20Bio70,%20368.pdf)

Abstract: Although the biosorption of single metal ions to various microorganisms has been extensively studied and adsorption isotherms have been developed for single-metal ion situations, very little attention has been given to the bioremoval and the expression of the adsorption isotherms of multi-metal ions systems. In this study, the competitive biosorption of iron(III) and chromium(VI) to *Chlorella vulgaris* from a binary metal mixture was studied and compared with the single metal ion situation in a batch stirred system. The effects of pH and single and dual metal ion concentrations on the biosorption rates and equilibrium uptakes were investigated. The optimum biosorption pH for both metal ions was determined as 2.0. Multi-metal ion biosorption studies were also performed at this pH value. It was observed that the biosorption rates and, yields and equilibrium uptakes of iron(III) or chromium(VI) ions were reduced by the presence of increasing concentrations of the other metal ion. Adsorption isotherms developed for both single and dual metal ion systems at the optimum pH were expressed by the non-competitive and competitive Langmuir and Freundlich adsorption models, and model parameters were determined by computer. It was seen that the adsorption equilibrium data fitted very well to both of the models in the concentration ranges studied.

Keywords: Binary Mixture of Iron(III)-Chromium(VI), Biosorption, Adsorption Isotherms of Single-and Multi-Metal Ion Systems, *C. Vulgaris*, Alga *Chlorella-Vulgaris*, Heavy-Metals, *Saccharomyces-Cerevisiae*, Waste-Water, Cell-Walls, Cadmium, Ions, Biomass, Binding, Zinc

Juang, R.S., Tseng, R.L., Wu, F.C. and Lee, S.H. (1997), Adsorption behavior of reactive dyes from aqueous solutions on chitosan. *Journal of Chemical Technology and Biotechnology*, **70** (4), 391-399.

Full Text: [J\J Che Tec Bio70, 391.pdf](J/J%20Che%20Tec%20Bio70,%20391.pdf)

Abstract: The capability of the use of chitosan for removing vinyl sulfone and chlorotriazine reactive dyes from aqueous solutions was examined, including equilibrium and dynamic studies. Experiments were performed as a function of dye concentration, and the amount and particle size of chitosan. It was shown that the adsorption capacities of chitosan were comparatively high for the three investigated dyes. The equilibrium data could be best fitted by the Redlich-Peterson equation over the entire concentration range (50-500 g m-3). A comparison of the adsorption capacity among such adsorbents as chitin and powdered activated carbon was made. Two rate parameters were finally obtained to describe the adsorption process on a quantitative basis. These parameters could be well correlated to the amount and particle size of dry chitosan.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Equilibrium and Dynamics, Behavior, Capacity, Chitosan, Color Removal, Derivatives, Dyestuffs, Equilibrium, Phenol, Process, Reactive Dyes, Silica, Sorption, Textile Effluents

? Edgehill, R.U. and Lu, G.Q. (1998), Adsorption characteristics of carbonized bark for phenol and pentachlorophenol. *Journal of Chemical Technology and Biotechnology*, **71** (1), 27-34.

Full Text: [J\J Che Tec Bio71, 27.pdf](J/J%20Che%20Tec%20Bio71,%2027.pdf)

Abstract: The potential of using carbonized slash pine bark as a substitute for activated carbon was examined in this study. The bark was carbonized by slow heating in nitrogen for 6.5 h to 672°C. The BET-N-2 surface area, average micropore and mesopore diameter, and micropore volume were 332 m2 g-1 21.7 Angstrom, and 0.125 cm3 g-1, respectively. The adsorption capacities for phenol and pentachlorophenol (PCP) at pH 2 and pH 8 were evaluated. The Langmuir equation provided a slightly better fit than the Freundlich equation to two sets of phenol data. The calculated Freundlich constants, K = 0.41 - 0.58 mmol, g, (mmol dm-3)(1, n) and 1, n = 0.30 - 0.41, were lower and higher, respectively, than literature values for activated carbons. The adsorption capacity of the carbonized bark was much lower for PCP than for phenol. The protonated and anionic PCP isotherms were Type II or III, respectively, in the Brunauer classification. The BET equation provided the best fit to protonated PCP isotherm data. The anionic PCP data were fitted to both the BET model and an equation used in the literature to represent phosphate adsorption on activated carbons. Nonlinear regression of the data for both phenol and PCP adsorption with the Freundlich, Langmuir and BET equations generally gave more accurate parameters, compared with the use of linearized equations to obtain the parameters. (C) 1998 SCI.

Keywords: Activated Carbon, Adsorption, Bet Isotherm, Carbonized Bark, Clay, Granular Activated Carbon, Irreversible Adsorption, PCP, phenol, Pine Bark, Regeneration, Removal, Sorption, Substituted phenols, Water

Johns, M.M., Marshall, W.E. and Toles, C.A. (1998), Agricultural by-products as granular activated carbons for adsorbing dissolved metals and organics. *Journal of Chemical Technology and Biotechnology*, **71** (2), 131-140.

Full Text: [J\J Che Tec Bio68, 187.pdf](J/J%20Che%20Tec%20Bio68,%20187.pdf)

Abstract: Surplus, low value agricultural by-products can be made into granular activated carbons (GACs) which are used in environmental remediation. This study characterized and evaluated GACs, made from these feeds tocks, as effective removers of organics and metals from water. The by-products included soft lignocellulosics such as rice straw, soybean hull, sugarcane bagasse, peanut shell, and harder materials such as pecan and walnut shells. The softer materials were combined with a binder, molasses, to produce briquettes and pellets. The precursors were CO2 or steam-activated, and subsequent treatments included oxidation to enhance metal adsorption. Many of the GACs had acceptable physical GAC attributes, such as durability, for commercial usage. GACs made from pecan and walnut shells adsorbed higher levels of benzene, toluene, methanol, acetonitrile, acetone, and 1,4-dioxane from an aqueous mixture than commercial GACs. Neither CO2 nor steam activation was particularly advantageous in enhancing metal adsorption. Oxidation using O2-N2 gas increased metal adsorption while (NH4)S2O8 solution did not In a copper solution, oxidized GACs made from soybean hull had three to four times the Cu(II) adsorption capacity of metal-adsorbing, commercial GACs. Oxidized GACs made from soybean hull, sugarcane bagasse, peanut shell, and rice straw adsorbed from a mixture higher amounts of Pb(II), Cu(II), Ni(II), Cd(II) and Zn(II) than any commercial GACs. Commercial GACs adsorbed only Pb(II), Cu(II) and Cd(II). The GACs made from the agricultural by-products have considerable potential for adsorption of organics and metals of environmental concern. (C) 1998 SCI.

Keywords: Soybean, Rice, Sugarcane, Shells, Activation, Carbons, Oxidation, Adsorption, Metals, Organics, Adsorption, Removal, Cadmium, Zinc, Lead

? Hashim, M.A., Sen Gupta, B., Kumar, S.V., Lim, R., Lim, S.E. and Tan, C.C. (1998), Effect of air to solid ratio in the clarification of yeast by colloidal gas aphrons. *Journal of Chemical Technology and Biotechnology*, **71** (4), 335-339.

Full Text: [1998\J Che Tec Bio71, 335.pdf](1998/J%20Che%20Tec%20Bio71,%20335.pdf)

Abstract: A study on the clarification of baker’s yeast suspension by Colloidal Gas Aphrons (CGA) employing a cationic surfactant, benzyl-dimethyl-hexadecyl-ammonium chloride, is presented. The variables investigated were the CGA flowrate, air flowrate and the yeast concentration. A separation efficiency as high as 95% was achieved at the optimum conditions of air flowrate and feed concentration. The mechanism of particle-bubble attachment was identified and a simple model for the monolayer adsorption of yeast cells on the bubble surface derived. (C) 1998 SCI.

Keywords: Adsorption, Air to Solid Ratio, Baker’s Yeast, Bubbles, Colloidal Gas Aphrons, Efficiency, Flotation, Mechanism, Particles, Separation, Yeast

Low, K.S., Lee, C.K. and Kong, L.Y. (1998), Decolorisation of crude palm oil by acid-activated spent bleaching earth. *Journal of Chemical Technology and Biotechnology*, **72** (1), 67-73.

Full Text: [J\J Che Tec Bio72, 67.pdf](J/J%20Che%20Tec%20Bio72,%2067.pdf)

Abstract: Regeneration of spent bleaching earth by acid activation and heat treatment has been investigated. Spent bleaching earth was activated by H2SO4 of various concentrations (1-40%) and heat treated at 120°C-350°C. The experimental results indicate that treatment of spent bleaching earth with 10% H2SO4 at 350°C produced a material which was most effective in removing coloured pigments from crude palm oil. Subsequent experiments were conducted using this particular acid-treated spent bleaching earth. Various parameters which affect the sorption process were studied. They include initial crude palm oil concentration, sorbent dosage and temperature. Applicability of both the Freundlich and Langmuir isotherms to the acid-treated spent bleaching earth-palm oil hexane miscella system indicates that both physiosorption and chemisorption were involved in the sorption process. Measurements of various quality parameters of bleached and crude palm oils were carried out. They include Lovibond Colour index, carotene content, peroxide value, free fatty acid, fatty acid composition and iodine value. The results show that the bleached palm oil retained good oil quality after the decolorisation process using 10% acid-treated spent bleaching earth with a Lovibond Colour of 6.4. (C) 1998 SCI.

Keywords: Decolorisation, Crude Palm Oil, Spent Bleaching Earth, Acid Activation, Adsorption

Vandevivere, P.C., Bianchi, R. amd Verstraete, W. (1998), Treatment and reuse of wastewater from the textile wet-processing industry: Review of emerging technologies. *Journal of Chemical Technology and Biotechnology*, **72** (4) 289-302.

Full Text: [J\J Che Tec Bio72, 289.pdf](J/J%20Che%20Tec%20Bio72,%20289.pdf)

Abstract: New ecolabels for textile products and tighter restrictions on wastewater discharges are forcing textile wet processors to reuse process water and chemicals. This challenge has prompted intensive research in new advanced treatment technologies, some of which currently making their way to full-scale installations. These comprise polishing treatments such as filtration, chemical oxidation and specialized flocculation techniques and pre-treatment steps including anaerobic digestion, fixed-film bioreactors, Fenton’s reagent oxidation, electrolysis, or foam flotation. Though several of these new technologies are promising in terms of cost and performance, they all suffer limitations which require further research and/or need broader validation. A segment of the research deals with the separate handling of specific sub-streams such as dyebath effluents to which membrane filtration is sometimes applied. The main limitation of this approach is the treatment of the concentrate stream. The spectrum of available technologies may, in the future, be further broadened to include fungi/H2O2-driven oxidation, specialized bio-sorptive processes, solvent extraction, or photocatalysis. (C) 1998 SCI.

Keywords: Textile, Wastewater, Dyes, Azo, Full-Scale, Activated Sludge, Filtration, Coagulation, Ozonation, Wool Scouring Effluent, Sound Business Decision, Water Treatment, Azo Dyes, Color Removal, Activated-Sludge, Anaerobic Bioflocculation, Sewage-Treatment, Go Green, Decolorization

? Joekes, I., Moran, P.J.S., Rodrigues, J.A.R., Wendhausen, R., Tonella, E. and Cassiola, F. (1998), Characterization of *Saccharomyces cerevisiae* immobilized onto chrysotile for ethanol production. *Journal of Chemical Technology and Biotechnology*, **73** (1), 54-58.

Full Text: [1998\J Che Tec Bio73, 54.pdf](1998/J%20Che%20Tec%20Bio73,%2054.pdf)

Abstract: *Saccharomyces cerevisiae* (CCT(-)3174 and commercial baker’s yeast) was immobilized by adsorption onto chrysotile. The adsorbed yeast cells were easily washed out, but cells grown in situ were strongly attached by entrapment by chrysotile microfibres. In fermentation experiments with 30% (w/v) glucose solution, the immobilized cells showed a 1.3-fold increase in initial reaction velocity. For immobilized CCT 3174, the final ethanol yield was 26% higher than that with free cells. (C) 1998 Society of Chemical Industry.

Keywords: Adsorption, Baker’s Yeast, Bakers-Yeast, Cell Adhesion, Ethanol Production, Fermentation, Immobilized Yeast, Metabolism, Microbial Cell Immobilization, Reduction, *Saccharomyces Cerevisiae*, *Saccharomyces Cerevisiae* on Chrysotile, Surface, Yeast, Yield

Grau, J.M. and Bisang, J.M. (1998), Cadmium removal from aqueous sulphate solutions by treatment with iron felts. *Journal of Chemical Technology and Biotechnology*, **73** (4), 398-404.

Full Text: [J\J Che Tec Bio73, 398.pdf](J/J%20Che%20Tec%20Bio73,%20398.pdf)

Abstract: The possibility of removing cadmium from effluents by electrochemical treatment using iron felts as three-dimensional electrodes was investigated. It was found that iron felts remove cadmium by three paths: (i) adsorption of cadmium ions by hydrous ferric oxide, (ii) cathodic electrodeposition and (iii) precipitation of cadmium hydroxide due to the localized alkalinity produced by the hydrogen evolution. The adsorption isotherm, at 30°C, of cadmium ions from an aqueous sulphate solution on hydrous ferric oxide is given. The influence of cathodic potential, volumetric how rate and interelectrode gap on the current, current efficiency and fractional conversion is discussed. The iron felts proved to be efficient in removing cadmium. The highest fractional conversion, congruent to 25% for single pass operation, with 100% current efficiency was obtained for a volumetric how rate of 9.57×10-6 m3s-1 using iron felt cathodes of 4×10-3 m thickness potentiostated at potentials lower than-1.5 V against a saturated calomel electrode.

Keywords: Metal Ion Solutions, Electrochemical Generation, Recovery, Electrodeposition, Ferrate, Anode, Cadmium Removal, Iron Felts, Effluent Treatment, Hydrous Ferric Oxide

González-Pradas, E., Villafranca-Sánchez, M., Gallego-Campo, A., Ureña-Amate, D. and Fernández-Pérez, M. (1999), Removal of linuron from water by natural and activated bentonite. *Journal of Chemical Technology and Biotechnology*, **74** (1), 49-54.

Full Text: [J\J Che Tec Bio74, 49.pdf](J/J%20Che%20Tec%20Bio74,%2049.pdf)

Abstract: The sorption of linuron on bentonite desiccated at 110°C untreated, and acid-treated with H2SO4 solutions over a concentration range between 0.25 M and 1.00 M from aqueous solution at 25°C has been studied by using batch experiments. In addition, column experiments were carried out with the bentonite sample treated with the 1.00 M H2SO4 solution [B-A(1.00)] by using two aqueous solutions of linuron of different concentrations (C = 4.97 mg dm-3 and C = 7.63 mg dm-3). The experimental data points have been fitted to the Langmuir equation in order to calculate the sorption capacities (X-m) of the samples; X-m values range from 0.02 g kg-1 for the untreated bentonite [B-N] up to 0.20 g kg-1 for the sample acid-treated with the 1.00 M H2SO4 solution. The removal efficiency (R) has also been calculated; R values ranging from 15.86% for the [B-N] sample up to 41.54% for [BA(1.00)]. The batch experiments show that the acid-treated bentonite is more effective than the natural bentonite in relation to sorption of linuron. The column experiments show that the B-A(1.00) sample might be reasonably used in removing linuron, the column efficiency increasing from 61.8% for the C = 7.63 mg dm-3 aqueous solution of linuron up to 77.6% for the C = 4.97 mg dm-3 one. (C) 1999 Society of Chemical Industry.

Keywords: Linuron, Bentonite, Sorption, Removal, Aqueous-Solution, Pesticides, Adsorption, Sepiolite, Atrazine

Li, P.H.Y., Bruce, R.L. and Hobday, M.D. (1999), A pseudo first order rate model for the adsorption of an organic adsorbate in aqueous solution. *Journal of Chemical Technology and Biotechnology*, **74** (1), 55-59.

Full Text: [J\J Che Tec Bio74, 55.pdf](J/J%20Che%20Tec%20Bio74,%2055.pdf)

Abstract: Five low rank, coal-based adsorbents, i.e. coal, grus, two chars, and an activated carbon were used to adsorb a low molecular weight organic compound from aqueous solution. The rates of adsorption were found to conform to pseudo first order kinetics with good correlation (r2 greater than 0.996). This kinetic model was used to calculate pseudo first order rate constants (k (1)’ min-1) and relative rate constants (rate constant/unit mass of adsorbent, k (1)” min-1g-1) for the adsorption process. Rate properties have been explained in terms of both a diffusion and chemically controlled rate determining step. Rate constants for the five adsorbents vary as expected on the basis of their physical properties, that is slowest for grus (compressed coal) and fastest for the activated carbon.

Keywords: Surface-Diffusion, Activated Carbon, Concentration-Dependence, Natural Adsorbents, Pore Diffusion, Acid Dye, Removal, Particles, Sorption, Systems, Adsorption, Rate, Pseudo First Order Kinetics, Coal-Based Adsorbents

Brady, J.M., Tobin, J.M. and Roux, J.C. (1999), Continuous fixed bed biosorption of Cu2+ ions: Application of a simple twoparameter mathematical model. *Journal of Chemical Technology and Biotechnology*, **74** (1), 71-77.

Full Text: [J\J Che Tec Bio74, 71.pdf](J/J%20Che%20Tec%20Bio74,%2071.pdf)

Abstract: Biomass from two fungi of the Mucorales order, laboratory cultured andimmobilised *Rhizopus arrhizus*, and industrial waste Mucor miehei, was testedfor capacity to adsorb copper from solution in batch and continuous-flow columnsystems. Maximum uptake levels were c 400 and 300 mmolg-1 (dry weight)respectively. Immobilisation of *Rhizopus arrhizus* in polyvinyl formal to cellloadings of 60% (w/w) did not diminish metal uptake levels, In continuous-flowcolumns both biosorbents adsorbed copper to levels equal or approaching thebatch uptake values. Column breakthrough curves were fitted to a two parametermodel and each of the parameters, sigma and t0, were linearly correlated withcolumn operating parameters. Predicted breakthrough curves agreed closely withexperimental values.

Keywords: *Rhizopus-arrhizus* Biomass, Fungal Biomass, Heavy-Metals, *Saccharomyces-Cerevisiae*, *Bacillus-Subtilis*, Cell-Walls, Copper, Adsorption, Binding, Yeast, Mucor Miehei, Heavy Metals, Polyvinyl Formal, Adsorption, Biosorption, Equilibrium Isotherm, Fixed-Bed Column

Teng, H. and Hsieh, C.T. (1999), Liquid-phase adsorption of phenol by activated carbons prepared from bituminous coals with different oxygen contents. *Journal of Chemical Technology and Biotechnology*, **74** (2), 123-130.

Full Text: [J\J Che Tec Bio74, 123.pdf](J/J%20Che%20Tec%20Bio74,%20123.pdf)

Abstract: Activated carbons prepared from two bituminous coals were used to adsorb phenol in aqueous solutions. The major difference between the coal precursors is the oxygen content. The carbon preparation consisted of carbonization of the coals followed by activation in CO2 to various extents of burn-off. Experimental results show that the amount of phenol adsorbed generally increases with the BET surface area of the carbon. The carbons prepared from the coal with a higher oxygen content have larger surface areas, and, therefore, exhibit higher capacities for phenol. The surface area of the carbon increases with the extent of carbon burn-off, whereas the increase in the adsorptive capacity due to the increasing burn-off level does not show a linear relationship with the increase in area; the ratio of the capacity to BET surface area is not constant and decreases with the burn-off level. This has been attributed to the accessibility of phenol to the surface being affected by the length of diffusion path, which is an increasing function of the burn-off level or the particle size. The amount of phenol adsorbed decreases with the temperature for these carbons. It was found, according to the Langmuir model, that the adsorption process was significantly affected by the oxygen content in the coal precursors. (C) 1999 Society of Chemical Industry.

Keywords: Activated Carbon, phenol, Liquid-Phase Adsorption, Oxygen Content, Bituminous Coal, CO2 Activation, Aqueous-Solutions, Fly-Ash, Oxidation, Removal, Steam

Notes: highly cited

? Vandevivere, P.C., Bianchi, R. and Verstraete, W. (1998), Treatment and reuse of wastewater from the textile wet-processing industry: Review of emerging technologies. *Journal of Chemical Technology and Biotechnology*, **74** (2), 289-302.

Full Text: [1998\J Che Tec Bio74, 289.pdf](1998/J%20Che%20Tec%20Bio74,%20289.pdf)

Abstract: New ecolabels for textile products and tighter restrictions on wastewater discharges are forcing textile wet processors to reuse process water and chemicals. This challenge has prompted intensive research in new advanced treatment technologies, some of which currently making their way to full-scale installations. These comprise polishing treatments such as filtration, chemical oxidation and specialized flocculation techniques and pre-treatment steps including anaerobic digestion, fixed-film bioreactors, Fenton’s reagent oxidation, electrolysis, or foam flotation. Though several of these new technologies are promising in terms of cost and performance, they all suffer limitations which require further research and/or need broader validation. A segment of the research deals with the separate handling of specific sub-streams such as dyebath effluents to which membrane filtration is sometimes applied. The main limitation of this approach is the treatment of the concentrate stream. The spectrum of available technologies may, in the future, be further broadened to include fungi/H2O2-driven oxidation, specialized bio-sorptive processes, solvent extraction, or photocatalysis. (C) 1998 SCI.

Keywords: Textile, Wastewater, Dyes, Azo, Full-Scale, Activated Sludge, Filtration, Coagulation, Ozonation, Wool Scouring Effluent, Sound Business Decision, Water Treatment, Azo Dyes, Color Removal, Activated-Sludge, Anaerobic Bioflocculation, Sewage-Treatment, Go Green, Decolorization

Sankar, M., Sekaran, G., Sadulla, S. and Ramasami, T. (1999), Removal of diazo and triphenylmethane dyes from aqueous solutions through an adsorption process. *Journal of Chemical Technology and Biotechnology*, **74** (4), 337-344.

Full Text: [J\J Che Tec Bio74, 337.pdf](J/J%20Che%20Tec%20Bio74,%20337.pdf)

Abstract: Direct Red 31, Acid Black 1 and Acid Green 16 belonging to diazo and triphenylmethane classification of dye chemicals are widely used during the manufacture of leather. The spent dyestuffs in wastewater escape biological treatment owing to their poor biodegradability. An adsorption procedure was used in this study for the removal of dyes from aqueous solution using Rice Bran-based Activated Carbon (RBAC). The molecular weight of the dye chemicals, the mass of RBAC and the diameter of RBAC particle had positive effects on the rate of adsorption. Initial concentration of dye chemicals, pH of the dye solution and temperature of adsorption showed a negative impact on adsorption. The enthalpies of adsorption for Direct Red 31, Acid Black 1 and Acid Green 16 were -32.1, -23.4 and -21.7 KJ mol-1 respectively, indicating the adsorption was an exothermic physical process. The entropies of adsorption for Direct Red 31, Acid Black 1 and Acid Green 16 were -96.94, -59.92 and -26.96 JK-1mol-1 respectively, suggesting that RBAC favours the adsorption process.

Keywords: Fly-Ash, Equilibrium, Carbon, Direct Red, Acid Black, Acid Green, Adsorption, Activated Carbon

Zouboulis, A.I., Rousou, E.G., Matis, K.A. and Hancock, I.C. (1999), Removal of toxic metals from aqueous mixtures. Part 1: Biosorption. *Journal of Chemical Technology and Biotechnology*, **74** (5), 429-436.

Full Text: [J\J Che Tec Bio74, 429.pdf](J/J%20Che%20Tec%20Bio74,%20429.pdf)

Abstract: The biosorption of toxic metals from an aqueous mixture containing zinc, copper and nickel, in the presence of calcium and sodium ions (usual co-existing cations in related systems) has been investigated. Industrial biomass samples of different origin have been examined batchwise as effective sorbents, including bacteria (*Streptomyces rimosus*), fungi (*Penicillium Chrysogenum*) and yeasts (*Saccharomyces carlsbergensis* and *Saccharomyces cerevisiae*). The effect of solution pH was evaluated in the range of 3-11.5. Selectivity was observed, particularly for the removal of copper. The observed removal of metals by the application of biosorption was also compared in laboratory experiments with other more conventional separation techniques (filtration, centrifugation and flotation). (C) 1999 Society of Chemical Industry.

Keywords: Biosorption, Bacterial and Fungal Biomass, Mixture of Toxic Metals, Copper, Zinc, Nickel, *Saccharomyces-Cerevisiae*, Heavy-Metals, Flotation, Biomass, Cadmium, Fungal, Accumulation, Biosorbents, Adsorption, Recovery

Tseng, R.L., Wu, F.C. and Juang, R.S. (1999), Effect of complexing agents on liquid-phase adsorption and desorption of copper(II) using chitosan. *Journal of Chemical Technology and Biotechnology*, **74** (6), 533-538.

Full Text: [J\J Che Tec Bio74, 533.pdf](J/J%20Che%20Tec%20Bio74,%20533.pdf)

Abstract: The effect of complexing agents on adsorption and desorption of Cu(II) from aqueous solutions using chitosan was investigated. Three complexing agents were used including EDTA (ethylenediaminetetraacetic acid), citric acid, and tartaric acid. It was shown that the isotherm data could be fitted by the Langmuir equation under a limited concentration range. Furthermore, the adsorption processes were analyzed by an intraparticle diffusion model and the rate parameters of intraparticle diffusion for Cu(II) adsorption could be correlated with the initial Cu(II) concentrations. Finally, the desorption of Cu(II) and its complexes from the loaded chitosan was tested using complexing agent solutions. Under comparable conditions, tartaric acid solution gave the best desorption efficiency.

Keywords: Activated Carbon, Metal, Edta, Ion, Adsorbents, Recovery, Sorption, Removal, Adsorption, Desorption, Equilibrium, Kinetics, Chitosan, Complexing Agents, Copper(II)

Kim, J.S. and Yi, J.H. (1999), Selective removal of copper ions from aqueous solutions using modified silica beads impregnated with LIX 84. *Journal of Chemical Technology and Biotechnology*, **74** (6), 544-550.

Full Text: [J\J Che Tec Bio74, 544.pdf](J/J%20Che%20Tec%20Bio74,%20544.pdf)

Abstract: Silica beads immobilized with 2-hydroxy-5-nonylacetophenoneoxime (LIX 84) were prepared after silica surface modification by gamma-aminopropyltriethoxysilane (SB-L). Batch and packed-column tests were conducted to evaluate the metal ion removal capabilities of the prepared adsorbent. Equilibrium isotherms of the SB-L with aqueous solutions containing copper ions were obtained. In addition, the kinetic performances for copper ion removal from aqueous solutions were investigated. The results showed that the amount of extraction increases with solution pH in the range between 1.5 and 5. The selectivity was also experimentally investigated, these results showed that the SB-L adsorbed copper ions selectively in the presence of other metal ions such as Ni2+, Co2+, Zn2+, Cd2+, Ca2+ and Mg2+. From the regeneration experiments, it was found that the copper ions adsorbed at the SB-L surface were recovered by acidic solutions. The recovery ratios were between 78% and 90%, depending on the types of acidic solutions. The results showed that the SB-L prepared may be used for the selective extraction of copper ions from aqueous solutions.

Keywords: Solvent-Extraction, Immobilized 8-Hydroxyquinoline, Separation, Membranes, Acid, Phase, Lead, LIX 84, Silica, Copper, Adsorption, Heavy Metal

Niu, H. and Volesky, B. (1999), Characteristics of gold biosorption from cyanide solution. *Journal of Chemical Technology and Biotechnology*, **74** (8), 778-784.

Full Text: [J\J Che Tec Bio74, 778.pdf](J/J%20Che%20Tec%20Bio74,%20778.pdf)

Abstract: Gold adsorption from cyanide solution by bacterial (Bacillus subtilis), fungal (*Penicillium Chrysogenum*) and seaweed (Sargassum fluitans) biomass was examined. At pH 2.0, these biomass types were capable of sequestering up to 8.0 µmol g-1, 7.2 µmol g-1 and 3.2 µmol g-1, respectively. An adverse effect of increasing solution ionic strength (NaNO3) on gold biosorption was observed. Gold-loaded biomass could be eluted with 0.1 mol dm-3 NaOH with efficiencies higher than 90% at PPI 5.0 at the Solid-to-Liquid ratio, S/L, =4 (gdm-3). Cyanide mass balances for the adsorption, desorption as well as for the AVR process indicated the stability of the gold-cyanide which did not dissociate either upon acidification or upon binding by biomass functional groups. Gold biosorption mainly involved anionic AuCN2- species bound by ionizable biomass functional groups carrying a positive charge when protonated. FTIR analyses indicated that the main biomass functional groups involved in gold biosorption are most probably nitrogen-containing weak base groups. The present results confirmed that waste microbial biomaterials have some potential for removing and concentrating gold from solutions where it occurs as a gold-cyanide complex. (C) 1999 Society of Chemical Industry.

Keywords: AuCN2-, Biosorption, Bacillus Subtilis, *Penicillium Chrysogenum*, Sargassum Fluitans, Hexavalent Chromium, Removal, Adsorption

Seco, A., Gabaldón, C., Marzal, P. and Aucejo, A. (1999), Effect of pH, cation concentration and sorbent concentration on cadmium and copper removal by a granular activated carbon. *Journal of Chemical Technology and Biotechnology*, **74** (9), 911-918.

Full Text: [J\J Che Tec Bio74, 911.pdf](J/J%20Che%20Tec%20Bio74,%20911.pdf)

Abstract: The single adsorption of cadmium and copper from aqueous solutions has been investigated on Darco 12-20 mesh granular activated carbon for a wide range of experimental conditions: pH, metal concentration and carbon concentration. The results showed the efficiency of the activated carbon as sorbent for both metals. Metal removal increases on raising pH and carbon concentration, and decreases on raising the initial metal concentration. The adsorption processes have been modelled using the surface complex formation (SCF) Triple Layer Model (TLM) with a single surface bidentate species or with an overall surface species with fractional stoichiometry. Bidentate stoichiometry considering pH, metal concentration and carbon concentration dependencies successfully predicted cadmium and copper removals for all experimental conditions. The Freundlich isotherm has been also checked.

Keywords: Adsorption, Single, Cd, Complexation, Systems, Zn, Activated Carbon, Adsorption, Cadmium, Copper, Triple Layer Model

O’Neill, C., Hawkes, F.R., Hawkes, D.L., Lourenço, N.D., Pinheiro, H.M. and Delée, W. (1999), Colour in textile effluents - sources, measurement, discharge consents and simulation: A review. *Journal of Chemical Technology and Biotechnology*, **74** (11), 1009-1018.

Full Text: [J\J Che Tec Bio74, 1009.pdf](J/J%20Che%20Tec%20Bio74,%201009.pdf)

Abstract: This paper aims to review the problem of colour in textile effluents, the different classes of dyes available and their contribution to the problem. Through new regulations, pressure is being placed on water companies all over the world to reduce the amount of colour in sewage effluent. Dyes exhibit low toxicity to mammals and aquatic organisms and therefore colour consents are normally applied for aesthetic and industrial reasons rather than for prevention of toxicity. The absorbance, ADMI values and concentrations of dyes in effluent are examined here with particular reference to reactive azo dyes used in cotton processing. Colour consents, the problem of colour in textile wastewaters and the importance for research in this area are also discussed. Dye concentrations of 0.01 g dm-3 up to 0.25 g dm-3 have been cited as being present in dyehouse effluent, depending on the dyes and processes used. ADMI values ranged from 50 to 3890 units for the dyeing of cotton. It was concluded that 1500 ADMI units was a reasonable value to aim for when simulating coloured effluents. Simulated textile effluents may be used for research purposes. These should resemble real wastes as closely as possible, but it is often difficult to replicate the ADMI values, absorbance and spectra of real effluents. The concentrations of dye used in simulated effluents examined in literature varied from 0.01 g dm-3 to 7 g dm-3. As absorbance and ADMI values change with the types of dye used, it is difficult to relate these values to dye concentrations. A concentration of 0.18 g dm-3 of a Red or Yellow dye or 0.43 g dm-3 of a blue dye would provide an ADMI of approximately 1500 units and fits within the range of dye concentrations presented in literature. A dye mixture simulating colour in a real textile effluent is suggested and some limitations of simulating actual wastewaters discussed. (C) 1999 Society of Chemical Industry.

Keywords: Colour, Absorbance, Admi, Textile Effluent, Dye, Consents, Waste-Water Treatment, Reactive Dyes, Azo-Dye, Decolorization, Removal, Wastewaters, Secondary, Industry, Ozone

Cox, M., EI-Shafey, E.I., Pichugin, A.A. and Appleton, Q. (1999), Preparation and characterisation of a carbon adsorbent from flax shive by dehydration with sulfuric acid. *Journal of Chemical Technology and Biotechnology*, **74** (11), 1019-1029.

Full Text: [J\J Che Tec Bio74, 1019.pdf](J/J%20Che%20Tec%20Bio74,%201019.pdf)

Abstract: A carbon adsorbent has been prepared from flax shive by treatment with sulfuric acid. Several factors have been considered in the preparation: reaction time, temperature, and the amount and concentration of sulfuric acid. The optimised conditions of preparation were based on the cation exchange capacity, yield and sorption performance for the metals cadmium and mercury(II). These two metals behave differently when adsorbed on the carbon. Thus cadmium sorption follows the cation exchange capacity data and the optimum conditions for preparing the carbon for this and other metals sorbed by an ion exchange mechanism were: 12 moldm-3 sulfuric acid at a ratio of 1 : 9 (weight flax shive : volume acid), 25-30 min reaction time at 200 ºC. Similar preparative conditions were found to give the optimum results for mercury sorption except that in this case, the temperature was 160 ºC. The sorbent shows a much higher uptake for mercury than cadmium, which suggests that the sorption mechanism for mercury sorption is not only ion exchange. The sorbents retained a high level of moisture (> 80%), and elemental analysis shows very low amounts of sulfur (~ 1%). Scanning electron microscopy shows that the carbon retains the fibrous texture of the original shive and X-ray diffraction shows that the carbons are amorphous. The presence of carboxyl, carbonyl and hydroxyl (or phenolic) groups is confirmed by infra-red spectroscopy. © 1999 Society of Chemical Industry

Keywords: Sorption, Carbon, Sulfuric Acid, Heavy Metals, Flax Shive, Environmental Remediation

Addour, L., Belhocine, D., Boudries, N., Comeau, Y., Pauss, A. and Mameri, N. (1999), Zinc uptake by *Streptomyces rimosus* biomass using a packed-bed column. *Journal of Chemical Technology and Biotechnology*, **74** (11), 1089-1095.

Full Text: [J\J Che Tec Bio74, 1089.pdf](J/J%20Che%20Tec%20Bio74,%201089.pdf)

Abstract: The ability of *Streptomyces rimosus* biomass to bind zinc ions in batch mode was shown recently. The aim of this study was to determine the zinc uptake capacity by *Streptomyces rimosus* biomass in continuous mode. Bacterial biomass was able to bind more Zn(II) after pretreatment with sodium hydroxide (1 mol dm−3) than without treatment. The maximum adsorption capacity and the adsorption capacity at the saturation point calculated by means of both the exchange zone model and the Thomas model were practically identical of about 2.9 mgZn(II) g−1biomass. This result was lower than the batch adsorption capacity of *Streptomyces rimosus*, indicating that the packed-bed is not the most appropriate process to exploit the bacterial biomass adsorption capacity. The effect of zinc concentration in the range of 10 to 200 mgZn(II) dm−3 on the biosorption capacity of the packed-bed was not significant. Biomass regeneration with 0.1 mol dm−3 HCl gave a 90% recovery of the adsorbed Zn(II). © 1999 Society of Chemical Industry

Keywords: Zinc, *Streptomyces rimosus*, Biosorption, Column, Pollution Control

Garrote, G., Domínguez, H. and Parajó, J.C. (1999), Mild autohydrolysis: An environmentally friendly technology for xylooligosaccharide production from wood. *Journal of Chemical Technology and Biotechnology*, **74** (11), 1101-1109.

Full Text: [J\J Che Tec Bio74, 1101.pdf](J/J%20Che%20Tec%20Bio74,%201101.pdf)

Abstract: *Eucalyptus globulus* wood samples were subjected to hydrothermal treatments under mild operational conditions (145-190 C, liquor to solid ratio 6-10 g g-1, reaction times up to 7.5 h). Residual xylan, xylooligosaccharides, other sugars, furfural, glucan and lignin contents were determined. Negligible effects were caused by hydrothermal treatments on both cellulose and lignin. Kinetic models were developed which describe the hydrolysis of hemicelluloses. Xylan degradation, xylooligosaccharide and xylose generation, and xylose dehydration to furfural were accurately described by models based on pseudohomogeneous, first-order kinetics with Arrhenius-type temperature dependence. These models are useful for a technical evaluation of this environmentally friendly technology.

Keywords: Autohydrolysis, *Eucalyptus Globules*, Hydrothermal Treatments, Xylan, Xylooligosaccharides, Wood

Wafwoyo, W., Seo, C.W. and Marshall, W.E. (1999), Utilization of peanut shells as adsorbents for selected metals. *Journal of Chemical Technology and Biotechnology*, **74** (11), 1117-1121.

Full Text: [J\J Che Tec Bio74, 1117.pdf](J/J%20Che%20Tec%20Bio74,%201117.pdf)

Abstract: Peanut shells of mesh size 10-20 were modified by combinations of treatments following a 32 factorial design. Treatments consisted of either no wash, water wash or base wash followed by no modification or modification with 0.6M citric acid or 0.6M phosphoric acid. The nine samples were evaluated for their uptake of five metal ions (Cd(II), Cu(II), Ni(II), Pb(II) and Zn(II)) from solution. The results were compared with metal ion adsorption by three commercial cation exchange resins, namely, Amberlite (R) 200, Amberlite (R) IRC 718 and Duolite (R) GT-73. The percent of metal ions adsorbed per gram of adsorbent was significantly increased by each of the acid treatments, average values ranged from 19 to 34% compared with non-acid treated samples at 5.7%. The percent of metal ions adsorbed for base-washed samples were higher than water-washed or unwashed shells. Interaction between wash and acid treatment was not significant for most of the experimental conditions used. Acid-treated samples were as effective as Duolite (R) GT-73 in the adsorption of Cd(II) and almost twice as effective in the adsorption of Zn(II) from solutions containing a single metal ion. In solutions containing multiple metal ions, citric acid samples were found to be most effective and selective for Cu(II) compared with Cd(II), Ni(II), and Zn(II). In general, phosphoric acid-modified shells removed the most metals from solution for the experimental samples and were more effective in removing Cd(II) and Zn(II) than two of the three commercial resins. Acid-modified peanut shells are promising as metal ion adsorbents.

Keywords: Ion-Exchange Properties, Aqueous-Solution, By-Products, Removal, Citrate, Peanut Shells, Adsorbents, Metals Ions

Grimes, S.M., Taylor, G.H. and Cooper, J. (1999), The availability and binding of heavy metals in compost derived from household waste. *Journal of Chemical Technology and Biotechnology*, **74** (12), 1125-1130.

Full Text: [J\J Che Tec Bio74, 1125.pdf](J/J%20Che%20Tec%20Bio74,%201125.pdf)

Abstract: Organic waste can be recycled as compost which has traditionally been used as a soil improver. As more waste is recycled as compost, it is becoming increasingly important to find alternative uses for compost. Leachability data are used to determine the environmental availability of Cd, Cu, Pb, and Zn contained in natural compost. Batch sorption data are used to determine uptake of additional Cd, Cu, Pb, and Zn by compost and assess its potential use in remediation work, as an alternative to natural materials such as peat. The relative binding of these additional metals to compost is found to be in the order Pb > Cd approximate to Cu > Zn. The sorption of metals on compost takes place, at least in part, by exchange of calcium bound to the compost and there is evidence that the sorption occurs in both humic and non-humic sites in the compost. The use of compost to bind metals in remediation work is discussed. (C) 1999 Society of Chemical Industry.

Keywords: Compost, Heavy Metals, Availability, Binding, Remediation, Municipal Solid-Waste, Water, Peat

Altin, O., Ozbelge, O.H. and Dogu, T. (1999), Effect of pH, flow rate and concentration on the sorption of Pb and Cd on montmorillonite: I. Experimental. *Journal of Chemical Technology and Biotechnology*, **74** (12), 1131-1138.

Full Text: [J\J Che Tec Bio74, 1131.pdf](J/J%20Che%20Tec%20Bio74,%201131.pdf)

Abstract: Continuous column adsorption of lead (Pb) and cadmium (Cd) was studied using pH adjustment and calcium-saturated montmorillonite in a short stainless steel column. Changing either pH or flow rate, while keeping inlet concentration of the ions constant, led to considerable changes in effluent concentrations and breakthrough curves (BTCs). At low pH values (2-4), H+ ions competed strongly with lead and cadmium ions; at intermediate pH (4-6), ionic size played the major role in adsorption and ion exchange and at high pH (6-9) precipitation was the major process taking place especially for lead sorption. At low flow rates less than 0.5 cm3 min−1, sorption of both lead and cadmium increased due to the long retention time in the column. When both lead and cadmium ions were present in the feed, adsorption remained the same while that of cadmium decreased compared with single ion experiments. © 1999 Society of Chemical Industry

Keywords: pH, Lead, Cadmium, Breakthrough Curve, Continuous Column, Montmorillonite, Ion Exchange

Altin, O., Ozbelge, O.H. and Dogu, T. (1999), Effect of pH, flow rate and concentration on the sorption of Pb and Cd on montmorillonite: II. Modelling. *Journal of Chemical Technology and Biotechnology*, **74** (12), 1139-1144.

Full Text: [J\J Che Tec Bio74, 1139.pdf](J/J%20Che%20Tec%20Bio74,%201139.pdf)

Abstract: A mathematical model is proposed and compared with experimental data for the migration of heavy metal ions (Pb and Cd) during the flow of aqueous solutions through calcium-saturated montmorillonite packing. The main system parameters are pH, flow rate and concentration. It is assumed that the Liquid phase in the porous montmorillonite can be divided into two regions, mobile and immobile; that adsorption and ion exchange on the clay surface are instantaneous, and that adsorption isotherms are Linear throughout the modelling considered. The Ranges of experimental parameters are: pH 2.5-7.3, solution flow rate of 0.1-1 cm3 min-1 and heavy metal concentrations of 5-10 ppm. Breakthrough curves (BTCs) obtained experimentally are affected by changes in pH and flow rates. Between pH 2.5 and 4, the model equations describe the process quite well but from 4 to 7 a large deviation between the model and experimental data is observed due to precipitation of metals.

Keywords: Impregnated Macroporous Resins, Particle Diffusion Kinetics, Solute Transport, Porous-Media, Aggregated Oxisol, Chemical-Reaction, Metal Sorption, Ion-Exchange, Soils, Adsorption, Adsorption, Ion Exchange, Lead, Cadmium, Montmorillonite Convective Dispersive Transport

Kim, J.S. and Yi, J.H. (2000), Selective removal of copper ions from multicomponent aqueous solutions using modified silica impregnated with LIX 84. *Journal of Chemical Technology and Biotechnology*, **75** (5), 359-362.

Full Text: [J\J Che Tec Bio75, 359.pdf](J/J%20Che%20Tec%20Bio75,%20359.pdf)

Abstract: A silica support impregnated with 2-hydroxy-5-nonylacetophenone oxime (LIX 84) was prepared after surface modification by gamma-aminopropyltriethoxysilane. Fixed-bed tests were conducted to investigate the capabilities of the prepared adsorbent with respect to the selective removal of copper ions from multi-metalsolutions. Break-through curves were obtained using the modified silica for a solution containing Cu2+, Cd2+, Ni2+, Co2+ and Zn2+, as well as an industrial electronics wastewater sample. The copper adsorption capacities for the multi-metalsolution and the wastewater were 0.175 and 0.198 mmolg-1, respectively under the conditions used in this study. The copper recovery ratios for the modified silica treated with the multi-metalsolution and the wastewater were 86 and 91%, respectively after treating with 0.1 moldm-3 HNO3. The results show that the modified silica, prepared here, has potential value for the selective removal of copper ions from multi-component aqueous solutions containing multi-metals using a fixed-bed reactor.

Keywords: Immobilized 8-Hydroxyquinoline, Acid, Separation, Phase, Silica, Impregnation, LIX 84, Fixed-Bed, Copper, Clean-Up, Electronics’ Wastewater

Özer, D., Özer, A. and Dursun, G. (2000), Investigation of zinc(II) adsorption on *Cladophora crispata* in a two-staged reactor. *Journal of Chemical Technology and Biotechnology*, **75** (5), 410-416.

Full Text: [J\J Che Tec Bio75, 410.pdf](J/J%20Che%20Tec%20Bio75,%20410.pdf)

Abstract: In this study, the adsorption of zinc(II) ions on *Cladophora crispata*, a green alga, was studied with respect to initial pH, temperature, initial metal ion and biomass concentration in order to determine the optimum adsorption conditions. Optimum initial pH values for zinc(II) ions were found to be 5.0 at optimum temperature, 25°C. The initial adsorption rates increased with increasing initial zinc(II) ion concentration up to 100 mgdm-3. The Freundlich and Langmuir adsorption isotherms were developed at various initial pH and temperature values. Then, the adsorption of zinc(II) ions to C crispata was investigated in a two-staged mixed batch reactor. The residual metal ion concentrations (Ceq) at equilibrium at each stage for a given quantity of dried algae (X-o)/volume of solution containing heavy metal ion (V-o) ratio were calculated by using Freundlich and Langmuir isotherm constants, it was observed that the experimental biosorption equilibrium data for zinc(II) ions are in good agreement with those calculated using both Freundlich and Langmuir models. The adsorbed zinc(II) ion concentration increased with increasing X-o/V-o ratios while the adsorbed metal quantities per unit mass of dried algae decreased.

Keywords: Alga *Chlorella-Vulgaris*, *Rhizopus-arrhizus*, Biosorption, Biomass, Isotherms, Mechanism, Recovery, Uranium, Cadmium, Nickel, Adsorption, Isotherm, Waste Water, Multi-Staged Reactor

Cox, M., El-Shafey, E.I., Pichugin, A.A. and Appleton, Q. (2000), Removal of mercury(II) from aqueous solution on a carbonaceous sorbent prepared from flax shive. *Journal of Chemical Technology and Biotechnology*, **75** (6), 427-435.

Full Text: [J\J Che Tec Bio75, 427.pdf](J/J%20Che%20Tec%20Bio75,%20427.pdf)

Abstract: Treatment of flax shive with sulfuric acid produced a carbonaceous material which has been used to remove mercury(II) from aqueous solution. The kinetics of sorption follows a first order reaction equation with the rate of sorption being higher for the wet material than for that which had been previously dried. Sorption of mercury depends on the pH of the aqueous solution with maximum uptake occurring in the pH range 6-7. Sorption capacity also increases with the increase of temperature. The presence of other metal ions such as K+, Na+, Mg2+ and Ca2+ decreases Hg(II) uptake capacity. A high capacity which exceeds the cation exchange capacity was observed, cumulative Hg(II) sorption exceeding 1 g g−1. This arises from the reduction of mercury(II) to mercury(I) chloride and elemental mercury from chloride media and to elemental mercury from nitrate media. This was confirmed from the identification of deposits on the carbon surface by scanning electron microscopy and X-ray diffraction. The reduction of mercury was accompanied by the oxidation of the carbon which was confirmed by the evolution of carbon dioxide. This observation was also supported by changes in the infra-red spectrum of the carbon after reaction. The sorption mechanism is discussed. © 2000 Society of Chemical Industry

Keywords: Mercury, Sorption, Carbon, Dehydration, Reduction, Flax

Aguado, R., Olazar, M., Barona, A. and Bilbao, J. (2000), Char-formation kinetics in the pyrolysis of sawdust in a conical spouted bed reactor. *Journal of Chemical Technology and Biotechnology*, **75** (7), 583-588.

Full Text: [J\J Che Tec Bio75, 583.pdf](J/J%20Che%20Tec%20Bio75,%20583.pdf)

Abstract: Both the generation of a microporous structure and char formation kinetics have been studied in the pyrolysis of sawdust of Pinus insignis in a conical spouted bed reactor, in the range 350-700°C. The BET surface area (representative of the physical evolution of the solid) and the C, H ratio of the solid (representative of the chemical structural change) have been taken as conversion indices. From the measurement of the C, H ratio of the solid (the more significant variable), it has been determined that the reaction order is 0.5 and that the kinetic constant is between 0.18 min-1 at 350°C and 1.26 min-1 at 700°C. However the value of the constant is almost independent of temperature, at 1 min-1 in the range 500-700°C. (C) 2000 Society of Chemical Industry

Keywords: Activated Carbons, Adsorption, Biomass, Char, Char Properties, CO2, Flash Pyrolysis, Kinetic, Kinetics, Pyrolysis, Sawdust, Sawdust Pyrolysis, Spouted Bed, Surface Area, Yield

Villaescusa, I., Martínez, M. and Miralles, N. (2000), Heavy metal uptake from aqueous solution by cork and yohimbe bark wastes. *Journal of Chemical Technology and Biotechnology*, **75** (9), 812-816.

Full Text: [J\J Che Tec Bio75, 812.pdf](J/J%20Che%20Tec%20Bio75,%20812.pdf)

Abstract: In this work the ability of cork and yohimbe bark wastes to remove Cu(II) and Ni(II) from aqueous solutions has been studied. The influence of pH, sodium chloride and metal concentration on metal uptake was investigated. Metal uptake showed a pH-dependent profile. Maximum sorption for both metals was found to occur at around pH 6-7. In the case of cork an increase of sodium chloride concentration provoked a decrease in metal removal. Adsorption isotherms at the optimum pH were expressed by the non-competitive Langmuir adsorption model, and model parameters were determined. It was seen that the adsorption equilibrium data fitted very well to the model in the concentration range studied. When comparing both biomaterials, yohimbe bark waste was found to be the most efficient adsorbent for both metals studied. (C) 2000 Society of Chemical Industry.

Keywords: Adsorbent, Adsorption, Bark, Biomass, Biomaterials, Biosorption, Copper, Cork, Cork Wastes, Ions, Langmuir, Metal, Metal Removal, Metal Uptake, Metals, Nickel, Removal, Sorption, Waste, Water, Yohimbe Bark Wastes

Aksu, Z. and Dönmez, G. (2000), Combined effects of sucrose and copper(II) ions on the growth and copper(II) bioaccumulation properties of *Candida sp*. *Journal of Chemical Technology and Biotechnology*, **75** (9), 847-853.

Full Text: [J\J Che Tec Bio75, 847.pdf](J/J%20Che%20Tec%20Bio75,%20847.pdf)

Abstract: A microbiological process using Candida sp was developed for the removal of copper(II) ions in the presence of molasses as nutrient. The combined effects of sucrose (in molasses) and copper(II) ions on the growth and copper(II) bioaccumulation properties of adapted Candida cells was tested under laboratory conditions as a function of initial pH and single-sucrose and dual-sucrose and copper(II) ion concentrations. The optimum pH value for maximum growth and metal ion accumulation was determined as 4.0 for the microorganism. At a constant copper(II) concentration, growth and copper(II) bioaccumulation increased with increasing concentrations of molasses sucrose up to 15 gdm-3. Although increased initial copper(II) concentration increased the copper(II) uptake capacity of the microorganism, inhibition by copper(II) ions of the growth of Candida sp was observed at all the concentrations of copper(II) at all the sucrose concentrations studied. The non-competitive inhibition kinetics (assuming copper(II) ions as the toxic inhibitory component) were used to define the relationship between the specific growth rate and molasses sucrose and copper(II) concentrations and model parameters were determined by using experimental data. (C) 2000 Society of Chemical Industry.

Keywords: Bioaccumulation, Copper(II), Sucrose, Molasses, Inhibition, Candida sp, Wastewater Treatment, Dilute Aqueous-Solutions, *Saccharomyces-Cerevisiae*, Metal-Ions, Biosorption, Removal, Cu(II), Cr(VI), Water

Cheung, C.W., Porter, J.F. and McKay, G. (2000), Elovich equation and modified second-order equation for sorption of cadmium ions onto bone char. *Journal of Chemical Technology and Biotechnology*, **75** (11), 963-970.

Full Text: [J\J Che Tec Bio75, 963.pdf](J/J%20Che%20Tec%20Bio75,%20963.pdf)

Abstract: The removal of cadmium ions from water by sorption onto bone char has been studied. Bone char, traditionally used for colour removal in sugar refining, is produced by the carbonisation of animal bone. Batch experiments were carried out to study the effects of initial cadmium ion concentration and bone char mass on the sorption rate. The experimental contact data were analysed using the Elovich model, previously used to describe the kinetics of gas adsorption on solids, and the Ritchie model, a modified second-order kinetics equation. Initial analysis of the data, using the Ritchie model, was poor and therefore a modification was incorporated to make the Ritchie model predictions correlate the experimental data more accurately. Both the Elovich and modified Ritchie equations accurately predict the sorption capacity of cadmium on bone char, however, the sorption kinetics, derived from the differential forms of the two equations, were correlated better using the Elovich equation. (C) 2000 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorption, Adsorption Rates, Analysis, Aqueous-Solutions, Bone Char, Cadmium, Capacity, Char, Colour, Colour Removal, Concentration, Elovich Equation, Fly-Ash, Heavy-Metals, Industry Waste-Water, Ion, Isotherms, Kinetics, Model, Modification, Modified, Peanut Hull Carbon, Peat, Predict, Predictions, Removal, Second-Order Equation, Second-Order Kinetics, Sorption, Sorption Capacity, Sorption Kinetics, Sugar, Water

Nakajima, A. and Sakaguchi, T. (2000), Uptake and removal of iron by immobilised persimmon tannin. *Journal of Chemical Technology and Biotechnology*, **75** (11), 977-982.

Full Text: [J\J Che Tec Bio75, 977.pdf](J/J%20Che%20Tec%20Bio75,%20977.pdf)

Abstract: Persimmon tannin was immobilised with formaldehyde (the aldehyde gel) and potassium peroxodisulfate (the persulfate gel). The resulting gels have high abilities to adsorb iron. The persulfate gel can adsorb iron from both iron(II) and iron(III) solutions with high efficiency. The adsorption of iron(III) by the persulfate gel was rapid and was affected by the solution pH, the concentration of iron in solution, and the mass of adsorbent. Adsorbed iron was easily desorbed with 0.1 mol dm-3 HCL solution. The gel can be repeatedly re-used for iron recovery using the adsorption-desorption cycle. The persulfate gel could remove trace amounts of iron in a sake-brewing water to facilitate the production of high quality sake. (C) 2000 Society of Chemical Industry.

Keywords: Immobilised Persimmon Tannin, Iron Removal, Adsorption, Metal-Ions

Chu, K.H. and Hashim, M.A. (2000), Adsorption of copper(II) and EDTA-chelated copper(II) onto granular activated carbons. *Journal of Chemical Technology and Biotechnology*, **75** (11), 1054-1060.

Full Text: [J\J Che Tec Bio75, 1054.pdf](J/J%20Che%20Tec%20Bio75,%201054.pdf)

Abstract: Waste streams generated by electroless copper plating in the printed circuit boards manufacturing industry often contain copper complexed by strong chelating agents such as EDTA. The consequence of metal complexation by chelating agents is that alternative treatment to chemical precipitation is often necessary to achieve the low metal concentrations required by increasingly stringent environmental regulations. This paper examines the feasibility of using activated carbon to remove EDTA-chelated copper(II) species as well as free copper(II) ions from aqueous solution. The adsorption characteristics of copper(II) and EDTA-chelated copper(II) on two granular activated carbons prepared from coal and coconut shell were evaluated. Adsorption equilibrium data of copper(II) on the two carbons corresponded well to the Langmuir model. The coconut shell-based carbon exhibited a greater adsorption capacity for copper(II) than the coal-based carbon under similar experimental conditions. Solution pH had a considerable influence on copper(II) adsorption by the two carbons. Low adsorption levels of copper(II) at pH 3 and high adsorption levels in the pH range of 4-6 were observed. However, a reverse adsorption trend was observed when the chelating agent EDTA was added to the copper(II) solution. Adsorption of EDTA-chelated copper(II) by the two carbons was higher at pH 3 than at pH 6. The contrasting adsorption behaviour of copper(II) ions and EDTA-chelated copper(II) species can be readily explained in terms of electrostatic interaction in that solution pH influences the surface charge of the carbons as well as the charge property of copper(II) ions and EDTA-chelated copper(II) species.

Keywords: Adsorption, Copper, EDTA, Activated Carbon

Hsieh, C.T. and Teng, H.S. (2000), Langmuir and Dubinin-Radushkevich analyses on equilibrium adsorption of activated carbon fabrics in aqueous solutions. *Journal of Chemical Technology and Biotechnology*, **75** (11), 1066-1072.

Full Text: [J\J Che Tec Bio75, 1066.pdf](J/J%20Che%20Tec%20Bio75,%201066.pdf)

Abstract: The present study investigated the adsorption of phenol, iodine and tannic acid onto activated carbon fabrics in aqueous solutions. The carbon fabrics were made of polyacrylonitrile with different extents of activation in steam. The increasing extent of activation is accompanied by increasing carbon porosity as well as liquid-phase adsorption capacity. Langmuir and Dubinin-Radushkevich (D-R) models were employed to analyze the equilibrium adsorption data. The fractional filling of carbon micropores and the mean free energy for adsorption were estimated according to these models. It is suggested on the basis of the present work that the mesopore fraction of the fabrics, the extent of carbon activation, and the adsorbate size are important as well as competitive factors determining the adsorption capacity. Both the equilibrium constant and free energy for adsorption increase with the mesopore fraction, indicating that the mesopores promote the adsorption onto high energy sites, whereas the fraction filling micropores decreases with the extent of carbon activation and the size of the adsorbates. (C) 2000 Society of Chemical Industry.

Keywords: Activated Carbon Fabric, Adsorption, Interface, Porous Media, Separation, Solutions, Liquid-Phase Adsorption, Fibers, Coal

Doulia, D., Rigas, F. and Gimouhopoulos, C. (2001), Removal of amino acids from water by adsorption on polystyrene resins. *Journal of Chemical Technology and Biotechnology*, **76** (1), 83-89.

Full Text: [J\J Che Tec Bio76, 83.pdf](J/J%20Che%20Tec%20Bio76,%2083.pdf)

Abstract: The adsorption of eight amino acids, L-asparagine, D, L-threonine, L-lysine, L-leucine D, L-methionine, L-tyrosine, L-phenylalanine and D, L-tryptophan, on the non-polar macroporous adsorbents Amberlite XAD-2 and XAD-4 (polystyrene-divinylbenzene copolymers) was studied. Equilibrium adsorption experiments were conducted to estimate the types of isotherm and their parameters. The effect the chemical composition and structure of the amino acids on the efficiency of adsorption was evaluated. The influence of pH and ionic strength was also studied. The data of adsorption isotherms of the examined amino acids seemed generally to approach the Freundlich isotherm model. Tryptophan isotherm adsorption data could match in some cases the Langmuir model. The majority of the adsorption isotherms were almost linear. In terms of adsorbed amino acid on both resin surfaces, the amino acids can be ranked thus: D, L-tryptophan > L-phenylalanine > D, L-methionine, L-tyrosine > L-leucine > L-lysine > D, L-threonine > L-asparagine. In low pH solution, adsorption was generally higher than that at intermediate and high pH values. Generally, as the ionic strength increases, the adsorption of the amino acids increases. (C) 2001 Society of Chemical Industry.

Keywords: Equilibrium Adsorption, Amino Acids, Polystyrene-Divinylbenzene Resin, Performance Liquid-Chromatography, Polymeric Resins, Activated Carbon, Ion-Exchange, Separation, Derivatives, Peptides

Tan, T.W., He, X.J. and Du, W.X. (2001), Adsorption behaviour of metal ions on imprinted chitosan resin. *Journal of Chemical Technology and Biotechnology*, **76** (2), 191-195.

Full Text: [J\J Che Tec Bio76, 191.pdf](J/J%20Che%20Tec%20Bio76,%20191.pdf)

Abstract: A new method for preparation of metal ion imprinted chitosan resin, which can considerably enhance the adsorption capacity and selectivity of the metal ion is presented in this paper. The conditions influencing the preparation of chitosan imprinted resin such as the cross-linking agent, epichlororohydrin and ethylene glycol diglycidyl ether, and metal ion concentration are optimized. The chemical and the physical stability are also discussed and the imprinted chitosan resin can be used many times without losing adsorption capacity. The adsorption isotherms were studied and a new model was suggested to correlate the relationship of adsorption with pH and metal ion concentration. (C) 2001 Society of Chemical Industry.

Keywords: Chitosan, Molecular Imprinting, Metal Ion, Resin

Niu, H. and Volesky, B. (2001), Gold adsorption from cyanide solution by chitinous materials. *Journal of Chemical Technology and Biotechnology*, **76** (3), 291-297.

Full Text: [J\J Che Tec Bio76, 291.pdf](J/J%20Che%20Tec%20Bio76,%20291.pdf)

Abstract: Adsorption of AuCN2- by chitinous materials such as acid-washed crab-shells burnt crab-shells, as well as by chitin modified by quaternization of amine was affected by the pH of the sorption system. The maximum AuCN2- uptake by acid-washed crab-shells occurred at pH 3.7 corresponding to a final Au concentration of 0-0.025mM. While this material did not bind any AuCN2- at pH 10, crab-shells burnt in a non-oxidizing atmosphere removed 90% of the metal under these alkaline conditions. SEM with EDXA analysis of the biosorbent showed that the heat treatment changed the ratio of C/O and created a highly porous material structure. FTIR results indicated that phenolic groups were the main sites responsible for AuCN2- binding on burnt acid-washed shells. Chitin, the main component of crab-shells, was modified by grafting tertiary amine to C-3 and C-6 on chitin to create quaternary amine groups. The presence of quaternary amine groups also made AuCN2- uptake possible at pH10. The results confirmed that certain chitinous materials are capable of effectively removing and concentrating anionic gold cyanide from both acidic and alkaline solutions if pretreated by appropriate physical or chemical methods. (C) 2001 Society of Chemical Industry.

Keywords: Biosorption, Gold-Cyanide, Crab-Shells, Chitin, Quaternary Amine, Biosorption

? Chamarthy, S., Seo, C.W. and Marshall, W.E. (2001), Adsorption of selected toxic metals by modified peanut shells. *Journal of Chemical Technology and Biotechnology*, **76** (6), 593-597.

Full Text: [2001\J Che Tec Bio76, 593.pdf](2001/J%20Che%20Tec%20Bio76,%20593.pdf)

Abstract: The objective of this study was to modify peanut shells to enhance their adsorptive properties toward the metal ions cadmium (Cd2+), copper (Cu2+), nickel (Ni2+), lead (Pb2+) and zinc (Zn2+). Milled peanut shells were initially washed with water or 0.1N NaOH or left unwashed. Following these treatments or lack of treatment, the shells were either left unmodified or modified by a heat treatment in the presence of either 1.0M phosphoric acid or 0.6M citric acid. Modified peanut shells were evaluated either for adsorption efficiency or for adsorption capacity using the five metal ions listed above. Adsorption efficiencies and capacities were compared with efficiencies and/or capacities for the commercial chelating or cation exchange resins Amberlite 200, Amberlite IRC-718, Duolite GT-73, and carboxymethylcellulose. For the adsorption efficiencies of individual metal ions, modified peanut shells met or exceeded the adsorption values for cadmium, copper, nickel or zinc ions compared with the commercial resins Duolite GT-73 and carboxymethylcellulose. In a solution containing all five metal ions, modified peanut shells met or exceeded the adsorption efficiencies for cadmium, copper and lead ions compared with Duolite GT-73, Amberlite IRC-718 and carboxymethylcellulose. Adsorption capacities of modified peanut shells met or exceeded the adsorption capacity of Duolite GT-73 for lead ions only. Citric or phosphoric acid-modified peanut shells showed a preference for Cu2+ and Pb2+ and appear promising as potentially inexpensive adsorbents for selected metal ions. (C) 2001 Society of Chemical Industry.

Keywords: Adsorbents, Adsorption, Aqueous-Solution, Cadmium, Capacity, Citric Acid, Copper, Cu2+, Efficiency, Heat Treatment, Heat-Treatment, Hull Carbon, Industry Waste-Water, Lead, Lead Ions, Metal Ions, Metals, Modified, Nickel, Peanut, Peanut Shells, Phosphoric Acid, Properties, Removal, Resins, Treatment, Water, Zinc

Sivasamy, A., Singh, K.P., Mohan, D. and Maruthamuthu, M. (2001), Studies on defluoridation of water by coal-based sorbents. *Journal of Chemical Technology and Biotechnology*, **76** (7), 717-722.

Full Text: [J\J Che Tec Bio76, 717.pdf](J/J%20Che%20Tec%20Bio76,%20717.pdf)

Abstract: Drinking water containing fluoride above a level of 1 mg dm-3 is considered to be unsafe for human consumption. Higher intake of fluoride can cause potential health hazards. The conventional processes of fluoride removal from water are ion exchange, reverse osmosis and electro-dialysis. However, the utility of these processes has been limited due to their expensive operation and subsequent disposal problem of the waste brine generated. Defluoridation of water samples by coal-based sorbents was studied at different adsorbent dosages. First-order adsorption rate constants using the Lagergren equation, the Freundlich adsorption isotherm, the Langmuir adsorption isotherm, film diffusion and pore diffusion coefficients have been evaluated for each system. The effect of pH on fluoride removal and the mechanism has also been discussed. Copyright (C) 2001 Society of Chemical Industry.

Keywords: Coal-Sorbents, Freundlich Adsorption Isotherm, Langmuir Adsorption Isotherm, Film Diffusion, Pore Diffusion, Defluoridation, Removal, Adsorption, Acid

Khalil, L.B., Girgis, B.S. and Tawfik, T.A.M. (2001), Decomposition of H2O2 on activated carbon obtained from olive stones. *Journal of Chemical Technology and Biotechnology*, **76** (11), 1132-1140.

Full Text: [J\J Che Tec Bio76, 1132.pdf](J/J%20Che%20Tec%20Bio76,%201132.pdf)

Abstract: Activated carbons were prepared from olive oil solid wastes by treatment in different schemes: impregnation with H3PO4 followed by pyrolysis at 300-700 degreesC, by steam pyrolysis at 600-700 degreesC, or by conventional steam activation at 850 degreesC. Porosity characteristics were determined by analysis of nitrogen adsorption isotherms, and carbons of widely different properties and surface pH values were obtained. Decomposition of H2O2 in dilute unbuffered solution was followed by measuring evolved oxygen volumetrically. First- order kinetics was followed, and the catalytic rate coefficients were evaluated. The carbons tested showed appreciable activity where evolved oxygen attained approximate to 10% of the stoichiometric amount in I h. The degree of decomposition showed inverse dependence on surface area, pore volume and mean pore dimensions. The chemical nature of the surface, rather than the porosity characteristics, was the principal factor in enhancing the disproportionation of H2O2 on the activated carbon surface. (C) 2001 Society of Chemical Industry.

Keywords: Activated Carbon, H2O2 Decomposition, Porosity, Surface Acidity, Hydrogen-Peroxide

Artola, A., Martin, M.J., Balaguer, M. and Rigola, M. (2001), Pilot plant biosorption in an integrated contact-settling system: Application to Cu(II) removal by anaerobically digested sludge. *Journal of Chemical Technology and Biotechnology*, **76** (11), 1141-1146.

Full Text: [J\J Che Tec Bio76, 1141.pdf](J/J%20Che%20Tec%20Bio76,%201141.pdf)

Abstract: Surplus biological sludge can be used as a low-cost adsorbent in the removal of heavy metal from wastewater. A three-zone contact-settling pilot plant was designed and operated to maintain continuous sludge-metal solution contact and subsequent separation of solid-liquid phases, all in the same vessel. Mild agitation was used to ensure good contact between Cu(II) and sludge without impairing solid-liquid separation. Heavy metal removal efficiency was largely unaffected by an increase in the Cu/sludge feed ratio as long as metal binding sites in the sludge remained unsaturated. Maximum metal uptake (75 mg Cu(II) g−1 of total solids in the sludge) was found for Cu/sludge feed ratios ≥ 90 mg Cu(II) g−1 of total solids. Pilot plant metal sorption uptake at different operational conditions correlated well with the calculated values from batch equilibrium adsorption isotherms. The amount of Cu(II) adsorbed on sludge influenced the degree of clarification due to the flocculating effect of Cu(II). Under operational conditions, a high degree of heavy metal removal and efficient clarification were achieved. Pilot plant operation at a Cu/sludge feed ratio around 90 mg Cu(II) g−1 of total solids allowed efficient use of the biosorbent and high heavy metal removal efficiency in addition to a good quality metal-free effluent in terms of low total suspended solids content. © 2001 Society of Chemical Industry

Keywords: Copper Removal, Biosorption, Digested Sludge, Sludge Flocculation, Pilot Plant

Vengris, T., Binkienė, R. and Sveikauskaitė, A. (2001), Electrokinetic remediation of lead-, zinc- and cadmium-contaminated soil. *Journal of Chemical Technology and Biotechnology*, **76** (11), 1165-1170.

Full Text: [J\J Che Tec Bio76, 1165.pdf](J/J%20Che%20Tec%20Bio76,%201165.pdf)

Abstract: Electrokinetic remediation of lead-, zinc- and cadmium-contaminated sand and clayey soils has been investigated under laboratory-scale conditions. Soil extracts of heavy metals (by 1 M HCl solution) were analysed by optical emission spectrometry. The efficiency of electrochemical remediation was partially dependent on the pH of the soil media. With pH increase, the migration of heavy metal ions toward the cathode was limited. When acetic acid was added to the sandy soil, almost complete remediation was achieved. A clay layer inserted in the cathode area did enhance the remediation rate. The most effective clean-up was achieved for zinc and cadmium, with less effective clean-up being achieved for lead. The effectiveness of the electrokinetic remediation of heavy metal-contaminated clayey soil was low. The appropriate acidity was not achieved using acetic acid because of the high buffering capacity of clay, and metal ion migration was impeded by its sorption onto some clay components. The conclusion was made that clays could be used as immobilizing media for heavy metal ions by electrokinetic remediation of various soils. © 2001 Society of Chemical Industry

Keywords: Electrokinetic Remediation, Sand, Clay, Lead, Zinc, Cadmium

Kim, D.S. and Park, B.Y. (2001), Effects on the removal of Pb2+ from aqueous solution by crab shell. *Journal of Chemical Technology and Biotechnology*, **76** (11), 1179-1184.

Full Text: [J\J Che Tec Bio76, 1179.pdf](J/J%20Che%20Tec%20Bio76,%201179.pdf)

Abstract: The effects of temperature, pH, chitin and chitosan on Pb2+ removal by crab shell were investigated. Pb2+ removal by crab shell was greater than that of chitin and chitosan, indicating that chitin did not contribute to Pb2+ removal by crab shell. The quantity and rate of Pb2+ removal increased as the pH value increased. The rate of Pb2+ removal increased with increased temperature, but the maximum amount of Pb2+ removal was constant irrespective of temperature. Metal ions (K+, Na+, Mg2+, Ca2+) were released from crab shell concomitant with Pb2+ removal by ion exchange. The amount of Ca2+ released was greater than any for other metal ions in both Pb2+ and P Pb2+-free solutions. The amount of Ca2+ released in Pb2+ solution was greater than that in Pb2+-free solution, whereas CO32- release in Pb2+ solution was less than in Pb2+-free solution. Pb2+ removal was mainly a consequence of dissolution of CaCO3(s) with consequence precipitation of Pb-3(CO3)2(OH)2(s) and PbCO3(s). Pb2+ accelerated the dissolution of CaCO3(s) by ion exchange and the precipitation occurred both at the surface and in the inner part of the crab shell. (C) 2001 Society of Chemical Industry.

Keywords: Crab Shell, Pb2+ Removal Mechanism, Micro-Precipitation, Chitin, Chitosan, pH, Temperature, Binary Metal Mixtures, *Saccharomyces-Cerevisiae*, R-arrhizus, Adsorption, Ions, Biosorption, Accumulation, Chromium(VI), Biosorbents, Copper(II)

Rivera-Utrilla, J., Bautista-Toledo, I., Ferro-García, M.A. and Moreno-Castilla, C. (2001), Activated carbon surface modifications by adsorption of bacteria and their effect on aqueous lead adsorption. *Journal of Chemical Technology and Biotechnology*, **76** (12), 1209-1215.

Full Text: [J\J Che Tec Bio76, 1209.pdf](J/J%20Che%20Tec%20Bio76,%201209.pdf)

Abstract: The adsorption of *Escherichia* *coli* on different activated carbons has been studied. The activated carbon samples used have been characterized, determining their surface area, pore size distribution, elemental analysis, mineral matter analysis and pH of the point of zero charge. The adsorption capacity of these carbons increased with their hydrophobicity and macropore volume. The number of bacteria adsorbed on the demineralized activated carbon in a solution of pH value equal to the iso-electric point of the carbon was negligible. However, in the presence of cations the proportions of bacterial cells adsorbed were 87.8% (Fe3+), 54.7% (Ca2+) and 24.8% (Mg2+) respectively. This increase in adsorption capacity in the presence of electrolytes has been explained on the basis of both the reduction in electrostatic free energy and the increase in cell surface hydrophobicity due to the metal bound by some compounds of the cell membrane. When the solution pH was intermediate between the pH values of the point of zero charge of the carbon and bacteria the number of bacteria adsorbed increased due to the attractive interactions between the carbon and bacteria. The adsorption of bacteria on activated carbons decreased the porosity and increased the negative charge density of the latter. Depending on the experimental conditions used, the presence of bacteria can enhance the capacity of activated carbons to adsorb lead. (C) 2001 Society of Chemical Industry.

Keywords: Activated Carbon, Adhesion, Adsorption, Analysis, Bacteria, Beta-Lactoglobulin, Capacity, Carbon, Cells, Density, Distribution, Drinking-Water, Electrolytes, Elemental Analysis, Energy, Escherichia Coli, Escherichia-Coli, Hydrogen-Bonds, Hydrophobicity, Interactions, Lead, Low-Energy, Matter, Membrane, Metal-Cations, Micropore Structure, Mineral, Outer-Membrane, pH, pH Values, Pore Size, Pore Size Distribution, Porosity, Reduction, Size Distribution, Subbituminous Coal, Surface, Surface Area, Zero Charge

Kelleher, B.P., Doyle, A.M., O’Dwyer, T.F. and Hodnett, B.K. (2001), Preparation and use of a mesoporous silicate material for the removal of tetramethyl ammonium hydroxide (TMAH) from aqueous solution. *Journal of Chemical Technology and Biotechnology*, **76** (12), 1216-1222.

Full Text: [J\J Che Tec Bio76, 1216.pdf](J/J%20Che%20Tec%20Bio76,%201216.pdf)

Abstract: A cubic mesoporous silicate (CMS) was prepared, characterised, and assessed as an adsorbent for tetramethyl ammonium hydroxide (TMAH) from aqueous solution. The adsorption process was studied as a function of temperature and time. Sorption closely followed the Langmuir model. The adsorption of TMAH on CMS was endothermic and kinetic studies suggest that the overall rate of adsorption was pseudo-second-order. Pore diffusion effects contribute to limiting the overall rate of adsorption while at lower initial TMAH concentrations, film diffusion becomes more important. Desorption studies were carried out using water and methanol. Methanol was the superior desorbing agent. (C) 2001 Society of Chemical Industry.

Keywords: Adsorption, Mesoporous Silicates, Tetramethyl Ammonium Hydroxide, Wastewater Treatment, Molecular-Sieves, Adsorption, Sorption, Isotherms, Recovery, phenol, Phase, Water, Peat

Sar, P. and D’Souza, S.F. (2001), Biosorptive uranium uptake by a *Pseudomonas* strain: characterization and equilibrium studies. *Journal of Chemical Technology and Biotechnology*, **76** (12), 1286-1294.

Full Text: [J\J Che Tec Bio76, 1286.pdf](J/J%20Che%20Tec%20Bio76,%201286.pdf)

Abstract: The biosorptive uranium(VI) uptake capacity of live and lyophilized *Pseudomonas* cells was characterized in terms of equilibrium metal loading, effect of solution pH and possible interference by selected co-ions. Uranium binding by the test biomass was rapid, achieving > 90% sorption efficiency within 10 min of contact and the equilibrium was attained after 1 h. pH-dependent uranium sorption was observed for both biomass types with the maximum being at pH 5.0. Metal uptake by live cells was not affected by culture age and the presence of an energy source or metabolic inhibitor. Sorption isotherm studies at a solution pH of either 3.5 or 5.0 indicated efficient and exceptionally high uranium loading by the test biomass, particularly at the higher pH level. At equilibrium, the lyophilized *Pseudomonas* exhibited a metal loading of 541 ±34.21 mg g−1 compared with a lower value by the live organisms (410 ±25.93 mg g−1). Experimental sorption data showing conformity to both Freundlich and Langmuir isotherm models indicate monolayered uranium binding by the test biomass. In bimetallic combinations a significant interference in uranium loading was offered by cations such as thorium(IV), iron(II and III), aluminium(III) and copper(II), while the anions tested, except carbonate, were ineffective. Uranium sorption studies in the presence of a range of Fe3+ and SO42− concentrations indicate a strong inhibition (80%) by the former at an equimolar ratio while more than 70% adsorption efficiency was retained even at a high sulfate level (30000 mg dm−3). Overall data indicate the suitability of the *Pseudomonas* sp biomass in developing a biosorbent for uranium removal from aqueous waste streams. © 2001 Society of Chemical Industry

Keywords: Uranium, Biosorption, *Pseudomonas*, pH, Iron, Sulfate, Isotherm

Sakurai, A., Yamamoto, T., Makabe, A., Kinoshita, S. and Sakakibara, M. (2002), Removal of lignin in a liquid system by an isolated fungus. *Journal of Chemical Technology and Biotechnology*, **77** (1), 9-14.

Full Text: [J\J Che Tec Bio77, 9.pdf](J/J%20Che%20Tec%20Bio77,%209.pdf)

Abstract: The screening of a strain which could perform lignin removal was carried out. Based on taxonomic study the isolated strain (LM-2) was identified as *Penicillium* sp. LM-2 could decolorize 0.6 g dm−3 lignin within 4 days in a shaking culture at 25 ºC. The efficiency of decolorization of the lignin was over 80% in the pH range of 4.0-6.0, but was low above pH 6.2. The rise of temperature had a slight adverse effect on the lignin decolorization in the range of 25-35 ºC. Lignolytic enzymes such as lignin peroxidase, manganese peroxidase and laccase were not detected in the culture broth or within the fungal cells. The lignin was removed from the high molecular weight fraction mainly by adsorption and accumulation inside the cells. © 2002 Society of Chemical Industry

Keywords: *Penicillium*, Lignin, Decolorization, Removal, Adsorption, Accumulation

Vinod, V.P. and Anirudhan, T.S. (2002), Sorption of tannic acid on zirconium pillared clay. *Journal of Chemical Technology and Biotechnology*, **77** (1), 92-101.

Full Text: [J\J Che Tec Bio77, 92.pdf](J/J%20Che%20Tec%20Bio77,%2092.pdf)

Abstract: Zirconium pillared clay (PILC) was prepared using montmorillonite as the base clay. Adsorption of tannic acid (tannin) was studied by a batch equilibrium technique, as a function of adsorbate concentration, temperature, pH, agitation speed, particle size of the adsorbent and ionic strength. The process of uptake is governed by diffusion controlled first-order reversible rate kinetics. The higher uptake for the pH range 4.0-6.0 was attributed to external hydrogen bonding between phenolic-OH groups of tannin molecules and the hydrogen bonding sites on the clay. The removal of tannin by adsorption was found to be > 99.0% depending on the initial concentration in the pH range of 4.0-6.0. The process involves both film and pore diffusion to different extents. The effects of solute concentration, temperature, agitation speed and particle size on the diffusion rate were investigated. Tannin uptake was found to increase with ionic strength due to the compression of diffuse double layers. The applicability of Langmuir and Freundlich isotherm models has been tested. The maximum adsorption capacity of PILC was found to be 45.8 μmol g-1 of clay and the affinity constant is 2.9×10-2 dm3 µmol-1 at 30degreesC. Thermodynamic parameters such as DeltaGdegrees, DeltaHdegrees and DeltaSdegrees were calculated to predict the nature of adsorption. The isosteric enthalpies of adsorption were also determined and found to decrease with increasing surface coverage. Regeneration with hot water (60degreesC) has been investigated for several cycles with a view to recovering the adsorbed tannin and also restoring the sorbent to its original state. Copyright (C) 2001 Society of Chemical Industry.

Keywords: Tannin Sorption, Pillared Clay, Adsorption Isotherms, Kinetic and Thermodynamic Parameters, Regeneration, Activated Carbon, Poly(4-Vinyl Pyridine), Aqueous-Solutions, Fly-Ash, Adsorption, Removal, Adsorbents, phenol, Water, pH

Querol, X., Moreno, N., Umaña, J.C., Juan, R., Hernández, S., Fernandez-Pereira, C., Ayora, C., Janssen, M., García-Martínez, J., Linares-Solano, A. and Cazorla-Amoros, D. (2002), Application of zeolitic material synthesised from fly ash to the decontamination of waste water and flue gas. *Journal of Chemical Technology and Biotechnology*, **77** (3), 292-298.

Full Text: [J\J Che Tec Bio77, 292.pdf](J/J%20Che%20Tec%20Bio77,%20292.pdf)

Abstract: Zeolitic material was synthesised from fly ash using two different conversion methodologies. The two conversion products obtained were: (a) impure zeolitic material obtained by direct conversion from different Spanish fly ashes, and (b) a high purity 4A-X zeolite blend synthesised from the silica extracts obtained from the Meirama fly ash (NW Spain). The zeolitic material was tested for potential application as an ion exchanger to decontaminate waters containing high concentrations of ammonium and heavy metals. Preliminary results show high cation uptake efficiencies (up to 4.7 meq g-1) which allowed fast decontamination of different types of industrial or acidic mine waste waters. The CO2, SO2 and NH3 sorption capacity of several zeolitic products was also determined and very promising results were obtained for the A4-X blend. Sorption capacity values of up to 74, 297, and 111 mg g-1 for CO2, SO2 and NH3 respectively were obtained for the zeolitic material synthesised from silica extracts from fly ash and a high-aluminate waste water.

Keywords: Coal Fly Ash, Zeolite Synthesis, Ion Exchange, Gas Adsorption

Rio, S., Delebarre, A., Héquet, V., Le Cloirec, P. and Blondin, J. (2002), Metallic ion removal from aqueous solutions by fly ashes: Multicomponent studies. *Journal of Chemical Technology and Biotechnology*, **77** (3), 382-388.

Full Text: [J\J Che Tec Bio77, 382.pdf](J/J%20Che%20Tec%20Bio77,%20382.pdf)

Abstract: Fly ashes from two fluidised bed power plants were tested to remove Pb2+, Cu2+, Cr(III), Ni2+, Zn2+ and Cr(VI) from aqueous solutions. Experimental design methodology was used to study the removal and the leaching as a function of (i) the water pollutant content, (ii) the metal concentration in water, (iii) the pH of the solution and (iv) the addition of lime to fly ashes. The results show that the percentage of adsorbed ions was greater when they were in contact with silico-aluminous fly ashes than sulfo-calcic fly ashes, except in the case of the ion Ni2+. The removal of metallic ions increases with increasing pH. A comparison of the adsorption capacity with similar tests carried out with activated carbon or low-cost sorbents shows that adsorption onto fly ash is an interesting alternative. © 2002 Society of Chemical Industry.

Keywords: Adsorption, Waste Water, Metallic Ions Removal

Nugteren, H.W., Janssen-Jurkovícová, M. and Scarlett, B. (2002), Removal of heavy metals from fly ash and the impact on its quality. *Journal of Chemical Technology and Biotechnology*, **77** (3), 389-395.

Full Text: [J\J Che Tec Bio77, 389.pdf](J/J%20Che%20Tec%20Bio77,%20389.pdf)

Abstract: Most coal fly ashes currently produced in The Netherlands contain leachable trace elements in amounts higher than allowed by Dutch law for its free application as a granular building material. To improve their technical and environmental quality, these ashes were subjected to forced leaching using water, citrate, oxalate, EDTA and carbonate solutions. With water alone, the free lime and substantial amounts of Mo (30%), Se (20-40%) and SO42− (40-50%) are removed. Using the extraction agents, these percentages increase to 60-90% and in addition 15-20% Cr, V and Sb are removed. Most of the extraction agents used form stable complexes or compounds with Ca2+, thus prewashing with water followed by treatment with extraction agents resulted in higher removal and/or lower reagent consumption. The environmental quality of the washed fly ash was evaluated using the Dutch standard leaching test (NEN7343). Leachability of oxyanions decreased by a factor of 2-4 after washing with water and by between 2 and 18 after washing with extraction agents. However, combined washing did not further decrease leaching but in some cases caused increased leaching. Selection of the washing procedure thus depends on the subsequent application of the ash, that is whether low concentrations or low mobility of trace elements are required. Removing extractants and metals remaining in the moisture after filtration will further decrease leaching. For a feasible process reduction of reagent consumption and simple methods for process water recycling are needed. © 2002 Society of Chemical Industry

Keywords: Fly Ash, Heavy Metals, Extraction, Leaching

El-Shafey, E.I., Cox, M., Pichugin, A.A. and Appleton, Q. (2002), Application of a carbon sorbent for the removal of cadmium and other heavy metal ions from aqueous solution. *Journal of Chemical Technology and Biotechnology*, **77** (4), 429-436.

Full Text: [J\J Che Tec Bio77, 429.pdf](J/J%20Che%20Tec%20Bio77,%20429.pdf)

Abstract: Treatment of flax shive with sulfuric acid produces a carbonaceous material that has been used to remove metal ions from aqueous solution. Metal ions including Cd(II), Cu(II), Cr(III), Co(II), Ni(II), Zn(II) and Pb(II) have been investigated for kinetic behaviour and sorption capacities. These metal ions show fast sorption kinetics following a first order rate equation. Cadmium was chosen as representative of these metal ions and a detailed study was carried out. The effect of pH on sorption was studied and it was found that maximum uptake occurred above pH 3-7, sorption was accompanied by release of protons into the solution and a ratio of [H+] released to [Cd2+] sorbed of approximately 2 was found. The sorption capacity showed no significant increase with increase of temperature. The presence of other metal ions such as K+, Na+, Mg2+ and Ca2+ decreases the Cd(II) capacity, indicating competition for the ion exchange sites. Successive sorption of Cd(II) shows that the capacity exceeds the monolayer capacity calculated from the Langmuir equation. Column studies showed good performance over a total of seven cycles of loading/stripping. These studies indicate that the sorption mechanism for these metal ions is related to a reversible ion exchange process on the carbon surface. © 2002 Society of Chemical Industry

Keywords: Heavy Metal, Sorption, Carbon, Cadmium, Ion Exchange, Flax

Koumanova, B., Peeva, P., Allen, S.J., Gallagher, K.A. and Healy, M.G. (2002), Biosorption from aqueous solutions by eggshell membranes and *Rhizopus oryzae*: Equilibrium and kinetic studies. *Journal of Chemical Technology and Biotechnology*, **77** (5), 539-545.

Full Text: [J\J Che Tec Bio77, 539.pdf](J/J%20Che%20Tec%20Bio77,%20539.pdf)

Abstract: This study assesses the use of eggshell membranes and *Rhizopus* *oryzae* as media for the biosorption of p-chlorophenol (p-CP), 2,4-dichlorophenol (2,4-dCP), 3, 5-dichlorophenol (3, 5-DCP), reactive dye and cadmium from aqueous solutions. The performance of the adsorbents was quantified by measuring the equilibrium uptake and the batch rate kinetics from solutions. The constants in the Freundlich, Langmuir and Redlich-Peterson isotherm models were calculated through the linearization of the equations and linear regression. The kinetics of the adsorption systems for cadmium and a reactive dye have been assessed in a batch stirred adsorber. The effect of the process parameters such as pH, adsorbate concentration, adsorbent dosage, adsorbent particle size, temperature and agitation speed are reported. The external mass transfer coefficients are reported for some different system conditions. Both materials are determined to be effective adsorbents and could find application in the treatment of contaminated wastestrearns. (C) 2002 Society of Chemical Industry.

Keywords: Eggshell Membrane, *Rhizopus* *Oryzae*, Biosorption, Isotherms, *Saccharomyces-Cerevisiae*, Fungal Biomass, Adsorption, Removal, Metal, *arrhizus*, Dyes, Pentachlorophenol, Component, Sorption

Yong, P., Rowson, N.A., Farr, J.P.G., Harris, I.R. and Macaskie, L.E. (2002), Bioaccumulation of palladium by *Desulfovibrio desulfuricans*. *Journal of Chemical Technology and Biotechnology*, **77** (5), 593-601.

Full Text: [J\J Che Tec Bio77, 593.pdf](J/J%20Che%20Tec%20Bio77,%20593.pdf)

Abstract: Palladium uptake by resting cell suspensions of *Desulfovibrio desulfuricans* NCIMB 8307 was studied without or with electron donor (formate), which gave metal uptake attributable to biosorption of Pd(II) and bioreduction of Pd(II) to Pd(0), respectively. The maximum biosorption capacity of palladium (at pH 2) was up to 196 mg Pd g−1 dry cells (1.85 mmol g−1; approx 20% of the dry weight). Biosorption was to 85% of the maximum in less than 10 min and the biomass was saturated within 30 min. Biosorption of Pd(II) was greater from the chloro- than the ammine complex and was inhibited in the presence of excess chloride ion. Bioreductive accumulation of Pd(II) from Pd(NH3)42+ was achieved in the presence of electron donor (formate) but was also inhibited by excess Cl−. Up to 100% of Pd(II) reduction to Pd(0) was achieved within 5 min anaerobically at pH 7 and 30 min at pH 3. Pd(0) was localized on the biomass surface using electron microscopy and was characterized using energy dispersive X-ray microanalysis (EDAX) and X-ray diffraction analysis (XRD). Biosorption was Pd-specific with respect to Pt and Rh using test solutions and acid (aqua regia) leachates from spent automotive catalysts. The total Pd removed from the latter was only 15%, attributable to the inhibitory effect of residual chloride ion from the acidic extractant. Pd biorecovery is limited by the need for an improved extraction technology to minimize the formation of PdCl42- in solution rather than by constraints of the Pd-accumulating biomass. © 2002 Society of Chemical Industry

Keywords: Palladium Bioaccumulation, *Desulfovibrio desulfuricans*

Kim, J.S. and Keane, M.A. (2002), The removal of iron and cobalt from aqueous solutions by ion exchange with Na-Y zeolite: Batch, semi-batch and continuous operation. *Journal of Chemical Technology and Biotechnology*, **77** (6), 633-640.

Full Text: [J\J Che Tec Bio77, 633.pdf](J/J%20Che%20Tec%20Bio77,%20633.pdf)

Abstract: The removal of single component and binary mixtures of divalent cobalt and iron from water by ion exchange with synthetic Y zeolite has been studied in batch, semi-batch and continuous modes of operation; the initial metal solution concentration did not exceed 2 mmol dm−3. Binary Co/Na and Fe/Na ion exchange equilibrium isotherms (294 K) are presented wherein exchange site heterogeneity is evident in the case of the iron treatment. Under conditions of stoichiometric ion exchange, removal efficiencies for both cobalt and iron decrease with increasing metal concentration (0.2-2 mmol dm−3) and the values were similar for both metals. Removal of cobalt under transient conditions was found to be temperature dependent. In the fixed bed operation, break-through behavior was sensitive to changes in both flow rate and inlet concentration. The break-through profiles for both metals under competitive and non-competitive conditions are presented; iron removal is lower in the presence of cobalt and vice versa. An *in situ* regeneration of the fully loaded zeolite by back exchange with sodium is considered and the exchange capacity of the regenerated zeolite is reported. The feasibility of employing cycles of heavy metal uptake/zeolite regeneration is addressed. © 2002 Society of Chemical Industry

Keywords: Na-Y Zeolite, Ion Exchange, Iron Removal, Cobalt Removal, Water Treatment

Chen, J.P., Lie, D., Wang, L., Wu, S.N. and Zhang, B.P. (2002), Dried waste activated sludge as biosorbents for metal removal: Adsorptive characterization and prevention of organic leaching. *Journal of Chemical Technology and Biotechnology*, **77** (6), 657-662.

Full Text: [J\J Che Tec Bio77, 657.pdf](J/J%20Che%20Tec%20Bio77,%20657.pdf)

Abstract: Dried waste activated sludge was used for copper removal from simulated waste water in this study. Unconditioned activated sludge (UAS) bound up to 35 mg Cu g−1, although there was significant leaching of organic material. Organic and copper leaching from the UAS increased significantly as the pH was reduced. Immobilization of UAS by sodium and calcium alginate was utilized in order to overcome the leaching problems, but reduced the adsorption capacity. Based on metal removal and organic leaching, calcium alginate-conditioned UAS (CACAS) was found to be the most suitable sorbent for copper removal. Kinetic experiments showed that copper removal by both sodium alginate-conditioned UAS (SACAS) and CACAS was faster than that by activated carbons, but slower than most of the other biosorbents described in the literature. FTIR spectroscopy identified a number of atomic groupings and structures in UAS relevant to copper adsorption. It suggested that hydrogen ions are replaced with copper ions. The Freundlich equation fitted the experimental isotherms better than the Langmuir equation. A computational model based on adsorption isotherm, external mass transfer and diffusion processes successfully described the kinetics of copper ion removal and suggested that the biosorption kinetics was controlled by mass transfer. © 2002 Society of Chemical Industry

Keywords: Metal Biosorption, Activated Sludge, Alginate, Modelling, Kinetics, FTIR

Chu, K.H. and Hashim, M.A. (2002), Adsorption and desorption characteristics of zinc on ash particles derived from oil palm waste. *Journal of Chemical Technology and Biotechnology*, **77** (6), 685-693.

Full Text: [J\J Che Tec Bio77, 685.pdf](J/J%20Che%20Tec%20Bio77,%20685.pdf)

Abstract: Solid waste such as palm fibre and shell produced by the palm oil industry is used by palm oil mills as boiler fuel to produce steam for electricity generation. The ash produced after combustion creates a disposal problem for the palm oil industry. This study explored the potential of oil palm ash as an adsorbent material for removal and recovery of zinc ions from aqueous solutions. The equilibrium uptake of zinc was found to increase with solution pH in the range 3-6, yielding a maximum adsorption capacity of 0.163 mmol g-1 of ash at a pH of 6. The affinity constant of oil palm ash was found to greatly exceed that of a commercial ion exchange resin, suggesting that oil palm ash may find potential application in treating dilute zinc-containing waste streams. Four isotherm models were used to fit the constant pH equilibrium isotherms obtained at four different pH values. The entire data set was successfully simulated using two of the isotherm models: a Langmuir model with pH-dependent parameters and an extended Langmuir-Freundlich model with pH-independent parameters. The rates of adsorption and desorption for zinc were measured using a stirred-batch contactor. The contact time required to reach apparent adsorption equilibrium was found to decrease with increasing adsorbent dosage. Both the rate and the extent of zinc desorption were affected by the pH of the desorbing solution. The adsorption and desorption rates were consistent with simple first-order rate models. (C) 2002 Society of Chemical Industry.

Keywords: Adsorption, Desorption, Ash, Oil Palm, Heavy Metals, Zinc, Fly-Ash, Aqueous-Solutions, Heavy-Metals, Biosorption, Removal, Sorption, Biomass, Zn, Sorbents, Zn(II)

Zouboulis, A.I., Lazaridis, N.K. and Matis K.A., (2002), Removal of toxic metal ions from aqueous systems by biosorptive flotation. *Journal of Chemical Technology and Biotechnology*, **77** (8), 958-964.

Full Text: [J\J Che Tec Bio77, 958.pdf](J/J%20Che%20Tec%20Bio77,%20958.pdf)

Abstract: Biosorptive flotation was used as a combined operation for the simultaneous abstraction of nickel, copper and zinc ions from aqueous streams. Laboratory-scale batch experiments, as well as pilot-scale continuous experiments, have been conducted. Grape stalks, a by-product of the winery industry, were used as sorbent material. The experimental procedure consisted of two consecutive stages: (i) biosorption, and (ii) flotation. The possibility of reusing biomass, after appropriate elution, was also examined. The main parameters examined were biomass concentration, particle size of sorbent, surfactant concentration, pH and flocculation. Flotation removals, following laboratory-scale experiments, were found to be in the order of 100, 85 and 70% for copper, zinc and nickel, respectively. In pilot-scale experiments, biomass sorption capacities were determined as 25 for copper, 81 for zinc and 7 μmol dm−3 for nickel. The order of biomass affinity regarding the studied metals was Cu > Zn > Ni. Short retention time and high effectiveness suggest that biosorptive flotation is a promising treatment process for the removal of toxic metals from contaminated aqueous solutions. © 2002 Society of Chemical Industry

Keywords: Biosorptive Flotation, Pilot-Scale Studies, Removal of Metal Mixture, Copper, Zinc, Nickel, Grape Stalks

Choi, S.H., Moon, S.H. and Gu, M.B. (2002), Biodegradation of chlorophenols using the cell-free culture broth of *pHanerochaete chrysosporium* immobilized in polyurethane foam. *Journal of Chemical Technology and Biotechnology*, **77** (9), 999-1004.

Full Text: [J\J Che Tec Bio77, 999.pdf](J/J%20Che%20Tec%20Bio77,%20999.pdf)

Abstract: A cell-free culture broth of *pHanerochaete chrysosporium* immobilized in polyurethane foam has been evaluated for the biodegradation of chlorophenols. Lignin peroxidase, manganese peroxidase, and oxalate concentrations in cell-free culture broth were measured and compared to find the optimum combination of secondary metabolites for the highest biodegradation of chlorophenols. The isozyme distributions and their expression levels were significantly different and changed with increases in the culture time. The oxalate concentration was also found to vary, depending on culture time. Cell-free broth containing an optimal combination of secondary metabolites showed the greatest biodegradation of 2,4,5-chlorophenol in the presence of veratryl alcohol and H2O2. phenols with greater numbers of chlorines were degraded more efficiently by this cell-free culture broth according to the results of biodegradation experiments for five chlorophenols, including 2-,4-,2,4-,2,4,5-, and pentachlorophenol, as well as phenol. This degradation efficiency correlated well with remaining lignin peroxidase activity during degradation. Cell-free culture broths may readily be used for biodegradation of highly recalcitrant chemicals since the system would not be affected by the toxicity of the chemicals nor would the adsorption characteristics of the cells be of concern. (C) 2002 Society of Chemical Industry.

Keywords: Adsorption, Biodegradation, Cell-Free Culture Broth, Chlorophenol Degradation, Chlorophenols, Degradation, Extracellular Peroxidases, Hydrogen-Peroxide, Immobilized, Inactivation, Lignin Peroxidase, Manganese Peroxidase, Oxidation, Pentachlorophenol, *pHanerochaete Chrysosporium*, Secondary Metabolites, Toxicity, Veratryl Alcohol, White-Rot Fungus

Kelleher, B.P., O’Callaghan, M.N., Leahy, M.J., O’Dwyer, T.F. and Leahy, J.J. (2002), The use of fly ash from the combustion of poultry litter for the adsorption of chromium(III) from aqueous solution. *Journal of Chemical Technology and Biotechnology*, **77** (11), 1212-1218.

Full Text: [J\J Che Tec Bio77, 1212.pdf](J/J%20Che%20Tec%20Bio77,%201212.pdf)

Abstract: Fly ash, from the combustion of poultry litter, was assessed as an adsorbent for chromium(III) from aqueous solution. The adsorption process was studied as a function of temperature and time. Adsorption was best described by the Langmuir model. The adsorption of chromium(III) on the fly ash was endothermic and kinetic studies suggest that the overall rate of adsorption was pseudo-second order. At low initial concentrations film diffusion effects contribute to limiting the overall rate of adsorption while at higher initial chromium(III) concentrations pore diffusion becomes more important. An adsorption capacity of 5.3 mg dm-3 was reached at 20degreesC. (C) 2002 Society of Chemical Industry.

Keywords: Adsorption, Poultry Litter, Fly Ash, Chromium(III), Wastewater Treatment, Waste-Water, Removal, Recovery, Cadmium, Lead

Wu, F.C., Tseng, R.L. and Juang, R.S. (2002), Adsorption of dyes and humic acid from water using chitosan-encapsulated activated carbon. *Journal of Chemical Technology and Biotechnology*, **77** (11), 1269-1279.

Full Text: [J\J Che Tec Bio77, 1269.pdf](J/J%20Che%20Tec%20Bio77,%201269.pdf)

Abstract: The adsorption isotherms and rates of two dyes and humic acid from aqueous solutions onto chitosan-encapsulated activated carbon (CEAC) beads were measured at 30degreesC. Such beads were prepared by mixing different weight percents of cuttlefish-based chitosan (100%, 80%, 67%, and 55%) and rice-based activated carbons. It was shown that the isotherms of dyes and humic acid were well fitted by the Freundlich equation. The adsorption capacity and rate could be enhanced when activated carbon was encapsulated with chitosan. Four simplified kinetic models including the pseudo-first-order equation, pseudo-second-order equation, intraparticle diffusion model, and the Elovich equation were tested to follow the adsorption processes. The adsorption of dyes was best described by the Elovich equation, but that of humic acid was best described by the intraparticle diffusion model. The kinetic parameters of each best-fit model were calculated and are discussed in this paper. (C) 2002 Society of Chemical Industry.

Keywords: Chitosan-Encapsulated Activated Carbon, Adsorption, Isotherms, Kinetics, Dyes, Humic Acid, Divalent Metal-Ions, Intraparticle Diffusion, Aqueous-Solutions, Cadmium Ions, Waste-Water, Sorption, Removal, Kinetics, phenols, Derivatives

Ko, D.C.K., Lee, V.K.C., Porter, J.F. and McKay, G. (2002), Improved design and optimization models for the fixed bed adsorption of acid dye and zinc ions from effluents. *Journal of Chemical Technology and Biotechnology*, **77** (12), 1289-1295.

Full Text: [J\J Che Tec Bio77, 1289.pdf](J/J%20Che%20Tec%20Bio77,%201289.pdf)

Abstract: The bed depth service time (BDST) design model, which accounts for the change of bed adsorption capacity with service time, has been modified to expand its application and overcome the limiting assumptions of the original BDST analysis. Column experiments were undertaken to test the new model for two adsorption systems, namely zinc ion–bone char and Acid Blue 80 dye-activated carbon. It was found that the percentage of saturation capacity could be correlated using a square-root dependence on the service time and this correlation was incorporated into the original BDST analysis to replace the total sorption capacity term, giving the model a much wider application to real systems. The empty bed residence time optimization approach was modified using the same time-dependent capacity expression and was successfully applied to the metal ion–bone char and the dye-activated carbon system with the use of equilibrium saturated bed capacity. These modifications to the BDST design model and the EBRT optimization model will give more accurate scale-up data for the design of large-scale column adsorption systems.

Keywords: Adsorption, Fixed Bed Column Design, Bed Depth Service Time, Empty Bed Residence Time, Equilibrium Saturated Bed Capacity

Machado, R., Carvalho, J.R. and Correia, M.J.N. (2002), Removal of trivalent chromium(III) from solution by biosorption in cork powder. *Journal of Chemical Technology and Biotechnology*, **77** (12), 1340-1348.

Full Text: [J\J Che Tec Bio77, 1340.pdf](J/J%20Che%20Tec%20Bio77,%201340.pdf)

Abstract: The removal of trivalent chromium from solutions using biosorption in cork powder is described. The adsorption isotherm was determined, along with the effect of different variables, such as biomass particle size, solid-liquid ratio, reaction time, metal concentration and pH, on the efficiency of chromium removal. It was concluded that the adsorption is slow and favoured by an increase in pH. Therefore, using a solid-liquid ratio of 4 g dm-3 it is possible to reduce the chromium concentration in the solution from 10 mg dm-3 to less than 1.5 mg dm-3 in 2h at 22degreesC. The kinetic studies verified that the sorption of chromium by cork was described by a second-order model. The elution results showed that 50% of the chromium bound to the cork was eluted using 0.5 mol dm-3 H2SO4 and that cork maintains its binding capacity over four cycles of biosorption/elution. (C) 2002 Society of Chemical Industry.

Keywords: Chromium(III), Cork, Biosorption, Elution, Biosorbent, Kinetics, Sorption, Waste, Moss

Fomina, M. and Gadd, G.M. (2003), Metal sorption by biomass of melanin-producing fungi grown in clay-containing medium. *Journal of Chemical Technology and Biotechnology*, **78** (1), 23-34.

Full Text: [J\J Che Tec Bio78, 23.pdf](J/J%20Che%20Tec%20Bio78,%2023.pdf)

Abstract: The sorption of toxic metals by fungal mycelia grown in clay-containing medium is reported in this work. Biomass of melanin-producing microfungi of the genus *Cladosporium* (*C cladosporioides*, *C resinae* and *C herbarum*) and *Aureobasidium pullulans*, clay minerals and fungal mycelia grown in clay-containing medium were compared for their equilibrium Cu and Cd uptake from pH-buffered solutions using experimental sorption isotherms. Bentonite (Cherkassy) in the natural form was shown to be the best Cu sorbent compared with the other clays and clay minerals tested. Cu sorption isotherms fitted the Langmuir sorption model for all cases. Comparison of Cu and Cd uptake for biomass and bentonite showed a lower biomass uptake capacity but a considerably higher affinity of the biosorbent for the solute. The presence of kaolinite and palygorskite in the medium generally reduced both Cu and Cd sorption capacity and the metal-binding ability of the fungal-clay mixtures. In contrast, addition of bentonite into the medium did not appreciably alter the Cd sorption ability but increased the sorption of Cu by *A pullulans* and *C cladosporioides* grown in this medium. A common feature for all fungi grown in the presence of bentonite was an increase in the Cu sorption capacity (*Q*max) of the biomineral sorbents and a reduction in their affinity (Langmuir parameter *b*) compared with control biomass. A difference between predicted and experimental data obtained for biomass grown on bentonite medium was also observed. The connection between the sorption capacity of biomass grown in clay-containing medium, mycelial morphology and the structure of fungal pellets is discussed and a mechanism for the changed sorption capacity of the combined biomineral sorbents is proposed which involves blocking or modification of binding sites on biotic and abiotic components of the biomineral association.

Rivero, M.J., Ibanez, R. and Ortiz, M.I. (2003), Analysis of the elimination process of polymerisation inhibitors from styrene by means of adsorption. *Journal of Chemical Technology and Biotechnology*, **78** (1), 64-72.

Full Text: [J\J Che Tec Bio78, 64.pdf](J/J%20Che%20Tec%20Bio78,%2064.pdf)

Abstract: This work is focused on the analysis, modelling and scale-up of a process of styrene purification. The first step in synthetic rubber production is to eliminate 4-tert-butylcatechol (TBC) which is added to styrene to prevent homopolymerisation during transport and storage. This process is carried out on an industrial scale by means of adsorption onto activated alumina. Equilibrium experiments at 10degreesC correlated to the Langmuir-Freundlich equation: q = 1.73×10-3 C-0.05 / 1 + 8.36×10-3 C-0.05 with a weighted standard deviation of 3.38%. Fixed bed column experiments were carried out on a laboratory scale to obtain breakthrough curves. A mathematical model that considers film and pore mass transfer resistances described satisfactorily the experimental results with a value of D-P = 3.96×10-9m2s-1 which was obtained from correlation of experimental data to simulated curves. Finally, a pilot plant was built and operated in order to verify the validity of the mathematical model and parameters obtained previously. (C) 2002 Society of Chemical Industry.

Keywords: Adsorption, Alumina, Alumina, Breakthrough, Breakthrough Curves, Column, Diffusion, Model, Modelling, Polymerization, Scale-Up, Styrene, TBC

Vaishya, R.C. and Gupta, S.K. (2003), Modelling arsenic(III) adsorption from water by sulfate-modified iron oxide-coated sand (SMIOCS). *Journal of Chemical Technology and Biotechnology*, **78** (1), 73-80.

Full Text: [J\J Che Tec Bio78, 73.pdf](J/J%20Che%20Tec%20Bio78,%2073.pdf)

Abstract: A medium developed by coating BaSO4 and Fe on quartz sand known as sulfate-modified iron oxide-coated sand (SMIOCS) was evaluated for the removal of arsenic(III) from simulated water with an ionic strength of 0.01M NaNO3 during batch studies. The medium was characterised for BET surface area, alkali-resistance, acid-resistance and the presence of iron and barium on the coated surface. Two simplified kinetic models, ie active available site (AAS) and chemical reaction rate models, were tested to investigate the adsorption mechanisms. The values of rate constants for both the models were found to decrease with increasing As(Ill) concentrations in the solute. The inverse relationship of rate constants of the reaction rate model with BET surface area showed that As(III) adsorption on SMIOCS was not due to physisorption but to chemisorption. A study of the effect of solute temperature showed that the adsorption of As(III) on SMIOCS media was due to chemisorption. The results of isothermal studies conducted at different pH values showed that adsorption data satisfied both the Langmuir and the Freundlich isotherm models. The adsorption of As(III) on the medium was pH dependent and maximum removal was observed in the pH range of 7-9. (C) 2002 Society of Chemical Industry.

Keywords: Aas, Adsorption, Arsenate, Arsenic, Arsenite, Batch, Chemical, Chemisorption, Coating, Drinking-Water, Filtration, Freundlich Isotherm, Groundwater, Ionic Strength, Iron, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetic Models, Mechanisms, Metals, Model, Models, pH, Ph Values, Quartz Sand, Range, Reaction, Reaction Rate, Removal, Sand, Sorption, Surface, Surface Area, Temperature, Water

? Ratola, N., Botelho, C. and Alves, A. (2003), The use of pine bark as a natural adsorbent for persistent organic pollutants: Study of lindane and heptachlor adsorption. *Journal of Chemical Technology and Biotechnology*, **78** (2-3), 347-351.

Full Text: [J\J Che Tec Bio78, 347.pdf](J/J%20Che%20Tec%20Bio78,%20347.pdf)

Abstract: Pine bark obtained as a sawmill by-product in the north of Portugal was used for the adsorption of lindane and heptachlor, two organochlorine pesticides classified as POPs (Persistent Organic Pollutants), from aqueous solutions. It is intended that this natural adsorbent be used as an alternative to activated carbon in an innovative approach for the removal of these classes of compounds, reducing significantly the regeneration costs of the process, thus providing for its intensification. The analytical methodology validated for pesticides’ quantification consisted of solid-phase microextraction (SPME) prior to gas chromatography with electron capture detection (GC-ECD), which presented limits of detection for lindane and heptachlor of 0.067 mug dm-3 and 0.062 mug dm-3, respectively. Repeatability, reproducibility and recovery were the parameters tested for validation, yielding better results for lindane. For the bark particle size used (125-300 mum), the average efficiency of removal attained for lindane was 80.6%, and 93.6% for heptachlor with the equilibrium time set at 24 h. Both Langmuir and Freundlich models were tested for the adsorption isotherm, but only the second approach produced reliable results for the adsorption parameters. Values obtained for log K-ow were 3.17 for lindane (R2 = 0.9927) and 4.85 for heptachlor (R2 = 0.9401). (C) 2003 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorption, Adsorption Isotherm, Heptachlor, Lindane, Organochlorine Pesticides, Pine Bark, Removal, Sorption

Cheung, W.H., Ng, J.C.Y. and McKay, G. (2003), Kinetic analysis of the sorption of copper(II) ions on chitosan. *Journal of Chemical Technology and Biotechnology*, **78** (5), 562-571.

Full Text: [J\J Che Tec Bio78, 562.pdf](J/J%20Che%20Tec%20Bio78,%20562.pdf)

Abstract: The removal of copper ions from aqueous effluents by chitosan was studied in equilibrium and agitated batch contacting systems. The sorption capacities of chitosan for copper ions are 1.26 and 1.12 mmol g-1 at pH 3.5 and 4.5, respectively. The equilibrium experimental data were best correlated by the Langmuir equation. The kinetics of sorption were studied at an initial solution pH of 4.5 and a chitosan particle size of 355–500 µm. The kinetics were analyzed using four models: the pseudo-first-order, pseudo-second-order, modified second-order and Elovich equations. The rate parameters for the four models were determined and the Elovich equation provided the best correlation of the experimental kinetic data. Copyright © 2003 Society of Chemical Industry

Keywords: Chitosan, Copper, Adsorption, Kinetics

? Koumanova, B., Peeva, P. and Allen, S.J. (2003), Variation of intraparticle diffusion parameter during adsorption of *p*-chlorophenol onto activated carbon made from apricot stones. *Journal of Chemical Technology and Biotechnology*, **78** (5), 582-587.

Full Text: [2003\J Che Tec Bio78, 582.pdf](2003/J%20Che%20Tec%20Bio78,%20582.pdf)

Abstract: The adsorption of para-chlorophenol onto an active carbon made from waste apricot stones has been studied. The batch kinetic adsorption processes have been measured for a range of system variables including agitation rate, initial concentration of para-chlorophenol, mass of carbon and particle size of carbon. The extent of adsorption is reported as plots of solid phase concentration against the square root of time. An intraparticle diffusion parameter is used to describe the mass transfer within the adsorbent. This parameter varies with the square root of time and can be related to the type of structure which occurs within an activated carbon. A correlation is proposed relating the process variable with the intraparticle diffusion parameter in each of the three mass transfer regions. (C) 2003 Society of Chemical Industry.

Keywords: Adsorption, Para-Chlorophenol, Active Carbon, Intraparticle Diffusion Parameter, Aqueous-Solution, Removal, Water, Dyes

Aoyama, M. (2003), Removal of Cr(VI) from aqueous solution by London plane leaves. *Journal of Chemical Technology and Biotechnology*, **78** (5), 601-604.

Full Text: [J\J Che Tec Bio78, 601.pdf](J/J%20Che%20Tec%20Bio78,%20601.pdf)

Abstract: The effect of initial metal concentration, contact time and solution temperature on the removal of Cr(VI) from solution by waste London plane leaves, generated by the pruning of street trees, was investigated in batch mode conditions. The removal of Cr(VI) was highly concentration-dependent and mainly governed by physico-chemical adsorption under the weak acidic conditions studied. The equilibrium data fit well in the Langmuir isotherm model. The Langmuir constants were calculated at different temperatures and both the adsorption capacity and adsorption intensity increased with rising temperature. The endothermic nature of the Cr(VI) adsorption was confirmed by the thermodynamic parameters. The study has shown that the waste leaves can be used as an effective adsorbent for removal of Cr(VI) from wastewater. Copyright © 2003 Society of Chemical Industry

Keywords: Removal of Cr(VI), Adsorption, London Plane Leaves, *Platanus* *acerifolia* Willd

Attia, A.A., Girgis, B.S. and Khedr, S.A. (2003), Capacity of activated carbon derived from pistachio shells by H3PO4 in the removal of dyes and phenolics. *Journal of Chemical Technology and Biotechnology*, **78** (6), 611-619.

Full Text: [J\J Che Tec Bio78, 611.pdf](J/J%20Che%20Tec%20Bio78,%20611.pdf)

Abstract: Two activated carbons were obtained from pistachio shells by impregnation with H3PO4 under standard conditions of acid concentration (50 wt%) and heat treatment at 773 K for 2 h. The soaking time was 24 and 72 h for the two samples before thermal pyrolysis. Analysis of the N2/77 K adsorption isotherms proved that both were highly adsorbing carbons with considerable microporosity, and that the prolonged contact with activant enhanced total porosity (surface area and pore volume) and increased the amount of mesoporosity. Adsorption isotherms of probe molecules, viz Methylene blue (MB), rhodamine B (RB), phenol (P) and p-nitrophenol (PNP), were determined at room temperature, from aqueous solutions. Both the Langmuir and Freundlich model adsorption equations show satisfactory fit to experimental data. Both carbons exhibit similar adsorption parameters irrespective of their porosity characteristics. The sequence of uptake per unit weight was: PNP > MB > RB > P. Low affinity towards phenol may be associated with its competition with water molecules which are more favourably attracted to the acid surface which has a high oxygen functionality. Preferred adsorption in the order PNP > MB > RB is proposed to be a function of carbon porosity, related to the increased molecular dimensions of the solutes. Adsorption from a binary mixture of equal concentrations of MB and RB showed reduced uptake for both sorbates in comparison to the single component experiments. RB removal surpasses that of MB in the binary test and may be attributed to lower water solubility and higher molecular dimensions. (C) 2003 Society of Chemical Industry.

Keywords: Active Carbon, Pistachio, H3PO4, Porosity, Organics Uptake, Aqueous-Solutions, pHosphoric-Acid, Adsorption Characteristics, Microporous Carbons, Surface-Properties, Waste Materials, P-Nitrophenol, Color Removal, Disperse Dye, Adsorbents

Krishnan, K.A., Sheela, A. and Anirudhan, T.S. (2003), Kinetic and equilibrium modeling of liquid-phase adsorption of lead and lead chelates on activated carbons. *Journal of Chemical Technology and Biotechnology*, **78** (6), 642-653.

Full Text: [J\J Che Tec Bio78, 642.pdf](J/J%20Che%20Tec%20Bio78,%20642.pdf)

Abstract: The sawdust (SD) waste generated in the timber industry was converted to a low-cost activated carbon (SDAC) using a simpler and cheaper activation process, single-step steam pyrolysis activation. The possibility of utilizing SDAC for the removal of lead (Pb(II)) in the absence of ligands and nitrilotriacetic acid (NTA) and ethylenediaminetetraacetic acid (EDTA) chelated Pb(II) complexes from the liquid phase was examined and the results were compared with those for commercial activated carbon (CAC). SDAC shows a high adsorption capacity for Pb(II) and Pb(II) chelates compared with CAC. The extent of adsorption of Pb(II) and Pb(II) chelates on activated carbons was found to be a function of solution pH and species distribution of Pb(II) and Pb(II) chelates. The optimum pH range for the removal of Pb(II) in the absence of ligands by SDAC was 6.5-8.0, whereas its maximum removal by CAC was observed at pH 6.5. In the presence of ligands, the extent of Pb(II) adsorption was enhanced in the pH range 2.0-5.0 and was reduced significantly in the pH range 6.0-8.0. The maximum uptake of Pb(II) chelates for both carbons was observed at pH 5.0. Kinetic models such as pseudo-first-order, pseudo-second-order and pore diffusion were tested to investigate the adsorption mechanism. Batch kinetic studies showed that the adsorption of Pb(II) from aqueous solutions with and without ligands could be best described by a psuedo-first-order model for both carbons. The effect of pH on the adsorption isotherms of Pb(II) and Pb(II) chelates was also investigated. The applicability of the Langmuir and Freundlich isotherms, established for various initial concentrations of the adsorbate and for different pH values, was tested at 30degreesC. (C) 2003 Society of Chemical Industry.

Keywords: Adsorption Kinetics, Activated Carbon, Steam Pyrolysis, Lead, Nta, Edta, Sawdust, Aqueous-Solutions, Moringa-Oleifera, Water-Treatment, Metal-Ions, Edta, Removal, Particles, Behavior, Sorption, Pb(II)

Ho, Y.S. (2003), Letter to the editor. *Journal of Chemical Technology and Biotechnology*, **78** (6), 724.

Full Text: [J\J Che Tec Bio78, 724.pdf](J/J%20Che%20Tec%20Bio78,%20724.pdf)

Keywords: Adsorption

Armağan, B., Özdemir, O., Turan, M. and Çelik, M.S. (2003), The removal of reactive azo dyes by natural and modified zeolites. *Journal of Chemical Technology and Biotechnology*, **78** (7), 725-732.

Full Text: [J\J Che Tec Bio78, 725.pdf](J/J%20Che%20Tec%20Bio78,%20725.pdf)

Abstract: The adsorption mechanism of three reactive dyes by zeolite has been examined with the aim of identifying the ability of zeolite to remove textile dyes from aqueous solutions. Towards this aim, a series of batch adsorption experiments was carried out, along with determination of the electrokinetic properties of both natural and modified zeolites. The adsorbent in this study is a clinoptilolite from the Gördes region of Turkey. The reactive dyes CI Reactive Black 5, Red 239 and Yellow 176 are typical azo dyes extensively used in textile dyeing. Adsorption tests were carried out as a function of mixing time, solids concentration, dye concentration and pH. The adsorption results indicate that the natural zeolite has a limited adsorption capacity for reactive dyes but is substantially improved upon modifying its surfaces with quaternary amines. An electrostatic adsorption mechanism involving the formation of a bilayer of amine molecules on the clinoptilolite surface onto which anionic dye molecules adsorb, depending on their polarities, is proposed. The results are also supported by electrokinetic measurements. The adsorption data were fitted to the Langmuir isotherm and it was found that the modified sepiolite yields adsorption capacities (*q*e) of 111, 89 and 61 mg g-1 for Red, Yellow and Black, respectively. These results are comparable to a popular adsorbent, activated carbon. Copyright © 2003 Society of Chemical Industry

Keywords: Activated Carbon, Adsorption, Adsorption, Aqueous-Solutions, Clay-Minerals, Clinoptilolite, Clinoptilolite, Modified Zeolites, Natural Zeolite, Organic Cations, Organozeolite, Reactive Dyes, Sepiolite, Sorption, Surface, Water, Zeolite, Zeolites

? Addour, L., Bakhti, Z., Belhocine, D., Grib, H., Lounici, H., Pauss, A., Piron, D. and Mameri, N. (2003), Filtration of zinc ions utilising pretreated *Streptomyces rimosus* biomass. *Journal of Chemical Technology and Biotechnology*, **78** (12), 1274-1280.

Full Text: [J\J Che Tec Bio78, 1274.pdf](J/J%20Che%20Tec%20Bio78,%201274.pdf)

Abstract: The performance of biofiltration of zinc utilising pretreated Streptomyces rimosus was studied. Streptomyces rimosus biomass is able to bind zinc ions in batch mode. The biomass granules may be regenerated easily by using a biomass pretreatment which confers rigidity to biosolids, without decreasing the zinc uptake capacity, thus allowing collection of the biomass by filtration. Accordingly, biomass was pretreated with an anionic enzymatic tension active product (Extran AP41) and regeneration with a cleaning product (HCl) was successfully realised. It was shown that the optimum concentration of biomass and pressure range are found to be between 50 and 120 g dm-3 and 0.5 and 1×105 Pa, respectively. Complete regeneration was reached after three cycles under optimal experimental conditions when the biosorbent was saturated with synthetic ZnCl2 solution. The filterability of biosolids was demonstrated. A combination of a batch reactor and a filtration process made it possible to increase the performance of the complete treatment process. The biosorption capacity of the biomass to bind Zn ions was slightly increased (from X = 14 mg g-1 in batch mode to X = 16.1 mg g-1 in a process combining batch reactor and pressure filtration) and the experimental contact time was considerably reduced. Integration of the filtration process produced a dewatering cake which considerably facilitated the regeneration operation. (C) 2003 Society of Chemical Industry.

Keywords: Activated-Sludge, Aqueous-Solution, Aspergillus- Niger, Biosorption, Biosorption, Cadmium, Compressibility, Copper Adsorption, Filtration, Heavy-Metals, Removal, *Rhizopus-Arrhizus*, Specific Resistance, *Streptomyces Rimosus*

Lee, V.K., Porter, J.F. and McKay, G. (2003), Fixed bed modelling for acid dye adsorption onto activated carbon. *Journal of Chemical Technology and Biotechnology*, **78** (12), 1281-1289.

Full Text: [J\J Che Tec Bio78, 1281.pdf](J/J%20Che%20Tec%20Bio78,%201281.pdf)

Abstract: The adsorption of three separate acid dyes onto activated carbon has been studied using fixed bed adsorption. A film-pore diffusion model was developed and applied to the experimental breakthrough curve data. A sensitivity analysis showed that pore diffusion was the dominant mass transport mechanism. Pore diffusion coefficients were determined by an optimization routine with a minimization of the sum of errors squared. The external mass transfer coefficients were sensitive to the external fluid dynamic parameters, such as liquid flow rate and mean particle size. These fluid dynamic parameters did not affect the effective diffusion coefficient. The effective diffusion coefficient was not affected by changes in the fluid dynamic parameters but did change with differing initial dye concentrations. This may be due to a contribution from surface diffusion to the effective diffusion coefficient. (C) 2003 Society of Chemical Industry.

Keywords: Dyes, Carbon, Film-Pore Diffusion, Optimization, Low Reynolds Numbers, Mass-Transfer, Water-Purification, Aqueous-Solutions, Batch Tests, Packed-Beds, Scale-Up, Removal, Kinetics, Pore

de Vargas, I., Macaskie, L.E. and Guibal, E. (2004), Biosorption of palladium and platinum by sulfate-reducing bacteria. *Journal of Chemical Technology and Biotechnology*, **79** (1), 49-56.

Full Text: [J\J Che Tec Bio79, 49.pdf](J/J%20Che%20Tec%20Bio79,%2049.pdf)

Abstract: The biosorption capacities of palladium and platinum were studied in three different species of Desulfovibvio: Desulfovibrio desulfuricans, Desulfovibrio fructosivorans and Desulfovibrio vulgaris. The influence of several parameters such as pH, acidic background and competitor anions on biosorption equilibria and biosorption kinetics were evaluated. Differences were observed between the three strains of Desulfovibvio with respect to the optimum biosorption parameters of both metals, suggesting differences in the metal speciation-dependent sorption mechanisms involved. The most promising Pd and Pt biosorption results were obtained using D desulfuricans with rapid achievement of equilibrium (90% of total sorption was achieved in 5-15 min) and a maximum value of 190 mg g-1 dry biomass and 90 mg g-1 dry biomass for Pd and Pt accumulation respectively, at pH 3. (C) 2003 Society of Chemical Industry.

Keywords: Biosorption, Catalysts, Chitosan, Desulfovibrio Desuluricans, Desulfovibrio-Desulfuricans, Gold, Heavy-Metals, Kinetics, Palladium, Platinum, Recovery, Reduction, Sorption, Uranium

Erhan, E., Yer, E., Akay, G., Keskinler, B. and Keskinler, D. (2004), phenol degradation in a fixed-bed bioreactor using micro- cellular polymer-immobilized *Pseudomonas syringae*. *Journal of Chemical Technology and Biotechnology*, **79** (2), 195-206.

Full Text: [J\J Che Tec Bio79, 195.pdf](J/J%20Che%20Tec%20Bio79,%20195.pdf)

Abstract: Highly porous (85% void volume) polymer beads with interconnecting micro-pores were prepared for the immobilization of *Pseudomonas syringae* for the degradation of phenol in a fixed-bed column bioreactor. The internal architecture of this support material (also known as PolyHIPE Polymer) could be controlled through processing before the polymerization stage. The transient and steady state phenol utilization rates were measured as a function of substrate solution flow rate and initial substrate concentration. The spatial concentration of the bacteria on the micro-porous support particles as well as within them was studied using scanning electron microscopy at various time intervals during the continuous operation of the bioreactor. It was found that although bacterial penetration into the porous support was present after 20 days, bacterial viability however, was compromised after 120 days as a result of the formation of a biofilm on the support particles. The steady state phenol utilization at an initial phenol concentration of 200 mg cm-3 was 100% provided that the flow rate was less than 7 cm3 min-1. Substrate inhibition at a constant flow rate of 4.5 cm3 min-1 was found to begin at 720 mg dm-3. The critical dilution rate for bacteria washout was high as a result of the highly hydrophobic nature of the support and the reduction of pore interconnect size due to bacterial growth within the pores in the vicinity of the surface of the support. (C) 2004 Society of Chemical Industry.

Keywords: 3-Phase Fluidized-Bed, Biodegradation Kinetics, Cells, Column, Column Reactor, Fixed Bed, Fixed Bed Column, Fixed-Bed Column, Immobilized *Pseudomonas syringae*, Lactic-Acid, Mass-Transfer, Packed-Bed Bioreactor, phenol Degradation, Process Intensification, Putida, Removal, Steady- State, Waste-Water, Wastewater Treatment

Liao, X.P., Lu, Z.B., Zhang, M.N., Liu, X. and Shi, B. (2004), Adsorption of Cu(II) from aqueous solutions by tannins immobilized on collagen. *Journal of Chemical Technology and Biotechnology*, **79** (4), 335-342.

Full Text: [J\J Che Tec Bio79, 335.pdf](J/J%20Che%20Tec%20Bio79,%20335.pdf)

Abstract: Novel adsorbents were prepared by immobilizing tannins on collagen fibre matrices. Their adsorption properties, including adsorption equilibrium, adsorption kinetics, and column adsorption kinetics to Cu(II) were investigated. Immobilized *Myrica rubra* tannin and black wattle tannin exhibited significantly higher adsorption capacity than larch tannin and the adsorption isotherms of these three immobilized tannins can be described by the Freundlich model. Detailed adsorption studies of immobilized black wattle tannin to Cu(II) indicated that temperature had little effect on the adsorption isotherms whereas the effect of pH was significant. Adsorption rate data fitted well to a pseudo-second-order rate model, and the adsorption capacity calculated by this model was consistent with the result of actual measurement at relatively higher adsorption temperatures. Immobilized black wattle tannin also had excellent column adsorption kinetic properties and high binding capacity. The adsorptivity of the column was stable even after repeated adsorption-desorption cycles. Copyright © 2004 Society of Chemical Industry

Keywords: Bovine Collagen, Immobilized Tannins, Adsorption, Cu(II), Adsorption Kinetics

Mussatto, S.I., Santos, J.C. and Roberto, I.C. (2004), Effect of pH and activated charcoal adsorption on hemicellulosic hydrolysate detoxification for xylitol production. *Journal of Chemical Technology and Biotechnology*, **79** (6), 590-596.

Full Text: [J\J Che Tec Bio79, 590.pdf](J/J%20Che%20Tec%20Bio79,%20590.pdf)

Abstract: Biotechnological conversion of xylose into xylitol using hydrolysates obtained from the hemicellulosic fraction of lignocellulosic materials is compromised by the presence of compounds released or formed during the hydrolysis process, some of them being toxic to microorganisms. In order to improve the bioconversion of these hydrolysates it is necessary to find methods to reduce their toxicity. In the present work, rice straw hemicellulosic hydrolysate was treated by six different procedures (all of them involving pH adjustment, with or without activated charcoal adsorption), before being used as a fermentation medium for xylitol production. The most effective method of treatment was to increase the initial pH (0.4) to 2.0 using solid NaOH, followed by the addition of activated charcoal (25 g kg-1) and increase in the pH to 6.5 using solid NaOH. Lignin degradation products were the most inhibitory compounds present in the hydrolysate; their removal was selective and strongly dependent on the pH employed in the treatment. The highest yield of xylitol was 0.72 g g-1 xylose, with a productivity of 0.55 g dm-3 h-1. Copyright © 2004 Society of Chemical Industry

Keywords: Activated Charcoal, Detoxification, Fermentative Process, Hemicellulosic Hydrolysate, pH Adjustment, Xylitol

Herzberg, M., Dosoretz, C.G., Tarre, S., Michael, B., Dror, M. and Green, M. (2004), Simultaneous removal of atrazine and nitrate using a biological granulated activated carbon (BGAC) reactor. *Journal of Chemical Technology and Biotechnology*, **79** (6), 626-631.

Full Text: [J\J Che Tec Bio79, 626.pdf](J/J%20Che%20Tec%20Bio79,%20626.pdf)

Abstract: The objective of this research was to characterize the performance of granulated activated carbon (GAC) as a carrier for *Pseudomonas* ADP in a non-sterile continuous fluidized bed reactor for atrazine degradation under anoxic conditions. The GAC was compared with two non-adsorbing carriers: non-adsorbing carbon particles (http://www3.interscience.wiley.com/giflibrary/12/lsquo.gifBaker producthttp://www3.interscience.wiley.com/giflibrary/12/rsquo.gif) having the same surface area available for biofilm growth as the GAC, and sintered glass beads. The initial atrazine degradation efficiency was higher than 90% in the reactors with the non-adsorbing carriers, but deteriorated to 20% with time due to contamination by foreign denitrifying bacteria. In contrast, no deterioration was observed in the biological granulated activated carbon (BGAC) reactor. A maximal atrazine volumetric and specific degradation rate of 0.820 ± 0.052 g atrazine dm-3 day-1 and 1.7 ± 0.4 g atrazine g-1 protein day-1 respectively were observed in the BGAC reactor. Concurrent atrazine biodegradation and desorption from the carrier was shown and an effluent concentration of 0.002 mg dm-3 (below the EPA standard) was achieved in the BGAC reactor. The advantages of the BGAC reactor over the non-adsorbing carrier reactors can probably be explained by the adsorption-desorption mechanism providing favorable microenvironmental conditions for atrazine-degrading bacteria. Copyright © 2004 Society of Chemical Industry

Keywords: Atrazine, GAC, Fluidized Bed Reactor, Biofilm, Degradation

Mamma, D., Kalantzi, S.A. and Christakopoulos, P. (2004), Effect of adsorption characteristics of a modified cellulase on indigo backstaining. *Journal of Chemical Technology and Biotechnology*, **79** (6), 639-644.

Full Text: [J\J Che Tec Bio79, 639.pdf](J/J%20Che%20Tec%20Bio79,%20639.pdf)

Abstract: The effect of limited proteolysis (digestion) of a commercial cellulase preparation (Ecostone® L350) on backstaining with indigo was investigated. The influence of protease (papain) concentration on limited proteolysis of cellulase preparation was studied, applying different ratios of papain/cellulase (w/w). Changes in adsorption on Avicel cellulose of the non-digested compared with the papain-digested Ecostone® L350 were examined using the Langmuir adsorption isotherm. The non-digested Ecostone® L350 exhibited stronger interaction to Avicel cellulose compared with the digested form, while the maximum efficiency of cellulase adsorption to Avicel cellulose decreased after digestion. When papain-digested Ecostone® L350 was applied on cotton fabrics during the dyeing procedure with indigo, a reduction of indigo backstaining was obtained compared with the non-digested Ecostone® L350. Copyright © 2004 Society of Chemical Industry

Keywords: Adsorption, Adsorption Isotherm, Backstaining, Binding Domain, Cellobiohydrolase, Cellulase, Cellulose, Commercial Cellulase, Concentration, Cotton, Crystalline Cellulose, Culture, Digestion, Efficiency, Hydrolysis, Indigo, Interaction, Isotherm, Langmuir Adsorption Isotherm, Limited Proteolysis, Modified, Protease, Proteolysis, Reduction

De Castro Dantas, T.N., Beltrame, L.T.C., Dantas Neto, A.A. and Moura, M.C.P.D. (2004), Use of microemulsions for removal of color and dyes from textile wastewater. *Journal of Chemical Technology and Biotechnology*, **79** (6), 645-650.

Full Text: [J\J Che Tec Bio79, 645.pdf](J/J%20Che%20Tec%20Bio79,%20645.pdf)

Abstract: One of the major environmental problems in the textile dyeing industry is the removal of color from effluents. The present study deals with color removal from effluents using microemulsions. The wastewater used in this study was the reactive exhausted dye liquor from a dyeing house containing Procion Yellow H-E4R (CI Reactive Yellow 84), Procion Blue H-ERD (CI Reactive Blue 160) and Procion Red H-E3B (CI Reactive Red 120). Color removal was determined by CIE L\*a\*b\* (CIELAB) color space, CIE L\*a\*b\* color difference, DeltaE\*(ab), and absorbance. Color removal greater than 95% was achieved, attaining values lower than the consent requirements established by the Environmental Agency. It was observed that pH is an important parameter in color removal and effluent pH correction from 10.44 to 9 before extraction improved results. The results obtained were modeled using the Scheffe net method and evaluated through the construction of isoresponse diagrams by correlation graphics between experimental values and those obtained through use of model equations, providing an experimental error of less than 2%. The optimized method very efficiently removed all dyes contained in the effluent. The same microemulsion phase recovered after the extraction process can be used at least a further 14 times and all the extractions gave good color removal. (C) 2004 Society of Chemical Industry.

Keywords: Cielab, Exhausted Dyebath, Extraction, Isoresponse Surface, Reactive Dyes, Scheffe Net, Adsorption, Decolorization, Extraction, Chromium, Reuse

Leyva-Ramos, R., Aguilar-Armenta, G., Gonzalez-Gutierrez, L.V., Guerrero-Coronado, R.M. and Mendoza-Barron, J. (2004), Ammonia exchange on clinoptilolite from mineral deposits located in Mexico. *Journal of Chemical Technology and Biotechnology*, **79** (6), 651-657.

Full Text: [J\J Che Tec Bio79, 651.pdf](J/J%20Che%20Tec%20Bio79,%20651.pdf)

Abstract: This work investigated the ion exchange of ammonia on clinoptilolite obtained from mineral deposits located in San Luis Potosi and Sonora, Mexico. Experimental ion exchange isotherm data were obtained in a batch adsorber. The effects of temperature and solution pH on the ion exchange capacity were studied and it was found that the exchange capacity was slightly increased by augmenting the temperature and by decreasing the pH from 6 to 3. The ion exchange capacity was independent of the diameter of the zeolite particles. The reversibility of ion exchange was analyzed by desorbing the ammonia exchanged on the zeolite. The ion exchange was reversible when 1% NaCl solution was used as the desorbing solution, but more ammonia was desorbed using 1% KCl solution in the desorption step. It was concluded that a considerable amount of ammonia was exchanged on the clinoptilolite and that the exchange capacity was slightly dependent on the temperature and pH. (C) 2004 Society of Chemical Industry.

Keywords: Ammonia, Clinoptilolite, Ion Exchange, Ion-Exchange, Natural Zeolite, Natural Zeolites, Removal, Waters

Loukidou, M.X., Karapantsios, T.D., Zouboulis, A.I. and Matis, K.A. (2004), Diffusion kinetic study of cadmiurn(II) biosorption by *Aeromonas caviae*. *Journal of Chemical Technology and Biotechnology*, **79** (7), 711-719.

Full Text: [J\J Che Tec Bio79, 711.pdf](J/J%20Che%20Tec%20Bio79,%20711.pdf)

Abstract: The removal of cadmium from aqueous solution by sorption on Aeromonas caviae particles was investigated in a well-stirred batch reactor. Equilibrium and kinetic experiments were performed at various initial bulk concentrations, biomass loads and temperatures. Biosorption equilibrium was established in about 1 h and biosorption was well described by the Langmuir and Freundlich biosorption isotherms. The maximum biosorption capacity was found as 155.32 mg Cd(II) g-1 at 20degreesC. The obtained sorption capacity is appreciably high for most experimental conditions; so A caviae may be considered as a suitable biosorbent for the removal of cadmium. Moreover, the sorption rate of cadmium onto A caviae particles was particularly sensitive to initial bulk concentration and solid load. A detailed analysis was conducted, examining several diffusion (external and intraparticle) kinetic models in order to identify a suitable rate expression. The results are discussed and indicate that biosorption of cadmium is a complex process that is described more correctly by more than one model. (C) 2004 Society of Chemical Industry.

Keywords: Biomass, Modelling, Diffusion, Equilibrium, Metal Removal, Wastewater, Heavy-Metals, Removal, Equilibrium, Sorption, Systems, Cadmium, Biomass

Li, X.Z., Liu, H., Cheng, L.F. and Tong, H.J. (2004), Kinetic behaviour of the adsorption and photocatalytic degradation of salicylic acid in aqueous TiO2 microsphere suspension. *Journal of Chemical Technology and Biotechnology*, **79** (7), 774-781.

Full Text: [J\J Che Tec Bio79, 774.pdf](J/J%20Che%20Tec%20Bio79,%20774.pdf)

Abstract: A new photocatalyst, named TiO2 microspheres, prepared by a sol-spraying-calcination method, can freely suspend with air bubbling in its aqueous suspension and easily settle down from a water phase under gravity. The experimental results demonstrated that TiO2 microspheres had better adsorption capacity than conventional TiO2 powders, due to large surface area, large pore volume, and also a porous structure. The photocatalytic activity of TiO2 microspheres in aqueous suspension was evaluated using salicylic acid (SA) as a model substrate. It was found that the Langmuir-Hinshelwood model in its integral form described the kinetics of SA photocatalytic degradation in the TiO2 microsphere suspensions better than its simplified form as a first-order reaction model, since the significant substrate adsorption on the catalysts was not negligible. The kinetics of SA photocatalytic degradation with different initial concentrations and pH was further investigated. The experiments demonstrated that the change of pH could significantly affect the adsorption of SA in the TiO2 microsphere suspensions. The effects of substrate adsorption rate and photoreaction rate on the overall performance of photocatalytic degradation is also discussed on the basis of experimental data. Copyright © 2004 Society of Chemical Industry

Keywords: Adsorption, Kinetics, Microsphere, pHotocatalysis, Titanium Dioxide

Chou, H.H., Huang, J.S. and Hong, W.F. (2004), Temperature dependency of granule characteristics and kinetic behavior in UASB reactors. *Journal of Chemical Technology and Biotechnology*, **79** (8), 797-808.

Full Text: [J\J Che Tec Bio79, 797.pdf](J/J%20Che%20Tec%20Bio79,%20797.pdf)

Abstract: When an inhibitory substrate, phenol, was treated under mesophilic conditions (25, 30, 35, and 40 °C), the upflow anaerobic sludge bed (UASB) reactors at 30 °C resulted in the greatest amount of biomass and the largest granule size, while the UASB reactors at 25 °C resulted in the smallest granule size and the greatest amount of wash-out of sludge. The granule size tended to be negatively correlated with the amount of wash-out of sludge. With an increase in temperature, the kinetic constant *k* for anaerobic phenol degradation increased and the half saturation constant (*K*s) decreased. The mass fraction of methanogens (*f*) increased with increasing operational temperature in the UASB reactors and the activation energy (*E*a) for acetate methanogenesis was larger than that for phenol acidogenesis in the batch reactors, indicating that the operational temperature imposes a more influential effect on methanogens than on acidogens. From the results of the activity of acidogens and methanogens (expressed in specific COD utilization rate), the rate-limiting step is phenol acidogenesis. Copyright © 2004 Society of Chemical Industry

Keywords: Upflow Anaerobic Sludge Bed, Mesophilic, Granule Characteristics, phenol Acidogenesis, Acetate Methanogenesis, Rate-Limiting, Kinetics

Rivero, M.J., Primo, O. and Ortiz, M.I. (2004), Modelling of Cr(VI) removal from polluted groundwaters by ion exchange. *Journal of Chemical Technology and Biotechnology*, **79** (8), 822-829.

Full Text: [J\J Che Tec Bio79, 822.pdf](J/J%20Che%20Tec%20Bio79,%20822.pdf)

Abstract: This work reports the viability and modelling of the removal of Cr(VI) from polluted groundwaters by means of ion exchange using the resin Lewatit MP-64. Feed groundwaters that contained Cr(VI) at an average concentration of 2431 mg dm-3 and 1187 mg dm-3 of chloride and 1735 mg dm-3 of sulfate as main anions were acidified to a pH of 2.0 prior to the removal process. Dynamic experiments were carried out in a fixed bed column with feed waters at flow rates in the range of 2.78×10-7 m3 s-1 to 5.55×10-7 m3 s-1. Regeneration was achieved with NaOH (2 mol dm-3). From the experimental results, the equilibrium of the ion exchange reaction was successfully modelled, obtaining an equilibrium constant (K’(AB)) = 44.90. Finally, a mass balance that included mass transfer resistances in the liquid and solid phases was developed and from the comparison between simulated and experimental data the value of the effective intraparticle diffusivity (D-s) was determined as 1.43×10-12 m2 s-1. (C) 2004 Society of Chemical Industry.

Keywords: Chromium (VI), Ion Exchange, Groundwaters, Mathematical Modeling, Liquid Mass-Transfer, Hexavalent Chromium, Back-Extraction, Anion-Exchanger, Equilibrium, Recovery, Chromate, Speciation, Separation, Oxyanions

Ikegami, T., Kitamoto, D., Negishi, H., Iwakabe, K., Imura, T., Sano, T., Haraya, K. and Yanagishita, H. (2004), Reliable production of highly concentrated bioethanol by a conjunction of pervaporation using a silicone rubber sheet-covered silicalite membrane with adsorption process. *Journal of Chemical Technology and Biotechnology*, **79** (8), 896-901.

Full Text: [J\J Che Tec Bio79, 896.pdf](J/J%20Che%20Tec%20Bio79,%20896.pdf)

Abstract: For the production of highly concentrated bioethanol by pervaporation using an ethanol-permselective silicalite membrane, pervaporation performance was investigated using a silicalite membrane entirely covered with a silicone rubber sheet to prevent direct contact with acidic compounds. By using a resistance model for membrane permeation, the separation factor of the covered silicalite membrane towards ethanol can be estimated from the individual pervaporation performances of the silicalite membrane and the silicone rubber sheet. No decrease in the ethanol concentration through the silicone rubber sheet-covered membrane was caused when ethanol solutions containing succinic acid were supplied. By directly passing the permeate-enriched ethanol vapor mixed with water vapor through a dehydration column packed with a molecular sieve of pore size 0.3 nm, highly concentrated bioethanol up to 97% (w/w), greater than the azeotropic point in the ethanol/water binary systems, can be obtained from 9% (w/w) fermentation broth. Copyright © 2004 Society of Chemical Industry

Keywords: Bioethanol, Pervaporation, Silicalite, Silicone Rubber, Resistance Model, Molecular Sieve

Liu, Y., Xu, H., Yang, S.F. and Tay, J.H. (2004), A theoretical model for biosorption of cadmium, zinc and copper by aerobic granules based on initial conditions. *Journal of Chemical Technology and Biotechnology*, **79** (9), 982-986.

Full Text: [J\J Che Tec Bio79, 982.pdf](J/J%20Che%20Tec%20Bio79,%20982.pdf)

Abstract: Batch tests have been most commonly employed to investigate the biosorption isotherms of heavy metals. There is evidence showing that the biosorption isotherm is influenced by initial metal and biosorbent concentrations, namely C-o and X-o. However, a quantitative description of the effect of initial conditions on biosorption isotherms still remained elusive. According to the thermodynamics of the biosorption process, an initial condition-dependent isotherm equation for biosorption of heavy metals was derived and verified by experimental data. This model demonstrated that the biosorption isotherms of heavy metals by aerobic granules were a function of the C-o/X-o ratio. The biosorption constant involved in the proposed model had a clearly defined physical meaning; this constant was found to be equal to the inverse of the thermodynamic equilibrium constant of the biosorption process. (C) 2004 Society of Chemical Industry.

Keywords: Aerobic Granule, Biosorption, Isotherm, Thermodynamics, Heavy Metal, Equilibrium, Thiobacillus-Ferrooxidans, Removal, Biomass, Sludge, Algae, Cu, Zn

Park, H.G. and Chae, M.Y.(2004), Novel type of alginate gel-based adsorbents for heavy metal removal. *Journal of Chemical Technology and Biotechnology*, **79** (10), 1080-1083.

Full Text: [J\J Che Tec Bio79, 1080.pdf](J/J%20Che%20Tec%20Bio79,%201080.pdf)

Abstract: Various alginate gel-based adsorbents were investigated for the removal of heavy metals: alginate beads, alginate capsules, and alginate gel-coated adsorbent. Of these, alginate capsules showed the greatest Pb2+ uptake capacity of 1560 mg g-1 of dry sodium alginate, and the alginate gel-coated adsorbent, prepared simply by forming a thin alginate film on an inert matrix, achieved rapid adsorption equilibrium within 10 min. Adsorbed metals were readily removed from the alginate gel-based adsorbents using eluents such as HNO3 and could be reused for up to 10 adsorption-desorption cycles without marked loss of metal uptake capacity. Alginate gel-coated adsorbents could be prepared in a dried state and have great application potential for the removal of heavy metals from contaminated water. Copyright © 2004 Society of Chemical Industry

Keywords: Alginate Gel, Heavy Metal, Biosorption, Adsorbent, Water Purification

Ahmedna, M., Marshall, W.E., Husseiny, A.A., Goktepe, I. and Rao, R.M. (2004), The use of nutshell carbons in drinking water filters for removal of chlorination by-products. *Journal of Chemical Technology and Biotechnology*, **79** (10), 1092-1097.

Full Text: [J\J Che Tec Bio79, 1092.pdf](J/J%20Che%20Tec%20Bio79,%201092.pdf)

Abstract: Chlorination of drinking water is a common practice, used by numerous municipalities in the United States (US) to safeguard their water supplies. However, the chlorine used can chemically react with organic components in the drinking water to produce unwanted chlorination by-products. The objective of this investigation was to evaluate the use of granular activated carbon produced from nutshells (almond, English walnut, pecan) in a point-of-use (POU) water filtration system designated ‘Envirofilter’ and to determine its efficacy in removing select, potentially carcinogenic chlorination by-products, namely the trihalomethanes (THMs) bromodichloromethane, bromoform and dibromochloromethane. The POU water filtration system that contained the nutshell-based carbons was designated ‘Envirofilter’ and adsorption efficiencies of this system were compared to that of four commercially available POU home water filter systems, namely, BRITA, Omni Filter, Phttp://www3.interscience.wiley.com/giflibrary/12/Umacr.gifR and Teledyne Water Pik. Eight different ‘Envirofilters’ were constructed of individual or binary mixtures of carbons produced from acid-activated almond or pecan shells and steam-activated pecan or walnut shells and evaluated for adsorption of the three chlorination by-products. The results indicate that only two of the eight http://www3.interscience.wiley.com/giflibrary/12/lsquo.gifEnvirofiltershttp://www3.interscience.wiley.com/giflibrary/12/rsquo.gif failed to remove more THMs than the commercial POU systems. In both cases, these filters contained carbons with either 100% acid-activated almond shells or 100% acid-activated pecan shells. All six of the other filters contained carbons with either 50% or 100% steam-activated pecan shells or steam-activated walnut shells. Therefore, ‘Envirofilters’ appeared to depend on the presence of steam-activated nutshell carbons for their success. The six effective ‘Envirofilters’ reduced THM levels to below the Maximum Contaminant Levels (MCL) required by the US Environmental Protection Agency (US EPA). Based on these results, these six ‘Envirofilters’ may be considered as a replacement for existing commercial filter systems because of their efficacy and projected cost. Copyright © 2004 Society of Chemical Industry

Keywords: Granular Activated Carbon, Point-of-Use Water Filter, Nutshells, Bromoform, Dibromochloromethane, Bromodichloromethane

Choy, K.K.H., Porter, J.F. and McKay, G. (2004), Film-surface diffusion during the adsorption of acid dyes onto activated carbon. *Journal of Chemical Technology and Biotechnology*, **79** (11), 1181-1188.

Full Text: [J\J Che Tec Bio79, 1181.pdf](J/J%20Che%20Tec%20Bio79,%201181.pdf)

Abstract: A mass transport model has been developed and applied to the adsorption of three acid dyes onto activated carbon in three single component systems. The mass transfer model is based on two rate controlling mass transfer steps, namely external film mass transfer and homogeneous solid-phase surface diffusion (HSD). Almost all previous film-HSD models have been based on numerical solutions to the diffusion equation using orthogonal collocation or Crank-Nicolson finite difference solutions. However, in the present model a semi-analytical solution to the solid surface diffusion equation is presented, yielding a sophisticated solution of the differential equations. The solutions provide a good correlation between the experimental concentration-time decay curves by incorporating the Langmuir equilibrium isotherm to describe the solid phase surface dye concentrations. However, the surface diffusivities show a dependence on the carbon particle surface coverage and these diffusivities have been correlated using a Darken relationship. Copyright © 2004 Society of Chemical Industry

Keywords: Acid Dye, Activated Carbon, Adsorption, Homogeneous Surface Diffusion Model (HSDM)

van Hullebusch, E.D., Zandvoort, M.H. and Lens, P.N.L. (2004), Nickel and cobalt sorption on anaerobic granular sludges: Kinetic and equilibrium studies. *Journal of Chemical Technology and Biotechnology*, **79** (11), 1219-1227.

Full Text: [J\J Che Tec Bio79, 1219.pdf](J/J%20Che%20Tec%20Bio79,%201219.pdf)

Abstract: The kinetics and equilibria of sorption of the divalent metal ions cobalt and nickel onto anaerobic granular sludge are described. Single component and binary equimolar systems were studied at different pH values (pH 6, 7 and 8). The kinetic modelling of metal sorption by anaerobic granular sludge has been carried out using Lagergren equations. On fitting the experimental kinetic data both in first- and pseudo-second-order equations, the regression analysis of a pseudo-second-order equation gave a higher *r*2 value, indicating that both external mass transfer and intra-particle diffusion are involved in the sorption process. The experimental isotherm data were analysed using the Langmuir, Freundlich and Redlich-Peterson equations. The Redlich isotherm, a combination of the Langmuir and Freundlich equations, was found to have the highest regression correlation coefficients at pH 7. At pH 8, the Langmuir mechanism dominated for cobalt and nickel adsorption. In contrast, at pH 6, the Freundlich equation gave a better correlation coefficient which suggests a more heterogeneous adsorption at that pH. The maximal adsorption capacity of the granular sludge, as determined by the Langmuir equation, for cobalt or nickel in single systems (8.92 mg g-1 Co TSS; 9.41 mg g-1 Ni TSS, pH 7) compared with binary systems (8.06 mg g-1 Co TSS; 8.43 mg g-1 Ni TSS, pH 7) showed no great difference in the accumulation of these metals onto granular sludge. Copyright © 2004 Society of Chemical Industry

Keywords: Anaerobic Granular Sludge, Nickel, Cobalt, Sorption Kinetics, Equilibrium Isotherm, pH Effect

Aravindhan, R., Madhan, B., Rao, J.R. and Nair, B.U. (2004), Recovery and reuse of chromium from tannery wastewaters using *Turbinaria ornata* seaweed. *Journal of Chemical Technology and Biotechnology*, **79** (11), 1251-1258.

Full Text: [J\J Che Tec Bio79, 1251.pdf](J/J%20Che%20Tec%20Bio79,%201251.pdf)

Abstract: Brown seaweed (*Turbinaria* spp) was pre-treated with sulfuric acid, calcium chloride and magnesium chloride and tested for its ability to remove chromium from tannery wastewater. Protonated seaweeds gave better uptake of chromium compared with calcium and magnesium treatments. Chromium uptake was optimal at pH 3.5. *Turbinaria* weed exhibited maximum uptake of about 31 mg of chromium for one gram of seaweed at an initial concentration of 1000 ppm of chromium. Freundlich and Langmuir adsorption isotherm models were used to describe the biosorption of chromium(III) by *Turbinaria* spp. The chromium-loaded seaweed was reused as a reductant in the preparation of the tanning agent basic chromium sulfate (BCS). Leathers made from this tanning agent had properties comparable to conventionally processed chrome-tanned leathers. Copyright © 2004 Society of Chemical Industry

Keywords: Tannery Wastewater, Chromium, Bioaccumulation, *Turbinaria* spp, seaweed, Isotherms

Marshall, W.E. and Wartelle, L.H. (2004), An anion exchange resin from soybean hulls. *Journal of Chemical Technology and Biotechnology*, **79** (11), 1286-1292.

Full Text: [J\J Che Tec Bio79, 1286.pdf](J/J%20Che%20Tec%20Bio79,%201286.pdf)

Abstract: Agricultural by-products are generally poor adsorbents of anions in solution. Therefore, modification of the by-product could enhance its anion exchange capabilities. The objective of this study was to increase the anion exchange properties of the agricultural by-product, soybean hulls, by chemical modification. Soybean hulls were quaternized with the quaternizing agent, *N*-(3-chloro-2-hydroxypropyl) trimethylammonium chloride, in the presence of a strongly alkaline environment. This modification increased the amount of positive charge on the hulls as evidenced by increased nitrogen content and increased uptake of anions compared with the unmodified hulls. A method to optimize the anion exchange properties of the hulls was developed. Ion exchange properties of the hulls toward anions of environmental significance, namely arsenate (As), chromate (Cr), dichromate (Cr2), phosphate (P) and selenate (Se) were determined. The modified hulls were also compared with commercial cellulose-based and synthetic anion exchange resins in their ability to remove these anions from solution. The experimental and commercial resins were also compared for their ability to remove a mixture of arsenate, chromate, dichromate and selenate from laboratory prepared solutions to levels below the maximum contaminant levels for these anions in drinking water as specified by the US Environmental Protection Agency (US EPA). Our results demonstrate that the soy hull resin is more efficient in anion removal than the commercial cellulose-based resin but not as effective as the commercial synthetic resin. Published in 2003 for SCI by John Wiley & Sons, Ltd.

Keywords: Soybean Hulls, Anion Adsorption, Anion Exchange Resin, Quaternization, *N*-(3-chloro-2-hydroxypropyl) Trimethylammonium Chloride

Kar, P. and Misra, M. (2004), Use of keratin fiber for separation of heavy metals from water d. *Journal of Chemical Technology and Biotechnology*, **79** (11), 1313-1319.

Full Text: [J\J Che Tec Bio79, 1313.pdf](J/J%20Che%20Tec%20Bio79,%201313.pdf)

Abstract: Nano-porous keratin fiber is effective in removing heavy metals from solutions. The biosorption of heavy metals from solutions is dependent upon the solution pH, the contact time, surface area and temperature. The intrinsic properties of the keratin fiber, ie stability over a wide range of pH, structural toughness and high surface area, are the positive factors. Alkaline ultrasonic treatment of the keratin fiber resulted in a multi-fold increase in metal uptake. Adsorption of heavy metals using both batch and column operations was conducted. Multiple elution and adsorption tests indicated that it is possible to reuse keratin fiber as a biosorbent for a number of cycles. Copyright © 2004 Society of Chemical Industry

Keywords: Keratin Fiber, Heavy Metals, Removal, Processing

Lee, M.Y., Hong, K.J., Kajiuchi, T. and Yang, J.W. (2004), Determination of the efficiency and removal mechanism of cobalt by crab shell particles. *Journal of Chemical Technology and Biotechnology*, **79** (12), 1388-1394.

Full Text: [J\J Che Tec Bio79, 1388.pdf](J/J%20Che%20Tec%20Bio79,%201388.pdf)

Abstract: The effects of contact time, solution pH and ionic strength on interactions between cobalt (59Co) ions in synthetic liquid waste and particles of raw crab shell, Portunus trituberculatus, in batch reactions were studied. Approximately 19.5 mg dm-3 Co was removed within 6 h after contact with 1.0 g dm-3 crab shell at an initial concentration of 20 mg dm-3 Co. Due to the dissolution of calcium carbonate in the crab shell, the solution pH changed spontaneously to 10, leading to precipitation of cobalt ions. The efficiency of cobalt removal depended on solution pH, but was less pH sensitive than for controls without crab shell. The maximum uptake of Co at an initial pH value of 5.0 was 510 mg g-1 crab shell. The removal efficiency was affected slightly by ionic strength up to 2.0 mol dm-3 of NaCl. Scanning electron microscopy (SEM) equipped with energy dispersive spectroscopy (EDS) indicated that the removal mechanism of Co by crab shell resulted primarily from the dissolution of calcium carbonate followed by precipitation of cobalt on the surface of the shell. Compared with commonly used ion-exchange resins such as natural zeolite, Durasil 70, and Durasil 230, the efficiency of Co removal by a column of mixture of crab shell and activated carbon was at least three-fold greater, indicating that crab shell is a suitable biosorbent for the removal of cobalt from liquid waste. Copyright © 2004 Society of Chemical Industry

Keywords: Crab Shell, Calcium Carbonate, Chitin, Precipitation, Sorption, Cobalt Removal

Yeon, K.H., Song, J.H., Kim, J.B. and Moon, S.H. (2004), Preparation and characterization of UV-grafted ion-exchange textiles in continuous electrodeilonization. *Journal of Chemical Technology and Biotechnology*, **79** (12), 1395-1404.

Full Text: [J\J Che Tec Bio79, 1395.pdf](J/J%20Che%20Tec%20Bio79,%201395.pdf)

Abstract: Ion-exchange textiles (IETs) suitable for use in continuous electrodeionization (CEDI) stacks were prepared using the ultraviolet (UV)-induced grafting of acrylic acid and sodium styrene sulfonate for cation-exchange textiles, or 2-hydroxyethyl methacrylate and vinylbenzyl trimethyl ammonium chloride for anion-exchange textiles, onto nonwoven polypropylene fabric using benzophenone as photoinitiator. Although the ion-exchange capacity (2.2 meq g-1) of the prepared strong acid cation-exchange textile was lower than that of IRN77 strong acid cation-exchange resin (4.2 meq g-1), the overall rate constant of IET was very high due to its low crosslinking and high specific surface area. There was no significant difference between the two different media in terms of the Co(II) removal rate. Furthermore, the current efficiency for IETs was higher than that of IRN77 cation-exchange resin during a CEDI operation, with efficiencies of 60% and 20%, respectively. The IET also showed the faster exchange kinetics. Therefore, IETs prepared in this study proved to have desirable ion-conducting characteristics within the CEDI systems. Also this study revealed that the primary removal mechanism in CEDI is the transport of ions through a medium and not the ionic capacity of a medium. (C) 2004 Society of Chemical Industry.

Keywords: Continuous Electrodeionization, Ion-Conducting Spacer, Ion-Exchange Resin, Ion-Exchange Textile, UV-Grafting Polymerization, High-Resistivity Water, Conducting Spacers, Waste-Water, Removal, Electrodeionization, Electrodialysis, Polymerization, Adsorption, Membranes, Cobalt

Mu, Y., Yu, H.Q., Zhang, S.J. and Zheng, J.C. (2004), Kinetics of reductive degradation of Orange II in aqueous solution by zero-valent iron. *Journal of Chemical Technology and Biotechnology*, **79** (12), 1429-1431.

Full Text: [J\J Che Tec Bio79, 1429.pdf](J/J%20Che%20Tec%20Bio79,%201429.pdf)

Abstract: The reductive degradation of Orange II in aqueous solution by zero-valent iron was investigated. The degradation of Orange II followed pseudo-first-order kinetics at various pH values and initial Orange II levels, but the formation of sodium sulfanilate, a major reductive product of Orange II, followed zero-order kinetics. Copyright © 2004 Society of Chemical Industry

Keywords: Azo-Dyes, Degradation, Metallic Iron, Wastewaters

Wu, R.C. and Qu, J.H. (2005), Removal of water-soluble azo dye by the magnetic material MnFe2O4. *Journal of Chemical Technology and Biotechnology*, **80** (1), 20-27.

Full Text: [2005\J Che Tec Bio80, 20.pdf](2005/J%20Che%20Tec%20Bio80,%2020.pdf)

Abstract: Magnetic ferrite material, MnFe2O4, as a novel adsorbent was prepared and characterized. Adsorption tests indicated that it is an excellent adsorbent for the removal of the azo dye Acid Red B (ARB) from water. After adsorbing ARB and recovery by the magnetic separation method, it can be regenerated by Fenton’s reagent. The pseudo-first-order and second-order kinetic models were used to describe the kinetic data and the rate constants were evaluated. The adsorption capacity was highly affected by the pH of the solution, and pH 3.8 was optimal. After regeneration, the adsorption capacity of MnFe2O4 increased significantly, which was the result of a decrease in average pore diameter, an increase in surface area of the adsorbent and the adsorption of ferric hydroxide produced in the regeneration reaction. The adsorption can be described with the Langmuir model and the maximum adsorption capacity for ARB was 53.8 mg g-1 adsorbent. FTIR study for ARB on MnFe2O4 indicated that the adsorption of ARB occurred via the azo group and the sulfonic group of the dye through the formation of a complex with the adsorbent surface. Copyright © 2004 Society of Chemical Industry

Keywords: Adsorption, Regeneration, Acid Red B, MnFe2O4, Magnetic Separation

Namasivayam, C. and Höll, W.H. (2005), Quaternized biomass as an anion exchanger for the removal of nitrate and other anions from water. *Journal of Chemical Technology and Biotechnology*, **80** (2), 164-168.

Full Text: [2005\J Che Tec Bio80, 164.pdf](2005/J%20Che%20Tec%20Bio80,%20164.pdf)

Abstract: Dried Chinese Reed (*Miscanthus sinensis*), a fast growing plant, was used as a model biomass for the development of anion exchangers using a quaternization agent, *N*-(3-chloro-2-hydroxypropyl)trimethylammonium chloride (CHMAC), and a cross-linking agent, epichlorohydrin. Anions studied include nitrate, phosphate, perchlorate and sulfate. Batch mode adsorption studies were conducted using aqueous solutions of anions. Detailed kinetics were studied for nitrate removal. Parameters studied included anion concentration, agitation time, adsorbent dose, and pH. Adsorption equilibrium occurred in 10 min for all the anions studied. Equilibrium adsorption data followed both Langmuir and Freundlich isotherms. The presence of phosphate, perchlorate, fluoride and sulfate lowered the adsorption significantly. The effects of pH on adsorption and desorption show that ion exchange is involved in the adsorption process. The adsorption capacity of the cross-linked and quaternized Chinese Reed for nitrate, sulfate, phosphate and perchlorate was found to be 7.55, 13.25, 16.61 and 10.07 mg of anion per g of the anion exchanger, respectively. Copyright © 2004 Society of Chemical Industry

Keywords: Quaternized Biomass, Anion Exchanger, Nitrate, Adsorption Isotherms, pH Effect

Shukla, S.R. and Pai, R.S. (2005), Removal of Pb(II) from solution using cellulose-containing materials. *Journal of Chemical Technology and Biotechnology*, **80** (2), 176-183.

Full Text: [2005\J Che Tec Bio80, 176.pdf](2005/J%20Che%20Tec%20Bio80,%20176.pdf)

Abstract: The potential of cheap cellulose-containing natural materials such as coir, jute, sawdust and groundnut shells for removal for Pb(II) from aqueous solution of lead nitrate was assessed before and after modifying them with a monochlorotriazine type of dye. The materials showed enhanced adsorption capacity of Pb(II) due to the specific dye loading. This was attributed to chelation and an ion exchange mechanism. The maximum cation uptake values obtained were 0.127, 0.087, 0.090, and 0.106 mmol g-1 for coir, sawdust, jute and groundnut shell in their dyed forms, respectively. The kinetics of both undyed and dyed coir was analysed and the second order rate equation was observed to provide the best correlation of the experimental data. Adsorption isotherm models were developed. The best fit was obtained in the Langmuir model. When subjected to repeated adsorption-desorption cycles, with an intermediate step of mild sodium hydroxide treatment, both dyed and undyed coir retained its adsorptive capacity even after five cycles of reuse. Copyright © 2004 Society of Chemical Industry

Keywords: Adsorption, Cellulose, Dye, Lead Ion, Kinetics, Langmuir Model

Zhang, H.R., Li, Q.B., Lu, Y.H., Sun, D.H., Lin, X.P., Deng, X., He, N. and Zheng, S.Z. (2005), Biosorption and bioreduction of diamine silver complex by *Corynebacterium*. *Journal of Chemical Technology and Biotechnology*, **80** (3), 285-290.

Full Text: [2005\J Che Tec Bio80, 285.pdf](2005/J%20Che%20Tec%20Bio80,%20285.pdf)

Abstract: *Corynebacterium* strain SH09 separated from a silver mine was used for biosorption and bioreduction of diamine silver complex. The biosorption of the diamine silver complex was better than that of silver ions and the maximum of the former was about 350 (mg Ag) (g dried biomass)-1. After dried cells of SH09 were resuspended in the aqueous solution of diamine silver complex in the dark at 60 °C for more than 72 h, transmission electron microscopy (TEM) observations showed that a large quantity of black particles whose diameter ranged from 10 to 15 nm were formed on the cell wall. The particles were identified as being silver nanoparticles by X-ray diffraction (XRD) and UV-vis spectroscopy. Under the same conditions, no bioreduction of silver nitrate was found. According to IR spectra, some functional groups, such as the amide of the proteins, were involved in the processes of biosorption and bioreduction. Copyright © 2004 Society of Chemical Industry

Keywords: Silver Nanoparticles, Bioreduction, Biosorption, Diamine Silver Complex, *Corynebacterium*

Rubin, E., Rodriguez, P., Herrero, R., Cremades, J., Barbara, I. and Sastre de Vicente, M.E. (2005), Removal of Methylene Blue from aqueous solutions using as biosorbent *Sargassum muticum*: An invasive macroalga in Europe. *Journal of Chemical Technology and Biotechnology*, **80** (3), 291-298.

Full Text: [2005\J Che Tec Bio80, 291.pdf](2005/J%20Che%20Tec%20Bio80,%20291.pdf)

Abstract: Methylene Blue adsorption on *Sargassum muticum*, an invasive macroalga in Europe, has been investigated using visible absorption spectroscopy. Different pre-treatments, protonation and chemical cross-linking with CaCl2 or H2CO, have been tested in order to improve the stability as well as the adsorption capacity of the algal biomass. The equilibrium binding has been described in terms of Langmuir or Freundlich isotherms depending on the algal pre-treatment; from the maximum adsorption capacity values, an estimation of the algal specific surface area was made. Moreover, it has been found that adsorption kinetics can be described according to the first order Lagergren model, from which the rate constant and the adsorption capacity were determined. Finally, simple empirical equations were obtained to evaluate the amount of Methylene Blue removed at any initial concentration and reaction time. The results obtained have shown that this type of material has a high adsorption capacity for Methylene Blue dye, this feature together with the short times needed to reach the equilibrium suggest that *Sargassum muticum* can be used as a low-cost biosorbent in wastewater treatments. Copyright © 2004 Society of Chemical Industry

Keywords: Biosorption, Dye Adsorption, *Sargassum Muticum*, Isotherms, Adsorption Kinetics

Namasivayam, C., Sakoda, A. and Suzuki, M. (2005), Removal of phosphate by adsorption onto oyster shell powder: Kinetic studies. *Journal of Chemical Technology and Biotechnology*, **80** (3), 356-358.

Full Text: [2005\J Che Tec Bio80, 356.pdf](2005/J%20Che%20Tec%20Bio80,%20356.pdf)

Abstract: Kinetic studies on the removal of phosphate by adsorption onto oyster shell powder have been investigated at 24 °C. The results showed that the equilibrium occurred in 10 min and the equilibrium data followed the Freundlich isotherm. Freundlich constants were found to be *k*f, 1.4×10-2, and *n*, 0.71. The phosphate removal was not influenced by pH over the range 5.0-10.5. Continuous agitation studies at 24 °C and 530 rpm reached equilibrium after 7.7 days, when 24 g dm-3 of oyster shell powder reduced the phosphate concentration from 50 to 7.0 mg dm-3. The Lagergren rate constant for the slow adsorption process was observed to be 3.81×10-4 dm3 min-1. Comparison with calcium carbonate, GR grade, showed that oyster shell powder and CaCO3 behave more or less in the same way. Copyright © 2004 Society of Chemical Industry

Keywords: pHosphate, Oyster Shells, Adsorption, Kinetics, pH Effect

Su, H.J., Wang, Z.X. and Tan, T.W. (2005), Preparation of a surface molecular-imprinted adsorbent for Ni2+ based on *Penicillium chrysogenum*. *Journal of Chemical Technology and Biotechnology*, **80** (4), 439-444.

Full Text: [2005\J Che Tec Bio80, 439.pdf](2005/J%20Che%20Tec%20Bio80,%20439.pdf)

Abstract: A new chitosan molecular-imprinted adsorbent was prepared from the mycelium of waste biomass. The results showed that an adsorbent using *Penicillium chrysogenum* mycelium as the core material was better than one derived from peanut coat. The adsorption capacity of the surface-imprinted adsorbent for Ni2+ was enhanced by increasing the chitosan concentration in the imprinting process. Epichlorohydrin was better than glutaraldehyde as a cross-linking agent; the optimal imprinted Ni2+ concentration for preparing the surface-imprinted adsorbent was 2 mg (Ni2+) g-1 of mycelium. The adsorption capacity of the surface-imprinted adsorbent was 42 mg g-1 (at 200 mg dm-3 initial metal ions concentration) and twice that of the mycelium adsorbent. The surface-imprinted adsorbent can be reused for up to 15 cycles without loss of adsorption capacity. Copyright © 2005 Society of Chemical Industry

Keywords: Adsorption, Adsorption Capacity, Biomass, Biosorption, Chitosan, Chitosan, Heavy Metal Ion, Ions, Mycelium, Surface Molecular Imprinting, Wastewater Treatment

Jyotsna, G., Kadirvelu, K., Chitra, R. and Kumar, G.V. (2005), Investigation of adsorption of lead, mercury and nickel from aqueous solutions onto carbon aerogel. *Journal of Chemical Technology and Biotechnology*, **80** (4), 469-476.

Full Text: [2005\J Che Tec Bio80, 469.pdf](2005/J%20Che%20Tec%20Bio80,%20469.pdf)

Abstract: Recently a new form of activated carbon has appeared: carbon aerogel (CA). Its use for the removal of inorganic (and especially metal ions) has not been studied. In the present study, the adsorption of three metal ions, Hg(II), Pb(II) and Ni(II), onto carbon aerogel has been investigated. Batch experiments were carried out to assess adsorption equilibria and kinetic behaviour of heavy metal ions by varying parameters such as agitation time, metal ions’ concentration, adsorbent dose and pH. They facilitated the computation of kinetic parameters and maximum metal ion adsorption capacities. Increasing the initial solution pH (2–10) and carbon concentration (50–500 mg per 50 cm3) increases the removal of all three metal ions. A decrease of equilibrium pH with an increase of metal ion concentration led us to propose an adsorption mechanism by ion exchange between metal cations and H+ at the carbon aerogel surface. Carboxylic groups are especially involved in this adsorption mechanism. Langmuir and Freundlich isotherm models were used to analyse the experimental data of carbon aerogel. The thermodynamics of the metal adsorption was also investigated for the practical implementation of the adsorbent. The sorption showed significant increase with increase of temperature. Kinetics models describing the adsorption of Hg(II), Pb(II) and Ni(II) ions onto carbon aerogel have been compared. Kinetics models evaluated include the pseudo-first order and second order model. The parameters of the adsorption rate constants have been determined and the effectiveness of each model assessed. The result obtained showed that the pseudo-second order kinetic model correlated well with the experimental data and better than the pseudo-first order model examined in the study. Mass transfer coefficients obtained can be useful in designing wastewater treatment systems or in the development of environmental technologies. Copyright © 2005 Society of Chemical Industry

Keywords: Carbon Aerogel, Heavy Metals, Adsorption Mechanism, Adsorption Kinetics, Isotherms

Cabrera, C., Gabaldón, C. and Marzal, P. (2005), Sorption characteristics of heavy metal ions by a natural zeolite. *Journal of Chemical Technology and Biotechnology*, **80** (4), 477-481.

Full Text: [2005\J Che Tec Bio80, 477.pdf](2005/J%20Che%20Tec%20Bio80,%20477.pdf)

Abstract: Zeolites have been shown to be effective adsorbents for the removal of heavy metals from aqueous solutions. A natural material from Cuba, containing zeolite, has been used for the removal of several metal ions, namely Cu2+, Zn2+, and Ni2+, to evaluate its potential use as a low-cost adsorbent. Batch experiments have been conducted to evaluate the process kinetics and the removal equilibrium at different pH values, metal and zeolite concentrations. Pseudo-second order kinetics and Freundlich equilibrium parameters have been obtained. Results suggested that this natural zeolite has a high potential for heavy metal retention. The selectivity of the studied metals was determined as Cu2+ >>Zn2+ > Ni2+, related to the first hydrolysis equilibrium constant. The metal removal efficacy was strongly dependent on pH, and to a lesser extent on metal/zeolite ratio. Copyright © 2005 Society of Chemical Industry

Keywords: Natural Zeolite, Copper, Nickel, Zinc, Kinetics, Freundlich Isotherms

? Zouboulis, A.I., Prochaska, C.A. and Solozhenkin, P.M. (2005), Removal of zinc from dilute aqueous solutions by galvanochemical treatment. *Journal of Chemical Technology and Biotechnology*, **80** (5), 553-564.

Full Text: [2005\J Che Tec Bio80, 553.pdf](2005/J%20Che%20Tec%20Bio80,%20553.pdf)

Abstract: The possibility of zinc removal, a common toxic metal, from simulated liquid effluents by the application of a novel treatment method, termed galvanochemical, was investigated. The galvanochemical process is considered as a simple, economic, friendly to the environment, method, which does not create harmful end-products. Synthetic wastewaters were examined, these contained concentrations of zinc commonly found in real wastewaters from small-to-medium size industrial units, such as metal-plating or metal-treatment plants. These liquid wastes pose an important environmental problem, due to the content of heavy metals. The optimization of the main operating parameters was the objective of the study. The galvanic pair scrap ratio iron:coke was used for these investigations. It was found that the use of the galvanic pair mixture of 80 g dm-3 (weight per solution volume ratio), agitated at 160 rpm for 5 h, removed more than 90% of zinc from the initial solution, containing initially 50 mg dm-3 of zinc. The scanning electron microscopy/energy disperse spectrometry (SEM/EDS) analysis performed on the products showed that zinc was adsorbed onto the coke to a small extent and that the zinc removal was mainly based on the adsorption of zinc onto the surface of active iron oxides formed as a result of galvanochemical reactions. Copyright © 2005 Society of Chemical Industry

Keywords: Galvanochemical Treatment, Galvanic Pair, Iron Scrap, Coke, Zinc, Scanning Electron Microscopy/Energy Disperse Spectrometry (SEM/EDS)

? Zeledón-Toruño, Z., Lao-Luque, C. and Solé-Sardans, M. (2005), Nickel and copper removal from aqueous solution by an immature coal (leonardite): effect of pH, contact time and water hardness. *Journal of Chemical Technology and Biotechnology*, **80** (6), 649-656.

Full Text: [2005\J Che Tec Bio80, 649.pdf](2005/J%20Che%20Tec%20Bio80,%20649.pdf)

Abstract: The removal of Ni(II) and Cu(II) from aqueous solutions by a low cost sorbent (leonardite) was studied. The metal uptake was pH-dependent and the maximum sorption for two metals was obtained at around pH 5-6. Batch kinetic studies showed that equilibrium time was reached after 2 h of contact time. Equilibrium isotherms were obtained for the adsorption data of the two metals in single and binary systems. Equilibrium data were fitted to Langmuir and Freundlich models and the maximum adsorption capacities were found to be 0.33 mmol of copper and 0.26 mmol of nickel per gram of leonardite. In binary solutions containing the two metals an important reduction of nickel uptake was observed while the sorption of copper was less affected. The presence of Ca2+ affected the removal of both copper and nickel ions, although the adsorption of nickel was reduced more than that of copper. Copyright © 2005 Society of Chemical Industry

Keywords: Immature Coal, Leonardite, Nickel, Copper, Adsorption, Wastewater Treatment

? Ko, D.C.K., Cheung, C.W. and Porter, J.F. (2005), A branched pore kinetic model applied to the sorption of metal ions on bone char. *Journal of Chemical Technology and Biotechnology*, **80** (8), 861-871.

Full Text: [2005\J Che Tec Bio80, 861.pdf](2005/J%20Che%20Tec%20Bio80,%20861.pdf)

Abstract: A slightly modified form of the branched pore model of Peel, Benedek and Crowe was successfully applied to describe the batch sorption kinetics of three metal ions-cadmium, copper and zinc-on bone char. In comparison with an analytical film-surface solution, the additional parameters of the branched pore model were observed to produce a significant improvement in correlating the experimental results. The ranges of the values of the model parameters derived were deemed reasonable and the branched pore sorption capacities of two of the three metal ions were comparable (ca 0.16 mmol g-1). Given that the surface diffusivities of the metal ions were observed to vary with averaged surface loading, a number of correlations were examined for their accuracy in describing this behaviour. The exponential expression of Neretnieks resulted in the smallest total error when the data for all three metal ions were considered together. Copyright © 2005 Society of Chemical Industry

Keywords: Branched Pore, Bone Char, Surface Diffusion

? Baker, F.S., Daley, R.A. and Bradley, R.H. (2005), Surface chemistry of wood-based phosphoric acid-activated carbons and its effects on adsorptivity. *Journal of Chemical Technology and Biotechnology*, **80** (8), 878-883.

Full Text: [2005\J Che Tec Bio80, 878.pdf](2005/J%20Che%20Tec%20Bio80,%20878.pdf)

Abstract: The surface oxygen content of selected wood-based phosphoric acid-activated carbons was quantified using X-ray photoelectron spectroscopy (XPS) and correlated with the residual bulk phosphate levels of the carbons and their adsorptivity in solution. The adsorption of Al3+, Cu2+, and *para*-chlorophenol, respectively, from water decreased as a function of increasing surface oxygen content of the carbons. When the carbon of lowest surface oxygen content was oxidized with ozone to impart a surface oxygen content comparable to that of a carbon with a much higher phosphate level, adsorption of Al3+, Cu2+, and *para*-chlorophenol from water decreased proportionally. The increase in polarity of the carbon surface was accompanied by a decrease in pH and appeared to be the dominant factor with respect to the adsorption of the target species from water. Copyright © 2005 Society of Chemical Industry

Keywords: Active Carbons, pHosphoric Acid Activation, Surface Chemistry, X-Ray pHotoelectron Spectroscopy (XPS)

? Rao, K.S., Dash, P.K., Sarangi, D., Chaudhury, G.R. and Misra, V.N. (2005), Treatment of wastewater containing Pb and Fe using ion-exchange techniques. *Journal of Chemical Technology and Biotechnology*, **80** (8), 892-898.

Full Text: [2005\J Che Tec Bio80, 892.pdf](2005/J%20Che%20Tec%20Bio80,%20892.pdf)

Abstract: Treatment of wastewater containing lead and iron was examined using two different ion-exchange resins namely Duolite ES 467 (containing amino-phosphonic functional groups) and a chelating ion-exchange resin (containing hydroxamic acid functional groups). Initially different sorption parameters such as contact time, pH, concentrations of sorbent, sorbate and chloride ion were studied. The sorption kinetics was observed to be fast and equilibrium could be reached within 30 min. Lead sorption efficiency increased with increase in pH whereas the opposite trend was observed with iron. The presence of chloride ions greatly reduced the Pb sorption efficiency in the case of Duolite ES 467. Column studies were carried out to recover Pb and Fe individually using Duolite ES 467 resin. The maximum uptake of Pb at pH 2 and 3 was observed to be 11.63 and 33.96 g dm-3 of resin respectively. Similarly, for Fe at pH 2 and 3 the uptake was observed to be 10.07 and 6.96 g dm-3 of resin respectively. In the presence of chloride ions, column studies were carried out using Duolite ES 467 for iron and chelating ion-exchange resin containing hydroxamic acid functional groups for lead sorption. Hydroxamic acid resin’s loading capacity remains constant for at least up to 20 cycles. Copyright © 2005 Society of Chemical Industry

Keywords: Ion-Exchange, Lead, Iron, Chelating Ion-Exchange Resin

? Covarrubias, C., Arriagada, R., Yáñez, J., García, R., Angélica, M., Barros, S.D., Arroyo, P. and Sousa-Aguiar, E.F. (2005), Removal of chromium(III) from tannery effluents, using a system of packed columns of zeolite and activated carbon. *Journal of Chemical Technology and Biotechnology*, **80** (8), 899-908.

Full Text: [2005\J Che Tec Bio80, 899.pdf](2005/J%20Che%20Tec%20Bio80,%20899.pdf)

Abstract: The removal of chromium(III) in packed columns of zeolite and activated carbon has been studied. The process of Cr(III) exchange in 13X zeolite was optimized using mass transference parameters. In addition, the effects of pH, the presence of interfering ions and the anion associated with the chromium in the solution were studied. It was found that particle diameter controls the Cr(III) exchange in the zeolite, indicating that particle diffusion predominantly controls the process of Cr(III) exchange in 13X zeolite. A mixed system of zeolite and activated carbon columns increased the efficiency of chromium removal from diluted wastewater. This effect occurred due to the reduction of the organic matter (chemical oxygen demand), adsorption of chromium, and interfering ions on the activated carbon column. The activated carbon + zeolite column system emerges as an alternative method in Cr(III) removal from tannery effluents. Copyright © 2005 Society of Chemical Industry

Keywords: Zeolite, Ion-Exchange, Chromiun(III), Activated Carbon, Water Treatment

? Leyva-Ramos, R., Rangel-Mendez, J.R., Bernal-Jacome, L.A. and Berber Mendoza, M.S. (2005), Intraparticle diffusion of cadmium and zinc ions during adsorption from aqueous solution on activated carbon. *Journal of Chemical Technology and Biotechnology*, **80** (8), 924-933.

Full Text: [2005\J Che Tec Bio80, 924.pdf](2005/J%20Che%20Tec%20Bio80,%20924.pdf)

Abstract: The adsorption isotherms of cadmium(II) and zinc(II) onto activated carbons were obtained in a batch adsorber. The concentration decay data were obtained in a rotating basket adsorber and were interpreted by a mathematical model, which takes into account the adsorption rate, external mass transport and intraparticle diffusion. The results showed that the overall rate of adsorption of Cd(II) and Zn(II) was mainly controlled by the intraparticle diffusion which was solely due to pore volume diffusion. The contribution of the external mass transport resistance was negligible. The effective pore volume diffusivities of Cd(II) and Zn(II) were predicted reasonably well using the ionic diffusivity of the metal and the void fraction and tortuosity of activated carbon. Copyright © 2005 Society of Chemical Industry

Keywords: Activated Carbon, Adsorption Rate, Intraparticle Diffusion, Heavy Metal

? Lima, I.M. and Marshall, W.E. (2005), Adsorption of selected environmentally important metals by poultry manure-based granular activated carbons. *Journal of Chemical Technology and Biotechnology*, **80** (9), 1054-1061.

Full Text: [2005\J Che Tec Bio80, 1054.pdf](2005/J%20Che%20Tec%20Bio80,%201054.pdf)

Abstract: Water quality and public health impacts of mass produced poultry manure have prompted the need for viable conversion and reuse solutions. Conversion of poultry manure to value-added granular activated carbons for environmental remediation can be such a solution. The objective of this study was to compare the effectiveness of poultry manure-based carbons for the adsorption of selected metal ions (copper, cadmium, nickel, zinc) from solutions containing individual ions or the four metal ions present together. Adsorption properties for poultry manure-based carbons were compared with those of two commercial carbons, PUR RF and Minotaur, and carbons from three traditional precursors, coal, coconut and wood. Pelletized samples were pyrolyzed at 700 °C for 1 h followed by 800 °C steam activation at 1, 3 and 5 mL min-1 water flow rate, for 30 and 45 min, under nitrogen. The carbon’s ability to adsorb the metals was influenced by the activation strategy, increasing for longer activation times and higher water flow rates, in the presence of a single metal solution. Saturation conditions were achieved at 20 mM and, at 5 mM, almost all metal ion in solution was adsorbed, except for nickel. Carbons showed similar affinity towards copper, cadmium and zinc, individually. However, when in competition, at 5 mM of each metal, manure-based carbons showed a preference for Cu2+ followed by Zn2+ and Cd2+. Poultry manure-based carbons outperformed all reference carbons and PUR RF, and, except for Ni2+, Minotaur was also outperformed. Experiments showed that the highest removal rate in a competition situation was obtained for broiler-cake carbon activated for 45 min at 3 mL min-1, with 93.1%, 50.9% and 85.2% for copper, cadmium and zinc ions, respectively. Published in 2005 for SCI by John Wiley & Sons, Ltd.

Keywords: Poultry Manure, Granular Activated Carbon, Adsorption, Multiple Metal Ions

? Wang, S.B., Boyjoo, Y., Choueib, A., Ng, E., Wu, H.W. and Zhu, Z.H. (2005), Role of unburnt carbon in adsorption of dyes on fly ash. *Journal of Chemical Technology and Biotechnology*, **80** (10), 1204-1209.

Full Text: [2005\J Che Tec Bio80, 1204.pdf](2005/J%20Che%20Tec%20Bio80,%201204.pdf)

Abstract: Various fly ash samples with different unburnt carbon contents were collected, characterised and tested for adsorption of basic dyes, Methylene Blue and Crystal Violet, in aqueous solution. It was found that unburnt carbon plays a major role in dye adsorption. The mineral matter of fly ash has little adsorption capacity and most of the adsorption capacity of fly ash can be attributed to the unburnt carbon. The fly ash with higher unburnt carbon content will have higher adsorption capacity. For the carbon-free fly ash, adsorption capacities for Methylene Blue and Crystal Violet are only 2×10-6 mol g-1 and 1.0×10-6 mol g-1, respectively, while the adsorption capacities for Methylene Blue and Crystal Violet on carbon-enriched fly ash are 1.2 ×10-4 mol g-1 and 1.0×10-4 mol g-1, respectively. A two-site Langmuir adsorption model best describes the adsorption isotherm. Copyright © 2005 Society of Chemical Industry

Keywords: Fly Ash, Unburnt Carbon, Basic Dyes, Wastewater, Adsorption

? Martín, M.I., López, F.A., Pérez, C., López-Delgado, A. and Alguacil, F.J. (2005), Adsorption of heavy metals from aqueous solutions with by-products of the steelmaking industry. *Journal of Chemical Technology and Biotechnology*, **80** (11), 1223-1229.

Full Text: [2005\J Che Tec Bio80, 1223.pdf](2005/J%20Che%20Tec%20Bio80,%201223.pdf)

Abstarct: This paper describes the use of two steelmaking industry by-products (rolling mill scale and blast furnace sludge) as adsorbents for removing heavy metals from aqueous effluent solutions. The adsorption of Pb2+, Zn2+ and Cd2+ on these materials has been studied by the determination of adsorption isotherms from solutions of controlled ionic strength. The effect of time, equilibrium temperature and metal solution concentration on adsorption efficiency was evaluated. The adsorption processes are analysed using the Langmuir theory. Desorption and dumping processes for the metals from loaded steelmaking industry by-products were also studied under different experimental conditions. The by-products were shown to be effective adsorbents for the studied cations in aqueous solutions within the range of working concentrations. Copyright © 2005 Society of Chemical Industry

Keywords: Rolling Mill Scale, Blast Furnace Sludge, Heavy Metals, Adsorption, Adsorption Isotherms, Effluent Treatment

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Full Text: [2005\J Che Tec Bio80, 1297.pdf](2005/J%20Che%20Tec%20Bio80,%201297.pdf)

Abstract: The uptake of Cu(II), Pb(II), Zn(II) and Ni(II) was investigated both individually and from mixed metal ion solutions using Sphagnum moss biomass immobilised in a polyurethane support. The data were evaluated using the Langmuir isotherm equation, and sorption capacities were calculated for different concentration ranges. It was concluded that care must be taken in presentation and interpretation of results when this modelling approach is applied at low concentrations. Repeated metal loading cycles also gave lower values for sorption capacity compared with the maximum potential value, due to equilibrium effects. The uptake capacity for the different metals on a weight basis was in the order lead > copper > zinc > nickel, but on a molar basis this changed to copper > lead > nickel > zinc. Sorption from a multi-component metal system showed that lead and copper competed equally for binding sites and much more effectively than zinc and nickel. Equations were derived to predict the percentage effect on a given metal ion of other metals in a multi-metal system based their behaviour in the relevant single and binary systems. Copyright © 2005 Society of Chemical Industry

Keywords: Heavy Metal, Biosorption, Langmuir Isotherm, Interaction Effect

? Kim, I.S., Lee, J.U. and Jang, A. (2005), Bioleaching of heavy metals from dewatered sludge by *Acidithiobacillus ferrooxidans*. *Journal of Chemical Technology and Biotechnology*, **80** (12), 1339-1348.

Full Text: [2005\J Che Tec Bio80, 1339.pdf](2005/J%20Che%20Tec%20Bio80,%201339.pdf)

Abstract: The feasibility of bioleaching for removal of heavy metals from dewatered sewage sludge using an iron-oxidizing bacterium *Acidithiobacillus ferrooxidans* was investigated. The influence of seven process parameters including cell adaptation, total amount and particle size of the sludge, initial concentrations of Fe2+ and *At ferrooxidans*, and addition of inorganic nutrients and sulfur were evaluated in terms of the solubilization of Zn, Cu and Cr. When sludge-adapted cells, addition of inorganic nutrients and lower sludge content were involved, higher yields of metal extraction were obtained. However, higher initial concentrations of *At ferrooxidans* and Fe2+, fine particle size of the sludge and S addition did not improve the metals’ solubilization during an experimental period of 7 days. As a result of a long-term (40 days) bioleaching experiment, 42% of Zn (1300-1648 mg kg-1), 39% of Cu (613-774 mg kg-1) and 10% of Cr (37-44 mg kg-1) in the sludge were leached into the solution. The results indicate that a bioleaching process conducted under operationally optimal conditions can be effectively employed for the removal of heavy metals from sewage sludge before land application. Copyright © 2005 Society of Chemical Industry

Keywords: Sewage Sludge, Bioleaching, *Acidithiobacillus Ferrooxidans*, Heavy Metals, Solubilization

? Sarkar, M., Acharya, P.K. and Bhattacharya, B. (2006), Removal characteristics of some priority organic pollutants from water in a fixed bed fly ash column. *Journal of Chemical Technology and Biotechnology*, **80** (12), 1349-1355.

Full Text: [2005\J Che Tec Bio80, 1349.pdf](2005/J%20Che%20Tec%20Bio80,%201349.pdf)

Abstract: The efficiency of a coal fly ash (generated from a thermal power plant) adsorption column for the removal of some priority organic pollutants, viz phenol, o-hydroxyphenol, m-hydroxyphenol and 4-nitrophenol from aqueous solution has been studied. The column performance was evaluated from the concept of the formation of a primary adsorption zone and the breakthrough curve. The extent of solute removal obtained from breakthrough curve during column operation was compared with that obtained from the isotherm parameters for batch operation. The loaded solutes in the column were successfully eluted with acetone, achieving 98% recovery. In order to determine the practical applicability of the column operation the process was repeated a number of times and the variation of column capacity with number of operation cycles was evaluated. Even after six successive cycles, the column was found to retain almost 80% capacity. Copyright © 2005 Society of Chemical Industry

Keywords: Priority Organic Pollutants, Fixed Bed Adsorption, Primary Adsorption Zone, Breakthrough Capacity, Elution

? Rincón, J., González, F., Ballester, A., Blázquez, M.L. and Muñoz, J.A. (2005), Biosorption of heavy metals by chemically-activated alga *Fucus vesiculosus*. *Journal of Chemical Technology and Biotechnology*, **80** (12), 1403-1407.

Full Text: [2005\J Che Tec Bio80, 1403.pdf](2005/J%20Che%20Tec%20Bio80,%201403.pdf)

Abstract: The sorption capacity of the brown alga Fucus vesiculosus for copper, cadmium, lead and nickel was investigated. Metal sorption yields were modified using different kinds of pretreatment reagents: HCl, CaCl2, formaldehyde, Na2CO3 and NaOH. The Langmuir isotherm was applied to both the non-treated and all treated biomass tests. Calcium chloride was the only chemical that improved the maximum sorption capacity of the biomass. Copyright © 2005 Society of Chemical Industry

Keywords: Biosorption, Heavy Metals, Biomass, Brown Algae, Pretreatment

? Meng, X.G., Zhu, J., Yan, J., Xie, J.Q., Kou, X.M., Kuang, X.F., Yu, L.F. and Zeng, X.C. (2006), Studies on the oxidation of phenols catalyzed by a copper(II)-Schiff base complex in aqueous solution under mild conditions. *Journal of Chemical Technology and Biotechnology*, **81** (1), 2-7.

Full Text: [2006\J Che Tec Bio81, 2.pdf](2006/J%20Che%20Tec%20Bio81,%202.pdf)

Abstract: The catalytic oxidation of phenol with hydrogen peroxide using a synthetic copper(II)-Schiff base complex as catalyst has been investigated in phosphate buffer at pH 7 and 25°C. In order to further investigate the reaction pathway, the catalytic oxidation of hydroquinone, p-benzoquinone and catechol were also studied under the same conditions. These reactions were found to be pseudo-first-order with respect to the concentration of phenolic substances. The rate constants were also calculated. In the presence of catalyst, the kinetics and the HPLC analysis showed that for the first step phenol was oxidized to hydroquinone and catechol, and the catalyst easily promoted the formation of hydroquinone but not catechol, for the second step the dihydroxybenzenes were further oxidized to benzoquinone, and lastly short-chain acids, including maleic acid and oxalic acid, were formed. The activity of the catalyst hardly decreased during the whole reaction. Addition of imidazole accelerated the oxidation of phenol. The catalytic decomposition of hydrogen peroxide using this catalyst was also investigated. Copyright © 2005 Society of Chemical Industry

Keywords: Phenols,Catalytic Oxidation, Reaction Kinetics, Hydrogen Peroxide

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Full Text: [2006\J Che Tec Bio81, 94.pdf](2006/J%20Che%20Tec%20Bio81,%2094.pdf)

Abstract: In biological treatment processes combined with the use of activated carbon, adsorbability and desorbability receive special attention. In particular, desorbability is of crucial importance for bioregeneration of activated carbon in these systems. This study aims to clarify the effect of the type of activated carbon on the extent of adsorption of phenol and the reversibility of adsorption. For this purpose, four different types of activated carbon: thermally-activated and chemically-activated powdered carbons (PAC), and their granular countertypes (GAC) with similar physical characteristics, were used. Adsorption and desorption isotherms showed that thermally-activated carbons, either in powdered or granular form, were better adsorbers for phenol than chemically-activated ones. However, apparently higher degrees of hysteresis (higher adsorption irreversibility) were calculated in the case of thermally-activated carbons. Chemisorption was the dominant adsorption mechanism for thermally-activated carbons, whereas physisorption was dominant for chemically-activated ones. Degrees of hysteresis for the PACs were found to be only slightly higher than their GAC countertypes, but desorption was faster from the PACs. The results suggest that, rather than the physical form, the type of carbon activation and the chemical characteristics of the surface play a more important role on the adsorbability of phenol and its reversibility. Copyright © 2005 Society of Chemical Industry

Keywords: Activated Carbon, Activation Method, Adsorption, Desorption, Irreversible Adsorption, Phenol

? Monteagudo, J.M., Durán, A., Martín, I.S. and Schwab, R.G. (2006), Treatment of aqueous solutions containing nickel using crandallite-type compounds. *Journal of Chemical Technology and Biotechnology*, **81** (3), 262-267.

Full Text: [2006\J Che Tec Bio81, 262.pdf](2006/J%20Che%20Tec%20Bio81,%20262.pdf)

Abstract: The removal of nickel from aqueous solutions streams has been investigated using an artificial amorphous crandallite-type compound, CaAl3(OH)6(HPO4)(PO4) (Ca-crandallite), synthesized in our laboratory. Equilibrium ion-exchange isotherms in an aqueous medium of Ca2+/Ni2+ at different pH values at 293 K have been determined. The experimental equilibrium data were satisfactorily correlated using a Langmuir-type empirical equation. At low pH values, the hydrogen ion competes with the heavy metal cation and the percentage removal of metal declines. It was found that the operating capacity of Ca-crandallite with respect to the metal ion increased with the pH of the solution, in accordance with a second-degree polynomial equation. However, the pH should not be allowed to rise to levels at which chemical precipitation as nickel hydroxide would occur, with 7.00 the highest value tested. Taking into account the variation of operating capacity with pH, the system exhibited a unique separation factor, namely all the experimental points can be described by a unique isotherm in a dimensionless form. The Ca-crandallite showed a high capacity, 2.176 meq g-1, for the exchange of Ni(II) from nickel nitrate solutions and the rate of exchange of metal increases with increasing solution temperature due to the enhancement of effective intraparticle diffusivity. Copyright © 2005 Society of Chemical Industry

Keywords: Nickel, Ion-Exchange, Crandallite, Waste-Waters

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Full Text: [2006\J Che Tec Bio81, 306.pdf](2006/J%20Che%20Tec%20Bio81,%20306.pdf)

Abstract: A novel process for the removal of NOx from flue gas by a combined Fe(II)EDTA absorption and microbial reduction has been demonstrated. Fe(II)EDTA-NO and Fe(III)EDTA (EDTA: ethylenediaminetetraacetate) can be effectively reduced to the active Fe(II)EDTA in the reactor containing microorganisms. In a steady-state absorption and regeneration process, the final removal efficiency of NO is up to 88%. The effects of four main parameters (i.e. NO, O2 and SO2 concentrations, and the amount of cyclic solution) on NOx removal efficiency were experimentally investigated at 50°C. The results provide some insight into conditions required for the successful removal of NOx from flue gas using the approach of Fe(II)EDTA absorption combined with microbial reduction. Copyright © 2005 Society of Chemical Industry

Keywords: NOx Removal, Fe(II)EDTA, Microorganisms, Absorption, Flue Gas

? Shibi, I.G. and Anirudhan, T.S. (2006), Polymer-grafted banana (*Musa paradisiaca*) stalk as an adsorbent for the removal of lead(II) and cadmium(II) ions from aqueous solutions: Kinetic and equilibrium studies. *Journal of Chemical Technology and Biotechnology*, **81** (3), 433-444.

Full Text: [2006\J Che Tec Bio81, 433.pdf](2006/J%20Che%20Tec%20Bio81,%20433.pdf)

Abstract: This study examined the effectiveness of a new adsorbent prepared from banana (*Musa paradisiaca*) stalk, one of the abundantly available lignocellulosic agrowastes, in removing Pb(II) and Cd(II) ions from aqueous solutions. The adsorbent (PGBS-COOH) having a carboxylate functional group at its chain end was synthesized by graft copolymerization of acrylamide on to banana stalk, followed by functionalization. Batch adsorption experiments were carried out as a function of solution pH, ionic strength, contact time, metal concentration, adsorbent dose and temperature. A pH range of 5.5-8.0 was found to be effective for the maximum removal for both Pb(II) and Cd(II). Metal uptake was found to decrease with increase in ionic strength due to the expansion of the diffuse double layer and, more importantly, the formation of some chloro complexes (since NaCl was used in the adjustment of ionic strength), which do not appear to be adsorbed to the same extent as cations [M2+ and M(OH)+]. The kinetic studies showed that an equilibrium time of 3 h was needed for the adsorption of Pb(II) and Cd(II) on PGBS-COOH and adsorption processes followed a pseudo-second-order equation. The Langmuir isotherm model fitted the experimental equilibrium data well. The maximum sorption capacity for Pb(II) and Cd(II) ions was 185.34 and 65.88 mg g-1, respectively, at 30°C. The thermodynamic parameters such as changes in free energy (ΔG°, enthalpy (ΔH° and entropy (ΔS° were derived to predict the nature of adsorption. The isosteric heat of adsorption was found to be independent of surface coverage. Adsorption experiments were also conducted using a commercial cation exchanger, Ceralite IRC-50, for comparison. Synthetic wastewater samples were treated with the adsorbent to demonstrate its efficiency in removing Pb(II) and Cd(II) ions from industrial wastewaters. Acid regeneration was tried for several cycles with a view to recovering the sorbed metal ions and also restoring the sorbent to its original state. Copyright © 2005 Society of Chemical Industry

Keywords: Banana Stalk, Adsorption Kinetics, Isotherm, Lead, Cadmium, Wastewater, Desorption

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Full Text: [2006\J Che Tec Bio81, 799.pdf](2006/J%20Che%20Tec%20Bio81,%20799.pdf)

Abstract: A novel hydrogel composite was prepared by incorporating Laponite RDS clay into poly(acrylic acid-co-N-vinyl-2-pyrrolodone) hydrogel during in-situ polymerization, and investigated with respect to its adsorption kinetics and isotherm toward Crystal Violet, a widely used cationic dye. It was found that the adsorption kinetics of Crystal Violet onto the hydrogel composite was consistent with the pseudo-second-order model. Compared with pure hydrogel, the hydrogel composite is characterized by greater amounts being adsorbed at equilibrium, and a higher rate constant and initial adsorption rate. By analyzing the experimental data using the Langmuir isotherm equation, an enhanced adsorption capacity was found for the hydrogel composite. Such material is expected to be a good adsorbent for water pollutants such as cationic dyes and treatment of these organic contaminants from wastewater. (c) 2006 Society of Chemical Industry.

Keywords: Dye Removal, Copolymeric Hydrogel, Hydrophilic Clay, Cationic Dye, Adsorption Kinetic, Charged Poly(Acrylamide) Gels, Aqueous-Solutions, Textile Dyes, Waste-Water, Adsorption, Decolorization, Chitosan, Ions

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Full Text: [2006\J Che Tec Bio81, 966.pdf](2006/J%20Che%20Tec%20Bio81,%20966.pdf)

Abstract: The ion-exchange equilibrium of Pb(II) and Cd(II) on clinoptilolite from different deposits was studied in this work. The Langmuir isotherm fitted the ion-exchange equilibrium data of both ions better than the Freundlich isotherm. The capacity of the natural zeolite to exchange Cd(II) and Pb(II) increased, augmenting the solution pH. This behaviour was attributed to the interactions between the ions in solution and the surface charge of the zeolite. Moreover, the capacity of the natural zeolite to exchange Cd(II) and Pb(II) was increased when the temperature was raised from 15 to 35°C. This tendency was explained by assuming that the ion exchange was an endothermic reaction. The selectivity of the zeolite for the metal cations decreased in the following order: Pb(II) > Cd(II). This order was not modified while reducing the solution pH, but the zeolite selectivity was increased. At pH 2 the selectivity of the zeolite for Pb(II) was nearly three times larger than at pH 4. Copyright © 2006 Society of Chemical Industry

Keywords: Cadmium, Clinoptilolite, Heavy Metals, Ion Exchange, Lead, Zeolite

? Rubín, E., Rodríguez, P., Herrero, R., Sastre de Vicente, M.E. (2006), Biosorption of phenolic compounds by the brown alga *Sargassum muticum*. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1093-1099.

Full Text: [2006\J Che Tec Bio81, 1093.pdf](2006/J%20Che%20Tec%20Bio81,%201093.pdf)

Abstract: Phenol, 2-chlorophenol (2-CP), and 4-chlorophenol (4-CP) biosorption on Sargassum muticum, an invasive macroalga in Europe, has been investigated. The efficiency of this biosorbent was studied measuring the equilibrium uptake using the batch technique. A chemical pre-treatment with CaCl2 has been employed in this study in order to improve the stability as well as the sorption capacity of the algal biomass. The influence of pH on the equilibrium binding and the effect of the algal dose were evaluated. The experimental data at pH = 1 have been analysed using Langmuir and Freundlich isotherms. It was found that the maximum sorption capacity of chlorophenols, qmax = 251 mg g-1 for 4-CP and qmax = 79 mg g-1 for 2-CP, as well as that of a binary mixture of both chlorophenols, qmax = 108 mg g-1, is much higher than that of phenol, qmax = 4.6 mg g-1. Moreover, sorption kinetics have been performed and it was observed that the equilibrium was reached in less than 10 h. Kinetic data have been fitted to the first order Lagergren model, from which the rate constant and the sorption capacity were determined. Finally, biosorption of the phenolic compounds examined in the present study on Sargassum muticum biomass was observed to be correlated with the octanol-water partitioning coefficients of the phenols. This result allows us to postulate that hydrophobic interactions are the main responsible for the sorption equilibrium binding. Copyright © 2006 Society of Chemical Industry

Keywords: Phenol, Monochlorophenol, Seaweed, Biosorption, Adsorption Isotherms, Adsorption Kinetics, Hydrophobicity

? Akar, T., Demir, T.A., Kiran, I., Özcan, A., Özcan, A.S. and Tunali, S. (2006), Biosorption potential of *Neurospora crassa* cells for decolorization of Acid Red 57 (AR57) dye. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1100-1106.

Full Text: [2006\J Che Tec Bio81, 1100.pdf](2006/J%20Che%20Tec%20Bio81,%201100.pdf)

Abstract: Biosorption of Acid Red 57 (AR57) on to *Neurospora crassa* was studied with variation of pH, contact time, biosorbent and dye concentrations and temperature to determine equilibrium and kinetic models. The AR57 biosorption was fast and equilibrium was attained within 40 min. Langmuir, Freundlich and Dubinin-Radushkevich (D-R) isotherm models were applied to experimental equilibrium data for AR57 biosorption at various temperatures. The equilibrium data fitted very well to all the equilibrium models in the studied concentration range of AR57. Maximum biosorption capacity (qmax) of AR57 on to N. crassa was 2.16×10-4 mol g-1 at 20°C. The kinetics of biosorption of AR57 were analyzed and rate constants were derived. The overall biosorption process was best described by a pseudo-second-order kinetic model. The changes in Gibbs free energy, enthalpy and entropy of biosorption were also evaluated for the biosorption of AR57 on to N. crassa. The results indicate that the biosorption was spontaneous and exothermic in nature. Copyright © 2006 Society of Chemical Industry

Keywords: *Neurospora Crassa*, Biosorption, Biosorbent, Acid Red 57, AR57, Isotherms, Kinetics

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Full Text: [2006\J Che Tec Bio81, 1107.pdf](2006/J%20Che%20Tec%20Bio81,%201107.pdf)

Abstract: This paper evaluates the potential use of a locally available organic soil amendment as a low-cost adsorbent. The removal of cadmium from aqueous solutions was studied by means of kinetic, batch and fixed-bed experiments. Batch experiments were conducted to evaluate the process kinetics and the removal equilibrium over a broad pH range. Pseudo-second-order kinetics and Freundlich equilibrium parameters were obtained. Six column experiments were carried out at different flow-rates and feed concentrations. Breakthrough curves showed higher metal retention than expected from the batch adsorption isotherms. Column modelling assuming rate-controlled pore diffusion was successfully performed. The adsorption process was reversed, regenerating the columns by eluting the cadmium using 0.1 mol dm-3 hydrochloric acid. The high retention capacity together with the favourable structural characteristics indicated that this material could be used as an effective and low-cost adsorbent for treatment of wastewaters containing heavy metals. Copyright © 2006 Society of Chemical Industry

Keywords: Cadmium, Adsorption, Fixed-Bed Column, Freundlich Isotherm, Kinetics, Peat, Intraparticle Diffusivity

? Toan, N.V., Ng, C.H., Aye, K.N., Trang, T.S. and Stevens, W.F. (2006), Production of high-quality chitin and chitosan from preconditioned shrimp shells. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1113-1118.

Full Text: [2006\J Che Tec Bio81, 1113.pdf](2006/J%20Che%20Tec%20Bio81,%201113.pdf)

Abstract: Chitin and chitosan with improved characteristics were produced from shrimp shell waste preconditioned by limited decay or by treatment with 0.016 mol L-1 benzoic acid. Preconditioned shrimp shells were transparent, had a clean surface and were susceptible to demineralization and deproteinization using 0.68 mol L-1 HCl and 0.62 mol L-1 NaOH, respectively. The ash and protein residues in the final chitosan were about 0.2% and 0.4%, respectively, the viscosity was up to 7000 cps, and the solubility and transparency nearly 100%. In comparison with treatment at ambient temperature (30°C) without preconditioning, the chemical consumption, the duration of the treatment, ash and protein residues was reduced to 75-25%, whereas viscosity and absence of insolubles improved by a factor of 2-3. Copyright © 2006 Society of Chemical Industry

Keywords: Chitosan, Chitin, Preconditioned Shrimp Shell, Limited Decay, Benzoic Acid

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Full Text: [2006\J Che Tec Bio81, 1119.pdf](2006/J%20Che%20Tec%20Bio81,%201119.pdf)

Abstract: Lactic acid, the most widely occurring hydroxycarboxylic acid, is an enigmatic chemical. It was discovered a long time ago and its use in food preservation and processing and as a specialty chemical has grown over the years with current production of about 120 000 t yr-1. Its potential as a major chemical feedstock, derived from renewable carbohydrates by sustainable technologies, to make plastics, fibers, solvents and oxygenated chemicals, had also been recognized. Recently, new technologies have emerged that can overcome major barriers in separations and purification and processing. Advances in electrodialysis (ED) and bipolar membranes and one particular process configuration termed the ‘double ED’ process, a specific combination of desalting ED followed by ‘water-splitting’ ED with bipolar membranes, has given very promising results, showing a strong potential for an efficient and economic process for recovery and purification of lactic acid without generating a salt waste. For the production of polymers, several advances in catalysts and process improvements have occurred in the technology to produce dilactide and its polymerization to produce plastics and fibers by Natureworks LLC, which is the leader in lactic polymer technology and markets. Other advances in esterification technology with pervaporation and development of biosolvent blends also have a high potential for ‘green’ solvents in many applications. Recently, a considerable amount of pioneering effort in technology, product development and commercialization has been expended by several companies. To overcome the barriers to replace long-established petroleum-derived products, further real support from consumer, regulatory and government organizations is also needed. Copyright © 2006 Society of Chemical Industry

Keywords: Lactic Acid, Oxychemicals Purification, Polymers, Production, Solvents

? Jorgensen, T.C. and Weatherley, L.R. (2006), Continuous removal of ammonium ion by ion exchange in the presence of organic compounds in packed columns. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1151-1158.

Full Text: [2006\J Che Tec Bio81, 1151.pdf](2006/J%20Che%20Tec%20Bio81,%201151.pdf)

Abstract: The removal of ammonia from wastewaters after secondary biological treatment can successfully be achieved by ion exchange. However, the presence of residual organic compounds can impart significant influence on the uptake and their presence may need to be considered during the design of a treatment system. The aim of this work was to determine the effect of the presence of certain organic compounds upon the uptake of ammonium ion and column breakthrough. Two organic contaminants were considered, including citric acid and protein (as whey protein isolate). Three cationic exchangers were used and included the natural zeolite clinoptilolite, the gel resin Dowex 50w-x8, and a macronet resin, Purolite MN-500. The influence of regeneration upon column breakthrough behaviour was also determined. The results showed that the presence of organic compounds had variable effects on ammonium ion uptake. In the case of clinoptilolite the presence of protein appeared to have very little effect upon breakthrough capacity. In the case of the clinoptilolite and the MN500 a substantial reduction of breakthrough capacity was observed in the presence of citric acid. In the case of clinoptilolite a very significant increase in column breakthrough performance was observed after cycles of exhaustion and regeneration. This was not observed in the case of the synthetic resins, which showed a more consistent performance from run to run. Overall the Dowex50w-x8 gave the highest breakthrough capacity for ammonium ion removal of 700 bed volumes. Regenerated clinoptilolite showed a maximum breakthrough capacity of 450 bed volumes, and MN-500 a consistent breakthrough capacity of 300 bed volumes. Copyright © 2006 Society of Chemical Industry

Keywords: Clinoptilolite, Ion Exchange, Water Treatment, Zeolites

? Yamasaki, H., Makihata, Y. and Fukunaga, K. (2006), Efficient phenol removal of wastewater from phenolic resin plants using crosslinked cyclodextrin particles. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1271-1276.

Full Text: [2006\J Che Tec Bio81, 1271.pdf](2006/J%20Che%20Tec%20Bio81,%201271.pdf)

Abstract: Removal of phenolic compounds from a raw industrial wastewater from phenolic resin processing, of which the components are phenol (8.9 wt%), *m*- and *p*-cresols (0.33 wt%), and xylenols (0.044 wt%), was carried out by using crosslinked cyclodextrin particles as a sorbent. A series of sorbents was prepared by varying the combination of cyclodextrin (CyD), β-CyD, γ-CyD, Mix-CyD (α-CyD: β-CyD: γ-CyD:dextrin = 30:10:10:50 wt/wt), the crosslinker, hexaMethylene diisocyanate (HDI) or toluene-2,6-diisocyanate, and their molar ratio in the reaction batch. The removal of the phenolic compounds from raw industrial wastewater was an instantaneous process and was completed within about 5 min. The best removal efficiency was obtained by the crosslinked β-CyD with HDI in a 1:8 molar ratio or the crosslinked Mix-CyD with HDI, also in a 1:8 molar ratio. The prepared sorbents were efficiently regenerated by elution of the adsorbed phenols from the crosslinked polymers with methanol. Copyright © 2006 Society of Chemical Industry

Keywords: Cyclodextrin, Removal of Phenols, Diisocyanate Network Polymer, Industrial Wastewater

? Wang, R., Liao, X.P., Zhao, S.L. and Shi, B. (2006), Adsorption of bismuth(III) by bayberry tannin immobilized on collagen fiber. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1301-1306.

Full Text: [2006\J Che Tec Bio81, 1301.pdf](2006/J%20Che%20Tec%20Bio81,%201301.pdf)

Abstract: The adsorption behavior of collagen fiber-immobilized bayberry tannin towards Bi(III) at acidic pH values was investigated. The adsorption capacity of the adsorbent towards Bi(III) was 0.348 mmol g-1 at 303 K, and increased with the rise in temperature. The adsorption isotherms of Bi(III) were in the shape of so-called type II isotherms and could be described by an empirical equation, ln *q*e = *k* + (1/*n*)*C*e, which implies that chemical adsorption is predominant at lower concentrations of Bi(III) and that physical adsorption is involved at higher concentrations. The adsorption kinetics of Bi(III) on the immobilized bayberry tannin could be well described by the pseudo-second-order rate model, and the adsorption capacities calculated by the model were almost the same as those determined by actual measurements. The adsorbent could be regenerated by using 0.02 mol dm-3 ethylenediaminetetraacetic acid (EDTA) solution after adsorption of Bi(III). The adsorption selectivity of the immobilized bayberry tannin towards Bi(III) in a Cu(II)-Bi(III) binary solution in acidic medium was remarkable. Therefore, it is strongly suggested that the immobilized bayberry tannin could be applied to the removal of Bi(III) from crude Cu(II) samples under proper conditions. Copyright © 2006 Society of Chemical Industry

Keywords: Immobilized Tannin, Bi(III), Adsorption, Selective Adsorption

? Zulkali, M.M.D., Ahmad, A.L., Norulakmal, N.H. and Sharifah, N.S. (2006), Comparative studies of *Oryza sativa* L. husk and chitosan as lead adsorbent. *Journal of Chemical Technology and Biotechnology*, **81** (7), 1324-1327.

Full Text: [2006\J Che Tec Bio81, 1324.pdf](2006/J%20Che%20Tec%20Bio81,%201324.pdf)

Abstract: The adsorption capacity of two low-cost adsorbents, *Oryza sativa* L. husk and chitosan, was studied. Lead solution was used as the adsorbate. The effect of initial lead concentration, pH, temperature, weight of adsorbent, particle size and contact time on lead uptake was investigated. It was found that the isotherm data were well described by the Freundlich isotherm for both adsorbents. The adsorption capacities of rice husk and chitosan were 5.69 and 8.31 mg g-1, respectively. It was shown that chitosan was more effective than rice husk. Copyright © 2005 Society of Chemical Industry

Keywords: Adsorption, Lead, Chitosan, Rice Husk, Isotherm, Kinetic

? Kargi, F. and Cikla, S. (2006), Zinc(II) ion recovery by biosorption onto powdered waste sludge (PWS): Effects of operating conditions. *Journal of Chemical Technology and Biotechnology*, **81** (10), 1661-1668.

Full Text: [2006\J Che Tec Bio81, 1661.pdf](2006/J%20Che%20Tec%20Bio81,%201661.pdf)

Abstract: Powdered waste sludge (PWS) obtained from a paint industry wastewater treatment plant and pretreated with 1% H2O2 was used for biosorption of Zn(II) ions from aqueous solution. The effects of operating conditions, pH, temperature, agitation speed, PWS particle size, Zn ion and PWS concentrations on the extent of Zn ion biosorption were investigated in batch experiments. The optimum pH resulting in maximum Zn ion biosorption was found to be pH = 5, since Zn ions precipitated in the form of Zn(OH)2 at pH levels above 5. The rate and extent of Zn ion biosorption increased with temperature between 25 and 50°C, although biosorption was not strongly sensitive to temperature variations since the activation energy was low at 4.5 kcal mol-1. Biosorbent particle size had a significant effect on Zn ion biosorption, yielding high percentage Zn removals at small particle sizes (D-p < 100 mu m) or large surface areas of PWS. Agitation speed also considerably affected the extent of Zn ion removal, and should be above 150 rpm in order to obtain a high rate. The extent of Zn ion biosorption was also affected by the initial Zn ion and PWS concentrations. At constant biosorbent (PWS) concentration, percentage Zn ion removal decreased, but the biosorbed Zn concentration increased with increasing initial Zn ion concentrations. However, at constant initial Zn concentrations, percentage Zn removal increased, but the biosorbed Zn ion concentration decreased with increasing adsorbent (PWS) concentration. With a maximum Zn ion biosorption capacity of 168 mg g-1 powdered waste sludge was proven to be an effective biosorbent compared to other biosorbents. (c) 2006 Society of Chemical Industry.

Keywords: Biosorption, Operating Conditions, Powdered Waste Sludge (PWS), Zn(II) Ions, Heavy-Metal Biosorption, Activated-Sludge, Removal, Kinetics, Chromium(VI), Equilibrium, Biomass, Batch

? O’Connell, D.W., Birkinshaw, C. and O’Dwyer, T.F. (2006), A modified cellulose adsorbent for the removal of nickel(II) from aqueous solutions. *Journal of Chemical Technology and Biotechnology*, **81** (11), 1820-1828.

Full Text: [2006\J Che Tec Bio81, 1820.pdf](2006/J%20Che%20Tec%20Bio81,%201820.pdf)

Abstract: A series of adsorption studies was carried out on a glycidyl methacrylate- modified cellulose material functionalised with imidazole (Cellulose-g-GMA-Imidazole) to assess its capacity in the removal of Ni(II) ions from aqueous solution. The study sought to establish the effect of a number of parameters on the removal of Ni(II) from solution by the Cellulose-g-GMA-Imidazole. In particular, the influence of initial metal concentration, contact time, solution temperature and pH were assessed. The studies indicated a Ni(II) uptake on the Cellulose- g-GMA-Imidazole sorbent of approximately 48mg g-1 of nickel from aqueous solution. The adsorption process fitted the Langmuir model of adsorption and the binding process was mildly endothermic. The kinetics of the adsorption process indicated that nickel uptake occurred within 400 min and that pseudo-second order kinetics best describe the overall adsorption process. Nickel(II) adsorption, recovery and re-adsorption studies indicated that at highly acidic pH values the adsorbent material becomes unstable, but in the range pH 3-6, the adsorbent is stable and shows limited but significant Ni(II) recovery and re-adsorption capability. © 2006 Society of Chemical Industry.

Keywords: Adsorption, Modified Cellulose, Nickel, Wasterwater Treatment

? Lu, C.Y. and Liu, C.T. (2006), Removal of nickel(II) from aqueous solution by carbon nanotubes. *Journal of Chemical Technology and Biotechnology*, **81** (12), 1932-1940.

Full Text: [2006\J Che Tec Bio81, 1932.pdf](2006/J%20Che%20Tec%20Bio81,%201932.pdf)

Abstract: Single-walled carbon nanotubes (SWCNTs) and multiwalled carbon nanotubes (MWCNTs) were oxidized by NaClO solutions and were employed as sorbents to study sorption characteristics of nickel(II) from aqueous solution. The surface properties of CNTs such as functional groups, total acidic sites and negatively charged carbons were greatly improved after oxidation, which made CNTs become more hydrophilic and resulted in sorption of more Ni2+. The amount of Ni2+ sorbed onto oxidized CNTs increased with a rise in agitation speed, initial Ni2+ concentration and solution pH in the range 1-8, but decreased with a rise in CNT mass and solution ionic strength. The sorption mechanisms are complicated and appear attributable to electrostatic forces and chemical interactions between the Ni2+ and the surface functional groups of the CNTs. The oxidized SWCNTs and MWCNTs have shorter equilibrium time and better Ni2+ sorption performance than the oxidized granular activated carbon, suggesting that both NaClO oxidized CNTs are efficient Ni2+ sorbents and that they possess good potential applications in water treatment. (c) 2006 Society of Chemical Industry

Keywords: Carbon Nanotubes, Sorption, Nickel, Granular Activated Carbon, Activated Carbon, Adsorption, Water

? Barriada, J.L., Herrero, R., Prada-Rodríguez, D. and Sastre de Vicente, M.E. (2007), Waste spider crab shell and derived chitin as low-cost materials for cadmium and lead removal. *Journal of Chemical Technology and Biotechnology*, **82** (1), 39-46.

Full Text: [2007\J Che Tec Bio82, 39.pdf](2007/J%20Che%20Tec%20Bio82,%2039.pdf)

Abstract: Crab shell and inexpensive chitin obtained from it have been studied to determine their capability to remove cadmium and lead from aqueous solutions. Factors affecting the process such as pH, metal concentration, time and temperature have been critically analysed. Results show that only cadmium uptake on crab shell is strongly influenced by the pH of the solution. The crab shell was also found to be more efficient. Equilibrium data analysis using the Langmuir isotherm indicates that crab shell can remove at least 1.4 mmol of metal per gram of sorbent at optimum pH. Temperature studies for metal sorption on chitin showed that the effect of temperature is very small for both the kinetic constant of the sorption process and for maximum uptake. Copyright © 2006 Society of Chemical Industry

Keywords: Crab Shell, Chitin, Cadmium(II), Lead(II), Removal

? Binupriya, A.R., Sathishkumar, M., Kavitha, D., Swarninathan, K. and Yun, S.E. (2007), Aerated and rotated mode decolorization of a textile dye solution by native and modified mycelial biomass of *Trametes versicolor*. *Journal of Chemical Technology and Biotechnology*, **82** (4), 350-359.

Full Text: [2007\J Che Tec Bio82, 350.pdf](2007/J%20Che%20Tec%20Bio82,%20350.pdf)

Abstract: Aerated and rotated mode adsorption experiments were carried out for the removal of a textile dye (reactive blue MR) from aqueous solution using native and pre-treated biomass of Trametes versicolor. The effect of process parameters like contact time, dosage of adsorbent and adsorbate and pH on adsorption was investigated. The higher the dye concentration, the lower was the adsorption. Increase in biomass dosage increased the adsorption. Kinetic study showed that the adsorption of dye on fungal biomass was a gradual process, and a second-order kinetic model fitted the present experimental data well. Experimental data were analyzed using Langmuir and Temkin et seq isotherms. Acidic pH was favorable for adsorption. Studies on pH effect and desorption show that chemisorption seems to play a major role in the adsorption process. Of the native and pre-treated biomass studied, autoclaved biomass showed a better adsorption capacity. The adsorption capacity of autoclaved biomass in aerated mode was found to be 50.51 mg g-1. Aerated mode showed a better adsorption capacity than rotated mode. (c) 2007 Society of Chemical Industry.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Capacity, Adsorption Process, Aqueous Solution, Aqueous-Solution, Biomass, Biosorption, Capacity, Chemisorption, Concentration, Congo-Red, Decolorization, Desorption, Dosage, Dye, Fungal Biomass, Groundwater, Ions, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Low-Cost Adsorbents, Model, Modified, MR, Parameters, pH, Process, Removal, Role, Sorption, Textile, Textile Dye, Trametes Versicolor, Waste-Water

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Full Text: [2007\J Che Tec Bio82, 389.pdf](2007/J%20Che%20Tec%20Bio82,%20389.pdf)

Abstract: Procion Blue H-B (PBHB) was used as a model reactive dye for biosorption studies onto inactive/dead mycelial biomass of Panus fulvus. Process parameters like pH, contact time and temperature were optimized. pH 2, 150 min of contact time and 35°C were found to be more favorable for maximum biosorption. Various two- and three-parameter isotherms were employed to understand the biosorption process. Among the various two-parameter isothermal models applied, the Langmuir isotherm showed the best fit and among the three-parameter isothermal models, the Khan, Redlich-Peterson, Sips and Toth isotherm models showed similar fits and only the Koble-Corrigan model showed a poor fit. In kinetic studies, pseudo-first-order model fitted better than pseudo-second-order model. Maximum desorption was observed in alkaline pH, which reveals the possibility of a chemisorption mechanism involved in the removal of PBHB. Among the various desorption media assessed, 70% (v/v) acetone showed complete desorption of the sorbate from the sorbent. Scanning electron microscopy images revealed the non-fibrous nature of the adsorbent. FT-IR studies showed the existence of amine groups in the sorbent which are the major adsorbent sites for reactive dyes. (c) 2007 Society of Chemical Industry.

Keywords: Acetone, Activated Carbon, Adsorbent, Adsorption, Amine, Basic-Dyes, Biomass, Biosorption, Chemisorption, Congo Red, Desorption, Dye, Dyes, Electron Microscopy, Equilibrium, FT-IR, FTIR, Groups, Ions, Isotherm, Isotherm Models, Isothermal, Isotherms, Kinetic, Kinetic Studies, Kinetics, Langmuir, Langmuir Isotherm, Mechanism, Media, Microscopy, Model, Modeling, Models, Mycelial Biomass, Panus Fulvus, Parameters, Pbhb, pH, Pith, Process, Pseudo-Second-Order, Reactive Dye, Reactive Dyes, Removal, Sites, Sorption, Temperature, Waste-Water

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Full Text: [2007\J Che Tec Bio82, 407.pdf](2007/J%20Che%20Tec%20Bio82,%20407.pdf)

Abstract: The use of chromium-containing toxic solid wastes from the leather industry for the removal of dyes from waste-waters has been studied. A batch adsorption model has been employed and the role of various experimental parameters on the efficiency of the process evaluated. The extent of dye removal was studied by varying parameters such as pH, contact time, initial concentration of the dye and amount of adsorbent. The experimental equilibrium data for this system has been analyzed using the linearized forms of Langmuir and Freundlich isotherms. The Langmuir isotherm was found to provide the best theoretical correlation of the experimental data and the adsorption was found to follow pseudo-second-order kinetics. The dye adsorbed solid wastes were used for the preparation of pigments. In essence, this study provides a greener solution for chromium-containing solid wastes, dye containing waste-waters and dye-adsorbed chromium solid wastes. (c) 2007 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Aqueous-Solution, Biosorbents, Chromium, Color Removal, Concentration, Correlation, Cost, Diazo Dye, Dye, Dye Removal, Dyes, Efficiency, Equilibrium, Freundlich, Isotherm, Isotherms, Kinetics, Langmuir, Langmuir Isotherm, Leather Industry, Model, Parameters, pH, Pigments, Process, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Removal, Role, Silica, Solid Waste, Solid Wastes, Sorption, Streams, Toxic, Waste, Waste-Water, Wastes, Water

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Full Text: [2007\J Che Tec Bio82, 711.pdf](2007/J%20Che%20Tec%20Bio82,%20711.pdf)

Abstract: To further improve the adsorption capacity of chitosan (CTS), a series of novel chitosan/organomontmorillonite nanocomposites (CTS/OMMT) were synthesized and the adsorption abilities for Congo red (CR) investigated in this study. The nanocomposites were characterized by Fourier transform infrared spectroscopy (FTIR), X-ray diffraction analysis (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM), and the results indicated that an exfoliated nanostructure was formed in CTS/OMMT nanocomposites. Compared with the adsorption capacity of OMMT (192.4 mg g-1), CTS/OMMT with an amount of cetyltrimethylammonium bromide equal to 0.75 CEC of MMT and molar ratio of CTS to OMMT of 1:10 exhibited the higher adsorption capacity (290.8 mg g-1). The adsorption behaviours of OMMT and CTS/OMMT showed that the adsorption kinetics and isotherms were in good agreement with a pseudo-second-order equation and the Langmuir equation, respectively. The IR spectra revealed that a chemical interaction occurred between CTS/OMMT and CR. The adsorption capacity of CTS/ONIMT nanocomposite was higher than that of other absorbents; this study suggested that the CTS/OMMT nanocomposite could be used as an adsorbent to remove CR dye from aqueous solution. (c) 2007 Society of Chemical Industry.

Keywords: Absorbents, Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Characteristics, Adsorption Kinetics, Analysis, Aqueous Solution, Capacity, CEC, Cetyltrimethylammonium Bromide, Chemical, Chitosan, Clay, Color Removal, Congo Red, Cr, CT, Decolorization, Dye, Effluents, Electron Microscopy, Fly-Ash, Fourier Transform Infrared Spectroscopy, FTIR, Infrared Spectroscopy, Interaction, IR, IR Spectra, Isotherms, Kinetics, Langmuir, Langmuir Equation, Microscopy, Nanocomposite, Nanocomposites, Organo-Montmorillonite, Pseudo Second Order, Pseudo-Second-Order, Scanning Electron Microscopy, SEM, Spectroscopy, TEM, Transmission, Transmission Electron Microscopy, Waste-Water, X-Ray Diffraction, XRD

? Ilhan, S., Iscen, C.F., Caner, N. and Kiran, I. (2008), Biosorption potential of dried *Penicillium restrictum* for Reactive Orange 122: Isotherm, kinetic and thermodynamic studies. *Journal of Chemical Technology and Biotechnology*, **83** (4), 569-575.

Full Text: [2008\J Che Tec Bio83, 569.pdf](2008/J%20Che%20Tec%20Bio83,%20569.pdf)

Abstract: BACKGROUND: This paper evaluates the biosorption of Reactive Orange 122 dye (RO 122) by dried Penicillium restrictum cells. The aim was to determine the pH, contact time, temperature and dye concentration for the applicability of biomass as an alternative biosorbent for the removal of RO 122. RESULTS: Optimum initial pH and equilibrium time for RO 122 were determined as 1.0 and 75 min at 25°C, respectively. The maximum biosorption capacity (q(max)) of biomass obtained from the Langmuir fit was 180.7, 190.1 and 219.8 mg g-1 biomass at 25, 40 and 50°C, respectively. Both Langmuir and Freundlich isotherm models were fitted to the experimental data at constant temperatures of 25, 40 and 50°C. The biosorption process was found to obey a pseudo-second-order kinetic model and was favourable at high temperatures. CONCLUSIONS: The biomass could be an alternative biosorbent to RO 122 dye removal because of having advantages of being easily cultivable, its low cost, high biosorption capacity with low biomass dosage (0.4 g dm-3) and reasonably rapid biosorption rate. (c) 2008 Society of Chemical Industry.

Keywords: Adsorption, Alternative, Aqueous-Solution, Basic Dye, Biomass, Biosorbent, Biosorption, Capacity, Cephalosporium-Aphidicola, Cost, Decolorization, Dye, Dye Removal, Equilibrium, Experimental, Freundlich, Freundlich Isotherm, Fungus Aspergillus-Niger, Isotherm, Isotherms, Kinetic, Kinetics, Langmuir, Model, Models, Penicillium Restrictum, pH, Potential, Reactive Orange 122, Removal, Temperature, Thermodynamic, Thermodynamics, Water

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Full Text: [2008\J Che Tec Bio83, 673.pdf](2008/J%20Che%20Tec%20Bio83,%20673.pdf)

Abstract: BACKGROUND: Zn(II) is commonly present in mining drainage in developing countries. Since loess is abundant and always located near mining sites in China, it would be useful to investigate the possibility and efficiency of using loess to remove Zn(II) from aqueous solution. RESULTS: The Zn(II) adsorption capacity of Chinese loess was determined as 215.9mg g-1. The adsorption followed pseudo-second-order kinetics and took place mainly by surface diffusion. Generally, higher initial pH and solute concentration resulted in higher % Zn(II) removal, while higher temperature and slurry concentration led to lower % Zn(II) removal. A thermodynamic study revealed that the adsorption process was exothermic, with the predicted enthalpy change ranging from -20.87 to -4.06 kJ mol-1. With the assistance of X-ray photoelectron spectroscopy and X-ray diffraction, the high adsorption capacity was ascribed to the growth of micro-organisms and mineral constituents such as kaolinite and goethite. CONCLUSION: Chinese loess proved effective for Zn(II) adsorption in this study. The optimal adsorption conditions included pH > 3.0, temperature < 15°C and contact time approximate to 400 min. As an abundant natural soil in and areas with very low population density, it would be appropriate to develop this material into a wastewater-purifying agent. (c) 2008 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorption, Adsorption Capacity, Aqueous Solution, Aqueous-Solution, Capacity, China, Chinese, Chinese Loess, Crystalline Iron-Oxides, Diffusion, Efficiency, Enthalpy, Equilibrium, Exothermic, Fly-Ash, Growth, Heavy-Metals, Kaolinite, Kinetics, Mechanism, Micro-Organism, Microorganisms, Mining, pH, Population, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Removal, Soil, Solution, Sorption, Spectroscopy, Surface Diffusion, Temperature, Thermodynamic, Thermodynamics, Transformation, X-Ray Diffraction, Zn(Ii), Zn(Ii) Adsorption

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Full Text: [2008\J Che Tec Bio83, 788.pdf](2008/J%20Che%20Tec%20Bio83,%20788.pdf)

Abstract: BACKGROUND: Biosorption of heavy metals from aqueous solution by modified activated carbon with Phanerochaete chrysosporium immobilised in Ca-alginate beads was investigated using a batch system and comparison of linear and nonlinear methods.

RESULTS: The amount of Cu(II), Zn(II) and Pb(II) ion sorption by the beads was as follows: activated carbon with P. chrysosporium immobilised in Ca-alginate beads (ACFCA) (193.4, 181.8, 136.6 mg g-1) > activated carbon immobilised in Ca-alginate beads (ACCA) (1.74.8, 162.0, 130.7 mg g-1) > P. chrysosporium (F) (148.8, 125.6, 120.4 mg g-1) > activated carbon (AC) (138.8, 112.3, 109.3 mg g-1) > plain Ca-alginate beads (PCA) (125.4, 105.2, 98.2 mg g-1). The widely used Langmuir and Freundlich isotherm models were utilised to describe the biosorption equilibrium process.

CONCLUSION: The results of this study suggest that the immobilisation of modified activated carbon with P. chrysosporium in Ca-alginate beads is suitable for a batch system. The isotherm parameters were estimated using linear and nonlinear regression analyses. The surface charge density of the biosorbents varied with the pH of the medium; the maximum biosorption of heavy metal ions on the biosorbents was obtained when the pH was between 5.6 and 7.4. (c) 2008 Society of Chemical Industry.

Keywords: Biosorption, Activated Carbon, Heavy Metal, Phanerochaete Chrysosporium, Industrial Waste-Water, Optimum Sorption Isotherm, Phanerochaete-Chrysosporium, Ca-Alginate, Basic-Dyes, Removal, Equilibrium, Cadmium, Ions, Algae

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Full Text: [2008\J Che Tec Bio83, 806.pdf](2008/J%20Che%20Tec%20Bio83,%20806.pdf)

Abstract: BACKGROUND: To elucidate the process and mechanism of Cu(II) biosorption onto aerobic granules, the influence of pH and ionic strength (IS) on the Cu(II) biosorption capacity and biosorption mechanism was studied. RESULTS: The biosorption of Cu(II) onto aerobic granules under different conditions of pH (3, 4 and 5), IS (0, 0.1 and 0.5mol L-1) and Cu(II) concentration (25-250 mg L-1) was investigated. The correlation coefficients of the pseudo-second-order kinetic model were R-2(2) > 0.99, while those of the Langmuir and Freundlich models were R-1(2) > 0.975 and R-2(2) > 0.955 respectively. The biosorption of Cu(II) increased with increasing pH, while the effect of IS on the biosorption was complicated, which could be explained by the competition among different metallic ions, colloidal chemistry theory or Derjaguin, Landau, verwey and Overbeek (DLVO) theory. About 70% of the solid phase Cu(II) was exchanged by Na(I), Ca(II) and Mg(II) released from the aerobic granules at pH 4 and 5. The results revealed that ion exchange is the most important biosorption mechanism but that other mechanisms also play a part. CONCLUSION: The sorption performance can be optimised by adjusting the pH and IS. Aerobic granules can be used as an alternative effective, economical and practical biosorbent for heavy metal removal. (c) 2008 Society of Chemical Industry.

Keywords: Activated-Sludge, Adsorption, Aerobic Granules, Alternative, Aqueous-Solution, Biomass, Biosorbent, Biosorption, Biosorption Mechanism, Capacity, Chemistry, Chromium(VI) Biosorption, Competition, Cu(II), Cu(II) Biosorption, Equilibrium, Freundlich, Heavy Metal, Heavy Metal Removal, Heavy-Metals, Ion Exchange, Ion-Exchange, Ionic Strength, Kinetic, Kinetic Model, Langmuir, Lead Biosorption, Mechanism, Metal, Model, Models, pH, Pseudo-Second-Order Kinetic Model, Removal, Sludge, Sorption, Theory

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Full Text: [2008\J Che Tec Bio83, 1034.pdf](2008/J%20Che%20Tec%20Bio83,%201034.pdf)

Abstract: BACKGROUND: Effective treatment of hyper-saline wastewaters containing phenol is required before their discharge into the sewage system and the environment. An investigation of the feasibility of the use of a combined physical-biological procedure is reported for the treatment of hyper-saline phenol wastewater. This process consists of two stages: first the phenol is removed and concentrated by resin XDA-1 from hyper-saline effluent, and then it is biodegraded in a subsequent stage with microorganisms to regenerate the adsorbent.

RESULTS: The removal of phenol by XDA-1 was found to be feasible under acidic and neutral conditions. It was found that decreasing temperatures are beneficial for phenol adsorption. The equilibrium data were well described by the Freundlich model. Increasing the salinity of the effluent improved the adsorption capacity of XDA-1, which is an advantage of the combined process for the treatment of saline wastewater. A pseudo-second-order kinetic model provided the best correlation with experiment results. Results indicate that phenol desorption is the rate-limiting step in the bio-regeneration process under the tested operating conditions. The adsorption and bio-regeneration process was repeated for up to six cycles, with percentage regeneration (PR) values remaining above 81%.

CONCLUSIONS: High PR values, good pore structure, and specific surface properties of the six-round-regenerated resin indicated the stability of the combination system in treating hyper-saline phenol wastewater. (C) 2008 Society of Chemical Industry.

Keywords: Adsorption, Phenol, Hyper-Saline Wastewater, Bio-Regeneration, Activated Carbon, Polymeric Adsorbents, Removal, Bioregeneration, Degradation, Reactor

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Full Text: [2009\J Che Tec Bio84, 13.pdf](2009/J%20Che%20Tec%20Bio84,%2013.pdf)

Abstract: Biosorption may be simply defined as the removal of substances from solution by biological material. Such substances can be organic and inorganic, and in gaseous, soluble or insoluble forms. Biosorption is a physico-chemical process and includes such mechanisms as absorption, adsorption, ion exchange, surface complexation and precipitation. Biosorption is a property of both living and dead organisms (and their components) and has been heralded as a promising biotechnology for pollutant removal from solution, and/or pollutant recovery, for a number of years, because of its efficiency, simplicity, analogous operation to conventional ion exchange technology, and availability of biomass. Most biosorption studies have carried out on microbial systems, chiefly bacteria, microalgae and fungi, and with toxic metals and radionuclides, including actinides like uranium and thorium. However, practically all biological material has an affinity for metal species and a considerable amount of other research exists with macroalgae (seaweeds) as well as plant and animal biomass, waste organic sludges, and many other wastes or derived bio-products. While most biosorption research concerns metals and related substances, including radionuclides, the term is now applied to particulates and all manner of organic substances as well. However, despite continuing dramatic increases in published research on biosorption, there has been little or no exploitation in an industrial context. This article critically reviews aspects of biosorption research regarding the benefits, disadvantages, and future potential of biosorption as an industrial process, the rationale, scope and scientific value of biosorption research, and the significance of biosorption in other waste treatment processes and in the environment. (C) 2008 Society of Chemical Industry.

Keywords: Absorption, Acid Process Streams, Adsorption, Algae, Algal Cell-Walls, Aqueous-Solutions, Bacteria, Biomass, Bioremediation, Biosorbent, Biosorption, Biotechnology, Concerns, Dyes, Environment, Exchange, Fungi, Heavy-Metal Biosorption, Industrial, Industry, Ion Exchange, Macroalgae, Mechanisms, Metals, Microalga Chlorella-Salina, Microalgae, Organic Wastes, Penicillium-Ochro-Chloron, Pollutants, Pollution, Process, Processes, Radionuclides, Recovery, Removal, Research, Review, Rhizopus-Arrhizus, Saccharomyces-Cerevisiae, Technology, Toxic, Toxic Metals, Toxic Metals, Treatment, UF, MF Membrane Reactor, Uranium

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Full Text: [2009\J Che Tec Bio84, 158.pdf](2009/J%20Che%20Tec%20Bio84,%20158.pdf)

Abstract: Groundwater contaminated by hazardous chlorinated compounds, especially chlorinated ethenes, continues to be a significant environmental problem in industrialized nations. The conventional treatment methods of activated carbon adsorption and air-stripping successfully remove these compounds by way of transferring them from the water phase into the solid or gas phase. Catalysis is a promising approach to remove chlorinated compounds completely from the environment, by converting them into safer, non-chlorinated compounds. Palladium-based materials have been shown to be very effective as hydrodechlorination catalysts for the removal of chlorinated ethenes and other related compounds. However, relatively low catalytic activity and a propensity for deactivation are significant issues that prevent their widespread use in groundwater remediation. Palladium-on-gold bimetallic nanoparticles, in contrast, were recently discovered to exhibit superior catalyst activity and improved deactivation resistance. This new type of material is a significant next-step in the development of a viable hydrodechlorination catalysis technology. (C) 2008 Society of Chemical Industry

Keywords: Nanoparticles; Nanotechnology; Catalysis; Trichloroethene; Water Pollution; Gold, Trichloroethene Hydrodechlorination; Reductive Dehalogenation; Chlorinated Hydrocarbons; Supported Catalysts; TCE Dechlorination; Organic-Compounds; Palladium-Gold; Pd Catalysts; Hydrodehalogenation; Groundwater

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Full Text: [2009\J Che Tec Bio84, 236.pdf](2009/J%20Che%20Tec%20Bio84,%20236.pdf)

Abstract: BACKGROUND: Sorption of polycyclic aromatic hydrocarbons (PAHs) on activated carbon and the Macronet polymeric sorbent MN200 was investigated to determine the effectiveness of each sorbent for removal of pollutants from aqueous solution and their possible use as sorbent materials for groundwater. Experiments were carried out to determine the loading capacities of a family of PAHs (acenaphthene, anthracene, fluoranthene, fluorene, naphthalene and pyrene). RESULTS: Activated carbon was the more effective sorbent, with maximum loadings of PAHs between 90 and 230 g kg-1, while MN200 resin showed values of 25-160 g kg-1. Loading isotherms based on the Langmuir, Freundlich and Redlich-Peterson models were determined. The hydrophobic character of the pollutants appeared as an important parameter related to the sorption process. Equilibrium and kinetic parameters were used to determine the retardation factors for each PAH. CONCLUSION: The calculated values for the simulation of barrier thickness using both sorbents, taking into account EU requirements for PAHs in groundwater effluent, were perfectly reasonable as a first estimate. The better kinetic properties of MN200 are evident in lower hydraulic residence times and consequently in a lower barrier thickness. (C) 2008 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorbents, Adsorption, Aromatic-Hydrocarbons, Filtration, Isotherms, Liquid-Chromatography, Macronet Polymeric Sorbent (Mn200), Naphthalene, Permeable Reactive Barrier (PRB), Polycyclic Aromatic Hydrocarbons (Pahs), Prediction, Removal, Sorption, Sorption, Transport

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Full Text: [2009\J Che Tec Bio84, 490.pdf](2009/J%20Che%20Tec%20Bio84,%20490.pdf)

Abstract: BACKGROUND: There are few reports about adsorbents for the effective removal of large-molecule pesticides such as DDT (1,1,1-trichloro-2,2’ bis(p-chlorophenyl)ethane). Some mesoporous silica materials and their modified derivatives might serve as good adsorbents for these large organic molecules because of their large pore diameter and special pore structures. In this work, the adsorption processes of DDT in aqueous solutions were investigated using different mesoporous silica materials, including HMS, MCM-41, SBA-15 and MCM-48. RESULTS: All these materials exhibit efficient DDT removal, and the adsorption is a rapid process with over 50% of DDT removed within approximately 2 h. The efficiency of DDT removal is influenced by the adsorbent characteristics, such as pore volume, pore diameter, connectivity between pore channels and surface OH groups. The influences of water/acetone ratio and initial DDT concentration in solution were also explored. It was found that with enhancing DDT solubility, the addition of acetone in the reaction solution had no evident impact on DDT adsorption efficiency. Increasing the initial concentration of DDT resulted in a decrease of DDT adsorption efficiency. The adsorption kinetics of DDT on mesoporous silica material is shown to be pseudo-second-order. After thermal treatment at a relatively low temperature of 450°C, the adsorbed DDT was completely decomposed and the adsorbents, except MCM-41, were regenerated well. CONCLUSION: The results demonstrate the potential of a simple and efficient new approach for the removal of OCPs (organochlorine pesticides), especially large OCP molecules from surface water or groundwater. (c) 2008 Society of Chemical Industry.

Keywords: Adsorption, Adsorption, Adsorption Kinetics, DDT, Dechlorination, Kinetics, Mcm-48, Mesoporous Silica, Molecular-Sieves, Organochlorine Pesticides, Pore Structure, Pseudo Second Order, Removal, Residue, SBA-15, Stability, Temperature

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Full Text: [2009\J Che Tec Bio84, 1043.pdf](2009/J%20Che%20Tec%20Bio84,%201043.pdf)

Abstract: BACKGROUND: The present study has concentrated on investigating the fluoride removal potential of nano-scale aluminum oxide hydroxide (nano-AIOOH). A series of batch adsorption experiments were carried out to assess parameters that influence the adsorption process. The different parameters investigated include the effect of contact time, initial fluoride concentration, adsorbent dose, pH of the solution and co-existing anions. RESULTS: Most of the adsorption took place during the first 30 min and kinetic and equilibrium adsorption data show that the process obeys a pseudo-second-order kinetic equation and the Langmuir adsorption model. The fluoride removal efficiency is greater than 90% between pH 6 and 8 and decreases as pH values increase to 11. The presence of SO42- or PO43- in aqueous solution was found to reduce the fluoride uptake. Desorption studies showed that the fluoride can easily be desorbed at pH 13. CONCLUSION: Nano-AIOOH possesses a maximum fluoride capacity of 3259 mg F- kg-1, which is comparable with that of activated alumina. Maximum adsorption occurred at around pH 7, which makes nano-AIOOH a potential adsorbent for drinking water treatment. (C) 2009 Society of Chemical Industry.

Keywords: Activated Alumina, Adsorbent, Adsorbent Dose, Adsorption, Adsorption, Alumina, Aluminum, Aluminum Oxide, Anions, Aqueous Solution, Background, Batch, Batch Adsorption, Capacity, Co-Existing Anions, Concentration, Data, Defluoridation, Desorption, Donnan Dialysis, Drinking Water, Drinking Water Treatment, Drinking-Water, Efficiency, Equilibrium, Experiments, First, Fixed-Bed, Fluoride, Fluoride Removal, Fluoride Removal, Fluoride Removal Efficiency, Interface, Kinetic, Kinetic Equation, Langmuir, Mechanism, Model, Nano-Scale Aluminum Oxide Hydroxide, Oxide, Performance, pH, Phosphate, Potential, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Equation, Removal, Removal Efficiency, Solution, Treatment, Uptake, Water, Water Treatment, Zero Charge

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Full Text: [2009\J Che Tec Bio84, 1371.pdf](2009/J%20Che%20Tec%20Bio84,%201371.pdf)

Abstract: BACKGROUND: Pb(II) is common in both waste-waters and gas emissions. In developing countries, public health problems have been reported concerning Pb(II) pollution, so that stringent measures are required to deal with it. MAJOR RESULTS: The adsorption and desorption behaviour of Pb(II) has been investigated on a natural Chinese kaolin. Several factors, including initial concentration, pH, equilibration time, dosage and temperature correlated positively with Pb(II) adsorption. The Pb(II) adsorption capacity of natural kaolin was 165.117 mg g-1. A kinetic study shows that Pb(II) adsorption on purified kaolin equilibrates within 35 min. The enthalpy changes of Pb(II) adsorption on purified kaolin were 63.683, 20.488 and 21.371 kJ mol-1 with entropy changes 262.250, 112.210 and 105.120 J mol-1 K-1 for solutions containing 50, 100 and 200 mg L-1 Pb(II) respectively, indicating an endothermic and spontaneous adsorption process. The desorption of Pb(II) from kaolin was difficult with more than 85% Pb(II) removal. Based on X-ray diffraction (XRD) analysis, the Pb(II) adsorption on natural and purified kaolin was attributed mainly to the magnesite component and complexation with the mineral surface. CONCLUSIONS: Natural kaolin exhibits a satisfactory performance for adsorption of Pb(II) from aqueous solution. The optimum conditions for adsorption were: ionic strength = 0.01 mol L-1; pH >= 7.2; dosage = 10 g L-1; temperature = 25ºC; duration >= 16 h (C-i = 80 mg L-1); and the optimum conditions for desorption were ionic strength = 0.1 mol L-1 and pH <= 5.0. (c) 2009 Society of Chemical Industry.

Keywords: Adsorption, Adsorption Capacity, Analysis, Aqueous Solution, Aqueous-Solution, Background, Behaviour, Biosorption, Capacity, Changes, Chinese, Clay, Complexation, Concentration, Cu(II), Desorption, Developing, Developing Countries, Duration, Emissions, Endothermic, Enthalpy, Entropy, Equilibration, Equilibrium, Health, Heavy-Metals, Ionic Strength, Ions, Kaolin, Kinetic, Kinetic Study, Kinetics, L1, Lead Pollution, Mechanism, Natural, Natural Kaolin, Parameters, Pb, Pb(II), Performance, pH, Pollution, Public, Public Health, Removal, Solution, Solutions, Sorption, Strength, Surface, Temperature, Thermodynamic, Thermodynamic Studies, Thermodynamics, Waste Waters, Wastewaters, X-Ray, X-Ray Diffraction, XRD

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Full Text: [2009\J Che Tec Bio84, 1726.pdf](2009/J%20Che%20Tec%20Bio84,%201726.pdf)

Abstract: BACKGROUND: Most adsorption studies consider only the adsorption of pollutants onto low cost adsorbents without considering how equilibrium and kinetic data can be optimized for the proper design of adsorption systems. This study considers the optimization of kinetic data obtained for the removal of Pb(II) from aqueous solution by a tripolyphosphate modified kaolinite clay adsorbent. RESULTS: Modification of kaolinite clay with pentasodium tripolyphosphate increases its cation adsorption capacity (CEC) and specific surface area (SSA) from 7.81 to 78.9 meq (100 g)-1 and 10.56 to 13.2 m2 g-1 respectively. X-ray diffraction patterns for both unmodified and tripolyphosphate-modified kaolinite clay suggest the modification is effective on the surface of the clay mineral. Kinetic data from the batch adsorption of Pb(II) onto the tripolyphosphate-modified kaolinite clay adsorbent were optimized to a two-stage batch adsorption of Pb(II) using the pseudo-second-order kinetic model. Mathematical model equations were developed to predict the minimum operating time for the adsorption of Pb(II). Results obtained suggest that increasing temperature and decreasing percentage Pb(II) removal by the adsorbent enhanced operating time of the adsorption process. The use of two-stage batch adsorption reduces contact time to 6.7 min from 300 min in the single-stage batch adsorption process for the adsorption of 2.5 m3 of 500 mg L-1 Pb(II) under the same operating conditions. CONCLUSION: Results show the potential of a tripolyphosphate-modified kaolinite clay for the adsorption of Pb(II) from aqueous solution and the improved efficiency of a two-stage batch adsorption process for the adsorption of Pb(II) even at increased temperature. (C) 2009 Society of Chemical Industry.

Keywords: Adsorbent, Adsorbents, Adsorber Design, Adsorption, Adsorption Capacity, Aqueous Solution, Background, Batch, Batch Adsorption, Cadmium Ions, Capacity, Cation, CEC, Clay, Clay Mineral, Contact Time, Contact Time, Cost, Data, Design, Efficiency, Equilibrium, Ions, Kaolinite, Kaolinite Clay, Kinetic, Kinetic Model, Kinetics, L1, Lead, Lead, Low Cost, Low Cost Adsorbents, Mathematical Model, Metal-Ions, Minimum, Model, Modeling, Modification, Modified, Nov, Operating Conditions, Optimization, Pb(II), Pb(II) Ions, Phosphate, Pollutants, Potential, Process Optimization, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Solution, Sorber, Sorption, Specific Surface, Specific Surface Area, Surface, Surface Area, Systems, Temperature, Tripolyphosphate, X-Ray, X-Ray Diffraction

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Full Text: [2010\J Che Tec Bio85, 590.pdf](2010/J%20Che%20Tec%20Bio85,%20590.pdf)

Abstract: This paper reviews the technology and biotechnology to remove heavy metals (such as copper, arsenic, lead and zinc) and cyanide from contaminated wastewater. The paper places special emphasis on gold mine wastewater and the use of low cost materials as sorbent. Various biological as well as physicochemical treatment processes are discussed and compared on the basis of costs, energy requirement, removal efficiency, limitations and advantages. Sorption using natural plant materials, industrial and agricultural waste has been demonstrated to have the potential to replace conventional methods for the removal of heavy metals because of its cost effectiveness, efficiency and the local availability of these materials as biosorbent. The parameters affecting sorption, such as initial ion concentration, pH, sorbent dosage, particle size and temperature, are discussed. The overall treatment cost of metal and cyanide contaminated wastewater depends on the process employed and the local conditions. In general, technical applicability, cost-effectiveness and plant simplicity are the key factors in selecting the most suitable treatment method. (C) 2010 Society of Chemical Industry.

Keywords: Agricultural, Agricultural Waste, Aqueous-Solutions, Arsenic, Availability, Biological, Biological Sulfate, Biosorbent, Biotechnology, By-Products, Carbon Source, Concentration, Conventional, Copper, Cost, Cost Effectiveness, Cost-Effectiveness, Costs, Cyanide, Effectiveness, Efficiency, Energy, Fixed-Bed Column, Gas-Lift Reactor, General, Gold, Gold Mine Wastewater, Heavy Metal, Heavy Metals, Hydraulic Retention Time, Lead, Local, Low Cost, Low-Cost, Metal, Metals, Methods, Natural, Particle Size, pH, Plant, Potential, Removal, Removal Efficiency, Requirement, Reviews, Size, Sorbent, Sorption, Streptomyces-Rimosus Biomass, Sulfate-Reducing Bacteria, Technology, Temperature, Treatment, Waste, Wastewater, Zinc

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Full Text: [2010\J Che Tec Bio85, 708.pdf](2010/J%20Che%20Tec%20Bio85,%20708.pdf)

Abstract: BACKGROUND: Arsenic pollution in drinking water has been found in most countries. Arsenate (As(V)) and arsenite (As(III)) are two major forms of inorganic arsenic species, and the latter is the more toxic. The removal of arsenic ions from water has attracted increased attention, and therefore further understanding and development of techniques for removal of arsenic ions are required. RESULTS: Adsorption of arsenate and arsenite from aqueous solutions using Ti-pillared montmorillonite (Ti-MMT) was investigated as a function of contact time, pH, temperature, coexisting ions, and ionic strength. The adsorption of both arsenate and arsenite were temperature and pH dependent, indicating different adsorption mechanisms. The effect of coexisting ions on the adsorption was also studied and, among the ions investigated, only phosphate had a noticeable influence on the adsorption of arsenate, while the effect of other ions was negligible. A pseudo-second-order chemical reaction model was obtained for both arsenate and arsenite; adsorption isotherms of arsenate and arsenite fitted the Langmuir and Freundlich isotherm models well. X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS) were used to study the nature of surface elements before and after adsorption. CONCLUSIONS: This work demonstrates that Ti-pillared montmorillonite is an efficient material for the removal of arsenate and arsenite from aqueous solutions. Experimental parameters such as contact time, solution pH, temperature, initial concentration, coexisting ions, and ionic strength have been optimized. (C) 2010 Society of Chemical Industry.

Keywords: Adsorption, Adsorption Isotherms, Adsorption Mechanisms, Aqueous Solutions, Aqueous-Medium, Arsenate, Arsenic, Arsenic Ions, Arsenite, As(III) Removal, Background, Chemical, Clays, Coagulation, Concentration, Development, Drinking Water, Drinking-Water, Filtration, Forms, Freundlich, Freundlich Isotherm, Function, Groundwater, Inorganic Arsenic, Ionic Strength, Ions, Isotherm, Isotherms, Kaolinite, Langmuir, Mechanism, Mechanisms, Model, Models, Montmorillonite, Oxide, pH, pH-Dependent, Phosphate, Pollution, Pseudo Second Order, Pseudo-Second-Order, Removal, Solution, Solutions, Species, Spectroscopy, Strength, Surface, Surface Complexation, Techniques, Temperature, Ti-Pillared Montmorillonite, Toxic, Understanding, Water, Work, X-Ray, X-Ray Diffraction, X-Ray Photoelectron Spectroscopy, XPS, XRD

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Full Text: [2010\J Che Tec Bio85, 926.pdf](2010/J%20Che%20Tec%20Bio85,%20926.pdf)

Abstract: BACKGROUND: There are a number of articles related to removal of boron by electrocoagulation using aluminium electrodes, but there are fewer articles describing the use of magnesium as the anode material. The main disadvantage of aluminium electrodes is the residual aluminium present in the treated water due to cathodic dissolution, which can create health problems. In the case of magnesium electrodes, there is no such disadvantage. This paper presents the results of studies on the removal of boron using magnesium and stainless steel as anode and cathode, respectively. RESULTS: Results show that a maximum removal efficiency of 86.32% was achieved at a current density of 0.2 A dm-2 and pH of 7 using magnesium as the anode and stainless steel as the cathode. The adsorption of boron fitted the Langmuir adsorption isotherm, suggesting monolayer coverage of adsorbed molecules. The adsorption process follows second-order kinetics. Temperature studies showed that adsorption was endothermic and spontaneous in nature. CONCLUSIONS: The magnesium hydroxide generated in the cell remove the boron present in the water and reduced to a permissible level and making it drinkable. The process scale up results was consistent with the results obtained from the laboratory scale, showing the robustness of the process. (C) 2010 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Adsorption-Kinetics, Aluminium, Aqueous-Solution, Background, Boron, Boron Removal, Coverage, Dissolution, Drinking Water, Efficiency, Electrocoagulation, Endothermic, Equilibrium, Health, Hydroxides, Industrial Solid-Waste, Ion-Exchange-Resin, Isotherm, Isotherms, Kinetics, Langmuir, Langmuir Adsorption Isotherm, Magnesium, Monolayer, pH, Potable Water, Removal, Removal Efficiency, Reverse-Osmosis, Robustness, Scale, Seawater, Second Order, Second Order Kinetics, Second-Order, Second-Order Kinetics, Technology, Temperature, Water

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Full Text: [2010\J Che Tec Bio85, 1084.pdf](2010/J%20Che%20Tec%20Bio85,%201084.pdf)

Abstract: BACKGROUND: Fibric peat was modified by hexadecyltrimethylammonium bromide (HTAB) to improve its performance in sorption of polycyclic aromatic hydrocarbons (PAHs). The raw fibric peat (P-R) and surfactant modified peat (P-HTAB) were characterized by capillary rise test to determine the effect of HTAB on surface hydrophobicity. Effect of contact time was also investigated. Batch sorption data were fitted to the Freundlich model and pseudo-second-order model for isotherm and kinetics study. RESULTS: P-HTAB had a more hydrophobic surface than P-R. After modification, the sorption coefficients (K-OC) of naphthalene, phenanthrene and pyrene on fibric peat increased from 1590, 29661 and 204171 mL g-1 to 2006, 52410 and 358569 mL g-1, respectively; the sorption rate constants of naphthalene, phenanthrene and pyrene increased from 0.00057, 0.00036 and 0.00051 g mu g-1 min-1 to 0.00062, 0.00140 and 0.00155 g mu g-1 min-1, respectively. The sorption coefficients of PAHs were positively correlated with the octane-water partition coefficients of PAHs. CONCLUSIONS: The hydrophobicity of fibric peat was enhanced through modification by HTAB, which resulted in the improved sorption rate and sorption capacity for PAHs. The sorption performance of P-HTAB reveals that it is an effective biosorbent for PAHs and has potential for treatment of wastewater containing hydrophobic organic contaminants. (C) 2010 Society of Chemical Industry.

Keywords: Activated Carbon, Adsorption, Aqueous Solution, Background, Biosorbent, Bromide, Capacity, Capillary, Contaminants, Data, Freundlich, Freundlich Model, Hexadecyltrimethylammonium, Hexadecyltrimethylammonium Bromide, Hydrophobic, Isotherm, Kinetics, Model, Modification, Modified, Modified Peat, Naphthalene, Organic, PAHs, Peat, Performance, Polycyclic Aromatic Hydrocarbons, Potential, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Rate Constants, Removal, Solution, Sorption, Sorption Capacity, Surface, Surfactant, Treatment, Waste-Water, Wastewater

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Full Text: [2010\J Che Tec Bio85, 1199.pdf](2010/J%20Che%20Tec%20Bio85,%201199.pdf)

Abstract: BACKGROUND: The removal of Reactive Red 120 (RR 120) from aqueous solutions using cetylpyridinium modified Resadiye bentonite (CP-bentonite) prepared by ion exchange was investigated with particular reference to the effects of temperature, pH and ionic strength on adsorption. RESULTS: Fourier transform infrared (FTIR) and thermal analysis (TG-DTG/DTA) techniques revealed that the anionic dye (RR 120) molecules replaced partly cationic surfactant species on interacting with CP-bentonite. The positive surface charge originating from the cationic surfactant species located on the external surface of the modified bentonite sample increased at low pH values. The significant amount of dye removal by CP-bentonite at high pH values proved the importance of pi and van der Waals interactions other than the electrostatic attraction in the duration of the adsorption process. The adsorption isotherms and the kinetic data were well described by the Langmuir and pseudo-second-order kinetic model, respectively. The Gibbs energy (ΔG), enthalpy (ΔH) and entropy (ΔS) changes in the temperature range 25-65ºC pointed out that the RR 120 uptake increased in parallel with the temperature. CONCLUSION: This study showed that the structural arrangement of cetylpyridinium ions in the CP-bentonite sample as well as the pH, temperature and ionic strength of the bulk solution influenced the adsorption of RR 120 dye from aqueous solutions by CP-bentonite. (C) 2010 Society of Chemical Industry.

Keywords: Acid Dye, Activated Clay, Adsorption, Adsorption Capacity, Adsorption Isotherms, Analysis, Anionic Contaminants, Aqueous Solutions, Azo Dyes, Background, Bentonite, Cationic Surfactant, Changes, Charge, Color Removal, Data, Duration, Dye, Dye Removal, Energy, Enthalpy, Entropy, FTIR, Ion Exchange, Ion-Exchange, Ionic Strength, Ions, Isotherms, Kinetic, Kinetic Model, Langmuir, Methylene-Blue, Model, Modified, Modified Clay-Minerals, Organic-Compounds, Organo-Bentonite, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Reactive Red 120, Reference, Removal, Solution, Solutions, Sorption, Species, Strength, Surface, Surface Charge, Surfactant, Surfactant-Modified Montmorillonite, Techniques, Temperature, Tg-Dtg, DTA, Thermal Analysis, Uptake

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Full Text: [2010\J Che Tec Bio85, 1310.pdf](2010/J%20Che%20Tec%20Bio85,%201310.pdf)

Abstract: BACKGROUND: This research provides new insights into the biosorption of zinc on a waste product from the orange juice industry. Optimal operating conditions maximizing percentage zinc removal were determined in batch and fixed-bed systems. Biomass was characterized by FTIR spectroscopy and by major cation content in order to better understand the biosorpion mechanism. Zn-loaded orange waste was proposed to be used as an alternative fuel in cement kilns. RESULTS: Sorption capacity was strongly affected by biosorbent dose and solution pH, and was not strongly sensitive to particle size under the experimental conditions studied. Equilibrium data were successfully described by a Langmuir model and sorption kinetic data were adequately modelled with the pseudo-second-order and Elovich rate equation. The biomass was found to possess high sorption capacity (*q*max = 0.664 mmol g-1) and biosorption equilibrium was established in less than 3 h. Experimental breakthrough curves were adequately fitted to the Thomas model and the dose-response model, obtaining sorption capacities in continuous assays higher than those found in batch mode. Characterization of the biomass suggested the possible contribution of carboxyl and hydroxyl groups of biomass in Zn2+ biosorption and it also highlighted the important role of light metal ions in a possible ion-exchange mechanism. CONCLUSIONS: Orange waste could be used as an effective and low-cost alternative biosorbent material for zinc removal from aqueous solution. (C) 2010 Society of Chemical Industry.

Keywords: Adsorption, Alternative, Aqueous Solution, Aqueous-Solution, Background, Batch, Batch Mode, Biomass, Biosorbent, Biosorption, Bone Char, Breakthrough, Breakthrough Curves, Cadmium Ions, Capacity, Cation, Cement, Characterization, Data, Elovich, Equilibrium, Experimental, Fixed Bed, Fixed-Bed, FTIR, FTIR Spectroscopy, Ion Exchange, Ion-Exchange, Ionexchange, Ions, Kinetic, Langmuir, Langmuir Model, Low Cost, Mechanism, Metal, Metal Ions, Metal-Ions, Methylene-Blue, Mode, Model, Operating Conditions, Orange Waste, Packed Bed, Particle Size, Peel, pH, Pseudo Second Order, Pseudo-Second-Order, Removal, Research, Rice Husk, Role, Size, Solution, Sorption, Sorption Capacity, Spectroscopy, Systems, Thomas Model, Waste, Zinc, Zn(II), Zn2+

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Full Text: [2010\J Che Tec Bio85, 1561.pdf](2010/J%20Che%20Tec%20Bio85,%201561.pdf)

Abstract: BACKGROUND: The sorption of arsenate, a poison of acute toxicity found in natural waters, onto chitosan, a biosorbent derived from waste seafood shells has been studied. A batch adsorber design model was developed to determine how much chitosan adsorbent is required to reduce the arsenate concentration in solutions to the WHO standard of 10 μg L-1. RESULTS: A series of batch kinetic experiments has been carried out at different initial pH values. The initial arsenate sorption appears to be completed after 30 min, however, a steady reversible reaction takes place resulting in the desorption of arsenate over 48 h. These phenomena in the batch kinetic data have been correlated simultaneously using the newly developed pseudo-first order reversible model. Two batch reactor design models have been developed and compared. The first model is a conventional approach based on the equilibrium isotherm capacity equation. A second batch adsorption reactor design is based on the principle of contacting time required, t(max), for the chitosan to achieve its maximum adsorption capacity, q(max). The practical outcome from the second batch adsorber model results in a saving in adsorbent mass per batch of approximately 39.4%, 96.2% and 92.3% chitosan adsorbent at pH conditions of 3.5, 4.0 and 5.0, respectively. CONCLUSION: The adsorbent cost and handling costs are reduced in the second batch adsorber model. There is also a significant savings in the batch turnaround time required in the batch adsorber design when the design is based on the maximum adsorption capacity rather than the equilibrium adsorption capacity. (C) 2010 Society of Chemical Industry.

Keywords: Acid Dyes, Activated Carbon, Acute Toxicity, Adsorbent, Adsorption, Adsorption Capacity, Aqueous-Solutions, Arsenate, As(V), Batch, Batch Kinetics, Biosorbent, Capacity, Chitosan, Contamination, Cost, Data, Desorption, Equilibrium, Equilibrium, Industry, Isotherm, Kinetic, Model, Models, pH, Reactor, Reactor Design, Removal, Sorption, Toxicity, Water

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Full Text: [2010\J Che Tec Bio85, 1616.pdf](2010/J%20Che%20Tec%20Bio85,%201616.pdf)

Abstract: BACKGROUND: At concentrations higher than 1 mg L-1, 4-chlorophenol (4-CP) is very toxic to living organisms, and if ingested beyond the permitted concentration it causes health disorders such as cancer and mutation. This laboratory study investigates treatment of contaminated water laden with 4-CP using coconut shell charcoal (CSC) waste. Batch studies were conducted to study the effects of dose, pH, and equilibrium time on 4-CP removal. To improve 4-CP removal, surface modification of the adsorbent with TiO2, HNO3, and/or NaOH was undertaken. RESULTS: At an initial 4-CP concentration of 25 mg L-1 under optimized conditions (dose 13.5 g L-1, pH 2.0; agitation speed 150 rpm and 50 min equilibrium time), the NaOH-treated CSC demonstrated a greater removal of 4-CP (71%) than those oxidized with HNO3 (40%) and/or coated with TiO2 (52%). The adsorption capacity of the NaOH-treated CSC (54.65 mg g(-1)) was higher than those treated with HNO3 (23.13 mg g(-1)) or coated with TiO2 (48.42 mg g(-1)). CONCLUSION: Although treatment results using the NaOH-treated CSC alone were promising, the treated effluents were still unable to meet the required limit of less than 1 mg L-1. Therefore, subsequent treatments are still required to complement the removal of 4-CP from the wastewater. (C) 2010 Society of Chemical Industry.

Keywords: 4-Chlorophenol, Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Adsorptive Removal, Agitation, Aqueous-Solution, Background, Batch, Cancer, Capacity, Chemical, Coated, Coconut Shell, Concentration, Effects, Effluents, Environmental Protection, Equilibrium, Ethylenediaminetetraacetic Acid, Health, Hydrogen-Peroxide, L1, Landfill Leachate, Light-Emitting-Diodes, Living, Living Organisms, Low-Cost Adsorbent, Modification, Mutation, Naoh, Natural-Waters, pH, Recalcitrant Compounds, Recalcitrant Compounds, Removal, Salicylic-Acid, Surface, Surface Modification, TiO2, Toxic, Treatment, Waste, Wastewater, Wastewater Treatment, Water

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Full Text: [2011\J Che Tec Bio86, 562.pdf](2011/J%20Che%20Tec%20Bio86,%20562.pdf)

Abstract: BACKGROUND: In this work, the solid-liquid extraction of terbium from phosphoric acid solutions using solvent-impregnated resin containing TOPS 99, an equivalent of di-2-ethylhexyl phosphoric acid, has been investigated. The parameters studied include equilibration time, acid concentration, amount of resin, metal concentration, kinetics, temperature, loading, elution, regeneration and recycling. RESULTS: FT-IR results confirm the physical interaction of the extractant with the resin. The extraction of terbium with TOPS 99 impregnated Amberlite XAD 4 resin was acid dependent and transfer of metal follows a cation exchange mechanism. The loading capacity of TOPS 99-impregnated resin for terbium was calculated to be 23.8 mg g(-1) resin. Controlling mechanism of the adsorption was found to be a chemical reaction following pseudo-second-order kinetics. The endothermic nature of extraction was confirmed by temperature studies. Among the various eluants studied, H2SO4 was the best. Regeneration and recycling of the resin indicated the resin can be used for continuous cycles. CONCLUSIONS: Terbium was successfully extracted from phosphoric acid using TOPS 99 extractant impregnated into Amberlite XAD4 with amaximum loading of 23.8 mg g-1 resin and fully recovered with 1 mol L-1 sulfuric acid. The resin was subjected to seven cycles of extraction and elution without any loss of performance. Further studies showed that terbium could be separated from lutetium. (C) 2010 Society of Chemical Industry.

Keywords: Adsorption, Cyanex 923, FT-IR, FTIR, Kinetics, Lanthanides, Nitrate Medium, Organophosphorus Extractants, Phosphoric Acid, Rare-Earth Elements, Regeneration, Removal, Resin, Separation, Separation Factors, Solid-Liquid Extraction, Sorption, Terbium, Tops 99 Impregnated Resin, Tulsion Ch-96, Yttrium

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Full Text: [2011\J Che Tec Bio86, 699.pdf](2011/J%20Che%20Tec%20Bio86,%20699.pdf)

Abstract: BACKGROUND: A core-shell type carboxylic acid modified resin was prepared and dye sorption characteristics of the resin were investigated. The resulting grafted resin material has been shown to be an efficient sorbent for removal of basic dyes from water as a result of the carboxylic acid group’s affinity towards basic dye molecules. RESULTS: The resin was characterized using Fourier transform infrared spectroscopy (FT-IR) and titrimetric methods. The basic dyes (methylene blue and crystal violet) were removed by contacting the swollen resin with aqueous dye solutions at room temperature. The adsorption capacities of resin were determined by colorimetric analysis of the residual dye content in the adsorption medium, which gave capacities for methylene blue and crystal violet of 300 and 250 mg g-1 resin, respectively. The prepared resin is also able to remove basic dyes completely from dilute aqueous dye solutions. Batch kinetic sorption experiments determined that a pseudo-second-order rate kinetic model was applicable. CONCLUSION: Flexibility of the polymer side chains is expected to provide pseudo-homogeneous reaction conditions and easy accessibility of the functional groups involved. The adsorbents are expected to have the advantage of mobility of the grafted chains in the removal of basic dyes from aqueous mixtures. The resin has potential as an adsorbent for removal of basic dyes for use over a wide pH range. (C) 2011 Society of Chemical Industry.

Keywords: Acid Functional Resin, Adsorption, Aqueous-Solutions, Batch, Color Removal, Craft Polymerization, Crystal Violet, Dye, Dye Removal, Dyes, FT-IR, FTIR, Kinetic, Kinetic Model, Methylene Blue, Methylene-Blue, pH, Poly(Vinylbenzyl Chloride), Polymeric Sorbent, Polystyrene Resin, Reactive Dyes, Resin, Sorption, Textile Wastewaters, Transfer Radical Polymerization, Waste-Water

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Full Text: [2011\J Che Tec Bio86, 1074.pdf](2011/J%20Che%20Tec%20Bio86,%201074.pdf)

Abstract: BACKGROUND: Disposal of large amounts of recurring industrial waste lignin is a big problem for the paper industries and there is need for a rational alternative to utilize this waste lignin. Thus highly porous activated carbons (ACs) were prepared from lignin using H3PO4 as an activating chemical with and without microwave treatment in a self-generated environment at 600 degrees C and the influence of different types of impregnation on the adsorption-desorption capacities of endosulfan from a liquid phase was studied. RESULT: The maximum adsorption capacities (X(m)) for ACs prepared by a microwave treatment and using a simple impregnation method were 6.2422 mg g-1 and 3.9557 mg g-1, respectively. Equilibrium adsorption time determined from kinetic experiments was 5 h and the experimental kinetic data were described by a pseudo-second-order rate model. Surface characteristics and desorption patterns showed considerable difference between the two ACs with the microwave treated AC showing less hysteresis, greater X(m) and established overall superiority over the other. CONCLUSION: Use of microwave treatment produced more oxygen surface functional groups. Results indicate that surface chemistry of the microwave treated sample is more important than the textural properties for the higher adsorption of endosulfan. The microwave treated sample also resulted in less hysteresis and fewer carbonyl surface groups. Desorption patterns cannot be predicted from adsorption alone. (C) 2011 Society of Chemical Industry.

Keywords: Acid, Activated Carbon, Adsorption, Chemical Activation, Desorption, Desorption, Endosulfan Adsorption, Equilibrium, Hysteresis, Industrial Waste Lignin, Kinetic, Microwave, Regeneration, Removal, Soil, Sorption, Waste, Wood Charcoal

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Full Text: [2011\J Che Tec Bio86, 1099.pdf](2011/J%20Che%20Tec%20Bio86,%201099.pdf)

Abstract: BACKGROUND: The retention behaviour of Pb(II) by hematite was studied as a function of various environmental parameters such as contact time, pH, ionic strength, foreign ions, humic substances and temperature under ambient conditions. RESULTS: Pb(II) sorption on hematite was rapid and the sorption could be described by a pseudo-second-order model very well. The sorption of Pb(II) on hematite was strongly dependent on pH and ionic strength. The presence of humic substances enhanced the sorption of Pb(II) on hematite at low pH, but reduced Pb(II) sorption at high pH. The Langmuir model fitted the sorption isotherms of Pb(II) better than the Freundlich model at three different temperatures, 293.15, 313.15 and 333.15 K. The thermodynamic parameters (ΔH degrees, ΔS degrees and ΔG degrees) calculated from the temperature dependent sorption isotherms indicated that the sorption process of Pb(II) on hematite was endothermic and spontaneous. CONCLUSIONS: The results indicate that hematite is a promising candidate for the treatment of heavy metal ions from large volume solution. (C) 2011 Society of Chemical Industry.

Keywords: Adsorption, Aqueous-Solution, Carbon Nanotubes, Ferric Hydroxide, Foreign Ions, Freundlich, Fulvic-Acid, Hematite, Humic Substances, Humic-Acid, Ionic Strength, Ionic-Strength, Isotherms, Langmuir, Metal-Ions, Pb(II), pH, Sorption, Sorption Isotherms, Sorption Kinetics, Temperature, Thermodynamic, Thermodynamic Parameters

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Full Text: [2011\J Che Tec Bio86, 1184.pdf](2011/J%20Che%20Tec%20Bio86,%201184.pdf)

Abstract: BACKGROUND: In Ghana, the discharge of untreated gold mine wastewater contaminates the aquatic systems with heavy metals such as copper (Cu), threatening ecosystem and human health. The undesirable effects of these pollutants can be avoided by treatment of the mining wastewater prior to discharge. In this work, the sorption properties of agricultural materials, namely coconut shell, coconut husk, sawdust and Moringa oleifera seeds for Cu(II) were investigated. RESULTS: The Freundlich isotherm model described the Cu(II) removal by coconut husk (R2 = 0.999) and sawdust (R2 = 0.993) very well and the Cu(II) removal by Moringa oleifera seeds (R2 = 0.960) well. The model only reasonably described the Cu(II) removal by coconut shell (R2 = 0.932). A maximum Cu(II) uptake of 53.9 mg g-1 was achieved using the coconut shell. The sorption of Cu(II) onto coconut shell followed pseudo-second-order kinetics (R2 = 0.997). FTIR spectroscopy indicated the presence of functional groups in the biosorbents, some of which were involved in the sorption process. SEM-EDX analysis confirmed an exchange of Mg(II) and K(I) for Cu(II) on Moringa oleifera seeds and K(I) for Cu(II) on coconut shell. CONCLUSION: This study shows that coconut shell can be an important low-cost biosorbent for Cu(II) removal. The results indicate that ion exchange, precipitation and electrostatic forces were involved in the Cu(II) removal by the biosorbents investigated. (C) 2011 Society of Chemical Industry.

Keywords: Adsorption, Aqueous-Solutions, Biosorbent, Biosorbents, Biosorption, Coconut Shell, Copper, Cu(II), Freundlich, Freundlich Isotherm, FTIR, Heavy Metals, Heavy-Metals, Ion Exchange, Ion-Exchange, Ions, Isotherm, Kinetics, Low-Cost, Removal, Removal, Sawdust, Scanning Electron Microscopy (SEM), Seed Powder, Sorption, Sorption Properties, Uptake, Waste-Water, Waste-Water, Wastewater, Wood Sawdust

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Full Text: [2011\J Che Tec Bio86, 1265.pdf](2011/J%20Che%20Tec%20Bio86,%201265.pdf)

Abstract: BACKGROUND: Water pollution by toxic organic compounds is of great concern and increasingly there are demands for effective sorbents to remove them. Bagasse fly ash, a sugar industry solid waste with disposal problems, was utilized as a source for the synthesis of zeolitic material. The efficiency of virgin and synthesized material was examined for the sorption of 2-chlorophenol. RESULTS: Zeolitic materials have been synthesized by alkaline hydrothermal and fusion methods. Zeolite P and Analcime were the major components of the zeolitic material. These materials were characterized by XRF, PXRD, FTIR and SEM and were found to have improved morphology with new crystalline phases. Batch sorption experiments for the removal of 2-chlorophenol by virgin and zeolitic materials were carried out to evaluate isotherm capacities and kinetics of sorption processes. The Langmuir isotherm better fits the equilibrium data which concur with physical sorption. Kinetic studies showed better correlation coefficients for pseudo-second-order and intraparticle diffusion model, confirming that the sorption rate was controlled by film diffusion followed by pore diffusion. Desorption studies were performed to regenerate the activity of the spent sorbents. The practical utility of sorbents was tested by column study. CONCLUSION: Bagasse fly ash, readily available at very low cost was successfully converted into zeolitic material. The synthesized zeolitic material showed enhanced capacities for the sorption of 2-chlorophenol and can be utilized as a low cost sorbent for treatment of phenolic waste-water. (C) 2011 Society of Chemical Industry.

Keywords: 2-Chlorophenol, Activated Carbon, Adsorptive Removal, Bagasse, Batch, Chlorophenols, Column, Desorption, Diffusion, Equilibrium, Fly Ash, FTIR, Heavy-Metals, Isotherm, Kinetic, Kinetics, Kinetics, Langmuir, Langmuir Isotherm, Low-Cost Adsorbents, Modified Bagasse Fly Ash, Phenolic-Compounds, Pollutants, Pseudo Second Order, Recovery, Removal, SEM, Sorbent, Sorption, Waste, Waste-Water, Wastewater, Zeolite

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Full Text: [2011\J Che Tec Bio86, 1332.pdf](2011/J%20Che%20Tec%20Bio86,%201332.pdf)

Abstract: BACKGROUND: A filamentous fungus Neurospora sitophila was immobilized in Zea mays silk tissue and the prepared system was employed as a new biosorbent for the treatment of reactive dye contaminated solutions. RESULTS: Decolorization potential of the biosorbent system was investigated in batch and continuous mode operations. Design parameters such as pH, biomass dosage, contact time, temperature, dye concentration and flow rate were investigated. Batch mode equilibrium data were analyzed kinetically to determine the rate constants. The process followed the pseudo-second-order kinetic model. The thermodynamics of the biosorption indicated the spontaneous and endothermic nature of the process. Biosorption was well described by the Langmuir isotherm model, with a maximum monolayer biosorption capacity of 105.33 mg g(-1). Relatively good dynamic flow decolorization potential was observed for the biosorbent system in synthetic and real wastewater conditions. Flow mode regeneration studies over ten consecutive cycles indicated that the suggested biosorbent maintained consistently high biosorption yield, above 70%. The possible dye-biosorbent interaction mechanism was also confirmed by zeta potential, FTIR, SEM and EDX analysis. CONCLUSION: High biosorption capacity and regeneration potential suggest that the new biosorbent system can be used as an alternative and low-cost biomaterial for the treatment of reactive dye contaminated solutions. (C) 2011 Society of Chemical Industry.

Keywords: Adsorption, Aqueous-Solution, Azo-Dye, Batch, Biosorbent, Biosorbent System, Biosorption, Dye, Equilibrium, FTIR, Fungal Biomass, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Mechanism, Methylene-Blue, Neurospora Sitophila, pH, Pseudo Second Order, Reactive Dye, Regeneration, Removal, SEM, Silica-Gel, Temperature, Thermodynamics, Waste Biomass, Wastewater

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Full Text: [2011\J Che Tec Bio86, 1449.pdf](2011/J%20Che%20Tec%20Bio86,%201449.pdf)

Abstract: BACKGROUND: Phosphate is one of the main contaminants responsible for the eutrophication of surface waters, and adsorption is a potential treatment method for this pollutant. A magnetic adsorbent manufactured from magnetite (Fe3O4) can be recovered easily from treated water by magnetic force, without requiring further downstream treatment. In this research, the surface of magnetite modified with aluminum and silica (Al/SiO2/Fe3O4) was used to adsorb phosphate in an aqueous solution in a batch system. RESULTS: The optimum solution pH for phosphate adsorption by Al/SiO2/Fe3O4 was found to be 4.5. The phosphate adsorption behavior of Al/SiO2/Fe3O4 was in good agreement with both the Langmuir and Freundlich adsorption isotherm, and the maximum adsorption capacity (q(m)) and Gibbs free energy of phosphate was 25.64 mg g-1 and-21.47 kJ mol-1, respectively. A pseudo-second-order model could best describe the adsorption kinetics, and the derived activation energy was 3.52 kJ mol-1. The optimum condition to desorb phosphate from Al/SiO2/Fe3O4 is provided by a solution with 0.05mol L-1 NaOH. CONCLUSIONS: Magnetic adsorbent is a potential material for a water treatment method. The results of this study will be helpful in the development of aluminum modified silica magnetic adsorbents that can be used to remove phosphate in aqueous solution. (C) 2011 Society of Chemical Industry.

Keywords: Activation, Adsorbent, Adsorption, Aluminum, Coated Magnetite, Equilibrium, Goethite, Isotherm, Kinetics, Langmuir, Magnetite, Mechanisms, Nanoparticles, Oxide Hydroxide, pH, Phosphate, Removal, Silica, Sorption, Waste-Water

# Title: Journal of Chemical Technology and Biotechnology A-Chemical Technology

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Chanda, M., Odriscoll, K.F. and Rempel, G.L. (1983), Cyanide detoxification by selective ion exchange with protonated poly (4-vinyl pyridine). *Journal of Chemical Technology and Biotechnology A-Chemical Technology*, **33** (2), 97-108.

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# Title: Journal of Chemical Technology and Biotechnology B-Biotechnology

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# Title: Journal of Chemical Thermodynamics

Full Journal Title: [Journal of Chemical Thermodynamics](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6854&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=334b039068a2ca5079d7e7df8d7544bc)

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Abstract: Calorimetric curves corresponding to those observed in adsorption calorimeters, were simulated by means of an analogue computer assuming first order, Elovich, and Bangham kinetics for the adsorption process. The parameters of the calorimeter and the rate of the adsorption process were varied independently so as to show their influence on the shape of the calorimetric curve.

Rauf, N. and Tahir, S.S. (2000), Thermodynamics of Fe(II) and Mn(II) adsorption onto bentonite from aqueous solutions. *Journal of Chemical Thermodynamics*, **32** (5), 651-658.

Full Text: [J\J Che The32, 651.pdf](J/J%20Che%20The32,%20651.pdf)

Abstract: The adsorption behaviour of Fe(II) and Mn(II) onto bentonite was studied as a function of temperature under optimized conditions of shaking time, amount of adsorbent, pH, and concentration of the adsorbate. Thermodynamic parameters such as *ΔHo*and *ΔSo*were calculated from the slope and intercept of the linear plot of ln *KD*against 1/*T*. Analysis of absorption results obtained at *T* = (298, 303, 313, and 323) K showed that the adsorption pattern on bentonite followed the Langmuir and Freundlich isotherm. A flame atomic absorption spectrometer was used for measuring the concentration of the metals.

Keywords: Adsorption, Thermodynamics, Iron, Manganese, Langmuir and Freundlich Isotherms, Enthalpy, Entropy, Gibbs Free Energy

Clegg, S.L. and Simonson, J.M. (2001), A BET model of the thermodynamics of aqueous multicomponent solutions at extreme concentration. *Journal of Chemical Thermodynamics*, **33** (11), 1457-1472.

Full Text: [J\J Che The33, 1457.pdf](J/J%20Che%20The33,%201457.pdf)

Abstract: The statistical mechanical basis of the use of Brunauer-Emmett-Teller isotherms to represent activities and other thermodynamic properties in extremely concentrated solutions was established by Ally and Braunstein (*J. Chem. Thermodynamics*1998, 30, 49–58) for a two-salt, single-solvent, mixture. Based upon the work of these authors, we have derived equations for solute and solvent activities in liquid mixtures containing a single solvent and indefinite number of solutes. New terms have been added to the model equations to express the effects of ternary ion interactions on the salt adsorption parameters. Solution composition is defined on the basis of salts, rather than ions, as components. As examples, the model is used to represent water activities in concentrated (lithium nitrate + potassium nitrate + water) and (lithium ion + sodium ion + chloride ion + nitrate ion + water) mixtures, and salt solubilities in (calcium chloride + calcium nitrate + water) mixtures.

Keywords: Aqueous Electrolytes, Thermodynamics, Activity Coefficients, Adsorption

Tahir, S.S. and Rauf, N. (2003), Thermodynamic studies of Ni(II) adsorption onto bentonite from aqueous solution. *Journal of Chemical Thermodynamics*, **35** (12), 2003-2009.

Full Text: [J\J Che The35, 2003.pdf](J/J%20Che%20The35,%202003.pdf)

Abstract: The adsorption behavior of Ni(II) onto bentonite was studied as a function of temperature under optimized conditions of shaking time, amount of adsorbent, pH, and concentration of the adsorbate. Thermodynamic parameters such as DeltaH(degrees), DeltaS(degrees), and DeltaG(degrees) were calculated from the slope and intercept of the linear plot of 1gK(D) against 1/T. Analysis of adsorption results obtained at T = (298, 303, 313, and 323) K showed that the adsorption pattern on bentonite followed the Langmuir, Freundlich, and D-R isotherms. A flame atomic absorption spectrophotometer was used for measuring the concentration of Ni(II). (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Thermodynamics, Nickel, Langmuir, Freundlich, D-R Isotherms, Enthalpy, Entropy, Gibbs Free Energy, Activated-Charcoal, Selective Adsorption, Removal, Adsorbent, Pb(II), UO22+, Water

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Full Text: [2007\J Che The39, 488.pdf](2007/J%20Che%20The39,%20488.pdf)

Abstract: The Freundlich and Langmuir isotherms were used to describe the biosorption of Cu(II), Pb(II), and Zn(II) onto the saltbush leaves biomass at 297 K and pH 5.0. The correlation coefficients (R) obtained from the Freundlich model were 0.9798, 0.9575, and 0.9963 for Cu, Pb, and Zn, respectively, while for the Langmuir model the R-2 values for the same metals were 0.0001, 0.1380, and 0.0088, respectively. This suggests that saltbush leaves biomass sorbed the three metals following the Freundlich model (R-2 > 0.9575). The K-F values obtained from the Freundlich model (175.5 center dot 10(-2), 10.5 center dot 10(-2). and 6.32 center dot 10(-2) mol center dot g(-1) for Pb, Zn, and Cu, respectively), suggest that the metal binding affinity was in the order Pb > Zn > Cu. The experimental values of the maximal adsorption capacities of saltbush leaves biomass were 0.13 center dot 10(-2), 0.05 center dot 10(-2). and 0.107 center dot 10(-2) mol center dot g(-1) for Pb. Zn, and Cu, respectively. The negative Delta G degrees values for Pb and the positive values for Cu and Zn indicate that the Pb biosorption by saltbush biomass was a spontaneous process. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Saltbush, Metal Ions Biosorption, Ion-Exchange, Isotherm, Thermodynamic, Surfactant-Modified Montmorillonite, Aqueous-Solution, Heavy-Metals, Adsorption, Removal, Sorption, Chromium(VI), Biomass, Algae, Water

? Debnath, S. and Ghosh, U.C. (2008), Kinetics, isotherm and thermodynamics for Cr(III) and Cr(VI) adsorption from aqueous solutions by crystalline hydrous titanium oxide. *Journal of Chemical Thermodynamics*, **40** (1), 67-77.

Full Text: [2008\J Che The40, 67.pdf](2008/J%20Che%20The40,%2067.pdf)

Abstract: The synthetic crystalline hydrous titanium(IV) oxide (CHTO), an anatase variety and thermally stable up to 300°C, has been used for adsorption of Cr(III) and Cr(VI) from the aqueous solutions, the optimum pH-values of which are 5.0 and 1.5, respectively. The kinetic data correspond very well to the pseudo-second order equation. The rates of adsorption are controlled by the film (boundary layer) diffusion, and increase with increasing temperature. The equilibrium data describe very well the Langmuir, Redlich-Peterson, and Toth isotherms. The monolayer adsorption capacities are high, and increased with increasing temperature. The evaluated ΔG° (kJ.mol-1) and ΔH° (kJ.mol-1) indicate the spontaneous and endothermic nature of the reactions. The adsorptions occur with increase in entropy (ΔS° = positive), and the mean free energy (E-DR) values obtained by analysis of equilibrium data with Dubinin-Radushkevick equation indicate the ion-exchange mechanism for Cr(III) and Cr(VI)-adsorptions. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Analysis, Aqueous Solutions, Boundary Layer, Carbon, Chromium, Cr(III), Cr(VI), Diffusion, Dye, Endothermic, Entropy, Equilibrium, Hexavalent Chromium, Ion Exchange, Ion-Exchange, Isotherm, Isotherms, Kinetic, Kinetics, Langmuir, Low-Cost Adsorbents, Mechanism, Monolayer, Oxide, Pseudo-Second Order, Pseudo-Second-Order, Redlich-Peterson, Rights, Sorptive Removal, Temperature, Thermodynamics, Titanium Oxide, Trivalent, Water

? Anirudhan, T.S. and Radhakrishnan, P.G. (2008), Thermodynamics and kinetics of adsorption of Cu(II) from aqueous solutions onto a new cation exchanger derived from tamarind fruit shell. *Journal of Chemical Thermodynamics*, **40** (4), 702-709.

Full Text: [2008\J Che The40, 702.pdf](2008/J%20Che%20The40,%20702.pdf)

Abstract: A novel cation exchanger (TFS-CE) having carboxylate functionality was prepared through graft copolymerization of hydroxyethylmethacrylate onto tamarind fruit shell (TFS) in the presence of N,N’-Methylene bisacrylamide as a cross-linking agent using K2S2O8/Na2S2O3 initiator system, followed by functionalisation. The TFS-CE was used for the removal of Cu(II) from aqueous solutions. At fixed solid/solution ratio the various factors affecting adsorption such as pH, initial concentration, contact time, and temperature were investigated. Kinetic experiments showed that the amount of Cu(II) adsorbed increased with increase in Cu(II) concentration and equilibrium was attained at 1 h. The kinetics of adsorption follows pseudo-second-order model and the rate constant increases with increase in temperature indicating endothermic nature of adsorption. The Arrhenius and Eyring equations were used to obtain the kinetic parameters such as activation energy (E-a) and enthalpy (Delta H-#), entropy (Delta S-#) and free energy (Delta G(#)) of activation for the adsorption process. The value of E-a for adsorption was found to be 10.84 kJ . mol-1 and the adsorption involves diffusion controlled process. The equilibrium data were well fitted to the Langmuir isotherm. The maximum adsorption capacity for Cu(II) was 64 . 10 mg . g-1 at T = 303 K. The thermodynamic parameters such as changes in free energy (Delta G degrees), enthalpy (Delta H degrees), and entropy (Delta S degrees) were derived to predict the nature of adsorption process. The isosteric heat of adsorption increases with increase in surface loading indicating some lateral interactions between the adsorbed metal ions. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activation, Activation Energy, Adsorption, Adsorption Capacity, Adsorption Kinetics, Aqueous Solutions, Biosorption, Capacity, Cation, Changes, Chromium(VI), Component Adsorption, Copolymerization, Copper(II) Ions, Cr(III), Crosslinking, Cu(II), Cu(II) Ions, Diffusion, Endothermic, Entropy, Equilibrium, Experiments, Graft, Graft Copolymerization, Heat of Adsorption, Isosteric Heat of Adsorption, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Metal, Metal Ions, Model, pH, Pseudo-Second-Order, Pseudo-Second-Order Model, Removal, Rights, Sawdust, Single, Sorption, Tamarind Fruit Shell, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Waste-Water

? Lu, X.Q. (2008), Comment on “Thermodynamic and isotherm studies of the biosorption of Cu(II), Pb(II), and Zn(II) by leaves of saltbush (Atriplex canescens)”. *Journal of Chemical Thermodynamics*, **40** (4), 739-740.

Full Text: [2008\J Che The40, 739.pdf](2008/J%20Che%20The40,%20739.pdf)

Abstract: Recently, Sawalha et al. [M.F. Sawalha, J.R. Peralta-Videa, J. Romero-Gonzalez, M. Duarte-Gardea, J.L. Gardea-Torresdey, J. Chem. Thermodyn. 39 (3) (2007) 488-492] presented characterisation of the biosoption of Cu(II), Pb(II), and Zn(II) onto the saltbush leaves (Atriplex caneseens) at 297 K and pH 5.0. However, the model application and some thermodynamic calculations were problematic or erroneous. (C) 2007 Elsevier Ltd. All rights reserved.

Document Type: Article

Language: English

KeyWords Plus: SURFACTANT-MODIFIED MONTMORILLONITE; SORPTION

# Title: Journal of Chemometrics

Full Journal Title: [Journal of Chemometrics](http://www3.interscience.wiley.com/cgi-bin/jhome/4425)

ISO Abbreviated Title:

JCR Abbreviated Title:

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Subject Categories:

: Impact Factor

? Kiralj, R. and Ferreira, M.M.C. (2006), The past, present, and future of chemometrics worldwide: some etymological, linguistic, and bibliometric investigations. *Journal of Chemometrics*, **20** (6-7), 247-272.

Full Text: [2006\J Che20, 247.pdf](2006/J%20Che20,%20247.pdf)

Abstract: Internet surfing for the word chemometrics in national languages and, in the Science Citation Index (SCI), searching for articles containing chemometr\* were performed. The bibliometric, webometric, and country development descriptors from literature were then treated by Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA). In total, 82 written and 127 pronunciation forms of chemometrics were found in 48 languages worldwide. The forms ending in ‘-y’ (chemometry) and ‘-ics’ (chemometrics) can be grouped into at least three groups (I, J, K). Scientific collaboration, country development, geography, history, and language were shown to be important determinants in creation of form(s) of chemometrics in a particular country or language. PCA and HCA show that tradition in chemometrics, level of country development, and its scientific production are important for the existence of chemometric societies and laboratories worldwide. Today, the world tends toward becoming more homogeneous with respect to chemometric activity, and will reach a corresponding normal distribution in about 70 years from now. Copyright (c) 2007 John Wiley & Sons, Ltd.

Keywords: Activity, Bibliometric, Bibliometrics, Chemometric Activity, Chemometric History and Etymology, Chemometrics, Collaboration, Creation, Development, Distribution, Genes, Geography, Groups, History, Homogeneous, International Collaboration, Internet, Investigations, Iran, Language, Languages, Languages, PCA, Principal Component Analysis, Production, SCI, Science Citation Index, Scientific Production, Searching, Webometrics

# Title: Journal of Chemotherapy

Full Journal Title: Journal of Chemotherapy

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Language: English

Publisher: E I F T Srl

Publisher Address: Via XX Settembre 102, 50129 Florence, Italy

Subject Categories:

Oncology:

Pharmacology & Pharmacy: Impact Factor 181 (2000)

? Papapetropoulou, M., Iliopoulou, J., Rodopoulou, G., Detorakis, J. and Paniara, O. (1994), Occurrence and antibiotic-resistance of *Pseudomonas* species isolated from drinking water in southern Greece. *Journal of Chemotherapy*, **6** (2), 111-116.

Abstract: A total of 194 samples of drinking waters consisting of 88 tap waters and 106 non-carbonated bottled waters were processed for isolation of *Pseudomonas* species during a 4-month period according to standard methods. *Pseudomonas aeruginosa* was the predominant isolated *Pseudomonas* species. Twenty-eight (14.4%) P. aeruginosa were isolated from 194 samples. Eight (9%) were isolated from 88 tap water samples and 20 (18.8%) from 106 bottled water samples. Eight (9%) tap waters yielded non-P. aeruginosa strains while bottled waters yielded 22 (20.7%) non-P. aeruginosa strains (P < 0.05). Antibiotic-resistant strains of *Pseudomonas* species have been isolated from the drinking waters. All but *Pseudomonas* stutzeri species had a multiple chloramphenicol-erythromycin resistance phenotype. Streptomycin and tetracycline resistance for P. aeruginosa was invariably accompanied by chloramphenicol, tetracycline, erythromycin and nalidixic acid resistance. The susceptibility of *Pseudomonas* species to newer antimicrobial agents (beta lactams, aminoglycosides, third generation cephalosporins and quinolones) was also evaluated. Ceftazidime and ciprofloxacin seemed to be the most active molecules. There were no resistant P. aeruginosa and P. stutzeri strains to all newer antibiotics tested while *Pseudomonas* maltophilia was the most resistant among the tested species (69.2% resistance for the newer antibiotics).

Keywords: Resistance, *Pseudomonas*, Chloramphenicol, Erythromycin, Streptomycin, Tetracycline

? Fietta, A., Morosini, M. and Cascina, A. (2001), Effects of continuous or pulsed exposure to rifabutin and sparfloxacin on the intracellular growth of Staphylococcus aureus and *Mycobacterium tuberculosis*. *Journal of Chemotherapy*, **13** (2), 167-175.

Abstract: The time-kinetics of the intracellular bioactivity and intracellular post-antibiotic effect (PAE) of rifabutin and sparfloxacin against Staphylococcus aureus and *Mycobacterium tuberculosis*, grown in human monocytes, were evaluated. Intracellular bactericidal activity against staphylococci was shown in the presence of extracellular drug concentrations equal or superior to 1, 10 plasma Cmax, The bactericidal activity of rifabutin was dependent on both its extracellular concentrations and the exposure time. In contrast, the pattern of the intracellular activity of sparfloxacin was characterized by a minimal concentration dependent killing. Both antibiotics (from 1, 10 to the expected lung Cmax) showed intracellular bioactivity against M, tuberculosis H37Ra and H37Rv strains. A long intracellular PAE on staphylococci (>4 hours) was demonstrated when drugs were removed from the infected monocytes after 1 h treatment. Our findings suggest that rifabutin and sparfloxacin may be useful in the treatment of lower respiratory tract infections due to intracellular pathogens

Keywords: 6-Fluoro-8-Methoxy Quinolone, Am-1155, Avium, Clarithromycin, Cultured Epithelial-Cells, Fluoroquinolones, In-Vitro, Intracellular Bioactivity, Intracellular Pae, M.Tuberculosis, *Mycobacterium tuberculosis*, pHarmacokinetics, Resistance, Rifabutin, S.Aureus, Sparfloxacin, Tissue, Tuberculosis

# Title: Journal of Child Psychology and Psychiatry

Full Journal Title: Journal of Child Psychology and Psychiatry

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

: Impact Factor

? Cohan, S.L., Chavira, D.A. and Stein, M.B. (2006), Practitioner review: Psychosocial interventions for children with selective mutism: A critical evaluation of the literature from 1990-2005. *Journal of Child Psychology and Psychiatry*, **47** (11), 1085-1097.

Abstract: Background: There have been several reports of successful psychosocial interventions for children with selective mutism (SM), a disorder in which a child consistently fails to speak in one or more social settings (e.g., school) despite speaking normally in other settings (e.g., home). The present literature review was undertaken in order to provide an up-to-date summary and critique of the SM treatment literature published in the past fifteen years. Methods: PUBMED, PsycINFO, and Web of Science databases were searched to identify SM treatment studies published in peer-reviewed journals between 1990 and 2005. Results: A total of 23 studies were included in the present review. of these, ten used a behavioral/cognitive behavioral approach, one used a behavioral language training approach, one used a family systems approach, five used a psychodynamic approach, and six used multimodal approaches to SM treatment. Conclusion: Although much of this literature is limited by methodological weaknesses, the existing research provides support for the use of behavioral and cognitive-behavioral interventions. Multimodal treatments also appear promising, but the essential components of these interventions have yet to be established. An outline of a cognitive-behavioral treatment package for a typical SM child is provided and the review concludes with suggestions for future research.

Keywords: Anxiety, Anxiety Disorders, Behavior Therapy, Behavioral Treatment, Child, Children, Databases, Disorder, Elective Mutism, Elective Mutism, Elementary-School, Evaluation, Follow-Up, Interaction Therapy, Interventions, Journals, Literature, Literature Review, Methods, Mute Children, Prevalence, Psychosocial, Psychotherapy, Pubmed, Research, Review, Sample, Science, Selective Mutism, Social, Social Anxiety, Therapy, Training, Treatment, Web of Science

# Title: Journal of the Chilean Chemical Society

Full Journal Title: Journal of the Chilean Chemical Society

ISO Abbreviated Title:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

: Impact Factor

? Montes, S.S., Valero, E.G., Morales, L.S., Vilches, A.M. and Schmidt, R. (2003), Adsorption capacity of copper of natural and modified radiata bark pine. *Journal of the Chilean Chemical Society*, **48** (4), 11-16.

Full Text: J Chi Che Soc48, 11.pdf

Abstract: The presence of soluble heavy metals in wastewaters, can be toxic for the living beings depending on theirs concentrations. Several studies have been proposed in the literature about the use of natural and modified barks, in relation with heavy metal adsorption from water. This technique have some comparative advantages in front of neutralization-precipitation traditional technique. This work studies the radiata bark pine behaviour in contact with pure solutions of copper at 20°C. The ionic exchange depends on slurry density, pH value and metal concentration. The maximun adsorption capacity on natural bark takes 90 to 120 minutes (slurry density greater than or equal to 0.15%(m, v)). The range of saturation values is between 20 to 50 mg, g dry bark. Using activated bark, the range of values is between 45 to 60 mg, g dried bark, with slight dependance of the pH value. In acid media, copper adsorption kinetic is compatible with a first order model, and its specific rate constant increases with the pH value. At same experimental conditions performed for both raw and chemically treated bark separately, it was observed that, keeping the same kinetic model, the specific rate constant increases near to three times when the chemically treated bark is used.

Keywords: Adsorption, Bark, Copper, Copper Adsorption, Heavy Metal, Heavy Metals, Heavy-Metal, Heavy-Metal Ions, Kinetic, Metals, Recovery, Removal

? Wankasi, D., Horsfall, M. and Spiff, A.I. (2005), Retention of Pb(II) ion from aqueous solution by Nipah palm (Nypa fruticans Wurmb) petiole biomass. *Journal of the Chilean Chemical Society*, **50** (4), 691-696.

Full Text: J Chi Che Soc50, 691.pdf

Abstract: The retention of Pb(II) from aqueous solution by pure (PB) biomass and thioglycolic acid (TGA) modified biomass (MB) of Nipah palm (Nypa fruticans Wurmb) petiole was studied using batch sorption technique. The equilibrium retention capacity of Pb(II) was determined from the Langmuir equation and found to be 15.06 mg g-1 and 17.60 mg g-1 for pure and modified biomass, indicating a small difference in Pb(II) retention after treatment with TGA. The data showed that chemisorption process could be the rate-limiting step in the retention mechanism. Studies on the retention of Pb(II) by Nipah palm petiole biomass are important because it may contribute in aiding the innovative removal and recovery of metal ions from contaminated industrial effluents.

Keywords: Nipah Palm, Adsorption, Waste Management, Heavy Metals, Bioremediation, Humic Substances, Activated Carbon, Removal, Sorption, Peat, Pith, Moss, Lead

? Yan, J.L. and Quan, G.X. (2009), Equilibrium and kinetic studies of phenol sorption by chitosan coated montmorillonite. *Journal of the Chilean Chemical Society*, **54** (1), 73-76.

Full Text: [2009\J Chi Che Soc54, 73.pdf](2009/J%20Chi%20Che%20Soc54,%2073.pdf)

Abstract: In order to provide physical support for chitosan and increase the accessibility of the binding sites for sorption process applications, chitosan was coated on the Surface of montmorillonite. For the optimization of the sorption of phenol on chitosan coated montmorillonite (CCM), effects of pH, initial concentration and temperature oil the sorption of phenol by CCM were investigated. In order to find the sorption characteristics, the isothermal data were applied to Langmuir and Freundlich linear isotherm equation, and the thermodynamic parameters (ΔH, ΔG and ΔS) were also calculated according to the Values of binding Langmuir constant K-L. The L type sorption isotherm between phenol and CCM suggests a relatively high affinity between the adsorbate and adsorbent, and the mechanism involved in the association of phenol with CCM were proton transfer, hydrogen bonding, London-Van der Waals forces because of lots of the OH and NH2 groups in the chitosan chain. The negative Delta H constant confirmed that the more phenol was adsorbed by CCM at lower temperature and the driving force for sorption process is an enthalpy effect, The kinetics of the sorption process of phenol on CCM were also investigated using the pseudo-first order and pseudo-second order kinetics, results showed that the second order equation model provided the best correlation with the experimental results. It was reached that modification of chitosan with montmorillonite increased the possibility of utilization of chitosan for phenol remove from aqueous solution.

Keywords: Activated Carbon, Adsorption, Aqueous-Solution, Charcoal, Chitosan, Equilibrium, Kinetics, Langmuir, Pentachlorophenol, Phenol, Pseudo Second Order, Sorption, Systems, Water

? Aslam, M.Z., Ramzan, N., Naveed, S. and Feroze, N. (2010), Ni(II) Removal by biosorption using *Ficus religiosa* (Peepal) leaves. *Journal of the Chilean Chemical Society*, **55** (1), 81-84.

Full Text: [2010\J Chi Che Soc55, 81.pdf](2010/J%20Chi%20Che%20Soc55,%2081.pdf)

Abstract: The pollutant binding capacity of acid treated Ficus Religiosa (Peepal) leaves was investigated in a batch system under varying conditions. The results indicate that sorption equilibrium was established in about 60 minutes with equilibrium capacity of 6.35±0.54mg/g. The Ni(II) sorption is highly dependent on pH and maximum removal was observed at pH 7 above which metal started to precipitate. It was also observed that sorption of Ni(II) decreases with increase in temperature. The experimental results were analyzed in terms of Langmuir and Freundlich isotherms. The Freundlich isotherm model fitted well to data with 0.94 regression co-efficient (R-2). Evaluation of experimental data in terms of biosorption kinetics showed that the biosorption of nickel (II) on biomass followed pseudo-second order kinetics. The results showed that biosorbent is an attractive low cost alternative for the treatment of wastewaters containing lower concentrations of Nickel.

Keywords: Alternative, Aqueous-Solution, Batch, Batch System, Binding, Biomass, Biosorbent, Biosorption, Biosorption Kinetics, Capacity, Cost, Cr(VI), Data, Equilibrium, Evaluation, Experimental, Ficus Religiosa, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Ions, Isotherm, Isotherm Model, Isotherm Models, Isotherms, Kinetics, Langmuir, Langmuir And Freundlich Isotherms, Low Cost, Mar, Metal, Metal Removal, Model, Ni(II), Nickel, pH, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second Order, Pseudo-Second Order Kinetics, Pseudo-Second-Order, Regression, Removal, Sorption, Temperature, Treatment, Wastewaters

? Sathasivam, K. and Haris, M.R.H.M. (2010), Banana trunk fibers as an efficient biosorbent for the removal of Cd(II), Cu(II), Fe(II) and Zn(II) from aqueous solutions. *Journal of the Chilean Chemical Society*, **55** (2), 278-282.

Full Text: J Chi Che Soc55, 278.pdf

Abstract: The biosorption of Cd(II), Cu(II), Fe(II) and Zn(II) from aqueous solutions by an agrowaste, namely banana trunk fibers (BTF), was investigated. The effect of pH, contact time, metal ions concentration, adsorbent dose and change in [M2+]/biomass were studied at ambient temperature (25ºC). The equilibrium process was described well by the Freundlich isotherm model with adsorption capacity, K-f of 8.49, 2.68, 6.58 and 1.74 mg/g for Cd(II), Cu(II), Fe(II) and Zn(II), respectively. Kinetic studies showed good correlation coefficients for a pseudo-second-order kinetic model. The BTF were subjected to different chemical modification methods (mercerization, acetylation, formaldehyde treatment, peroxide treatment, stearic acid treatment and sulphuric acid treatment) and the adsorption capacity (q(e)) of each modified BTF for the metal ions was obtained. Our findings hitherto reveal that the q(e) values are practically similar to that of the unmodified BTF confirming that the latter by its nature, that is its chemical composition, is already an efficient biosorbent for the removal of the heavy metal ions.

Keywords: Acid Treatment, Acid-Treatment, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Capacity, Agrowaste, Aqueous Solutions, Arrhizus, Banana Trunk Fibers, Biosorbent, Biosorption, Biosorption, Cadmium, Capacity, Cd(II), Chemical, Chemical Modification, Composition, Concentration, Correlation, Cu(II), Equilibrium, Fibers, Formaldehyde, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Heavy Metal, Heavy Metal Ions, Heavy-Metals, Ions, Isotherm, Isotherm Model, Kinetic, Kinetic Model, Kinetic Studies, Lead Ions, Metal, Metal Ions, Methods, Model, Modification, Modified, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Solutions, Sorbent, Sorption, Sulphuric Acid, Temperature, Treatment, Waste-Water, Zn(II)

? Mousavi, H.Z. and Seyedi, S.R. (2010), Kinetic and equilibrium studies on the removal of Pb(II) from aqueous solution using nettle ash. *Journal of the Chilean Chemical Society*, **55** (3), 307-311.

Full Text: J Chi Che Soc55, 307.pdf

Abstract: In this study the removal of Pb(II) from aqueous solution onto nettle ash (NA) as a low cost adsorbent was reported. Batch mode experiments were conducted at 25ºC to study the effects of initial concentration of lead ions, contact time, pH and adsorbent dose on the removal process. It is observed that the adsorption increased with increasing contact time, and the equilibrium was attained after shaking for 30 min. Batch equilibrium experiments exhibited that a maximum lead uptake was obtained M pH 6.0. The experimental data were analyzed by the Langmuir, Freundlich and Tempkin models and the isotherm data tilted well to the Langmuir isotherm with monolayer adsorption capacity of 1000 mg/g. The cost of removal is expected to be quite low, as the adsorbent is cheap and easily available in large quantities. The present study showed that nettle ash was capable to remove lead ions from industrial wastewater samples.

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Capacity, Aqueous Solution, Capacity, Concentration, Cost, Data, Equilibrium, Experimental, Experiments, Fixed-Bed, Fly-Ash, Freundlich, Heavy-Metals, Industrial Waste-Water, Industrial Wastewater, Ions, Isotherm, Kinetic, Langmuir, Langmuir Isotherm, Lead, Low Cost, Low Cost Adsorbent, Mode, Models, Monolayer, Pb, Pb(II), pH, Pinus-Sylvestris, Removal, Rice Husk, Solution, Tree Leaves, Uptake, Wastewater

? Fonseca, C., Araneda, C., Yazdani-Pedram, M., Borrmann, T., Basualto, C., Sapag, J. and Valenzuela, F. (2010), Microencapsulation of trioctylamine in polymeric matrices for removing Zn(II) and Cu(II) from chloride aqueous solutions. *Journal of the Chilean Chemical Society*, **55** (3), 408-414.

Full Text: J Chi Che Soc55, 408.pdf

Abstract: The microencapsulation of the non-specific basic extractant trioctylamine in polymeric matrices synthesized from styrene and divinylbenzene was studied. The microcapsules were prepared by adding the amine compound during in situ free radical suspension polymerization using benzoyl peroxide as the initiator and using variable proportions of both monomers. SEM analysis shows that the microcapsules have a spherical shape presenting an average surface area of 480 m2g-1 and a pore size around 0.5 to 1.8 nm. Synthesis of the microspheres was affected by the amount of extractant used and by the proportion of both monomers during their preparation. The obtained microcapsules were used for the sorptive removal of Zn(II) and Cu(II) ions from chloride aqueous solutions, reaching extraction extents near 90% under the best conditions, following an anion-exchange mechanism between the metallic-ions and the extractant immobilized onto the microcapsules. Zn(II) and Cu(II) sorption kinetics experiments were performed and efficient uptake of both metals within a few minutes was measured. The experimental results were explained using a pseudo-second-order rate kinetics model, which fit the results of chemisorption of both metals onto the microcapsules well.

Keywords: Acid, Adsorption, Adsorption, Analysis, Aqueous Solutions, Chemisorption, Chloride, Cu(II), Cu(II) Ions, Equilibrium, Experimental, Experiments, Extraction, Free Radical, Immobilized, In Situ, Ions, Kinetics, Kinetics Model, Mechanism, Metal-Ions, Metals, Microcapsules, Microcapsules, Microencapsulation, Microspheres, Model, Molybdenum, Polymeric, Polymerization, Preparation, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Rate Kinetics, Removal, SEM, Separation, Size, Solutions, Solvent-Extraction, Sorption, Sorption Kinetics, Styrene, Supported Liquid-Membrane, Surface, Surface Area, Suspension, Synthesis, Trioctylamine, Uptake, Wastewater Treatment, Zn(II), Zn(II) and Cu(II)

# Title: Journal de Chimie Physique et de Physico-Chimie Biologique

Full Journal Title: [Journal de Chimie Physique et de Physico-Chimie Biologique](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=00217689)

ISO Abbreviated Title: J. Chim. Phys.-Chim. Biol.

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Subject Categories:

Biochemistry & Molecular Biology: Impact Factor 0.379, 287/310 (2000)

Chemistry, Physical: Impact Factor 0.379, 85/91 (2000)

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Notes: highly cited

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Keywords: Adsorption

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Abstract: The aim of this study is the adsorption on activated carbon of two amino-acids: the phenylalanine (pHe) and the tyrosine (Tyr) at different pH chosen around the isoelectric point (pKi = 5,6 and 5,9 respectively). The kinetic adsorption evolution is used to calculate the external mass transfert coefficient and the adsorption rate. Equilibrium parameters such as the maximum adsorption capacity and the equilibrium constant have been determined by different linearized relations: Langmuir, Elovich and Bohart - Adams equations. In this case, the same results are obtained by the Langmuir and Elovich relations for the maximum adsorption capacity: 0,90 and 1,10 mmol.g-1 for the pHe and Tyr respectively and the values are practically not influenced by the pH. On the other hand, the equilibrium constant values increase with it (between 4 and 7,4) for (pHe). This result can be explained by a greater attraction between the negative pH increasing charge of the carbon surface and the ammonium group. The presence of calcium ions does not increase the adsorption capacity.

Keywords: Carbon, Isotherms

? Mrad, I., Ghorbel, A., Lambert, J.F. and Che, M. (1997), Cadmium adsorption on Al-pillared montmorillonite. *Journal de Chimie Physique et de Physico-Chimie Biologique*, **94** (11-12), 1883-1896.

Abstract: Results of acido-basic titration of aluminium pillared montmorillonite shows that surface hydroxilic groups of pillared clay (heavy metals adsorption sites) are different to hydroxilic alumina surface groups, showing the abcence of alumina pillar in the interlamellar space. In this work we propose the cadmium adsorption mechanism by the study of cadmium adsorption isotherms at different pH. Kinetic study show that pillared clay needs 7 days to adsorb a maximum quantity of heavy metal. We also show the utility of using clay as matrix of aluminic pillar in their adequate form to fix heavy metals.

Keywords: Pillared Clay, Acido-Basic Titration, Cadmium, Adsorption, Environment, Soils, Sites, Zinc, pH, Heterogeneity, Kinetics, Sorption, Oxides, Zn

? Houas, A., Bakir, I., Ksibi, M. and Elaloui, E. (1999), Removal of a Methylene Blue from aqueous solution over the commercial activated charcoal CECA40. *Journal de Chimie Physique et de Physico-Chimie Biologique*, **96** (3), 479-486.

Abstract: The removal of Methylene Blue (BM) through adsorption over the commercial actived charcoal (CECA 40) was studied in a static batch reactor. At constant pH and temperature the adsorption equilibrium time is equal to 5 hours regardless of the initial concentration of metylene blue (BM). The adsorption in this case follows a Langmuir isotherm of the first type with an ultimate adsorption capacity of about 367,6 mg of Methylene Blue for each gram of CECA 40. Moreover, we observed no significant influence of temperature on the adsorption equilibrium. The adsorption and the Intraparticular diffusion kinectics were studied. Adsorption is clearly higher in an alcaline environment than in the acid one. This adsorption is further improved by the use of finer granulometry.

Keywords: Waste, Water, Dye, Adsorption, Actived Charcoal, Methylene Blue, Isotherms, Kinetics

# Title: Journal of China-Japan Friendship Hospital

Full Journal Title: [Journal of China-Japan Friendship Hospital](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=ZRYH&NaviLink=%e4%b8%ad%e6%97%a5%e5%8f%8b%e5%a5%bd%e5%8c%bb%e9%99%a2%e5%ad%a6%e6%8a%a5)

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ISSN: 1001-0025

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lin, M., Sun, R.H. and Wang, R.T. (2004), A preliminary study of evaluating method on the performance of medical papers in the general hospital. *Journal of China-Japan Friendship Hospital*, **18** (3), 174-178.

Full Text: [2004\J Chi-Jap Fri Hos18, 174.pdf](2004/J%20Chi-Jap%20Fri%20Hos18,%20174.pdf)

Abstract: To explore the comprehensive performance evaluation method of medical papers by using biblio-metric parameters in the general hospital and test it by practical application. Methods: The papers performance were e-valuated from both papers published and papers cited. The weight coefficients of papers published and papers cited were determined by consulting experts. As a result, it was applied to the evaluation of publication and citation of papers of the core departments in China- Japan Friendship Hospital fr...

Keywords: Bibliometric Parameters, Performance Evaluation, Medical Papers

# Title: Journal of China University of Geosciences (Social Sciences Edition)

Full Journal Title: [Journal of China University of Geosciences (Social Sciences Edition)](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=DDXS&NaviLink=%e4%b8%ad%e5%9b%bd%e5%9c%b0%e8%b4%a8%e5%a4%a7%e5%ad%a6%e5%ad%a6%e6%8a%a5(%e7%a4%be%e4%bc%9a%e7%a7%91%e5%ad%a6%e7%89%88))

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Subject Categories:

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? Liu, X., He, W. and Qiu, J.P. (2005), Competitive ability of research on social & humanity science of universities from the achievement aspect. *Journal of China University of Geosciences (Social Sciences Edition)*, **5** (3), 52-58.

Full Text: [2005\J Chi Uni Geo5, 52.pdf](2005/J%20Chi%20Uni%20Geo5,%2052.pdf)

Abstract: The paper makes a bibliometric analysis on the prizes of research product of three sessions on social & humanity science awarded by the Ministry of Education, including prize dist ribution in universities or colleges, prize dist ribution in subjects, research focus of subjects, superior subjects of universities or colleges, and the research output rate of univer sities or colleges. All this can reflect the competitive ability of research on social & humanity science of universities or colleges from the achievement aspect.

Keywords: Awarded Research Product, Universities, Social & Humanity Science, Competitive Ability of Research, Bibliometric Analysis

# Title: Journal of the Chinese Chemical Society

(J. Chin. Chem. Soc. (Taipei); Chung-Kuo Hua Hsueh Hui Hui Chih)

Full Journal Title: [Journal of the Chinese Chemical Society](http://www.ceps.com.tw/ec/ecJnlIntro.aspx?Jnliid=3598)

ISO Abbreviated Title: J. Chin. Chem. Soc.

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Journal Country/Territory: Taiwan

Language: English

Publisher: Chinese Chem Soc

Publisher Address: PO Box 609, Taipei 10099, Taiwan

Subject Categories:

Multidisciplinary Chemistry: Impact Factor 0.577, 88/124 (2006)

? Luo, C.S. and Huang, S.D. (1992), Solution characteristics for adsorption of copper ion with iron(III) hydroxide from aqueous ammonia solution. *Journal of the Chinese Chemical Society*, **39** (3), 223-230.

Full Text: [1992\J Chi Che Soc39, 223.pdf](1992/J%20Chi%20Che%20Soc39,%20223.pdf)

Abstract: The distribution of copper ion species in aqueous ammonia solution is evaluated as a function of pH by a numerical approach. Adsorption of copper on colloidal iron(III) hydroxide in solutions of total ammonia (0.14-1.2M) are performed at various values of pH. The maximum efficiency of adsorption occurs when the sum of the fractions of the species Cu(NH/sub 3/)/sup 2+/, Cu(NH/sub 3/)/sub 2//sup 2+/ and Cu(NH/sub 3/)/sub 3//sup 2+/ in the solution reaches its maximum. With varied solution pH, the distribution of copper species is the determining factor for maximum adsorption, whereas the surface properties of the adsorbing particles show smaller effects under the test conditions.

Keyword: Adsorption, Amminecopper(II), Iron(III), Hydroxide, Colloid

Chen, S.H. (1997), An investigation on the effect of arsenic poisoning on humans, agriculture and fisheries. *Journal of the Chinese Chemical Society*, **44** (2), 115-121.

Full Text: [J\J Chi Che Soc44, 115.pdf](J/J%20Chi%20Che%20Soc44,%20115.pdf)

Abstract: The purpose of this investigation is to try and understand the degree of arsenic poisoning in the waste water from agricultural chemical factories which release effluents into the waterways in their vicinity. The method of determination is to use the water samples, soil, fish, clams, shell-fish, etc. found in the areas along the canals and aqueducts and those which lie upstream, midstream and downstream and also the hair samples of people living in the contiguous areas, to check for the levels of arsenic in them by emission spectroscopy. From the analysis during a one year investigation, we find that the level of As in the water creatures of Chungkang Stream and Lu-Er-Men Stream is much higher than in the other water areas of Taiwan such as along beaches and the other rivers; the levels in the hair of the people who live nearby these water courses have a certain degree of correspondence with their eating habits and the quantity of food eaten; however, even those people who eat relatively little have almost 3% As, beyond the 2 mg/kg limit allowed for human beings. We are fully aware of the high level of food contamination on Taiwan and this fact has been taken into consideration. The effect of As contamination in the soil on agricultural produce does not seem to have any apparent relationship. By the way, the influence of the monthly average rainfall on As contamination in the soil is not obvious.

Wan Ngah, W.S., Ab Ghani, S. and Hoon, L.L. (2002), Comparative adsorption of lead(II) on flake and bead-types of chitosan. *Journal of the Chinese Chemical Society*, **49** (4), 625-628.

Full Text: [J\J Chi Che Soc49, 625.pdf](J/J%20Chi%20Che%20Soc49,%20625.pdf)

Abstract: The adsorption of Pb(II) ions from aqueous solutions by chitosan flakes and beads was studied. The chitosan beads were prepared by casting an acidic chitosan solution into alkaline solution. Experiments were carried out as a function of pH, agitation period and initial concentration of Pb2+ ions. The uptake of Pb2+ ions from aqueous solution was determined from changes in concentration as measured by atomic absorption spectroscopy. The maximum uptake of Pb2+ ions on chitosan beads was greater than that on chitosan flakes. Adsorption isothermal data could be interpreted by the Langmuir equation. The experimental data of the adsorption equilibrium from Pb2+ ion solutions correlated well with the Langmuir isotherm equation. SEM analyses were also conducted for visual examination of the chitosan flakes and beads. Physical properties including surface area and average pore diameter were characterized by N2 adsorption experiment.

Keyword: Chitosan Flakes, Chitosan Beads, Surface Morphology, Surface Area, Average Pore Diameter, Adsorption Isotherm, Adsorption Capacity

Wang, W.K., Zhou, W.Z. and Huang, W.L. (2002), Separation of dyes from aqueous solutions by paper adsorption. *Journal of the Chinese Chemical Society*, **49** (6), 999-1002.

Full Text: [J\J Chi Che Soc49, 999.pdf](J/J%20Chi%20Che%20Soc49,%20999.pdf)

Abstract: Separation of the dyes methyl violet, Methylene blue, and congo red from aqueous solutions by paper capillary permeation adsorption method was studied using paper. Nearly100% of the investigated dyes could be separated under the optimum conditions. The effect of pH on the separation efficiency was studied in particular. At pH 5-9, 1.3-11,and 7-11, the maximum separation was achieved for methyl violet, Methylene blue and congo red, respectively. The effects of dye concentration and some foreign ions on the separatability were examined. Moreover, the selective separation of some dyes was attempted by elution with chemical reagents.

Keyword: Dyes, Paper Capillary Permeation Adsorption, Separatability

Farajzadeh, M.A. and Vardast, M.R. (2003), Rice bran as an excellent sorbent for heavy metals from aqueous media, 1. Optimization of conditions. *Journal of the Chinese Chemical Society*, **50** (2), 245-250.

Full Text: [J\J Chi Che Soc50, 245.pdf](J/J%20Chi%20Che%20Soc50,%20245.pdf)

Abstract: In this two-part report, the efficiency of rice bran in removal of heavy metals such as cadmium, lead, zinc, nickel, copper and iron(III) from aqueous solution is investigated. The different experimental conditions such as pH, temperature, volume of solution, bran amount, particle size, exchange time, stirring speed, etc. are studied, and the optimum conditions are selected in part I of this series of reports. The efficiency of bran in removal of heavy metals is presented with and without treatments. For treatment, heat or acid, alkali and salt solutions were used. The results obtained show that after treating with saturated sodium chloride solution, its efficiency for Ni2+ and Zn2+ improves. At pH 5, all studied cations have recoveries more than 93% (lead and cadmium 100%). The exchange speed is very high and has preference over the classical ion exchangers.

Keywords: Heavy Metals, Rice Bran, Atomic Absorption Spectrophotometry, Ions

? Farajzadeh, M.A. and Vardast, M.R. (2003), Rice bran as an excellent sorbent for heavy metals from aqueous media, 2. Determination of related parameters. *Journal of the Chinese Chemical Society*, **50** (2), 251-256.

Full Text: [2003\J Chi Che Soc50, 251.pdf](2003/J%20Chi%20Che%20Soc50,%20251.pdf)

Abstract: In part 2 of this report related parameters of the rice bran (as a sorbent of heavy metals) such as exchange capacity, distribution coefficients and isotherms, etc. were studied. The obtained results show that selectivity of the bran towards heavy metals such as Cu(II), Cd(II), Fe(III), Ni(II), Zn(II) and Pb(II) is very high. Also, distribution coefficients between aqueous solution and bran are more than 10(4) so that all cations are completely adsorbed by the bran in relatively low concentrations. The principal advantages of this sorbent are as follows: high efficiency, very high exchanging speed, cheapness (in comparison with conventional resins), performance in batch and continuous conditions and producing no environmental pollution. The only disadvantage of the bran is low exchanging capacity for some elements (but for lead it is comparable to classical resins); however, it is able to eliminate heavy metals in mg/L level and above. On the other hand, due to low cost of bran and high cost of recovery of ion exchangers there is no necessity to recover the bran. Reproducibility of the proposed method in removal of heavy metals is excellent and the relative standard deviations for eight repeated removals for all cations with the exception of iron are less than 1%.

Keywords: Heavy Metals, Rice Bran, Selectivity Coefficient, Exchanging Capacity, Treatment

Wang, W.K. (2003), Separation of herbicides from aqueous solutions by paper adsorption. *Journal of the Chinese Chemical Society*, **50** (3A), 403-406.

Full Text: [J\J Chi Che Soc50, 403.pdf](J/J%20Chi%20Che%20Soc50,%20403.pdf)

Abstract: Separation of the herbicides 2,4-D methyl ester and pentachlorophenol from aqueous solutions by paper capillary permeation adsorption method was studied using paper. Nearly 43% and 99% of the investigated herbicides 2,4-D methyl ester and pentachlorophenol, respectively, could be separated under optimum conditions. The effect of pH on the separation efficiency was studied in particular. At pH1-11 and 1, the maximum separation was achieved for 2,4-D methyl ester and pentachlorophenol, respectively. The effects of herbicide concentration and some salts on the separatability were examined. Desorption techniques by elution with water to remove the herbicides from paper were developed. Moreover, the selective separation of the herbicides from the dispersion dyes Methylene blue and congo red was attempted.

Keyword: Herbicides, Paper Capillary Permeation Adsorption, Separatability

Farajzadeh, M.A. and Monji, A.B. (2004), Treated rice bran for scavenging Cr(III) and Hg(II) from acidic solution. *Journal of the Chinese Chemical Society*, **51** (4), 751-759.

Full Text: [J\J Chi Che Soc51, 751.pdf](J/J%20Chi%20Che%20Soc51,%20751.pdf)

Abstract: The purpose of this study was to examine the efficiency with which rice bran (treated or untreated) removes heavy metals, especially Cr(III) and Hg(II), from acidic solution. Sorption assays were done in shaken flasks in the presence of rice bran. Different experimental conditions such as pH, volume of solution, bran weight, particle size, exchange time and stirring time were improved. The efficiency of bran was studied before and after treatments. For treatment, solutions of acid, alkali and salt were used. The results show that after treating with 4 M sodium chloride solution, its efficiency in removal of Cr(III) and Hg(II) was improved. Kinetic measurements of chromium and mercury removal by bran have revealed that sorption equilibrium was obtained after 10 min of contact. Sorption experiments done with various granulometric fractions of rice bran have shown that this sorbent has the same efficiencies in meshes higher than 20. Further research is necessary in order to determine a mechanism for cations removal by the bran. It is mentioned that the process of making polished rice from brown rice discharges rice bran; therefore, it is very inexpensive, with a cost of 1/50-1/40 of that of synthetic sorbent, and thus its use would significantly lower the cost of wastewater treatment.

Keywords: Rice Bran, Treatment, Chromium(III), Mercury(II), Heavy Metals, Adsorption, Excellent Sorbent, Aqueous-Media, Heavy-Metals, Mercury

? Xu, J.Q., Jia, J.P. and Wang, J.W. (2005), Ultrasonic decomposition of ammonia-nitrogen and organic compounds in coke plant wastewater. *Journal of the Chinese Chemical Society*, **52** (1), 59-65.

Full Text: [2005\J Chi Che Soc52, 59.pdf](2005/J%20Chi%20Che%20Soc52,%2059.pdf)

Abstract: The investigations of the ultrasonic decomposition of NH3-N and organic compounds (i.e., CODCr) in coke plant wastewater are presented in this work. The process parameters were controlled with respect to the presence (or absence) of air atmosphere, initial pH value, initial concentration, and ultrasonic power density in the process of ultrasonic decomposition. It is noted that the ultrasonic removal efficiencies for both the NH3-N and the CODCr were increased in the presence of the air atmosphere and significantly affected by the initial pH value. The removal efficiencies increased with increasing the ultrasonic power density while they decreased with increasing the initial concentration. The effects of n-butyl alcohol as an effective OH radical scavenger on the removal efficiencies indicates that the ultrasonic decomposition of the NH3-N was carried out mainly via the mechanism of thermal decomposition in cavitation bubbles or in the interfacial region, whereas the ultrasonic decomposition of the CODCr mainly resulted from the reactions with OH radicals in the bulk solution. The GC/MS analysis indicates that most of the organic compounds in the wastewater were effectively destroyed by ultrasound.

Keywords: Ammonia-Nitrogen, Aqueous-Solution, Coke Plant Wastewater, Degradation, Hot-Spot, Irradiation, Kinetics, Organic Compounds, Phenol, Sonochemistry, Ultrasonic Decomposition

? Gawade, A.S., Vanjara, A.K. and Sawant, M.R. (2005), Removal of disperse dyes from water using surfactant treated alumina. *Journal of the Chinese Chemical Society*, **52** (5), 907-913.

Full Text: [2005\J Chi Che Soc52, 907.pdf](2005/J%20Chi%20Che%20Soc52,%20907.pdf)

Abstract: An alumina surface was modified by adsorption of an anionic surfactant, sodium dodecyl sulfate (SDS). Typical S-shaped isotherm of surfactant on alumina was observed, The adsorption of Disperse Red-11, Disperse Blue-26 and Disperse Red-156 on alumina and surfactant treated alumina has been investigated. The enhancement in adsorption of these disperse dyes on surfactant treated alumina is observed, which may be attributed to their solubilization in surfactant aggregates formed at the solid/liquid interface. The effect of pH on adsorption has been studied. The adsorption is greatly influenced by pH of the medium. The applicability of the Langmuir model and the Dual-Mode sorption model (DSM) were tested for equilibrium data.

Keywords: Surfactant-Treated Alumina, Solubilization, Dual-Mode Sorption Model, Dilute-Solution Separation, Dual-Mode Sorption, Reusable Adsorbents, Aqueous-Solution, Adsorption, Phenanthrene, Phenol

? Mane, S.M., Vanjara, A.K. and Sawant, M.R. (2005), Removal of phenol from wastewater using date seed carbon. *Journal of the Chinese Chemical Society*, **52** (6), 1117-1122.

Full Text: [2005\J Chi Che Soc52, 1117.pdf](2005/J%20Chi%20Che%20Soc52,%201117.pdf)

Abstract: The adsorption of phenol on Date Seed Carbon (DSC) was investigated to assess its possible use as an adsorbent for the processing of phenolic wastewater. The influence of various factors Such as initial concentration, agitation speed, amount of adsorbent and temperature on the adsorption capacity has been studied. The percentage removal of phenol was observed to increase with increase an initial concentration of phenol. The adsorption of phenol decrease with an increase in temperature indicated the exothermic nature of the reaction. The Langmuir and Freundlich equations interpret adsorption isothermal data. Kinetic data was obtained by using a pseudo-second-order equation to understand the reaction mechanism. Thermodynamic parameters Such as Delta G, Delta H and Delta S for the adsorption process were calculated.

Keywords: Adsorption, Date Seed Carbon, Langmuir and Freundlich Equation, Pseudo-Second-Order Equation, Thermodynamic Parameters, System

? Soltan, M.E., Sirry, S.M. and Fawzy, E.M. (2007), Evaluation of the sorptive capacity of sugarcane bagasse and its coal for heavy metals in solution. *Journal of the Chinese Chemical Society*, **54** (6), 1401-1412.

Full Text: [2007\J Chi Che Soc54, 1401.pdf](2007/J%20Chi%20Che%20Soc54,%201401.pdf)

Abstract: Recycling of sugarcane bagasse and its coal as metal sorbents to capture metal ions from wastewater is the aim of this study. Thus, stability of sugarcane bagasse and its coal, in addition to the solubilities of metal ions in synthetic solution, were determined in this study at different pH values. Also, sorption of Fe, Mn, Cd, and Pb ions with different concentrations (10-100 mg L-1) on different grain size fractions of sugarcane bagasse (< 150 > mu m) and its coal (< 80 > mu m) was carried out under different pH values (2, 4 and 6), dosage (2, 6, and 10 g L-1), time intervals (15-300 min.) and temperature (20-50°C). The results indicated that the sugarcane bagasse and its coal were more stable at pH 6, and the solubilities of metal ions in the synthetic solution exhibited high values at pH 2 more than pH 4 and 6, respectively. Generally, removal of metal ions using the sorbents increased with the decreasing of grain size fractions and with increasing of pH values (6 > 4 > 2), sorbent doses (10 > 6 > 2 g L-1) and initial concentrations of metal ions (10-100 mg L-1). Coal of sugarcane bagasse was more effective than the sugarcane bagasse for removal of the metal ions from solution. Positive values of ΔH° suggest the endothermic nature of sorption in all cases. The negative Gibb’s free energy values indicate the feasibility of the process and spontaneous nature of sorption (Fe-bagasse coal system), while the positive value of ΔG° suggests the non-spontaneous character of adsorption of all metals. The negative values of entropy change ΔS° (Pb-bagasse system) indicate the highly ordered adsorption process in this case, while the positive values of ΔS° show the increased randomness at solid/solution interface during the sorption metal ion on bagasse. The results of activation energy values indicate the order of sorption feasibility is: Pb > Fe > Cd > Mn in the case of bagasse and Fe > Pb > Cd > Mn in the case of coal. Generally, the results of this study suggest that the sugarcane bagasse and its coal might provide an economical method for the removal of metal ions from wastewater.

Keywords: Sugarcane Bagasse, Coal, Metal Sorbents, Thermodynamic, Kinetic Parameters, Activated Carbons, Aqueous-Solution, Cadmium Biosorption, Cane Bagasse, Removal, Adsorption, Water, Ions, Lead, Equilibrium

? Wang, T.H., Li, M.H., Wei, Y.Y. and Teng, S.P. (2009), Effects of pH and concentration on Cs ions sorption and diffusion in crushed granite by using batch and modified capillary method. *Journal of the Chinese Chemical Society*, **56** (4), 748-754.

Full Text: [2009\J Chi Che Soc56, 748.pdf](2009/J%20Chi%20Che%20Soc56,%20748.pdf)

Abstract: A comprehensive evaluation of Cs ions sorption to and diffusion in crushed granite was conducted in this study. The sorption capacity of crushed granite suggested by the Langmuir model was 5.48×10-6 mol-Cs/g-granite. The distribution coefficient (Kd) was around 7.5 mL/g and pH independent. By using an in-diffusion method with a modified capillary column, some diffusion relevant parameters of Cs ions in crushed granite were derived. The apparent diffusion coefficient (Da) seemed unaffected by Cs concentration (1.15×10-10 to 2.82×10(-10) m2/s, at 10-7 and 10-3 M, respectively). The determined effective diffusion coefficients (De) were located in the window from 8.59×10-10 (10-7 M) to 1.69×10-9 (10-3 M) m2/s. Under various pH environments, pH independent Da (9.0×10-9 m2/s) and De (1.0×10-9 m2/s) values were observed. Under current systems, consistently higher De than Da implied the diffusion of Cs ions was governed by surface diffusion phenomenon. Whereas the pH insensitive feature indicated the Cs sorption to crushed granite was mainly through ion-exchange reaction. Moreover, further SEM/EDS mapping clearly showed the adsorbed Cs ions were highly concentrated on the fracture surface of biotite.

Keywords: Capillary Column, Capillary Columns, Cesium, Compacted Bentonite, Cs-137, Density, Dependent Diffusion, Diffusion, Diffusion Coefficient, Distribution Coefficient, Evaluation, Hanford Site, Ion Exchange, Langmuir, Local Taiwan Laterite, Modified, Radioactive Waste Repository, Radionuclides, Sorption, Subsurface Sediments, USA

? Zahoor, M. (2010), Removal of thiram from aqueous solutions. *Journal of the Chinese Chemical Society*, **57** (6B), 1361-1366.

Full Text: [2010\J Chi Che Soc57, 1361.pdf](2010/J%20Chi%20Che%20Soc57,%201361.pdf)

Abstract: In this study activated carbon was used for the removal of thiram from aqueous solutions. Adsorption experiments were carried out as a function of time, initial thiram concentration and temperature. Equilibrium data fitted well to the Freundlich and Langmuir equilibrium models in the studied concentration range. Adsorption kinetics followed a pseudo second-order kinetic model rather than pseudo first-order model. The results from kinetic experiments were used to describe the adsorption mechanism. Both boundary layer and intraparticle diffusion played important role in the adsorption mechanism of thiram. Thermodynamic parameters (ΔGº, ΔHº, and ΔSº) were determined and the adsorption process was found to be an endothermic one. The negative values of ΔGº at different temperatures were indicative of the spontaneity of the adsorption process.

Keywords: Activated Carbon, Adsorption, Adsorption, Adsorption Kinetics, Adsorption Thermodynamics, Bagasse Fly-Ash, Degradation, Dye, Environmental Pollution, Equilibrium, Fixed-Bed, Freundlich, Kinetic, Kinetic Model, Kinetics, Langmuir, Methylene-Blue, Pesticide, Pesticides, Removal, Sugar-Industry Waste, Thermodynamic, Thiram, Water

? Wang, X., Zhang, Y. and Lin, Q.M. (2011), Kinetic and thermodynamic investigations of Zn(II) adsorption on microcrystalline anthracene modified with 8-hydroxyquinoline and its application to the preconcentration and determination of trace zinc. *Journal of the Chinese Chemical Society*, **58** (7), 937-946.

Full Text: [2011\J Chi Che Soc58, 937.pdf](2011/J%20Chi%20Che%20Soc58,%20937.pdf)

Abstract: A new method that utilizes microcrystalline anthracene modified with 8-hydroxyquinoline as an adsorbent has been developed for the preconcentration of trace Zinc(II). The possible reaction mechanism is discussed in detail. The influences of different parameters, such as acidity, other metal ions, the amounts of 8-hydroxyquinoline and anthracene, etc. on the enrichment yield of Zn(II) have been studied to optimize the experimental conditions. The experimental data were fitted well with the pseudo-second-order kinetic model and Langmuir model at all studied temperatures and the maximum adsorption capacity was 32.58 mg.g-1 (300 K). The thermodynamic parameters (ΔG(theta), ΔH(theta) and ΔS(theta)) showed the feasibility, exothermic and spontaneous nature of the adsorption at 280 similar to 320 K. Experiments indicate that Zn(II) can be completely separated from Cu(II), Co(II), Cd(II), Mn(II), Ni(II) in the eluent. The recovery of this method is in the range of 96.0%similar to 105.0% with preconcentration factor of 100 and the limit of detection after preconcentration is 0.068 mu g. L-1. The proposed method has been successfully applied to the determination of trace Zn(II) in effluents and synthetic water sample having a composition similar to certified water sample SLRS-4 (NRC, Canada). Analytical results obtained by this recommended method were very satisfactory.

Keywords: 8-Hydroxyquinoline, Adsorbent, Adsorption, Atomic-Absorption-Spectrometry, Cd(II), Copper, Cu(II), Environmental-Samples, Ions, Kinetic, Langmuir, Microcrystalline Anthracene, Naphthalene, Preconcentration, Removal, Separation, Silica-Gel, Solid-Phase Extraction, Thermodynamic, Zinc, Zn

# Title: Journal of the Chinese Colloid & Interface Society

(J. Chin Colloid & Interface Soc.)

Full Journal Title: [Journal of the Chinese Colloid & Interface Society](http://interfacial.ncu.edu.tw/journal/oldjournal.php)

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Subject Categories:

Chiang, C.C. and Hsu, Y.C. (1997), Adsorption behavior of acid dye (AB9) on activated clay. *Journal of the Chinese Colloid & Interface Society*, **20** (4), 215-223.

? Wang, C.C., Juang, L.C., Hsu, T.C., Lee, C.K. and Chiu, H.M. (2003), Adsorption of acid dye onto surfactant-modified montmorillonite. *Journal of the Chinese Colloid & Interface Society*, **25** (1-4), 59-70.

Full Text: [2003\J Chi Col Int Soc25, 59.pdf](2003/J%20Chi%20Col%20Int%20Soc25,%2059.pdf)

Abstract: Ca-montmorillonites were exchanged with organic cations, tetramethylammonium (TMA) and hexadecyltrimethylammonium (HDTMA), to study the ion-exchange effects on the pore structure, surface characteristics, and adsorption properties of montmorillonite. The revolution of both the surface area and pore structure of montmorillonite was characterized based on the classical analyses of the nitrogen adsorption isotherms as well as the XRD patterns. The change of surface characteristics was identified with FTIR patterns and zeta potential plots. The adsorption isotherms of acid dye, Acid Blue 264 (AB264), were then measured to identify the effects of the exchange process on the adsorption characteristics of montmorillonite. It was found that the exchange process might induce an increase or decrease in the surface area, pore size, and pore volume of montmorillonite, depending on the arrangement of organic cations in the interlayer and then, the organic cations size and their degree of hydration. On the other hand, the HDTMA may form a bilayer structure on the surfaces of montmorillonite, which is induced by the hydrophobic bonding by the conglomeration of large C16 alkyl groups associated with HDTMA, and cause positive charge development on surfaces. It is concluded that the mechanism of retention appears to be replacement of counterion of the surfactant by anionic dyes and the HDTMA-modified montmorillonite may be a good adsorbent for the removal acid dyes from wastewater solutions.

Keywords: Surfactant Cations, Organo-Clay, Admicelles, Anionic Dyes

? Lee, C.K., Wang, C.C., Juang, L.C., Liu, S.S., Hsu, T.C. and Chiu, H.M. (2004), Cation exchange effects on the pore structure and adsorption of montmorillonite. *Journal of the Chinese Colloid & Interface Society*, **26** (3), 157-166.

Full Text: [2004\J Chi Col Int Soc26, 157.pdf](2004/J%20Chi%20Col%20Int%20Soc26,%20157.pdf)

Abstract: Ca-montmorillonite (Ca-Mont) was exchanged with both metal (titanium, iron, and copper) and organic dye cations (Basic Green 5 (BG5) and Basic Violet 10 (BV10)) to study the effects of cation exchange on the pore structure and adsorption characteristics of montmorillonite. The BG5-montmorillonite (BG5-Mont) and BV10-montmorillonite (BV10-Mont) were used to examine the reusable characteristics of the montmorillonite after it was used to adsorb the dyes from the wastewater solutions. Both the nitrogen isotherms and XRD patterns of the examined montmorillonites were firstly measured. The ion-exchange effects on the surface area, surface fractal dimension, pore size and pore size distribution, and basal spacings [d(001)] of montmorillonites are identified based on the classical and fractal analyses of the nitrogen adsorption isotherms as well as the XRD patterns. The effects of the alteration of both the surface area and pore structure on the adsorption of organic vapors on montmorillonite are discussed.

Keywords: Montmorillonite, Metal Cations, Surface Area, Pore Structure, Adsorption Isotherm

# Title: Journal of the Chinese Institute of Chemical Engineers

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Ku, Y. and Yen, M.L. (1991), The effect of chelating agents on the removal of lead from wastewaters by sulfide precipitation. *Journal of the Chinese Institute of Chemical Engineers*, **22** (2), 81-88.

Full Text: [J\J Chi Ins Che Eng22, 81.pdf](J/J%20Chi%20Ins%20Che%20Eng22,%2081.pdf)

Chen, Y.Y. and Lee, D.J. (1994), Heat and mass transfer in a rotary kiln incinerator: Parametric examination. *Journal of the Chinese Institute of Chemical Engineers*, **25** (4), 247-256.

Full Text: [J\J Chi Ins Che Eng25, 247.pdf](J/J%20Chi%20Ins%20Che%20Eng25,%20247.pdf)

Abstract: The significance of the parameters appearing in a steady state model developed in Chen and Lee (1994) are analyzed. A two-level fractional factorial experimental design table is employed for numerically evaluating the effects of various dimensionless groups and the interactions. The results demonstrate that, with a fixed burner flame, the kiln length/diameter ratio, which accounts for the thermal radiation contributions between exposed surfaces in a kiln, and the solid waste heat value are the two factors most influence the kiln performance. The significance of other main factors and the interactions are definite or relatively small. The effects of countercurrent operations are also discussed.

Keywords: Parametric Study, Orthogonal Table, Thermal Radiation, Rotary Kiln, In-Depth, Transfer Model, Exit

Chen, Y.Y. and Lee, D.J. (1995), Diffuse view factors between burner flame and enclosed surfaces in a rotary kiln incinerator. *Journal of the Chinese Institute of Chemical Engineers*, **26** (3), 195-198.

Full Text: [J\J Chi Ins Che Eng26, 195.pdf](J/J%20Chi%20Ins%20Che%20Eng26,%20195.pdf)

Keywords: View Factor, Incinerator, Radiation Heat Transfer

Maezawa, A., Goto, J. and Uchida, S. (1996), Effect of surfactant adsorption onto fine active carbon particles on oxygen absorption into the suspensions. *Journal of the Chinese Institute of Chemical Engineers*, **27** (5), 401-404.

Full Text: [J\J Chi Ins Che Eng27, 401.pdf](J/J%20Chi%20Ins%20Che%20Eng27,%20401.pdf)

Abstract: The effect of particles on the oxygen absorption rate into the solution with the surfactant is studied, The enhancement factor which is the ratio of mass transfer coefficient for a suspension with surfactant to that for distilled water depends on time and the ratio of the amounts of surfactant and fine active carbon. The change in the surface tension by the adsorption of surfactant on the fine active carbon causes the time dependence of the enhancement factor. However, the enhancement factor is lower under the condition of stronger agitation.

Keywords: Gas Absorption, Suspension, Surfactant Adsorption, Enhancement Factor, Slurry Reactors, Mechanism

Wang, R.C. and Yang, J.J. (1997), Competitive adsorption of bisolute phenols onto granular activated carbon. *Journal of the Chinese Institute of Chemical Engineers*, **28** (3), 185-195.

Full Text: [J\J Chi Ins Che Eng28, 185.pdf](J/J%20Chi%20Ins%20Che%20Eng28,%20185.pdf)

Abstract: A series of equilibrium experiments have been conducted to assess the capactiy of granular activated carbon (GAG) to adsorb three bisolute contaminants of phenols including p-nitrophenol/phenol, p-chlorophenol/phenol acid p-chlorophenol/p-nitrophenol. The observed equilibrium data are analyzed and compared with four existing models, i.e, Langmuir competitive model, extended three-parameter isotherm, ideal adsorbed solution theory and modified ideal adsorbed solution theory. The mutual interferences of phenolic adsorption onto GAC are prominent by experimental observation and the bisolute adsorption isotherm curves can be represented by ideal adsorbed solution theory for all three binary phenolic mixtures. Furthermore, modified ideal adsorbed solution theory can reduce the deviations between the experimental and calculated values. The dete mination of the sorbent capacity will offer the accurate description of bisolute equilibrium behavior for designing the activated carbon adsorber to remove phenol pollutants from wastewater.

Keywords: Dilute Aqueous-Solutions, 2 Dissolved Organics, Thermodynamics, Equilibria, Model, Competitive Adsorption, Granular Activated Carbon, phenols

Chern, J.M. and Wu, C.Y. (1999), Adsorption of binary dye solution onto activated carbon: Isotherm and breakthrough curves. *Journal of the Chinese Institute of Chemical Engineers*, **30** (6), 507-514.

Full Text: [J\J Chi Ins Che Eng30, 507.pdf](J/J%20Chi%20Ins%20Che%20Eng30,%20507.pdf)

Abstract: The adsorption and desorption behaviors of mustard yellow and red binary dye mixtures by granular activated carbon from aqueous solution were studied. Batch tests with different initial dye concentrations were performed to determine the adsorption isotherms while column tests with different feed dye compositions were performed to measure the breakthrough and desorption curves. The Fritz and Schlunder model was found to best fit the binary adsorption isotherm data. The coherence condition incorporated with the Fritz-Schlunder isotherm model was used to construct the composition path diagram with which the intermediate-zone composition could be determined. Simple equations were derived based on the non-linear wave propagation theory to predict the breakthrough and desorption curves.

Keywords: Fixed-Beds, Acid Dyes, Removal, Equilibria, Wave Propagation, Fixed-Bed Dynamics, Binary Dye, Activated Carbon, Adsorption, Desorption

? Chen, Y.W., Koh, K.K. and Wang, Y.M. (2000), Characterization of galloaluminosilicate MCM-41 molecular sieve. *Journal of the Chinese Institute of Chemical Engineers*, **31** (2), 123-134.

Full Text: [2000\J Chi Ins Che Eng31, 123.pdf](2000/J%20Chi%20Ins%20Che%20Eng31,%20123.pdf)

Abstract: A series of mesoporous galloaluminosilicate MCM-41 molecular sieves with various compositions have been synthesized. Hexadecyltrimethylammonium bromide was used as an organic surfactant in the synthesis. These materials were characterized with nitrogen sorption, powder X-ray diffraction (XRD), differential thermal analysis (DTA), thermogramitric analysis (TGA), scanning electron microscope (SEM), transmission electron microscope (TEM) and solid slate NMR. The solid products had the MCM-41 structure and contained only atomically dispersed gallium consistent with the framework gallium in MCM-41. Incorporation of either Ga or Al into the framework of MCM-41 affects the long-range order of the mesopores without damaging the essentially mesoporous nature of the materials. Gallium was easier to incorporate into the framework than aluminum. All of the materials had a uniform pore size distribution with pore size around 30 Angstrom. The morphologies of [Ga, Al]-MCM-41 were spherical particle packages. A small amount of aluminum had been expelled from the framework of MCM-41 upon calcination at 550°C.

Keywords: Calcination, Galloaluminosilicate, MCM-41, MCM-41 Molecular Sieve, Mechanism, Mesoporous Material, Mesoporous Materials, Molecular Sieves, SEM, Sorption, Stability, Surfactant, Templates, Zeolite

Hsuen, H.K. (2000), Linear formulas for intraparticle adsorption. *Journal of the Chinese Institute of Chemical Engineers*, **31** (2), 199-202.

Full Text: [J\J Chi Ins Che Eng31, 199.pdf](J/J%20Chi%20Ins%20Che%20Eng31,%20199.pdf)

Abstract: A sequence of linear approximations is presented for the description of intraparticle adsorption of a spherical sorbent particle subject to a step change in the surface concentration. The approximations were developed by considering the dependence of mass transfer coefficient on adsorption time. Excellent agreement between the present approximation (n = 3) and the exact solution was found and relative errors are less than 0.58%. In terms of simplicity and accuracy, the present approximations are superior to other previously available ones reported in the literatures.

Keywords: Linear Driving Force, Adsorption, Diffusion, Approximation, Diffusion, Particle, Model

? Yu, Q.M., Kaewsarn, P., Matheickal, J.T. and Ma, W.D. (2000), Pretreated biomass of marine macroalgae as low cost high efficiency adsorbent for heavy metal ions. *Journal of the Chinese Institute of Chemical Engineers*, **31** (4), 411-415.

Full Text: J Chi Ins Che Eng31, 411.pdf

Abstract: Environmental pollution from industrial wastewater that contains heavy metals is an important issue in many countries. Cost effective technologies for the removal and recovery of the heavy metals are needed. Recently, much interest has been devoted to the processes of biosorption of heavy metals, in which various types of biomass, such as bacteria, fungi, and algae, are used as adsorbents for heavy metal ions. In this paper, the pretreated biomass (biosorbent) of a group of marine macroalgae was evaluated for its biosorption properties. The chemical and mechanical stabilities of the biomass were much improved by using pretreatment methods. The microstructures of the biomass were obtained by using electron microscopy. The heavy metal uptake capacities of the biosorbents ranged from 0.8-1.5 mmol/g (dry wt) for a number of divalent heavy metal ions. The capacities were higher than most other types of biomass and were comparable to commercial ion exchange resins. The kinetics of the biosorption process and the fixed-bed breakthrough curves were also studied. This study indicated that the biosorbents derived from the biomass of marine macroalgae could be used as highly effective adsorbent for the removal and recovery of heavy metal ions from industrial wastewater.

Keywords: Algae, Aqueous-Solutions, Biosorption, Biosorption, Fixed-Bed, Heavy Metal, Ion Exchange, Kinetics, Marine Algae, Wastewater Treatment

? Annadurai, G., Lee, D.J. and Juang, R.S. (2000), Box-Behnken studies on dye removal from water using chitosan and activated carbon adsorbents. *Journal of the Chinese Institute of Chemical Engineers*, **31** (6), 609-615.

Full Text: [2000\J Chi Ins Che Eng31, 609.pdf](2000/J%20Chi%20Ins%20Che%20Eng31,%20609.pdf)

Abstract: The percentages of adsorption of Rhodamine 6G from water using both chitosan and activated carbon adsorbents: at three particle sizes (0.5, 0.75, and 1.0 mm), temperatures (30, 45, and 60°C), and initial pH values (7, 8, and 9) were compared. The Box-Behnken design was applied in a second-degree quadratic polynomial regression model to test the effects and interactions of the variables using three-factorial experimental designs. The statistical analysis revealed that the second-degree quadratic model gave a good fit with an R2 value of 0.9704 and 0.9989, and an F-value of 25.5 and 719.9 with chitosan and activated carbon, respectively. The significance for each variable on the adsorption of dye Rhodamine 6G was identified, and the optimal conditions for dye removal were obtained.

Keywords: Box-Behnken Method, Experimental Design, Dye Adsorption, Chitosan, Activated Carbon, Aqueous-Solutions, Color Removal, Acid Dye, Adsorption, Equilibria, Chitin

? Wu, H.S. and Yen, C.W. (2002), Ethylene oxide removal from simulated wastewater. *Journal of the Chinese Institute of Chemical Engineers*, **33** (3), 243-251.

Full Text: [2002\J Chi Ins Che Eng33, 243.pdf](2002/J%20Chi%20Ins%20Che%20Eng33,%20243.pdf)

Abstract: The sorption and removal behaviors of ethylene oxide (EO) from wastewater were investigated using the adsorption and stopping methods. Three Amberlite resins (XAD-4, XAD-7, and XAD-16) and two activated carbon fibs (CP-900 and CP1100) were employed to adsorb EO from simulated wastewater in a batch reactor. The best adsorbent was XAD-16. The unit-adsorbed ratio of EO to resin decreased with increasing amounts of resin. In the stripping method, two operating types, semibatch and continuous packed bed, were employed to remove EO. High airflow rate and high temperature were favorable for increasing the stripping efficiency. The total-tower liquid mass-transfer coefficient K-L and gas mass-transfer coefficient K-G were also obtained. In the EO recovery system, EO removal from waste gas was conducted by means of chemical absorption. The addition of an acidic agent (HCl and H2SO4) could increase the absorption efficiency in an absorption tower. The incremental concentration of the acidic agent increased the absorption efficiency. The absorbed capability of EO for both H2SO4 and HCl was high, particularly for H2SO4. The reaction-rate constant and Arrhenius activation energy were also obtained.

Keywords: Absorption, Acid, Activated Carbon, Adsorption, Aqueous-Solutions, Capacity, CO2, Ethylene Oxide, Exposure, Kinetics, Mass Transfer, Resin, Sorption, Stripping

? Leu, F.C. and Chang, T.H. (2002), A convenient TPD method for calculating the integral heat of sorption. *Journal of the Chinese Institute of Chemical Engineers*, **33** (3), 321-324.

Full Text: [2002\J Chi Ins Che Eng33, 321.pdf](2002/J%20Chi%20Ins%20Che%20Eng33,%20321.pdf)

Abstract: An easy and convenient TPD method based on the Langmuir adsorption model is developed to calculate the integral heat (ΔH°) of gaseous adsorbate sorbed on the metallic catalysts. And, the mathematical description for this method is also established. Two systems, the hydrogen absorption into palladium black and the hydrogen adsorption on Ir/Al2O3, were taken to verify this method. The sorbed heats were calculated to be 13.2, 30.6 and 31.5 kJ (.) mol-1 for Pd black, 10% Ir/Al2O3 and 3% Ir/Al2O3, respectively. The calculated heats are consistent with those obtained from the isosteric and calorimetric methods.

Keywords: Adsorption, Catalyst, Equation, Hydrogen, Integral Heat of Sorption, Sorption, TPD

Ho, T.C., Lee, Y., Kobayashi, N., Hopper, J.R. and Lin, J. (2003), Measurement and modeling of elemental mercury sorption on various activated carbons in a fixed-bed adsorber. *Journal of the Chinese Institute of Chemical Engineers*, **34** (1), 17-23.

Full Text: [J\J Chi Ins Che Eng34, 17.pdf](J/J%20Chi%20Ins%20Che%20Eng34,%2017.pdf)

Abstract: The characteristics of mercury sorption by activated carbon were experimentally measured and theoretically modeled. Experiments were carried out in a fixed-bed mercury sorption facility composed of a mercury permeation tube embedded in an isothermal water bath, a fix-bed adsorber enclosed in a furnace, and an on-line GC for mercury measurements. The proposed sorption model involved the coupling of a kinetic model based on the mechanisms of surface equilibrium and external mass transfer, and a material balance model based on the tank-in-series approach. Three different equilibrium expressions were used in the model, i.e., the Henry’s Law, the Langmuir isotherm and the Freundlich isotherm. In additional to kinetic simulations using the developed model, an equilibrium model was also used to simulate the thermodynamically preferred mercury species under the experimental conditions. The experimental results have indicated that the factors affecting the adsorption efficiency include the type of activated carbon, the adsorption temperature, the inlet mercury concentration, and the gas flow rate. The developed kinetic model has been found to describe well both the current experimental results and those reported in the literature.

Keywords: Mercury, Adsorption, Activated Carbon, Fixed-Bed, Kinetic Modeling

Chiou, M.S., Ho, P.Y. and Li, H.Y. (2003), Adsorption behavior of dye AAVN and RB4 in acid solutions on chemically cross-linked chitosan beads. *Journal of the Chinese Institute of Chemical Engineers*, **34** (6), 625-634.

Full Text: [J\J Chi Ins Che Eng34, 625.pdf](J/J%20Chi%20Ins%20Che%20Eng34,%20625.pdf)

Abstract: One kind of adsorbent with a high adsorption capacity for anionic dyes was prepared using ionically and chemically cross-linked chitosan beads. A batch system was applied to study the adsorption of one acid dye (AAVN) and one reactive dye (RB4) in aqueous solutions by the cross-linked chitosan beads. The adsorption capacities (g/kg) had very large, values of 3362 (AAVN) and 3823 (RB4) at pH 3, 30degreesC, which were 6.6 (AAVN) and 6.0 (RB4) times that of those of the commercial activated carbon. The Langmuir and Freundlich adsorption models were applied to describe the equilibrium isotherms. The Langmuir model agreed very well with the experimental data (R2 > 0.9980). The kinetics of adsorption for a single dye and the kinetics of removal of ADMI color value and COD for dyes in mixture solutions at different initial dye concentrations and pHs were evaluated by the pseudo first-order and second-order models. The data agreed very well with the pseudo second-order kinetic model. The study of competitive adsorption showed that the adsorption favored AAVN slightly in the experiments with higher dye concentrations.

Keywords: Adsorption Capacity, Anionic Dyes, Cross-Linked Chitosan Beads, Langmuir Isotherm, Pseudo Second-Order Model, Competitive Adsorption, Activated Carbon, Aqueous-Solution, Pore Diffusion, Reactive Dyes, Removal, Chitin, Equilibrium, Biosorption, Sorption, Waste

? Chen, W.J., Hsiao, L.C. and Su, Y.L. (2005), Sorption competition and mechanisms of desorption of heavy-metal contaminants from kaolin clays using surfactant solutions of sodium dodecyl sulfate. *Journal of the Chinese Institute of Chemical Engineers*, **36** (2), 147-159.

Full Text: [2005\J Chi Ins Che Eng36, 147.pdf](2005/J%20Chi%20Ins%20Che%20Eng36,%20147.pdf)

Abstract: A new mechanism based on a combination of acid-base interactions and hydro- phobic attraction at the solid-water interface is proposed for the surfactant-enhanced washing of heavy-metal-contaminated kaolin clays. Batch washing mechanisms for kaolin clay suspension, which was chosen as a model system for the environmentally friendly separation of copper(II) and nickel(II) metal ions, were studied with respect to the sorption competition at the clay interface via acid-base interactions and hydrophobic attraction, transformation of the micellar structure of sodium dodecyl sulfate surfactants, and desorption of heavy metals off the particle surfaces. The sorption onto kaolin clays of heavy-metal ions from single- and binary-metal solutions was observed through isotherm tests conducted at 20°C and pH 6.5. In binary systems, the adsorption of acidic Cu2+ onto the basic surface sites of kaolin clays is four times higher than that of Ni2+. Metal-spiked kaolin clays containing both 0.447 mg copper/g kaolin and 0.137 mg nickel/g kaolin were washed out less than 1% of each metal contaminant with water alone at pH 6.5. Experimental results of metal removal were compared under variation of operating conditions, including the surfactant dose, pH, temperature, time, and solid content. A single washing at pH 6.5 with 5000 mg/L of sodium dodecyl sulfate above the critical micelle concentration (cmc) could remove 60% of the nickel and 23% of the copper from kaolin clays. The combination of 5000 mg/L of basic surfactant and 10 mg/L of nitric acid at pH 5.5 was able to remove 63% of the nickel and 60% of the copper. It was then postulated that a three-step washing mechanism for metal removal using the sodium dodecyl sulfate surfactants could proceed through adsorption of basic, anionic surfactant molecules from dissociating micelles onto metal-spiked kaolin clay and self-reassembling into micelles via hydrophobic attraction. In this way, metal-surfactant complexes would be formed with acidic metal cations via acid-base interactions, followed by desorption of micellar metal-surfactant complexes from the kaolin clay into the solution via electrostatic repulsion.

Keywords: Heavy-metal removal, Kaolin clay, Surfactant, Sorption, Desorption

? Ramesh, A., Lee, D.J. and Wong, J.W.C. (2005), Adsorption equilibrium of heavy metals and dyes from wastewater with low-cost adsorbents: A review. *Journal of the Chinese Institute of Chemical Engineers*, **36** (3), 203-222.

Full Text: [2005\J Chi Ins Che Eng36, 203.pdf](2005/J%20Chi%20Ins%20Che%20Eng36,%20203.pdf)

Abstract: This review surveyed recent publications on the adsorption uptakes of heavy metals and dyes from water and wastewater streams using low-cost adsorbents derived from agricultural waste, industrial wastes, inorganic particulates, or some natural products. Most adsorption works adopted either the Langmuir or Freundlich isotherms (or both) for adsorption data correlation. Despite a few exceptions, the waste-derived adsorbents have lower adsorption uptakes than the activated carbon. However, the cheapness of the former represents the major advantage for possible applications. Effects of process parameters, such as temperature and pH, on and the possible mechanisms to metals or dyes adsorption were addressed in some detail. We also highlighted the compensation effects during thermodynamic parameter evaluation, which were possibly overlooked in current literature.

Keywords: Adsorption, Heavy Metal, Dye, Low-Cost Adsorbent, Equilibrium, Bagasse Fly-Ash, Aluminum-Industry Waste, Peanut Hull Pellets, Aqueous-Solutions, Activated Carbon, Red Mud, Agricultural Waste, Methylene-Blue, Congo-Red, Sawdust Adsorption

? Chen, P.C., Shi, W., Du, R. and Chen, V. (2005), Mass transfer and absorption of acidity gas in an alkaline solution containing fine crystals using a pH-Stat continuous bubble-column scrubber. *Journal of the Chinese Institute of Chemical Engineers*, **36** (3), 223-233.

Full Text: [2005\J Chi Ins Che Eng36, 223.pdf](2005/J%20Chi%20Ins%20Che%20Eng36,%20223.pdf)

Abstract: The mass-transfer rate and reaction kinetics play important roles in the removal of acidity gases and in gas-liquid reactive crystallization processes. in order to determine the absorption rate, a multiple-tube plug-flow model was adopted. For sake of gaining a better understanding of the effects of process variables on the absorption of acidity gas, i.e., carbon dioxide, into an alkaline solution containing fine barium carbonate crystals, a continuous bubble-column scrubber under a pH-stat condition was used. Assuming a two-film mechanism with fast second order reaction under the operating conditions applied in this work, the masstransfer coefficients could be obtained successfully. The effects of solid loading, the pH of the solution, gas concentration, gas-flow rate, and liquid-flow rate on the absorption rate and volumetric mass-transfer coefficient of carbon dioxide were investigated. Correlations of volumetric mass-transfer coefficients with process variables are investigated here and the gasliquid interfacial area and local mass-transfer coefficient are discussed to provide insight into the mass-transfer mechanism.

Keywords: Scrubber, Absorption, Carbon Dioxide, Mass-Transfer Coefficient

? Wang, M.Y. and Chang, J.S. (2005), Enhanced decolorization of azo dyes with selected mutants of Escherichia coli. *Journal of the Chinese Institute of Chemical Engineers*, **36** (3), 235-242.

Full Text: J Chi Ins Che Eng36, 235.pdf

Abstract: An Escherichia coli strain was mutated by random mutagenesis via exposure to UV light. The resulting mutants were acclimated in azo-dye-containing media to select for highly efficient and stable decolorization activity on two azo dyes (Reactive Black B and Reactive Red 22). Two mutant strains (namely, E coli UVT1 and E. coli UV68) were identified and their specific decolorization rates for the azo dyes were up to 3-fold faster than that of the mother strain. The mutant strains also displayed up to 7-fold increase in total decolorization efficiency, which is represented by the time required for 50% color removal. Decolorization characteristics of the mutants were investigated in terms of their dependence on dye concentration, glucose concentration, and environmental conditions (e.g., temperature, agitation rate, etc.). The mutant E coli UVT1 exhibited optimal color removal activity under high dye concentrations and was less sensitive to oxygen inhibition. The decolorization performance of the UVT1 strain was superior to that of the other mutant strain UV68. Decolorization by the mutants was shown to be an enzymatic event, while contribution of metabolism-independent biosorption to the color removal was negligible. Kinetic analysis by Monod-type model suggests that the mutation may lead to an enhanced accessibility of the dye substrate to the bacterial decolorizer. The inhibitory effect of glucose on decolorization was observed and seemed to be closely associated with sharp pH decreases due to formation of acidic metabolites while using glucose for cell growth and decolorization.

Keywords: Azo Dye, Bacterial Decolorization, Biosorption, Degradation, Dye, Dyes, Escherichia Coli, Kinetics, Microbial Decolorization, Mutation, Pseudomonas-Luteola, Reactive Dyes, Strain, Waste-Water

? Lee, I.H., Kuan, Y.C. and Chern, J.M. (2007), Equilibrium and kinetics of heavy metal ion exchange. *Journal of the Chinese Institute of Chemical Engineers*, **38** (1), 71-84.

Full Text: [2007\J Chi Ins Che Eng38, 71.pdf](2007/J%20Chi%20Ins%20Che%20Eng38,%2071.pdf)

Abstract: Ion exchange has a great potential to remove heavy metals from industrial wastewaters or heavy metal-containing sludge. In order to design and operate heavy metal removal processes, the equilibrium relationship between ions and resin must be known a prior. A series of ion-exchange equilibrium tests of Cu2+/H+, Zn2+/H+, and Cd2+/H+ systems using Amberlite IR-120 were performed. The equilibrium data were analyzed by the Langmuir isotherm, Freundlich isotherm, and selectivity coefficient approaches. The thermodynamic parameters such as Gibbs free energy change, enthalpy change, and entropy change were calculated. By comparison of the selectivity coefficients, the affinity sequence to IR-120 is Cu2+ > Zn2+ > Cd2+ > H+. Moreover, in order to understand the heavy metal extraction kinetics in the presence of Amberlite IR-120, the ion-exchange kinetics was also studied. The ion-exchange kinetic data were regressed by the pseudo first-order, second-order models, and a reversible reaction model. The activation energies calculated from the rate coefficients at different temperatures are 15.41, 7.04, and 17.01 kJ/mol for copper, zinc, and cadmium, respectively. Although the pseudo first- and second-order models are easier to use for data analysis, the resultant model parameters depend on operating conditions. The reversible reaction model is capable to predict the effects of resin to solution ratio, initial heavy metal concentration, and temperature on the ion-exchange kinetic curves. (c) 2007 Taiwan lnstitute of Chemical Engineers. Published by Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorption Behaviors, Affinity, Affinity Sequence, Amberlite, Amberlite IR-120, Analysis, Aqueous-Solutions, Biosorption, Cadmium, Cd2+, Comparison, Concentration, Copper, Cu2+, Data Analysis, Design, Effects, Electrodialysis, Energy, Enthalpy, Entropy, Equilibrium, Equilibrium Data, Extraction, Extraction Kinetics, First Order, Free Energy, Freundlich, Freundlich Isotherm, Gibbs Free Energy, Heavy Metal, Heavy Metal Ion, Heavy Metal Removal, Heavy Metals, Heavy-Metal, Industrial, Industrial Wastewaters, Ion, Ion Exchange, Ion Exchange Kinetics, Ion-Exchange, Ion-Exchange Equilibrium, Ion-Exchange Kinetics, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Langmuir-Isotherm, Metal, Metal Extraction, Metal Ion, Metal Removal, Metals, Model, Models, Operating Conditions, Order, Parameters, Pb2+, Potential, Predict, Pseudo First-Order, Pseudo-First-Order, Rate, Reaction, Removal, Resin, Resins, Reverse-Osmosis, Reversible, Reversible Reaction Model, Second Order, Selectivity, Selectivity Coefficient, Sludge, Taiwan, Temperature, Temperatures, Tests, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Waste-Water, Wastewaters, Zinc, Zn2+

? Chen, J.P. and Lin, Y.S. (2007), Sol-gel-immobilized recombinant *E. coli* for biosorption of Cd2+. *Journal of the Chinese Institute of Chemical Engineers*, **38** (3-4), 235-243.

Full Text: [2007\J Chi Ins Che Eng38, 235.pdf](2007/J%20Chi%20Ins%20Che%20Eng38,%20235.pdf)

Abstract: Recombinant Escherichia coli engineered with a metal-binding peptide was immobilized by entrapment in SiO2 gel beads using the sol-gel method. Biosorption of Cd2+ ions by the immobilized cells was studied in both batch and continuous systems. Adsorption equilibrium could be established within 3 h and the kinetics was well described by the pseudo-second-order kinetic model. The equilibrium data were best described by the Langmuir isotherm with the maximum uptake capacity being 79.9 mg/g cell at 25°C. More than 95% of the adsorbed Cd2+ Could be removed with 0.1 M CaCl2 during desorption. No loss in adsorption capacity was found up to five repeated adsorption/desorption cycles. From mass transfer analysis, only intraparticle diffusion effect was found to be important at low Cd2+ concentration (50 mg/dm3), while at high concentration (250 mg/dm3), both intraparticle and external mass transfer affected biosorption. Continuous removal and recovery of Cd2+ could be carried out by the immobilized cells in a packed-bed reactor. (C) 2007 Taiwan Institute of Chemical Engineers. Published by Elsevier B.V. All rights reserved.

Keywords: Adsorption, Aqueous-Solutions, Biosorption, Cadmium, Cadmium Biosorption, Cd2+, Cells, Desorption, Diffusion, Equilibrium, Escherichia-Coli, Ester Synthesis, Heavy-Metal Detoxification, Immobilized, Immobilized Cells, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Mass Transfer, Metallothionein, Phytochelatins, Removal, Silica-Gel, Sol-Gel

? Wang, L.H. and Lin, C.I. (2008), Adsorption of chromium(III) ion from aqueous solution using rice hull ash. *Journal of the Chinese Institute of Chemical Engineers*, **39** (4), 367-373.

Full Text: [2008\J Chi Ins Che Eng39, 367.pdf](2008/J%20Chi%20Ins%20Che%20Eng39,%20367.pdf)

Abstract: Rice hull was calcined to rice hull ash (RHA) at 500°C under 20 mL air/s for 50 min. The RHA thus prepared has been found to be able to remove chromium(III) ion from aqueous solution, though not very efficient. The experiments indicated that the rate of removal of Cr3+ and the removal of Cr3+ at equilibrium was increased upon decreasing the RHA dosage. The removal could also be enhanced upon increasing the initial chromium concentration, or adsorption temperature. However, pH in the range of 2.5-5.4 or stroke speed higher than 120 stroke/min could not change the removal. The dependence of the RHA dosage and the initial chromium concentration on the removal have been found to be strong, while that of adsorption temperature is mild. An empirical equation correlating the relationship between the removal of Cr3+ and the adsorption time was determined. (c) 2008 Taiwan Institute of Chemical Engineers. Published by Elsevier B.V. All rights reserved.

Keywords: Adsorption, Chromium, Kinetics, Rice Hull Ash, Blast-Furnace Waste, Fly-Ash, Industry Waste, Metal-Ions, Lead II, Removal, Kinetics, Sorption, Water, Slag

? Ho, Y.S. (2008), Comments on “Sol–gel-immobilized recombinant *E. coli* for biosorption of Cd2+”. *Journal of the Chinese Institute of Chemical Engineers*, **39** (5), 539.

Full Text: [2008\J Chi Ins Che Eng39, 539.pdf](2008/J%20Chi%20Ins%20Che%20Eng39,%20539.pdf); [2008\J Chi Ins Che Eng-Ho.pdf](2008/J%20Chi%20Ins%20Che%20Eng-Ho.pdf)

Keywords: Adsorption, Kinetics, Models, Pseudo-First Order, Pseudo-Second Order, Quotation Error

? Lin, C.I. and Wang, L.H. (2008), Rate equations and isotherms for two adsorption models. *Journal of the Chinese Institute of Chemical Engineers*, **39** (6), 579-585.

Full Text: [2008\J Chi Ins Che Eng39, 579.pdf](2008/J%20Chi%20Ins%20Che%20Eng39,%20579.pdf)

Abstract: The rate equations and isotherms for two adsorption models have been formulated and discussed. The rate equations obtained have been compared to those of pseudo-first-order model and pseudo-second-order model, respectively. Calculated results indicated that the rate equations of single site model and dual site model could be approximated by those of pseudo-first-order model and pseudo-second-order model, respectively, in a limited ranges of the values of C-A.Se(\*) (or C-A.S2e(\*)), K\* and t\*. The adsorption isotherm of single site model has been found to be the same as that of Langmuir type. (C) 2008 Taiwan Institute of Chemical Engineers. Published by Elsevier B.V. All rights reserved.

Keywords: Adsorption, Aqueous-Solution, Bone Char, Cadmium, Dual Site Model, Fly-Ash, Ions, Kinetics, Lsotherm, Metal Removal, Peat, Rate Equation, Single Site Model, Sorption, Waste-Water

# Title: Journal of the Chinese Integrative Medicine

Full Journal Title: [Journal of the Chinese Integrative Medicine](http://www.jcimjournal.com/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Maio, E.Y. (2010), Clinical critical qualitative evaluation of the selected randomized controlled trials in current acupuncture researches for low back pain. *Journal of the Chinese Integrative Medicine*, **8** (12), 1133-1146.

Full Text: [2010\J Chi Int Med8, 1133.pdf](2010/J%20Chi%20Int%20Med8,%201133.pdf)

Abstract: Background: Many randomized controlled trials (RCTs) and reviews concluded that acupuncture is not an effective treatment for low back pain (LBP) and there is no difference between real acupuncture and sham acupuncture in the treatment of LBP.

Objective: This study aims to evaluate the most recently published RCTs and reviews from the clinical protocol, which is used by professional acupuncturists.

Data sources and synthesis: English-language studies were identified through searches of The Cochrane Library, PubMed/MEDLINE and EMBASE, limited to those published between January 2007 and January 2010. Eighteen trials studying conditions related to LBP conditions treated by acupuncture or acupuncture as one of the co-interventions were eligible.

Study appraisal methods: A critical clinical qualitative evaluation is the core methodology of this study. The study design employs daily used clinical skills and knowledge with supplementary statistical concepts to evaluate the quality and reliability of the selected RCTs and reviews. Five evaluation criteria were established for the assessment of the selected RCTs and reviews. By implementing the evaluation criteria, which are similar to the inclusion and exclusion criteria used in RCTs, the weaknesses, limitations or errors of RCTs and reviews can be identified, despite the strength of internal validity produced by statistical calculations.

Results: Various terms are used when describing LBP conditions. However, 16 RCTs or 88% of the trials did not establish a medical diagnosis. No trials had objective measurements as a clinical standard for assessing outcomes. Furthermore, significant variation existed due to the numerous treatment methods or therapists used in the RCTs included in the study. Various co-interventions were used in 10 or 55% of the trials, among them, 6 or 33% of the trials used non-steroidal anti-inflammatory drugs (NSAID) or analgesics. Due to the lack of diagnostic status, the accuracy of the external validity was put into question. No logistic regression models were used in any of the selected RCTs and reviews to resolve the degree of heterogeneity.

Conclusion: All selected RCTs either partially met the evaluation criteria or did not fulfill the evaluation criteria while being compared. The major problem existing in all RCTs was the lack of accurate medical diagnosis and a lack of objective measurements to judge the clinical outcomes, which in turn, created incorrect eligibility criteria, improper matches and inaccuracies in data recording before entry into statistical calculations. As a consequence of the subjective nature of measurements, conclusions of RCTs and RCT-based reviews were biased due to overgeneralized or cross-generalized estimations, which infer that alternative explanations cannot be excluded. In addition, the range of variables created in the treatment procedure was difficult to control or estimate, in turn, threatening the reliability of RCTs’ estimations. For these reasons, creating appropriate diagnostic criteria before randomization and constructing a related objective outcome measurement, which are more relevant to clinical practice, should be considered in future RCTs and systematic review studies.

# Title: Journal of the Chinese Medical Association

Full Journal Title: [Journal of the Chinese Medical Association](http://www.sciencedirect.com/science/journal/17264901)

ISO Abbreviated Title:

JCR Abbreviated Title: J Chin Med Assoc

ISSN: 1726-4901

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Chen, T.J., Chen, Y.C., Hwang, S.J. and Chou, L.F. (2007), International collaboration of clinical medicine research in Taiwan, 1990-2004: A bibliometric analysis. *Journal of the Chinese Medical Association*, **70** (3), 110-116.

Full Text: [2007\J Chi Ins Che Eng70, 110.pdf](2007/J%20Chi%20Ins%20Che%20Eng70,%20110.pdf)

Abstract: BACKGROUND: The number of publications in journals indexed in the Institute for Scientific Information (ISI) database of the Thomson Corporation is generally used to assess the research performance of individuals, institutions and countries in scientific fields. The aim of this study was to analyze the trends in Taiwan’s ISI publications in clinical medicine from 1990 to 2004. Special attention was paid to internationally collaborated works that were identified based on the countries of co-authors’ affiliations. METHODS: The bibliographic records of articles with an author’s affiliation in Taiwan were downloaded from the Web of Science on the Internet. The analysis was then limited to the journals of clinical medicine defined as such in the ISI Essential Science Indicators. International collaboration was deemed to exist in an article if any co-author’s affiliation was located outside Taiwan. The impact factors in the 2004 Journal Citation Reports Science Edition were arbitrarily adopted to estimate the quality of articles. RESULTS: Taiwan’s ISI publications in clinical medicine increased from 315 articles in 1990 to 2,636 in 2004. Only 7.4% (n=1,494) of the 20,207 articles published during the study period were published in journals with an impact factor equal to or greater than 5. The share of articles with international collaboration was 13.6% (n=2,752) on average. Taiwan’s researchers collaborated with colleagues in 76 countries. The USA, as the most important collaborating partner of Taiwan’s clinical medicine researchers, had contributed to 69.9% of articles with international collaboration. Generally, articles with international collaboration were published in journals with higher impact factors or had more citations than those without international collaboration. The number of articles published in each year, in each of selected subject categories and from each of selected domestic institutions did not correlate with the percentage of articles with international collaboration, respectively. CONCLUSION: Taiwan has achieved a significant increase in the number of ISI publications in clinical medicine. Yet there exists opportunity for improvement in international collaboration.

Keywords: Affiliation, Analysis, Background, Bibliometric, Bibliometric Analysis, Citations, Clinical, Co-Authors, Collaboration, Database, Impact, Impact Factor, Impact Factors, Improvement, Institute for Scientific Information, Institutions, International, Internet, ISI, Journal Citation Reports, Journals, Medicine, Methods, Performance, Publications, Quality, Quality of, Records, Research, Research Performance, Taiwan, Trends, USA, Web of Science

? Huang, C.P. (2009), Bibliometric analysis of obstructive sleep apnea research trends. *Journal of the Chinese Medical Association*, **72** (3), 117-123.

Full Text: [2009\J Chi Ins Che Eng72, 117.pdf](2009/J%20Chi%20Ins%20Che%20Eng72,%20117.pdf)

Abstract: Background: This study aimed to describe current trends and areas of future research using a bibliometric evaluation of the publication output associated with research on obstructive sleep apnea (OSA) during the 16-year period of 1991-2006. Methods: Data encompassing the period from 1991 to 2006 were extracted from the Science Citation Index online version. We analyzed selected documents with “obstructive sleep apnea”, “obstructive apnea”, or “OSA” as a part of the title, abstract, or key words and reported the following parameters: trends of publication output, journal pattern, country of publication, authorship, author-gene rated key words, and KeyWords Plus (R). Results: The annual number of articles on OSA grew at a faster rate than did the number of general scientific publications, from approximately 200 in 1991 to 650 in 2006. The main subject categories in which research on OSA was conducted were the respiratory system and clinical neurology, each of which accounted for > 10% of total articles. Most of the research was conducted in the major industrial countries, with most international collaborations involving the United States and Canada. Certain terms were identified by KeyWords Plus (R) but not by a author-gene rated key words, and some terms increased in frequency of use over time. Conclusion: This study provides a bibliometric analysis showing that the annual number of publications related to OSA has been increasing at a much faster rate than the overall scientific literature during the past 16 years in a growing number of specialized journals. Analysis of key words (KeyWords Plus (R)) suggests research trends and areas for future research. [J Chin Med Assoc 2009;72(3):117-123].

Keywords: Analysis, Authorship, Bibliometric, Bibliometric Analysis, Bibliometric Evaluation, Canada, Citation, Clinical, Collaborations, Country, Evaluation, General, Health, International, Journal, Journals, Literature, Mar, Medline, Neurology, Number of Publications, Obstructive Sleep Apnea, Pattern, Publication, Publications, Research, Science, Science Citation Index, Scientific Literature, Scientific Publications, Sleep, Sleep Disorder, Time, Trends, United States, Version

# Title: Journal of Chromatography A

Full Journal Title: [Journal of Chromatography A](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5248&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=056d46d97fb0ef2f7a8b51e5dfcf4316)

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Publisher Address: PO Box 211, 1000 AE Amsterdam, Netherlands

Subject Categories:

Biochemical Research Methods: Impact Factor 3.096, 13/53 (2005)

Chemistry, Analytical: Impact Factor 3.096, 7/70 (2005)

Hardy, C.J. (1959), Zur bestimmung von adsorptionsenthalpien mit hilfe der gaschromatographie. *Journal of Chromatography A*, **2**, 490-498.

Full Text: [J\J Chr A2, 490.pdf](J/J%20Chr%20A2,%20490.pdf)

Abstract: Activity coefficients at infinite dilution, γ, have been calculated for a series of halogenated hydrocarbons in dinonyl phthalate, glycerol, and Silicone fluid 702 over the range 20–100. Values of γ for several aliphatic hydrocarbons and oxygenated compounds have also been calculated.

The values of γ for halogenated hydrocarbons are compared with those for other substances in polar and non-polar solvents and are discussed in relation to the transport of solutes through gas-liquid columns. Considerable deviations from ideality have been found for halogenated hydrocarbons in highly polar solvents, *e.g.* for halogenated methanes at 25 γ > 10 in glycerol and > 100 in water. The variation of γ with temperature has been shown to depend upon the particular solute and upon the solvent.

A summary is given of the experimental requirements for the accurate determination of γ by gas-liquid chromatography.

Knözinger, H. and Spannheimer, H. (1964), Zur bestimmung von adsorptionsenthalpien mit hilfe der gaschromatographie. *Journal of Chromatography A*, **16**, 1-6.

Full Text: [J\J Chr A16, 1.pdf](J/J%20Chr%20A16,%201.pdf)

Abstract: The construction of a gas chromatograph with which heats of adsorption can be determined, is described, as well as the evaluation of the chromatograms obtained.

Sewell, P.A. and Stock, R. (1970), Comparison of acitvity coefficients measured by a static and by a dynamic method. *Journal of Chromatography A*, **50**, 10-18.

Full Text: [J\J Chr A50, 10.pdf](J/J%20Chr%20A50,%2010.pdf)

Abstract: Activity coefficients at infinite dilution were determined for various chlorinated hydrocarbons in squalene and dinonyl phthalate by two distinct chromatographic methods. The first, and well known method, involved the measurement of specific retention volumes; the second, and less common method, involved measurements obtained from the diffuse edge of a single chromatographic peak. In the latter case the injection of very large samples was necessary. The results are compared with activity coefficients obtained by the static method that uses a McBain balance. Generally, agreement between the dynamic and static methods is good. A conclusion reached is that non-linearity of the partition isotherm may be an important factor when measuring activity coefficients even at infinite dilution.

Dollimore, D., Heal, G.R. and Martin, D.R. (1970), An improvement in the elution technique for measurement of adsorption isotherms by gas chromatography. *Journal of Chromatography A*, **50**, 209-218.

Full Text: [J\J Chr A50, 209.pdf](J/J%20Chr%20A50,%20209.pdf)

Abstract: The measurement of adsorption isotherms by the elution chromatographic technique and the application of a data logger and a computer for this purpose is described. A new method of calculation which commences from the top of the chromatographic peak and progresses downwards is developed. Long elution times are shown in the examples quoted but reproducible isotherms are obtained. Isosteric heats of adsorption calculated from these isotherms are found to be in better agreement with other methods of measurement than previous chromatographic results.

Huber, J.F.K. and Gerritse, R.G. (1971), Evaluation of dynamic gas chromatographic methods for the determination of adsorption and solution isotherms. *Journal of Chromatography A*, **58** (1), 137-158.

Full Text: [J\J Chr A58, 137.pdf](J/J%20Chr%20A58,%20137.pdf)

Abstract: Various dynamic gas chromatographic methods for the determination of distribution isotherms in gas-solid and gas-liquid-solid systems are compared. The influence of the column length, the carrier gas velocity and the nature of the carrier gas is discussed. Isotherms of different shapes are studied. An equation for the calculation of distribution isotherms from gas chromatographic data is derived which applies not only at low mole fractions but also at higher mole fractions.

? (1972), Errata. *Journal of Chromatography A*, **67** (2), 393-399.

Full Text: [J\J Chr A67, 393.pdf](J/J%20Chr%20A67,%20393.pdf)

Waksmundzki, A., Rudziński, W., Suprynowicz, Z., Leboda, R. and Lasoń, M. (1974), Investigations of adsorbent heterogeneity by gas chromatography: I. Investigation of adsorption mechanism on heterogeneous surfaces. *Journal of Chromatography A*, **92** (1), 9-23.

Full Text: [J\J Chr A92, 9.pdf](J/J%20Chr%20A92,%209.pdf)

Abstract: The new graphical method for investigating adsorption mechanisms on heterogeneous surfaces, developed recently by Rudziński, Tóth and Jaroniec, is applied to gas chromatographic data. It is shown that the function (∂ln *p*/∂ln *Nt*), giving the adsorption mechanism, can easily be evaluated from the function *VN*=*VN*(*p*), obtained directly from gas chromatographic measurements. Moreover, the use of the function *VN*(*p*) in the evaluation of (∂ln *p*/∂ln *Nt*) gives a smaller error than the use of the adsorption isotherm. The utilisation of gas chromatographic data is demonstrated for four adsorption systems, obtained by using two silica gels and two adsorbates.

Zhitomirskii, B.M., Agafonov, A.V., Berman, A.D. and Yanobskii, M.I. (1974), Theoretical approach to gas-solid chromatography applied to slow attainment of adsorption equilibrium and to Langmuir isotherm. *Journal of Chromatography A*, **94**, 1-12.

Full Text: [J\J Chr A94, 1.pdf](J/J%20Chr%20A94,%201.pdf)

Abstract: Gas—solid chromatography with the slow attainment of adsorption equilibrium, described by the Langmuir isotherm, has been treated theoretically. An analytical solution was obtained for the relevant set of non-linear equations. A relationship was derived for the concentration at the peak maximum. *c*max., as a function of the retention time, *t*max.: Imagewhere *ka* and *kd* are the rate constants of adsorption and desorption, respectively, 2 is the column length, *Ug* is the linear carrier gas velocity and *a*max. is the amount of compound adsorbed for complete converage of the surface. This equation was used for the calculation of *ka*/*kd* and *a*max. from experimental data on the adsorption of toluene by silica—alumina catalysts. The absolute values of *ka* and *kd* were calculated from the condition of closeness between experimental and calculated curves making use of the obtained analytical solution. The rate constants for the adsorption anddesorption of toluene and the value of *a*max. were also found.

? Jandera, P., Janderová, M. and Churáček, J. (1978), Gradient elution in liquid chromatography. VIII. Selection of the optimal composition of the mobile phase in liquid chromatography under isocratic conditions. *Journal of Chromatography A*, **148** (1), 79-97.

Full Text: [1960-80\J Chr A148, 79.pdf](1960-80/J%20Chr%20A148,%2079.pdf)

Abstract: The influence of the composition of the mobile phase on resolution in liquid chromatography is considered from both the theoretical and the practical points of view. Different theoretical models for adsorption and ion-exchange chromatography are compared and an approach is suggested that permits calculations of the composition of the mobiel phae that is necessary in order to achieve the separation required. The factors limiting the applicaion of the mathematical approach presented. are discussed. The theoretical conclusions are supported by several practical examples of chromatographic separations on silica and alumina.

? Schoenmakers, P.J., Billiet, H.A.H., Tijssen R. and De Galan, L. (1978), Gradient selection in reversed-phase liquid chromatography. *Journal of Chromatography A*, **149** (3), 519-537.

Full Text: [1960-80\J Chr A149, 519.pdf](1960-80/J%20Chr%20A149,%20519.pdf)

Abstract: The rational selection of an optimal gradient in reversed-phase liquid chromatography is discussed from two viewpoints. Firstly, a general expression is derived for the numerical calculation of retention data for the case when the relationship between the capacity factor, *k*, and the mobile phase composition, ϕ, is known. For a linear gradient a graphical solution is demonstrated and analytical solutions are presented for simple but widely applicable *k*---ϕ relationships. Retention data thus calculated agree well with experimental results.

Secondly, the multi-component solubility parameter theory is used to predict the *k*---ϕ relationship. Modification of the stationary chemically bonded phase under the influence of the organic modifier is introduced to improve the accuracy of the predictions. Empirical correlations using solubility parameters are presented as an alternative to the theoretical expressions.

Karaiskakis, G. and Katsanos, N.A. (1978), Desorption kinetic-parameters and adsorption thermodynamic parameters determined simultaneously by stopped-flow gas- chromatography. *Journal of Chromatography A*, **151** (3), 291-297.

Full Text: [J\J Chr A151, 291.pdf](J/J%20Chr%20A151,%20291.pdf)

Abstract: The use of the equations derived in a previous paper has led to determination of rate constants for desorption, and of equilibrium constants for adsorption, of heptane on two kinds of active sites of modified alumina and of porous glass. Experiments at various temperatures have permitted the calculation of desorption activation energies and entropies of activation from the variation of rate constants with temperature, as well as the calculation of adsorption enthalpies and entropies from the variation of equilibrium constants with temperature.

? Stamberg, K., Cabicar, J. and Havlicek, L. (1984), Ion-exchange kinetics in systems with non-linear equilibrium isotherms: Sorption of uranium(VI) on strong acid cation exchangers. *Journal of Chromatography A*, **201** (1), 113-120.

Full Text: [1984\J Chr A201, 113.pdf](1984/J%20Chr%20A201,%20113.pdf)

Abstract: The kinetics of sorption of uranium(VI) from aqueous solutions on the strong acid cation exchangers Amberlite IR-120 and 200 was studied. The influences of the concentration of UO2(NO3)2 in the range 10-3 - 10-1 M and of the temperature (298-332°K) were examined. The results were evaluated by means of an “ash model” modified for systems with non-linear equilibrium isotherms. It has been found that the applicability of the kinetic model depends not only on the solution concentl ation, but also on the type of cation exchanger used.

Jaroniec, M. and Jaroniec, J.A. (1984), Theoretical description of association effects in liquid adsorption chromatography with a mixed mobile phase. *Journal of Chromatography A*, **295** (2), 377-386.

Full Text: [J\J Chr A295, 377.pdf](J/J%20Chr%20A295,%20377.pdf)

Abstract: A general treatment of liquid adsorption chromatography with a mixed mobile phase, starting with Snyder’s displacement model and incorporating complexation reactions between solute and solvent molecules and solvent in the mobile phase, is discussed. This treatment leads to an equation defining the dependence of the capacity ratio on the mobile phase composition by means of the thermodynamic equilibrium constants describing this displacement process and complexation reactions in the mobile and stationary phases. This equation may be considerably simplified when only one type of complex forms in the solution.

Notes: highly cited (> 1000)

? Hjertén, S. (1985), High-performance electrophoresis: Elimination of electroendosmosis and solute adsorption. *Journal of Chromatography A*, **347** (2), 191-198.

Full Text: [1985\J Chr A347, 191.pdf](1985/J%20Chr%20A347,%20191.pdf)

Abstract: In ideal electrophoresis in free solution neither electroendosmosis nor adsorption of solutes onto the inside of the electrophoresis chamber should occur. In this paper we show that these two disturbing phenomena are negligible in free high-performance electrophoresis when the narrow-bore electrophoresis tube is coated with a mono-molecular layer of non-cross-linked polyacrylamide. The coating procedure is described in detail.

Keywords: Adsorption

Huang, J.X. and Horváth, C. (1987), Adsorption isotherms on high-performance liquid chromatographic sorbents. I. Peptides and nucleic acid constituents on octadecyl-silica. *Journal of Chromatography A*, **406**, 275-285.

Full Text: [J\J Chr A406, 275.pdf](J/J%20Chr%20A406,%20275.pdf)

Abstract: A miniaturized chromatographic system with short, narrow-bore columns was used for the measurement of adsorption isotherms of peptides and of nucleic acid constituents on octadecyl-silica by frontal chromatography. The range of mobile phase composition was similar to that used in elution chromatography of the substances investigated. Adsorption isotherms were measured under different experimental conditions as far as the mobile phase pH and composition as well as the column temperature are concerned. Most isotherms were concave down, and the data were fitted to both the Langmuir and JovanoviImage models, the former yielding a somewhat better fit. Under certain conditions, sigmoidal isotherms were also observed and this behavior was attributed to solvent-mediated conformational changes and molecular stacking. The results shed light on the adsorption behavior of the substances under investigation on octadecyl-silica, the most commonly employed sorbent in reversed-phase Chromatography, over a wide range of concentrations. The interest in preparative and process-scale chromatography.

? Hage, D.S. and Walters, R.R. (1988), Non-linear elution effects in split-peak chromatography. I. Computer-simulations for the cases of irreversible diffusion-limited and adsorption-limited kinetics. *Journal of Chromatography A*, **436** (2), 111-135.

Full Text: [1988\J Chr A436, 111.pdf](1988/J%20Chr%20A436,%20111.pdf)

Abstract: The split-peak effect, in which even a small sample of pure analyte elutes in both non-retained and retained fractions, has been shown to be useful chromatographic tool for such applications as the determination of protein adsorption rate constants and diffusion coefficients. To evaluate such parameters, it is necessary to obtain data independent of sample size, or to work under linear elution conditions. In this paper, computer simulations were used to determine how non-linear elution conditions affect such measurements. The two cases studied were those in which the rate of analyte retention was limited either by diffusion or adsorption of analyte on the column. The simulation data were then compared to results obtained with two experimental systems: the retention of hemoglobin on reversed-phase columns and the binding of immunoglobulin G to protein A affinity columns. From the simulations, guidelines were developed for minimizing or eliminating non-linear elution effects in both of the cases studied.

Keywords: Chromatography, Elution, Kinetics

Naikwadi, K.P., Karasek, F.W. and Hatano, H. (1990), Analyses of polychlorinated dibenzo-*p*-dioxins and dibenzofurans and precursors in fly ash samples collected at different points in post-combustion zone of Japanese machida incinerator. *Journal of Chromatography A*, **511**, 281-290.

Full Text: [J\J Chr A511, 281.pdf](J/J%20Chr%20A511,%20281.pdf)

Abstract: Several samples collected at the post-combustion zone of the Machida incinerator in Japan were analyzed for polychlorinated dibenzo-*p*-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), polychlorinated phenols (PCPs) and polychlorinated benzenes (PCBEs). All samples show lower levels of PCDDs and PCDFs in comparison to the levels of observed in other samples from various incinerators around the world. The Machida incinerator in Japan shows ten times lower levels of PCDDs/PCDFs than the Ontario incinerator in Canada. Analyses of fly ash samples collected at different points in the post-combustion zone shows higher levels of PCDDs/ PCDFs at points near the stack, and decreasing towards the combustion zone. That trend indicates the formation of PCDs/PCDFs in the electrostatic precipitator by catalytic activity of fly ash in addition to their probable formation in the incinerator furnace. Variations in normal operating conditions have no or very little effect on the amount of PCDDs/PCDFs formed. Municipal solid waste in Japan has been separated into combustible and non-combustible materials. Only the combustible materials were incinerated in the Machida incinerator, which is fluidized bed design with CaO inject into the bed.

Romano, J., Jandik, P., Jones, W.R. and Jackson, P.E. (1991), Optimization of inorganic capillary electrophoresis for the analysis of anionic solutes in real samples. *Journal of Chromatography A*, **546** (1-2), 411-421.

Full Text: [J\J Chr A546, 411.pdf](J/J%20Chr%20A546,%20411.pdf)

Abstract: Inorganic capillary electrophoresis (ICE) is a separation technique which offers many advantages for the analysis of anionic solutes in real samples. Parameters which influence ICE separations such as system configuration, choice of electrolyte anion, electrolyte pH and the addition of electroosmotic flow modifier were investigated and a number of electrolytes of varying mobilities were studied. Optimized conditions were established for the separation of inorganic anions, organic acids and alkylsulfonates and the technique was applied to the analysis of a variety of anionic solutes in several complex sample matrices.

Keywords: Zone Electrophoresis, Conductivity Detection, Ion Chromatography, Carboxylic-Acids, Sensitivity

Jones, W.R. and Jandik, P. (1991), Controlled changes of selectivity in the separation of ions by capillary electrophoresis. *Journal of Chromatography A*, **546** (1-2), 445-458.

Full Text: [J\J Chr A546, 445.pdf](J/J%20Chr%20A546,%20445.pdf)

Abstract: The selectivity of low-molecular-weight inorganic and organic anions is evaluated on a capillary electrophoresis system utilizing a negative power supply and indirect UV detection at 254 nm. The background electrolyte chromate was found to be most useful for highly mobile inorganic anions and short chain carboxylates. Incorporated in this electrolyte is an additive that reverses the direction of electroosmotic flow (EOF) in the capillary, so that the EOF augments the mobility of the analytes. This results in exceedingly short analysis times, under 5 min, with efficiencies approaching 600 000 theoretical plates. From migration time data, a correlation between ionic equivalent conductance and analyte mobility in the electrolyte is established. This empirical correlation equation aids in the prediction of migration order (selectivity) of a separation. Other parameters evaluated on the chromate electrolyte are ionic strength, pH and EOF modifier concentration. It was found that pH and the EOF modifier provided significant selectivity control over the analytes while the other electrolyte parameters permitted only subtle changes in selectivity.

Keywords: Anions

McCoy, M.A. and Liapis, A.I. (1991), Evaluation of kinetic models for biospecific adsorption and its implications for finite bath and column performance. *Journal of Chromatography A*, **548** (1-2), 25-60.

Full Text: [J\J Chr A548, 25.pdf](J/J%20Chr%20A548,%2025.pdf)

Abstract: Dynamic models that could describe the adsorption of adsorbate onto ligand immobilized on porou or non-porous particles in batch and column systems, are presented and solved.

Two different kinetic models (kinetic models 1 and 2) are used to describe the dynamics of the adsorption mechanism when beta-galactosidase is adsorbed onto monoclonal antibody immobilized on porous silica particles. The differences in the theoretical predictions of the concentration of the adsorbate in the fluid of the finite bath obtained from kinetic models 1 and 2, are not significant and the agreement between experiment and theory is good. But the two different kinetic models lead to different estimates for the value of the pore diffusivity, and provide significantly different concentration profiles for the adsorbate in the pore fluid and adsorbed phases of the adsorbent particles of the batch system. The column results indicate that the differences in the breakthrough curves obtained from kinetic models 1 and 2, increase as the column length increases. Also, the concentration profiles of the adsorbate in the adsorbent particles obtained from kinetic models 1 and 2, are significantly different and their differences vary along the axial distance of the column. The results indicate that while it is a necessary condition for a kinetic model to describe properly the experimental overall mass-transfer resistance, this is not also a sufficient condition for the accurate determination of the adsorption mechanism and for the accurate estimation of the values of the rate constants and of the pore diffusivity. Furthermore, the differences in the concentration profiles of the adsorbate in the adsorbent particles, obtained from kinetic models 1 and 2, have important implications on the performance of the adsorption stage, as well as on the performance of the wash and elution stages. Experiments are suggested which could provide information that could significantly improve the model discrimination and parameter estimation studies for the determination of a proper mechanism for the dynamics of the adsorption step and of an accurate estimate for the value of the pore diffusivity. When the estimated value of the pore diffusivity is varied by±20%, the effect on the dynamic behavior of the batch and column systems can be appreciable. The effect on the dynamic behavior of the batch and column systems when the estimated value (from a correlation) of the film mass transfer coefficient is varied by±20%, is not significant.

The batch adsorption of beta-galactosidase onto anti-beta-galactosidase immobilized on non-porous glass coated beads is found to be controlled by film mass transfer and the dynamics of the adsorption step. The batch model with a second-order reversible interaction mechanism for the adsorption step, provides theoretical predictions such that the agreement between experiment and theory is reasonable. When the estimated value (from a correlation) of the film mass transfer coefficient is varied by±20%, the effect on the dynamic behavior of the batch and column systems (having nonporous adsorbent particles) is not significant. Column experiments are suggested which could provide information, in addition to the information obtained from batch experiments, that could improve the model discrimination and parameter estimation studies for the determination of a proper mechanism for the dynamics of the adsorption step, in affinity adsorption systems involving non-porous adsorbent particles.

Keywords: Affinity-Chromatography, Elution Stage, Separations, Proteins, Matrices, Binding, Ligand, Beds

Zhu, J., Katti, A.M. and Guiochon, G. (1991), Comparison of various isotherm models for predicting competitive adsorption data. *Journal of Chromatography A*, **552** (1-2), 71-89.

Full Text: [J\J Chr A552,71.pdf](J/J%20Chr%20A552,71.pdf)

Abstract: Competitive adsorption isotherms were determined for 2-phenylethanol and 3-phenylpropanol on ODS-silica with methanol-water as the mobile phase. The experimental data were fitted to the Langmuir competitive isotherm, the second-order ideal adsorbed solution isotherm of LeVan and Vermeulen, the seven-parameter quadratic isotherm (ratio of two second-degree polynomials) and the competitive Fowler isotherm. The best results were obtained by adjusting the five parameters of the competitive Fowler isotherm by a non-linear regression. Unfortunately, this isotherm gives the mobile phase concentration as a function of the surface coverage and the equation cannot be inverted in closed form.

Keywords: Nonlinear Liquid-Chromatography, Theoretical Band Profiles, Ideal Model, Computer-Simulation, Mobile Phase, Binary, Propagation, Langmuir

? Pennanen, S., Auriola, S., Manninen, A., Komulainen, H. (1991), Identification of the main metabolites of 2-ethylhexanoic acid in rat urine using gas chromatography-mass spectrometry. *Journal of Chromatography A*, **568** (1), 125-134.

Full Text: 1991\J Chr A568, 125.pdf

Abstract: The metabolites of 2-ethylhexanoic acid, an industrial chemical and the active ingredient in wood preservatives, were investigated in rat urine. Male Wistar rats were given 2-ethylhexanoic acid (2-EHA) in drinking water (600 mg/kg daily) for nine weeks, and then urine specimens were collected and analysed. The compounds were identified by gas chromatography-mass spectrometry in both electron-impact mode and chemical ionization mode. In addition to 2-EHA, ten different 2-EHA-related metabolites were found in the urine of 2-EHA-treated rats. The main metabolite was 2-ethyl-1, 6-hexanedioic acid. Urine also contained 2-ethyl-6-hydroxyhexanoic acid and five other hydroxylated metabolites and two lactones, the detailed structures of which have not yet been elucidated. The unsaturated 5, 6-dehydro-EHA was also identified; this is the metabolite corresponding to 2-n-propyl-4-pentenoic acid, the hepatotoxic metabolite of valproic acid. At least part of the 2-EHA is present in urine as a glucuronide conjugate.

Weston, A., Brown, P.R., Jandik, P., Jones, W.R. and Heckenberg, A.L. (1992), Factors affecting the separation of inorganic metal-cations by capillary electrophoresis. *Journal of Chromatography A*, **593** (1-2), 289-295.

Full Text: [J\J Chr A593, 289.pdf](J/J%20Chr%20A593,%20289.pdf)

Abstract: Various alkali metals, alkaline earth metals, transition metals and lanthanides were separated by capillary electrophoresis, and factors influencing the separations were studied. The reproducible separation of fifteen metal cations was completed in 8 min. The detection system showed a linear relationship between peak area and analyte concentration. To permit the use of indirect photometric detection and to ensure symmetrical peak shapes, a highly UV-absorbing amine having an electrophoretic mobility similar to those of the analyte cations was chosen as the major component of the electrolyte. Complexing compounds were added to the electrolyte to maximize selectively the differences in the apparent mobilities of the cations and enhance the separations.

Keywords: Zone Electrophoresis, Mobilities, Detector

Romano, J.P. and Krol, J. (1992), Regulated methods for ion analysis. *Journal of Chromatography A*, **602** (1-2), 205-211.

Full Text: [J\J Chr A602, 205.pdf](J/J%20Chr%20A602,%20205.pdf)

Abstract: Ion chromatography is one of the analytical techniques that has been approved by the United States Environmental Protection Agency (EPA) for the determination of inorganic ions such as nitrite and nitrate-in-drinking water. Advantages of ion chromatography methodology include separation before detection, increased sensitivity, simple sample preparation, and faster analysis time compared to non-chromatography techniques. This paper offers a discussion of approved ion chromatography methods 300.0 and B-1011 as well as other methods that are being currently reviewed and also new methodologies for the future.

Helfferich, F.G. and Carr, P.W. (1993), Review: Non-liner waves in chromatography. I. Waves, shocks and shapes. *Journal of Chromatography A*, **629** (2), 97-122.

Full Text: [J\J Chr A629, 97.pdf](J/J%20Chr%20A629,%2097.pdf)

Abstract: Cause and effect in non-linear chromatography are examined from the point of view of wave theory. This first of four instalments is restricted to single-component systems and examines monotonic concentration variations and chromatographic peaks and bands. It uses the wave equation, which states the velocity at which a given concentration advances, to establish the properties of “waves, “ that is, monotonic concentration variations. Depending on the sense of curvature of the isotherm, a wave may be self-sharpening or non-sharpening. A self-sharpening wave remains, or sharpens to become, a shock layer; a nonsharpening wave spreads indefinitely, eventually in proportion to traveled distance. The concentration profile of a shock layer depends on the shape of the isotherm and on the dispersive effect of non-idealities, of which resistance to mass transfer usually is the most important. Mass-transfer resistance in the moving phase causes “fronting;” mass-transfer resistance within the stationary sorbent causes “tailing.” It is therefore in general not possible to model shock layers with only a single, lumped mass-transfer parameter. The concentration profile of a nonsharpening wave depends almost exclusively on the shape of the isotherm.

The knowledge of wave behavior is used to examine peak shapes in elution under overload conditions and bands in displacement. The peak shape in elution is almost entirely determined by the degree of overload and the shape of the isotherm. Wave theory confirms a rule previously stated by Knox that, in columns exceeding a certain length, samples containing the same amount of solute give peaks of essentially the same shape under conditions of predominant concentration overload, predominant volume overload, or any combination of the two. In displacement development, the final pattern can be established by determination of the lengths of the bands of the individual components according to Tiselius and separate calculation of the shock-layer profiles.

Keywords: Liquid-Chromatography, Adsorption, Band

Romano, J.P. and Krol, J. (1993), Capillary ion electrophoresis, an environmental method for the determination of anions in water. *Journal of Chromatography A*, **640** (1-2), 403-412.

Full Text: [J\J Chr A640, 403.pdf](J/J%20Chr%20A640,%20403.pdf)

Abstract: Capillary ion electrophoresis has recently been introduced as a new separations technique for the analysis of inorganic anions. Among its many attributes are rapid, highly efficient separations with different selectivities (compared to ion chromatography), simplicity, and economy.

This paper demonstrates the ability of capillary ion electrophoresis to analyze primary and secondary anionic contaminants as well as other ions of environmental concern in drinking water, groundwater, and wastewater. Analysis time is less than five minutes. A comparison of the data to ion chromatography shows excellent correlation.

De Jong, A.P.J.M., Liem, A.K.D. and Hoogerbrugge, R. (1993), Study of polychlorinated dibenzodioxins and furans from municipal waste incinerator emissions in the Netherlands: Analytical methods and levels in the environment and human food-chain. *Journal of Chromatography A*, **643** (1-2), 91-106.

Full Text: [J\J Chr A643, 91.pdf](J/J%20Chr%20A643,%2091.pdf)

Abstract: An overview is given of the methods that have been used in the study of polychlorodibenzo-p-dioxins and polychlorodibenzofurans in agriculture and the human food chain in a national survey and monitoring programme, including sampling strategies, sampling in the field and clean-up and analysis in various biological and environmental samples by high-resolution gas chromatography-high resolution mass spectrometry. The quality of data was evaluated as a result of internal quality control protocols and participation in interlaboratory comparison studies. Statistical analysis techniques and modelling were applied in order to compare and relate congener profiles in various matrices and to evaluate levels found in field studies for their use for regulatory purposes.

Keywords: Para-Dioxins, P-Dioxins, Fly-Ash, Cleanup Procedure, MS-MS, Dibenzofurans, Milk, Samples, Combustion, PCDDs

Bellot, J.C. and Condoret, J.S. (1993), Selection of competitive adsorption model for modeling displacement chromatography *Journal of Chromatography A*, **657** (2), 305-326.

Full Text: [J\J Chr A657, 305.pdf](J/J%20Chr%20A657,%20305.pdf)

Abstract: The influence of the model used to describe the basic competitive interactions between a stationary phase and migrating solutes was investigated to simulate reversed-phase displacement chromatography. Experimental separations of catechol-resorcinol mixtures using phenol as the displacer were compared with numerical simulations. The competitive Langmuir model, the LeVan-Vermeulen model and the quadratic model were chosen to describe the competitive adsorption equilibria. These models were related either to their non-competitive parameters or to their competitive parameters. A novel simplified experimental procedure is proposed to obtain competitive parameters for a binary mixture. The chromatographic process is described by the equilibrium-dispersive model and the calculations were performed by using a finite difference method. The results demonstrated that competitive isotherm equations with numerically fitted parameters do not lead to a good description of a displacement separation process. On the other hand, the LeVan-Vermeulen isotherm, with non-competitive Langmuir parameters, was found to be a relevant choice to the experimental conditions involved.

Keywords: Overloaded Elution Chromatography, Preparative Liquid-Chromatography, Band Profiles, Nonlinear Chromatography, Frontal Chromatography, Isotherms, Prediction, Optimization, Silica, Parameters

Pietta, P., Facino, R.M., Carini, M. and Mauri, P. (1994), Thermospray liquid chromatography mass-spectrometry of flavonol glycosides from medicinal plants. *Journal of Chromatography A*, **661** (1-2), 121-126.

Full Text: [J\J Chr A661, 121.pdf](J/J%20Chr%20A661,%20121.pdf)

Abstract: High-performance liquid chromatography interfaced with thermospray mass spectrometry is described for the identification of various flavonol glycosides from Ginkgo biloba, Calendula officinalis and Tilia cordata. Thermospray ionization gave parent species with few and diagnostic fragment ions, thus allowing structure elucidation as well as discrimination between different glycosylation sites.

Keywords: Calendula Officinalis, High-Performance Liquid

Oehrle, S.A. (1994), Versatility of capillary electrophoresis of anions with a high-mobility chromate electrolyte. *Journal of Chromatography A*, **671** (1-2), 383-387.

Full Text: [J\J Chr A671, 383.pdf](J/J%20Chr%20A671,%20383.pdf)

Abstract: Capillary ion electrophoresis (Waters’ trade name: Capillary Ion Analysis) is a capillary electrophoretic technique which is optimized for the rapid analysis of low-molecular-mass inorganic and organic ions. Indirect UV detection at 254 nm was used throughout. An electroosmotic flow modifier was added to the chromate electrolyte and a negative power supply was used. Analysis of anions in a variety of samples with differing matrices was investigated. Examples discussed include trace level anions in power plant water (ng/ml) and µg/ml level of anions in intermediate and concentrated sulfonated dyes. Anion analysis using this technique is rapid (less than 5 min), with little sample preparation required. The same electrolyte composition, with only minor variations, was used for all samples. Both hydrostatic mode of injection for ppm level analysis and electromigration mode of injection for trace analysis was used.

Hills, J.W., Hill, H.H., Hansen, D.R. and Metcalf, S.G. (1994), Carbon dioxide supercritical fluid extraction of incinerator fly ash with a reactive solvent modifier. *Journal of Chromatography A*, **679** (2), 319-328.

Full Text: [J\J Chr A679, 319.pdf](J/J%20Chr%20A679,%20319.pdf)

Abstract: Carbon dioxide supercritical fluid extraction was used to extract polycyclic aromatics, halogenated phenols, halogenated aromatics and dioxins from a municipal incinerator fly ash matrix. The extraction solvent was modified with methanol or a reactive solvent modifier, N, O-bis-trimethylsilyl-trifluoroacetamide (BSTFA), which was added to the sample before extraction. Extracts, obtained at two temperatures and with three supercritical fluid formulations, were analyzed by the US Environmental Protection Agency contract-laboratory program GC-MS procedure for semi-volatile organic compounds. Average recoveries of surrogate analytes with pure carbon dioxide and carbon dioxide modified with methanol were 50% (500 atm and 100°C). Average recoveries were 82% at 100°C and 54% at 30°C with BSTFA present. Carbon dioxide modified with methanol was found to be less efficient than carbon dioxide modified with BSTFA. Unlike earlier uses of reactive modifiers, the acidic and phenolic components were determined as the free acids and phenols. Hydrolysis of trimethylsilyl derivatives of phenols, produced by the modifier during the extraction, with methanol reproduced the free phenols. At 60°C the average hydrolysis yield of the four phenols was 96.7%. This hydrolysis step also allowed analysis of free acids by standard methods.

Keywords: Dibenzo-Para-Dioxins, Derivatization

Rhemrev-Boom, M.M. (1994), Determination of anions with capillary electrophoresis and indirect ultraviolet detection. *Journal of Chromatography A*, **680** (2), 675-684.

Full Text: [J\J Chr A680, 675.pdf](J/J%20Chr%20A680,%20675.pdf)

Abstract: A method is validated for the determination of anions with capillary electrophoresis (CE) in combination with indirect UV detection. The method described here is used for the analysis of eight of the most common anions (fluoride, chloride, bromide, sulphate, nitrate, nitrite, thiosulphate and phosphate). Next, the method is compared with a another buffer system for the determination of anions with CE and indirect UV detection. Typical limits of detection are obtained between 1 and 3 mg/l for the above-mentioned compounds. The repeatability and reproducibility of the system differs per compound and is, with the exception of fluoride and phosphate, between 4 and 6% and 5-10%, respectively. Linearity was observed between 1 and 10 mg/l. The method is applied for the determination of anions in drinking water, serum and urine.

Keywords: Zone Electrophoresis, Ion, Separation, Optimization, Mobilities

Suen, S.Y. and Etzel, M.R. (1994), Sorption kinetics and breakthrough curves for pepsin and chymosin using pepstatin A affinity membrances. *Journal of Chromatography A*, **686** (2), 179-192.

Full Text: [1994\J Chr A686, 179.pdf](1994/J%20Chr%20A686,%20179.pdf)

Abstract: Isotherms and kinetic parameters for pepsin and chymosin sorption to immobilized pepstatin A were measured in batch experiments. The measured single-solute parameters were used in an affnity-membrane model which included competitive sorption kinetics, axial diffusion and dead volume mixing. The predictions made using the affinity-membrane model matched the experimental breakthrough curves, whereas predictions made using local-equilibrium theory were a distinct mismatch. The performance of affinity-membrane separations was dominated by slow sorption kinetics.

Keywords: Chromatography, Performance, Protein, Bioseparations, Separations, Systems

Gros, N. and Gorenc, B. (1995), Expert-system for the ion-chromatographic determination of alkali and alkaline-earth metals in mineral waters. *Journal of Chromatography A*, **697** (1-2), 31-43.

Full Text: [1995\J Chr A697, 31.pdf](1995/J%20Chr%20A697,%2031.pdf)

Abstract: The main limiting factors (the highest concentration that may be injected, the lowest concentrations that can be determined, attainable quality of results and limitations arising from the interfering effects of ions in much higher concentrations) that could prevent the successful suppressed ion chromatographic determination of lithium, sodium, ammonium, potassium, magnesium, calcium and strontium in any particular mineral water were obtained experimentally and organized into three databases supporting the operation of an expert system. The expert system permits the planning of appropriate dilutions, the prediction of suitable detector output ranges, the planning of the appropriate standard additions or concentrations of calibration solutions necessary for the successful quantitative analysis and predicts interferences for the determination of individual ions in particular real samples. The predictions of the expert system were checked experimentally on two different natural samples. All the predictions were realistic and, although very simple calculations were used by the expert system, appropriate distinction between different extents of interferences was achieved. The described expert system works well and offers significant support to the planning of the analysis of different natural mineral waters.

Beeskow, T.C., Kusharyoto, W., Anspach, F.B., Kroner, K.H. and Deckwer, W.D. (1995), Surface modification of microporous polyamide membranes with hydroxyethyl cellulose and their application as affinity membranes. *Journal of Chromatography A*, **715** (1), 49-65.

Full Text: [J\J Chr A715, 49.pdf](J/J%20Chr%20A715,%2049.pdf)

Abstract: Activated membranes for covalent immobilization of hydroxyethyl cellulose (HEC) were obtained by reaction of microfiltration nylon membranes (N66) with bisoxirane or formaldehyde. Covalent linkage of HEC was essential for the reduction of non-specific interactions with proteins and yielded a HEC coating as a layer of extended coils at the porous network of the membrane after both activation methods, thus reducing the water permeability of the modified membranes. Immobilization of iminodiacetic acid (IDA) onto HEC-coated membranes via standard oxirane chemistry provided IDA affinity membranes with almost identical properties to IDA chromatographic sorbents. The extended coil structure of the coating accounts for protein capacities higher than a theoretical monolayer coverage would yield. The thermodynamics of the interaction of metal chelate affinity (MCA) membranes with the proteins lysozyme, ovalbumin (OVA) and concanavalin A (Con A) demonstrated that dissociation constants K-D>10-5 M are unsuitable for the retention of target proteins on a single membrane disc. This was demonstrated by the separation of a protein mixture of lysozyme (K-D approximate to 10-5 M) and Con A (K-D approximate to 10-7 M) on an MCA membrane.

Keywords: Performance Liquid-Chromatography, Concanavalin-A, 3-Dimensional Structure, Protein-Purification, Rapid Purification, Adsorption, Adsorbents, Separation, Interface, Supports

van der Hoff, G.R., Pelusio, F., Brinkman, U.A., Baumann, R.A. and van Zoonen, P. (1996), Automated solid-phase extraction coupled to gas chromatography with electron-capture detection: A combination of extraction and clean-up of pyrethroids in the analysis of surface water. *Journal of Chromatography A*, **719** (1), 59-67.

Full Text: [1996\J Chr A719, 59.pdf](1996/J%20Chr%20A719,%2059.pdf)

Abstract: The combination of automated solid-phase extraction (SPE) and large-volume introduction gas chromatography electron-capture detection (GC-ECD) is used for the determination of synthetic pyrethroids in surface and drinking water. The selectivity that is needed for the use of GC-ECD of environmental samples is achieved by addition of a polarity modifier to the sample. In this study, sufficient methanol was added to 19 ml of sample to obtain a level of 30% of modifier prior to SPE. The cartridge is washed with one additional ml of 30% methanol in water. After drying, the cartridge is eluted with toluene. GC-ECD analysis is performed by on-column introduction of 100 microliters of the toluene extract. The whole procedure was automated by using an automated solid-phase extraction apparatus. Limits of detection (LODs) for the pyrethroids in surface water are in the range of 1 to 8 ng/1 (signal-to-noise ratio = 3); even lower limits of detection are possible for drinking water.

Bruzzoniti, M.C., Mentasti, E., Sacchero, G. and Sarzanini, C. (1996), Retention model for singly and doubly charged analytes in ion-interaction chromatography. *Journal of Chromatography A*, **728** (1-2), 55-65.

Full Text: [J\J Chr A728, 55.pdf](J/J%20Chr%20A728,%2055.pdf)

Abstract: A theoretical model for -1 and -2 charged analytes in ion-interaction chromatography was studied and a general equation was developed for describing the simultaneous effect on the concentrations of the ion-interaction reagent, organic modifier and counter ion on k’. The modelling concerns the retention process as a result of several adsorption and ion-exchange equilibria, considering the adsorption of neutral and charged ion pairs on the stationary phase. The retention model was applied to a large number of experimental chromatographic data obtained in the separation of metal complexes on a silica C-8 column. The experimental design was planned in order to describe the chromatographic behaviour in a multi-dimensional space (k’ versus tetrabutylammonium, nitrate and methanol concentrations). The adsorption and ion-exchange constants were calculated by an iterative method of non-linear regression. The average error between the calculated and experimental k’ values (<13%) is close to the experimental error (about 5%), supporting the applicability of the equation developed.

Keywords: Retention Models, Thermodynamic Parameters, Metal Complexes, Acid Alizarin Violet N, Cobalt Complexes, Copper Complexes, Pair Liquid-Chromatography, Organic Modifier Concentration, Aromatic Sulfonic-Acids, Reversed-Phase Systems, Electrostatic Theory, Metal-Ions, Adsorption, Extension, Mechanism, Isotherm

Oehrle, S.A. (1996), Analysis of anions in drinking water by capillary ion electrophoresis. *Journal of Chromatography A*, **733** (1-2), 101-104.

Full Text: [J\J Chr A733, 101.pdf](J/J%20Chr%20A733,%20101.pdf)

Abstract: Capillary ion electrophoresis (CIE) (Waters’ trade name: Capillary Ion Analysis, CIA) is a capillary electrophoretic technique which is optimized for the rapid analysis of low-molecular-mass inorganic and organic ions. An electroosmotic flow modifier (OFM) was added to the chromate electrolyte and a negative power supply was used. Indirect UV detection at 254 nm was used throughout. Analysis of anions in a variety of drinking water samples was done. Anion analysis using this technique is rapid (less than 5.5 min), with little sample preparation required. Comparison of anion amounts found using CIA and conventional suppressed ion chromatography (IC) was done with good correlation between the two techniques.

Keywords: Water Analysis, Capillary Elctrophoresis, Drinking Water, Anions, Optimization

Quiñones, I. and Guiochon, G. (1996), Application of different isotherm models to the description of single-component and competitive adsorption. *Journal of Chromatography A*, **734** (1), 83-96.

Full Text: [J\J Chr A734, 83.pdf](J/J%20Chr%20A734,%2083.pdf)

Abstract: Previously reported competitive adsorption data of 2-phenylethanol and 3-phenylpropanol on ODS-silica with methanol-water mobile phase were fitted to the Langmuir isotherm, the generalized version of the Langmuir model suggested by statistical mechanics, and the Jovanovic competitive isotherm equations. The best results were obtained with the 11-parameter quadratic isotherm defined by the ratio of two second-degree polynomials, which takes into account all molecular interactions in both the solution and the sorbed monolayer. The Jovanovic model was used to derive a relationship widely applied to predict reversed-phase chromatography retention data as a function of aqueous binary mobile phases.

Keywords: Mobile-Phase Composition, Preparative Chromatography, Adsorption Isotherm, Retention Model, 2-pHenylethanol, 3-pHenylpropanol, Liquid-Chromatographic Sorbents, Frontal Chromatography, Band Profiles, Enantiomers, Binary, Silica, Prediction, Separation, Cellulose, Behavior

Hogendoorn, E.A., Hoogerbrugge, R., Baumann, R.A., Meiring, H.D., de Jong, A.P. and van Zoonen, P. (1996), Screening and analysis of polar pesticides in environmental monitoring programmes by coupled-column liquid chromatography and gas chromatography-mass spectrometry. *Journal of Chromatography A*, **754** (1-2), 49-60.

Full Text: [J\J Chr A754, 49.pdf](J/J%20Chr%20A754,%2049.pdf)

Abstract: Screening and analysis of polar pesticides based on coupled-column reversed-phase liquid chromatography (LC-LC) and GC-or LC-MS is a powerful tool in the execution of environmental monitoring programmes. This paper presents a unified approach utilising LC-LC screening followed by GC-MS confirmation. As polar pesticides are not generally amenable to GC a widely applicable derivation technique is used. The results demonstrate that the proposed LC and MS techniques are capable of analysing a wide range of polar pesticides down to levels of 0.1 microgram/l (EU limit for drinking water). LC switching techniques for group analysis or individual compounds rely on the reversed-phase retention and the UV detectability of the pesticides in combination with the choice of the LC columns. Fast miniaturised derivatization prior to GC-MS forms an integral part in the proposed strategy. In order to avoid extraction losses, derivation in the aqueous sample, preferably with electrophoric reagents with enhanced sensitivity in GC-NICI-MS are employed where possible. In this communication, method development and validation fitting in the strategy are evaluated and the results of the combined approach are discussed.

Notes: highly cited

? Mazzotti, M., Storti, G. and Morbidelli, M. (1997), Optimal operation of simulated moving bed units for nonlinear chromatographic separations. *Journal of Chromatography A*, **769** (1), 3-24.

Full Text: [1997\J Chr A769, 3.pdf](1997/J%20Chr%20A769,%203.pdf)

Abstract: The simulated moving bed (SMB) technology is receiving more and more attention as a convenient technique for the production scale continuous chromatographic separation of fine chemicals. Characteristic features of SMBs are improved performances with respect to preparative chromatography and nonlinear competitive adsorption behavior. The selection of the operating conditions to achieve high separation performances under nonlinear conditions is acknowledged to be the major problem in running a SMB unit for a new application. This problem is solved in this paper, where a general theory is developed which provides explicit criteria for the choice of the operating conditions of SMB units to achieve the prescribed separation of a mixture characterized by both constant selectivity Langmuir isotherms and variable selectivity modified Langmuir isotherms. The space of the operating parameters, i.e. the fluid to solid flow-rate ratios, is divided in regions with different separation regimes. The effect of increasing nonlinearity of the system on the operating conditions and the separation performances, namely desorbent requirement, enrichment, productivity and robustness of the separation, is thoroughly analyzed. The obtained results are shown to provide a very convenient tool to find both optimal and robust operating conditions of SMB units. Finally, a comparison between model predictions and experimental data dealing with the resolution of different racemic mixtures assesses the reliability and accuracy of the obtained theoretical findings.

Keywords: Adsorption, Adsorption Isotherms, Adsorption Technology, Chiral Epoxide, Competitive Adsorption, Countercurrent, Enantioseparation, Isotherms, Non-Linear Chromatography, Preparative Chromatography, Robust Design, Simulated Moving Bed Chromatography

van den Hoop, M.A. and van Staden, J.J. (1997), Determination of phosphate in natural waters by capillary electrophoresis. Influence of solution composition on migration time and response. *Journal of Chromatography A*, **770** (1-2), 321-328.

Full Text: [J\J Chr A770, 321.pdf](J/J%20Chr%20A770,%20321.pdf)

Abstract: This paper deals with the determination of the more complex phosphate anion by capillary electrophoresis using indirect UV detection. First, the pH of the running electrolyte influences both the migration time and the response of the phosphate anion. Both effects could be explained well by taking into account phosphorus speciation in solution. In addition, the experimental method has been applied to three different sets of natural water systems; (i) groundwater, (ii) surface water and (iii) stemflow samples. The migration time behaviour of phosphate was different for the three sample sets and, hence, difficulties arise with respect to a clear and unique identification of the compound. Deviations herein could be minimized by applying a correction method for migration time drift. Concentrations of phosphate could be quantified in most samples and were confirmed by a colorimetric method. Average recoveries of additions of phosphate to groundwater, surface water and stemflow samples were 105, 83 and 103%, respectively. For one stemflow sample, quantitative recovery of phosphate was possible only by changing the pH of the running electrolyte solution. The latter observation might be very useful in setting up speciation-related measurement methods.

Abad, E., Caixach, J. and Rivera, J. (1997), Application of DB-5ms gas chromatography column for the complete assignment of 2,3,7,8-substituted polychlorodibenzo-*p*-dioxins and polychlorodibenzofurans in samples from municipal waste incinerator emissions. *Journal of Chromatography A*, **786** (1), 125-134.

Full Text: [J\J Chr A786, 125.pdf](J/J%20Chr%20A786,%20125.pdf)

Abstract: The analysis of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using four different gas chromatography (GC) columns (DB-5, DB-5ms, DB-DIOXIN and Cp-Sil 88) for the correct assignment and accurate determination of the 2,3,7,8-chloro-substituted isomers to attain the limit value of 0.1 ng I-TEF/Nm3 (I-TEF=International Toxic Equivalent Factor) for the municipal waste incinerator (MWI) emissions is described. The DB-Sms GC column allows improvements in the analysis of PCDDs and PCDFs, especially for several toxic isomers which coelute with interfering compounds on DB-5, DB-DIOXIN or Cp-Sil ss GC columns, such as 2,3,7,8-TCDF, 1,2,3,4,7, 8-HxCDF, 1,2,3,7,8-PeCDD or 1,2,3,7,8,9-HxCDD. In fact, the results indicated that the column allows the correct assignment of fourteen toxic isomers. However, separation of 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF and 1,2,3,7,8,9-HxCDF shows interferences, which are critical. (C) 1997 Elsevier Science B.V.

Keywords: Polychlorodibenzo-p-Dioxins, Polychlorodibenzofurans, Stationary

Douce, D.S., Clench, M.R., Cooke, M. and Wang, J. (1997), Evidence for the adsorption of nitrated polycyclic aromatic hydrocarbons by tree bark. *Journal of Chromatography A*, **786** (2), 275-283.

Full Text: [J\J Chr A786, 275.pdf](J/J%20Chr%20A786,%20275.pdf)

Abstract: It has been previously demonstrated that polycyclic aromatic hydrocarbons (PAH) are adsorbed onto tree bark and that bark may in fact be used as a passive sampler for these compounds. It is now demonstrated that by suitable modification of this methodology nitrated polycyclic aromatic hydrocarbons (nitro-PAH) may also be detected in bark. Bark samples were taken from urban locations in Sheffield, South Yorkshire, UK. After soxhlet extraction using dichloromethane, the nitro-PAH fraction was isolated by solid-phase extraction using amino and alumina cartridges in series. Nitro-PAH were detected by gas chromatography with electron capture detection and gas chromatography-mass spectrometry in the negative chemical ionisation mode. A comparison is made with nitro-PAH found in diesel particulate extracts.

Keywords: Tree Bark, Polynuclear Aromatic Hydrocarbons, Nitrated Polynuclear Aromatic Hydrocarbons

Beltrán, J.L., Guiteras, J. and Ferrer, R. (1998), Parallel factor analysis of partially resolved chromatographic data - Determination of polycyclic aromatic hydrocarbons in water samples. *Journal of Chromatography A*, **802** (2), 263-275.

Full Text: [J\J Chr A16, 263.pdf](J/J%20Chr%20A16,%20263.pdf)

Abstract: A procedure, based on parallel factor analysis (PARAFAC), has been used for the analysis of polycyclic aromatic hydrocarbons in water samples. The chromatographic system has been set to obtain short-time chromatograms containing several unresolved peaks. The detection system consisted of a fast-scanning fluorescence spectra detector, which allowed three-dimensional data - where retention time, emission wavelengths and fluorescence intensity were represented - to be obtained. The procedure has been applied to spiked tap water samples with good results. (C) 1998 Elsevier Science B.V.

Keywords: Factor Analysis, Water Analysis, Fluorescence Detection, Detection, LC, Polynuclear Aromatic Hydrocarbons, Performance Liquid-Chromatography, Excitation/Emission Matrix Spectrofluorometer, Transformation Factor-Analysis, Principal Component Analysis, pHotodiode-Array Detection, Fluorescence Detection, Capillary Electrophoresis, Peak Purity, Ocean Water, Calibration

Bao, M.L., Pantani, F., Griffini, O., Burrini, D., Santianni, D. and Barbieri, K. (1998), Determination of carbonyl compounds in water by derivatization-solid-phase microextraction and gas chromatographic analysis. *Journal of Chromatography A*, **809** (1-2), 75-87.

Full Text: [J\J Chr A809, 75.pdf](J/J%20Chr%20A809,%2075.pdf)

Abstract: The solid-phase microextraction (SPME) technique was evaluated for the determination of 23 carbonyl compounds in water. The carbonyl compounds in water were derivatized with omicron-(2, 3, 4, 5, 6-pentafluorobenzyl)-hydroxylamine hydrochloride (PFBHA), extracted with SPME from liquid or headspace and analyzed by GC with electron capture detection (GC-ECD). The effects of agitation techniques and the addition of salt (NaCl) on extraction, the absorption-time and absorption-concentration profiles were examined. The precision of the SPME technique for the determination of carbonyl compounds was evaluated with spiked bidistilled water, ozonated drinking water, and rain water. The relative standard deviations obtained from different spiked water matrix were similar, and in the range of 5.7-21.1%. The precision can be further improved by using an internal standard. With 4 ml of water sample, the limits of detection for most of the tested carbonyl compounds using liquid or headspace SPME-GC-ECD were similar and in the range of 0.006-0.2 micrograms/l, except for glyoxal and methylglyoxal, which showed low sensitivity when using headspace SPME. In the analysis of an ozonated drinking water sample, the SPME techniques gave comparable results to those of the conventional liquid-liquid extraction method.

Seeber, G., Buchmeiser, M.R., Bonn, G.K. and Bertsch, T. (1998), Determination of airborne, volatile amines from polyurethane foams by sorption onto a high-capacity cation-exchange resin based on poly(succinic acid). *Journal of Chromatography A*, **809** (1-2), 121-129.

Full Text: [J\J Chr A809, 121.pdf](J/J%20Chr%20A809,%20121.pdf)

Abstract: A high-capacity carboxylic acid-functionalized resin prepared by ring-opening metathesis polymerization based on cross-linked endo, endo-poly(norborn-2-ene-5, 6-dicarboxylic acid) was used for the sampling of volatile, airborne amines from polyurethane (PU) foams. Six tertiary amines which represent commonly used promotors for the formation of PUs from diisocyanates and polyols, namely pentamethyldielhylenetriamine, diazabicyclooctane, N-methylmorpholine, N-ethylmorpholine, 1,4-dimethylpiperazine and N, N-dimethylethanolamine, were sorbed onto the new resin. The sorption behavior of the new material was investigated in terms of loading capacities, the influence of concentration, flow-rate as well as of the amount of resin. Breakthrough curves were recorded from each single component as well as of mixtures thereof. Finally, the resin was used for the sampling of amines evaporating from PU foams applied in buildings. Further information about time dependent concentration profiles were obtained using a combination of GC-MS and Fourier transform IR spectroscopy. (C) 1998 Elsevier Science B.V. All rights reserved.

Keywords: Poly(Succinic Acid)-Based Sorbents, Sorbents, Extraction Methods, Air Analysis, Amines, Solid-Phase Extraction, Performance Liquid-Chromatography, Aliphatic-Amines, Biogenic-Amines, Air, Derivatization, Polyamines, HPLC

Hogendoorn, E.A., Ossendrijver, F.M., Dijkman, E. and Baumann, R.A. (1999), Rapid determination of glyphosate in cereal samples by means of pre-column derivatisation with 9-fluorenylmethyl chloroformate and coupled-column liquid chromatography with fluorescence detection. *Journal of Chromatography A*, **833** (1), 67-73.

Full Text: [J\J Chr A833, 67.pdf](J/J%20Chr%20A833,%2067.pdf)

Abstract: A rapid procedure for the determination of glyphosate in cereals has been developed. Convenient sample pretreatment is carried out by (i) a overnight standing extraction of 1.0 g homogenized sample with 20 ml of water, (ii) centrifugation of the samples, (iii) a passing of 2.5 ml of the clear layer through a 100 mg C18 solid-phase extraction cartridge and (iv) collection of the last 1.5 ml of the eluent into a calibrated tube. For the instrumental analysis, the efficient approach developed earlier for environmental water samples [J.V. Sancho, F. Hernández, F.J. LUpez, E.A. Hogendoorn, E. Dijkman, P. van Zoonen, J. Chromatogr. A, 737 (1996) 75] was successfully adopted for the determination of glyphosate in the obtained cereal extracts. The procedure includes a 15 min derivatisation step of the analyte with 9-fluorenylmethyl chloroformate and a 16 times dilution step prior to instrumental analysis employing coupled-column LC with fluorescence detection. The developed procedure has a sample throughput of more than 25 samples per day and a limit of quantification of 0.5 mg/kg. The method was validated by analyzing freshly spiked cereal samples and samples with aged residues at levels between 1.0 and 10 mg/kg. The overall recovery of the freshly spiked samples was 86% (n = 10) with a repeatability of 6.5% and a reproducibility of 9.5%. For samples with aged residues recoveries performed at different time intervals (range 80-150 days) did not differ significantly; the overall recovery (n = 10) was 74% with a repeatability and reproducibility of 14 and 20%, respectively.

Blatný, P. and Kvasnička, F. (1999), Application of capillary isotachophoresis and capillary zone electrophoresis to the determination of inorganic ions in food and feed samples. *Journal of Chromatography A*, **834** (1-2), 419-431.

Full Text: [J\J Chr A834, 419.pdf](J/J%20Chr%20A834,%20419.pdf)

Abstract: The purpose of this review is to summarise critically the possibilities of capillary isotachophoresis and capillary zone electrophoresis for the determination of inorganic ions in food and feed samples. This article covers papers published since 1977. (C) 1999 Elsevier Science B.V. All rights reserved.

Keywords: Reviews, Food Analysis, Isotachophoresis, Capillary Zone Electrophoresis, Inorganic Cations, Inorganic Anions, Alkaline-Earth Metal, UV Detection, pHotometric Detection, Foodstuff Analytics, Drinking-Water, Anions, Separation, Nitrate, Nitrite, Complex

Schmitt-Kopplin, pH., Burhenne, J., Freitag, D., Spiteller, M. and Kettrup, A. (1999), Development of capillary electrophoresis methods for the analysis of fluoroquinolones and application to the study of the influence of humic substances on their photodegradation in aqueous phase. *Journal of Chromatography A*, **837** (1-2), 253-265.

Full Text: [J\J Chr A837, 253.pdf](J/J%20Chr%20A837,%20253.pdf)

Abstract: Analytical techniques in capillary zone electrophoresis (CZE) and capillary electrokinetic chromatography (MEKC) were developed for the analysis of fluoroquinolone carboxylic acids (norfloxacin, ciprofloxacin, ofloxacin, enrofloxacin, danofloxacin) and their major degradation products. The theoretical determination of the charge densities of the studied compounds allowed the rapid development of the separation buffer conditions. These rapid estimations can be used as an effective screening tool in capillary electrophoresis (CE) method development. The two CE methods were applied to follow the photostability of enrofloxacin with and without humic substances under natural sunlight conditions. Enrofloxacin showed an average half-life of 2.0 h under summer sunlight conditions and the photolysis kinetic decreased in the presence of humic acids. The presence of humic substances in irradiated solution caused changes in the measured photodegradation product profile. Studies in affinity capillary electrophoresis (ACE) of enrofloxacin and its degradation products with the dissolved humic acids showed a lower adsorption potential of enrofloxacin to the humic phase than the degradation products, The adsorption of some photodegradation products to the dissolved humic matrix may explain the differences in the measured photodegradation products concentration in irradiated solutions. ACE turned out to be a rapid screening tool for the comparison of the adsorption potential of active ingredients and their degradation products to dissolved organic phases using very small amounts of sample. (C) 1999 Elsevier Science B.V. All rights reserved.

Keywords: Affinity Capillary Electrophoresis, pHotodegradation, Fluoroquinolones, Quinolones, Humic Acids, Micellar Electrokinetic Chromatography, Performance Liquid-Chromatography, Zone Electrophoresis, pHotolytic Degradation, Carboxylic-Acids, S-Triazines, Ciprofloxacin, Pesticides, Elucidation, Atrazine

Rantakokko, P., Nissinen, T. and Vartiainen, T. (1999), Determination of bromide ion in raw and drinking waters by capillary zone electrophoresis. *Journal of Chromatography A*, **839** (1-2), 217-225.

Full Text: [J\J Chr A217, 839.pdf](J/J%20Chr%20A217,%20839.pdf)

Abstract: A new capillary zone electrophoretic method was developed for the determination of bromide ion in raw and drinking waters. An NaCl-based low-pH buffer caused a reduction of electroosmotic flow (EOF) in the buffer zone, whereas injected water sample resulted in higher EOF in the sample zone thus pumping out the neutral water plug. Sample stacking was used for the preconcentration. The method was applicable for waters from low to intermediate ionic strengths, i.e., the concentration of chloride should preferably be less than 40 mg/l. The method had a limit of detection of 15 micrograms/l at a signal-to-noise ratio of three (S/N = 3) and a limit of quantitation of 20 micrograms/l. CZE results obtained with real samples were compared with ion chromatography--inductively coupled mass spectrometric results.

van der Hoff, G.R. and van Zoonen, P. (1999), Trace analysis of pesticides by gas chromatography. *Journal of Chromatography A*, **843** (1-2), 301-322.

Full Text: [J\J Chr A483, 301.pdf](J/J%20Chr%20A483,%20301.pdf)

Abstract: The analysis of pesticides is relevant to both food quality and the environment. Many laboratories are occupied with the analysis of pesticides in food, water or soil. Capillary gas chromatography is the technique most widely used in pesticide analysis. In present laboratory practice it serves as a screening method for over 300 pesticides. In this review we describe the role of gas chromatography as an analytical tool in combination with currently used or recently developed sample preparation techniques.

Hogendoorn, E.A., Westhuis, K., Dijkman, E., Heusinkveld, H.A., den Boer, A.C., Evers, E.A. and Baumann, R.A. (1999), Semi-permeable surface analytical reversed-phase column for the improved trace analysis of acidic pesticides in water with coupled-column reversed-phase liquid chromatography with UV detection. Determination of bromoxynil and bentazone in surface water. *Journal of Chromatography A*, **858** (1), 45-54.

Full Text: [J\J Chr A858, 45.pdf](J/J%20Chr%20A858,%2045.pdf)

Abstract: The coupled-column (LC-LC) configuration consisting of a 3 microm C18 column (50×4.6 mm I.D.) as the first column and a 5 microm C18 semi-permeable-surface (SPS) column (150×4.6 mm I.D.) as the second column appeared to be successful for the screening of acidic pesticides in surface water samples. In comparison to LC-LC employing two C18 columns, the combination of C18/SPS-C18 significantly decreased the baseline deviation caused by the hump of the co-extracted humic substances when using UV detection (217 nm). The developed LC-LC procedure allowed the simultaneous determination of the target analytes bentazone and bromoxynil in uncleaned extracts of surface water samples to a level of 0.05 microg/l in less than 15 min. In combination with a simple solid-phase extraction step (200 ml of water on a 500 mg C18-bonded silica) the analytical procedure provides a high sample throughput. During a period of about five months more than 200 ditch-water samples originating from agricultural locations were analyzed with the developed procedure. Validation of the method was performed by randomly analyzing recoveries of water samples spiked at levels of 0.1 microg/l (n = 10), 0.5 microg/l (n = 7) and 2.5 microg/l (n = 4). Weighted regression of the recovery data showed that the method provides overall recoveries of 95 and 100% for bentazone and bromoxynil, respectively, with corresponding intra-laboratory reproducibilities of 10 and 11%, respectively. Confirmation of the analytes in part of the samples extracts was carried out with GC-negative ion chemical ionization MS involving a derivatization step with bis (trifluoromethyl)benzyl bromide. No false negatives or positives were observed.

Molins, C., Hogendoorn, E.A., Dijkman, E., Heusinkveld, H.A. and Baumann, R.A. (2000), Determination of linuron and related compounds in soil by microwave-assisted solvent extraction and reversed-phase liquid chromatography with UV detection. *Journal of Chromatography A*, **869** (1-2), 487-496.

Full Text: [J\J Chr A869, 487.pdf](J/J%20Chr%20A869,%20487.pdf)

Abstract: The combination of microwave-assisted solvent extraction (MASE) and reversed-phase liquid chromatography (RPLC) with UV detection has been investigated for the efficient determination of phenylurea herbicides in soils involving the single-residue method (SRM) approach (linuron) and the multi-residue method (MRM) approach (monuron, monolinuron, isoproturon, metobromuron, diuron and linuron). Critical parameters of MASE, viz, extraction temperature, water content and extraction solvent were varied in order to optimise recoveries of the analytes while simultaneously minimising co-extraction of soil interferences. The optimised extraction procedure was applied to different types of soil with an organic carbon content of 0.4-16.7%. Besides freshly spiked soil samples, method validation included the analysis of samples with aged residues. A comparative study between the applicability of RPLC-UV without and with the use of column switching for the processing of uncleaned extracts, was carried out. For some of the tested analyte/matrix combinations the one-column approach (LC mode) is feasible. In comparison to LC, coupled-column LC (LC-LC mode) provides high selectivity in single-residue analysis (linuron) and, although less pronounced in multi-residue analysis (all six phenylurea herbicides), the clean-up performance of LC-LC improves both time of analysis and sample throughput. In the MRM approach the developed procedure involving MASE and LC-LC-UV provided acceptable recoveries (range, 80-120%) and RSDs (<12%) at levels of 10 microg/kg (n = 9) and 50 microg/kg (n = 7), respectively, for most analyte/matrix combinations. Recoveries from aged residue samples spiked at a level of 100 microg/kg (n = 7) ranged, depending of the analyte/soil type combination, from 41-113% with RSDs ranging from 1-35%. In the SRM approach the developed LC-LC procedure was applied for the determination of linuron in 28 sandy soil samples collected in a field study. Linuron could be determined in soil with a limit of quantitation of 10 microg/kg.

Keywords: Supercritical-Fluid Extraction, Polycyclic Aromatic-Hydrocarbons, Organochlorine Pesticides, Gas-Chromatography, Sediments, Samples, Optimization, Metabolites, Isoproturon, Triazines, Microwave-Assisted Solvent Extraction, Extraction Methods, Coupled Columns, Soil, Environmental Analysis, Linuron, pHenylureas, Pesticides

Delcomyn, C.A., Weinberg, H.S. and Singer, P.C. (2001), Use of ion chromatography with post-column reaction for the measurement of tribromide to evaluate bromate levels in drinking water. *Journal of Chromatography A*, **920** (1-2), 213-219.

Full Text: [J\J Chr A920, 213.pdf](J/J%20Chr%20A920,%20213.pdf)

Abstract: A user-friendly ion chromatography method in conjunction with a post-column reaction (PCR) achieves practical quantitation limits for the oxyhalides bromate and chlorite of 0.05 µg/l and 0.10 µg/l, respectively. This level of measurement allows for the accurate assessment of bromate contributed to finished drinking waters that have been chlorinated using sodium hypochlorite. The target sensitivity of oxyhalides in the presence of other major ion species typically found in drinking water is achieved by PCR using excess bromide under acidic conditions to form a tribromide species that is detected by ultraviolet spectrometry. The method setup involves non-hazardous materials, as opposed to other recently developed methods that employ somewhat hazardous chemicals for generating the reaction necessary for the detection of bromate at sub-µg/l levels. No pretreatment of the samples is required, other than filtration and quenching of oxidant residual. (C) 2001 Elsevier Science BN. All rights reserved.

Keywords: Water Analysis, Tribromide, Bromate, Chlorite, Oxyhalides, Bromide, Chlorate, Iodate, Inorganic Anions, Performance Liquid-Chromatography, Plasma-Mass Spectrometry, Postcolumn Derivatization, Bottled Water

Carrillo-Morales, G., Dávila-Jiménez, M.M., Elizalde-González, M.P. and Peláez-Cid, A.A. (2001), Removal of metal ions from aqueous solution by adsorption on the natural adsorbent CACMM2. *Journal of Chromatography A*, **938** (1-2), 237-242.

Full Text: [J\J Chr A938, 237.pdf](J/J%20Chr%20A938,%20237.pdf)

Abstract: The adsorption of Cd+2, Cr+3, Cu+2, Fe+3, Ni+2, Pb+2 and Zn+2 from aqueous solution was used to study the sorption properties of the adsorbent CACMM2 extracted from a cactus. Quantitation of the cation concentrations was performed by HPLC with diode array detection using on-column complex formation with 8-hydroxyquinoline. Removal degree from 100 mg M*n*+ l-1 solutions followed the series: Cu>Cd>Fe>Ni>Cr>Zn. Henry and Freundlich constants were determined since adsorption did not reach saturation plateaux in the studied concentration interval. Sorption of chromium by CACMM2 was stronger than the sorption onto lignin, calcium oxalate and cellulose up to 1000 mg Cr3+ l-1. Copper and iron were desorbed to a greater extent, while lead adsorption was practically irreversible. CACMM2 was able to remove more than 83% of chromate in a freshly prepared and exhausted chromate commercial solution.

Keywords: Metal Cations

Cavazzini, A., Felinger, A., Kaczmarski, K., Szabelski, P. and Guiochon, G. (2002), Study of the adsorption equilibria of the enantiomers of 1-phenyl-1-propanol on cellulose tribenzoate using a microbore column. *Journal of Chromatography A*, **953** (1-2), 55-66.

Full Text: [J\J Chr A953, 55.pdf](J/J%20Chr%20A953,%2055.pdf)

Abstract: Using competitive frontal analysis, the binary adsorption isotherms of the enantiomers of 1-phenyl-1-propanol were measured on a microbore column packed with a chiral stationary phase based on cellulose tribenzoate. These measurements were carried out using only the racemic mixture. The experimental data were fitted to four different isotherm models: Langmuir, BiLangmuir, Langmuir–Freundlich and Tóth. The BiLangmuir and the Langmuir–Freundlich models accounted best for the competitive adsorption data. An excellent agreement between the experimental and the calculated overloaded band profiles for various samples of racemic mixture was obtained when the equilibrium dispersive model of chromatography was used together with the BiLangmuir competitive isotherm. The isotherm parameters measured under competitive conditions were used to calculate the overloaded band profiles of large samples of the pure *S*- and *R*-enantiomers, too. A satisfactory agreement between the experimental and calculated band profiles was observed when using in the computation the corresponding single component BiLangmuir isotherm derived from the binary isotherm previously determined. Thus only data derived from the racemic mixture are required for computer optimization of the preparative chromatography separation of the enantiomers.

Keywords: 1-pHenyl-1-Propanol, Cellulose Tribenzoate

Kaczmarski, K., Cavazzini, A., Szabelski, P. Zhou, D.M., Liu, X.D. and Guiochon, G. (2002), Application of the general rate model and the generalized Maxwell–Stefan equation to the study of the mass transfer kinetics of a pair of enantiomers. *Journal of Chromatography A*, **962** (1-2), 57-67.

Full Text: [J\J Chr A962, 57.pdf](J/J%20Chr%20A962,%2057.pdf)

Abstract: The general rate model of chromatography can be coupled with the generalized Maxwell–Stefan equation that describes the surface diffusion flux. The resulting model is useful to describe the behavior of two enantiomers during their separation on chiral phases, cases in which the mass transfer kinetics is known to be sluggish. A case in point is the modeling of the elution profiles of the racemic mixture of the two enantiomers of 1-phenyl-1-propanol on cellulose tribenzoate coated on silica, a popular chiral stationary phase. The competitive equilibrium isotherm behavior of the two enantiomers on the chiral stationary phase was described using the competitive Tóth isotherm model. An excellent agreement between the experimental and the calculated profiles was observed in the whole range of experimental conditions investigated, at low and high column loadings.

Keywords: Enantiomeric Separation, General Rate Model, Generalized Maxwell-Stefan Equation, Kinetic Studies, Adsorption Behavior, Diffusion, Cellulose, 1-pHenyl-1-Propanol, Chromatography, Profiles, Zeolites, Phase

Berezkin, V.G. and Viktorova, E.N. (2002), Changes in the basic experimental parameters of capillary gas chromatography in the 20th century. *Journal of Chromatography A*, **985** (1-2), 3-10.

Full Text: [J\J Chr A985, 3.pdf](J/J%20Chr%20A985,%203.pdf)

Abstract: Studies of qualitative changes in capillary gas chromatography are of significant practical and scientific interest. This paper analyzes the evolution of the most important experimental chromatographic parameters over the last three decades and is based on the use of a new approach to scientometrical research that is referred to as applied scientometry. One essential feature of this approach is that it looks at the entire contents of each paper rather than only taking account its title, abstract, and references (as is typical for conventional scientometry). In this paper, we monitor how the most important chromatographic parameters, such as column length and diameter, layer thickness, stationary liquid phases, separation temperature mode, etc., have been evolving over the period 1970–2000. We used data from the following journals: Chromatographia, Journal of Chromatography, and Journal of High Resolution Chromatography and Chromatography Communications.

Keywords: Reviews, Scientometrics, Gas Chromatography

Wu, C.Y., Suen, S.Y., Chen, S.C. and Tzeng, J.H. (2003), Analysis of protein adsorption on regenerated cellulose-based immobilized copper ion affinity membranes. *Journal of Chromatography A*, **996** (1-2), 53-70.

Full Text: [J\J Chr A996, 53.pdf](J/J%20Chr%20A996,%2053.pdf)

Abstract: Immobilized metal affinity membranes (IMAMs) were prepared by immobilizing copper ions on microporous regenerated cellulose membranes through different types of chelating agents (dentate and triazine dye). The resulting chelator utilization percentages were 95% for iminodiacetic acid, 56% for N, N, N-tris(carboxymethyl)ethylenediamine, 52% for Cibacron blue 3GA, and 140% for Cibacron red 3BA. On the other hand, triazine dyes were slightly superior to dentate chelators on metal ion utilization for protein adsorption. In batch single-protein adsorptions, the protein adsorption capacity decreased with increasing molecular size and number of accessible surface histidine residues [lysozyme >bovine serum albumin (BSA)>gamma-globulin], while the binding strength order was the opposite (gamma-globulin>BSA>lysozyme). Moreover, the proportions of specific and nonspecific bindings were evaluated by varying pH and salt concentration conditions. A large fraction of the adsorption capacity was found to come from the nonspecific interactions for the prepared IMAMs. Lastly, batch three-protein adsorptions were performed and weak adsorption competition was observed. (C) 2003 Elsevier Science B.V. All rights reserved.

Keywords: Binding Studies, Adsorption, Membranes, Immobilized Metal Affinity Chromatography, Proteins, Cibacron-Blue, Poly(2-Hydroxyethylmethacrylate) Membranes, Lysozyme Adsorption, Stationary Phases, Chromatography, Purification, Separation, Polysulfone

Notes: highly cited

? Liu, R., Zhou, J.L. and Wilding, A. (2004), Simultaneous determination of endocrine disrupting phenolic compounds and steroids in water by solid-phase extraction-gas chromatography-mass spectrometry. *Journal of Chromatography A*, **1022** (1-2), 179-189.

Full Text: [2004\J Chr A1022, 179.pdf](2004/J%20Chr%20A1022,%20179.pdf)

Abstract: A solid-phase extraction (SPE)-gas chromatography (GC)-mass spectrometry (MS) analytical method for the simultaneous separation and determination of endocrine disrupting chemicals (EDCs) from water samples is described in detail. Important and contrasting EDCs including estrone, 17beta-estradiol, 17alpha-ethynylestradiol, 16alpha-hydroxyestrone, 4-nonylphenol, bisphenol A and 4-tert-octylphenol were selected as the target compounds. The SPE technique, followed by the derivatisation with his (trimethylsilyl) trifluoroacetamide was used for the extraction recoveries of target compounds from water samples. A number of parameters that may affect the recovery of EDCs, such as the type of SPE cartridges, eluents, as well as water properties including pH value, and concentration of salts and humic substances were investigated. It is shown that the Oasis cartridges produced the best recoveries of target EDCs while ethyl acetate was efficient in eluting EDCs from SPE cartridges. The recovery of some EDCs was enhanced by the addition of salt, but reduced by the increase in pH value and humic acid concentration. The optimised method was further verified by performing spiking experiments in natural river water and seawater matrices, with good recovery and reproducibility for all the selected compounds. The established method was successfully applied to environmental water samples from East and West Sussex, UK, for the determination of the target EDCs. (C) 2003 Elsevier B.V. All fights reserved.

Keywords: Water Analysis, Endocrine Disruptors, Steroids, Phenolic Compounds, Performance Liquid-Chromatography, Sewage-Treatment Plants, Ethoxy-Chain Nonylphenols, Bisphenol-A, Waste-Water, Microextraction Method, Fluorescence Detection, Trace Amounts, River Water, Estrogens

Zhang, A.Y., Kuraoka, E., Hoshi, H. and Kumagai, M. (2004), Synthesis of two novel macroporous silica-based impregnated polymeric composites and their application in highly active liquid waste partitioning by extraction chromatography. *Journal of Chromatography A*, **1061** (2), 175-182.

Full Text: [J\J Chr A1061, 175.pdf](J/J%20Chr%20A1061,%20175.pdf)

Abstract: Two kinds of novel macroporous silica-based chelating polymeric adsorption materials. TODGA/SiO2-P and CMPO/SiO2-P. were synthesized by impregnating and immobilizing two chelating agents, N,N,N’,N’-tetraoctyl-3-oxapentane-1,5-diamide (TODGA) and octyl(phenyl)-N,N-diisobutylcarbamoylmethylphoshine oxide (CMPO), into the pores of SiO2-P particles. To separate minor actinides (MA(III)) such as Am(III) and Cm(HI), the adsorption and elution of 13 typically simulated fission products from a 3 M HNO3 were performed. It was found that in the first column packed with TODGA/SiO2-P, all of the simulated elements were separated effectively into four groups: (1) Cs(I), Mo(VI), and the most portion of Ru(III) (non-adsorption group), (2) Sr(II), small portion of Gd(III) and all of light REs(III) (MA-/RE-Sr group). (3) most of Gd(III) and all heavy RE(III) (hRE group), and (4) Zr(IV), Pd(II), and a little of Ru(III) (Zr-Pd group) by eluting with 3.0 M HNO3. 1.0 M HNO3, distilled water, and 0.5 M H2C2O4, respectively, at 298 K. MA(III) was predicted to flow into the second group along with Nd(III) because of their close adsorption-elution onto TODGA/SiO2-P. In the second column packed with CMPO/SiO2-P, MA-/RE-Sr group was separated into (1) Sr(II), (2) middle RE(III) such as Gd(III), Eu(III), Sm(III), and quite small portion of Nd(III) (MA-mRE), and (3) light RE(III) such as La(III), Ce(III), and most of Nd(III) by eluting with 3.0 M HNO3 and 0.05 M DTPA-pH 2.0, respectively, at 323 K. MA(III) was believed to flow into MA-mRE group along with Gd(III) due to their similar adsorption properties towards CMPO/SiO2-P. Based on positions of MA(M) appeared in light and heavy RE(III), an improved MAREC process for MA(III) partitioning from HLW was proposed. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Synthesis, Silica-Based Polymeric Material, Chromatographic Separation, Highly Active Liquid Waste, MAREC Process, Solvent-Extraction, Octyl(pHenyl)-N,N-Diisobutylcarbamoylmethylphosphine Oxide, Radiolytic Degradation, Minor Actinides, Separation, Adsorption, Lanthanides, Resin, Cmpo

? Rimando, A.M. and Perkins-Veazie, P.M. (2005), Determination of citrulline in watermelon rind. *Journal of Chromatography A*, **1078** (1-2), 196-200.

Full Text: [2005\J Chr A1078, 196.pdf](2005/J%20Chr%20A1078,%20196.pdf)

Abstract: Watermelon (Citrullus vulgaris Schrad.) is a natural and rich source of the non-essential amino acid citrulline. Citrulline is used in the nitric oxide system in humans and has potential antioxidant and vasodilatation roles. A method using gas chromatography-mass spectrometry (GC-MS) was developed to separate citrulline from glutamic acid, which co-elute when analyzed by high performance liquid chromatography. Watermelons were analyzed by GC-MS to determine the citrulline content among varieties, types, flesh colors, and tissues. Citrulline content ranged from 3.9 to 28.5 mg/g dry weight (dwt) and was similar between seeded and seedless types (16.6 and 20.3 mg/g dwt, respectively). Red flesh watermelons had slightly less citrulline than the yellow or orange flesh watermelons (7.4, 28.5 and 14.2 mg/g dwt, respectively). Rind contained more citrulline than flesh on a dry weight basis (24.7 and 16.7 mg/g dwt, respectively) but a little less on a fresh weight (fwt) basis (1.3 and 1.9 mg/g fwt, respectively). These results indicate that watermelon rind, an underutilized agricultural waste, offers a source of natural citrulline. Published by Elsevier B.V.

Keywords: Citrulline, Watermelon, Rind, Wild Watermelon, Amino-Acids, Arge Homolog, Derivatives, Leaves

? Cano, T., Offringa, N.D. and Willson, R.C. (2005), Competitive ion-exchange adsorption of proteins: Competitive isotherms with controlled competitor concentration. *Journal of Chromatography A*, **1079** (1-2), 116-126.

Full Text: [2005\J Chr A1079, 116.pdf](2005/J%20Chr%20A1079,%20116.pdf)

Abstract: The competitive adsorption processes inevitably present in chromatographic separations of complex mixtures have not been extensively studied. This is partly due to the difficulty of measuring true competitive isotherms, in which all system parameters (including competitor concentrations) are held constant. We report a novel approach to determining competitive protein adsorption isotherms in which the competitor concentration is held constant across the entire isotherm. By using the heme prosthetic group in cytochrome b(5) as a quantitative spectrophotometric label, competitive isotherms between cytochrome b(5) and a-lactalbumin can be constructed. Similarly, manganese-substituted protoporphyrin IX heme replacement allows the non-perturbing labeling of individual cytochrome b(5) conservative surface charge mutants by replacement of a single atom in the interior of the protein. This labeling allows the study of competition between cytochrome b(5) charge mutants of identical size and shape, which differ only in charge arrangement. Using these techniques, the effect of competing species on equilibrium behavior and the apparent heterogeneity of anion-exchange adsorbents in the presence of competitors can be quantitatively studied by fitting the data to two popular single-component binding models, the Temkin and the Langmuir-Freundlich (L-F) isotherms. (c) 2005 Elsevier B.V. All rights reserved.

Keywords: Protein Adsorption, Competitive Adsorption, Ion-Exchange, Competitive Binding, Competitive Isotherms, Anion-Exchange, Temkin Isotherm, Langmuir-Freundlich Isotherm, Metal-Affinity-Chromatography, Containing Cytochrome-C, Liquid-Chromatography, Preparative Chromatography, Multipoint Binding, Temkin Isotherm, Heterogeneity, Equilibrium, Surfaces, Site

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Full Text: [2006\J Chr A1126, 311.pdf](2006/J%20Chr%20A1126,%20311.pdf)

Abstract: In the frame of the local equilibrium theory of chromatography, design criteria for complete separation of binary mixtures in simulated moving bed (SMB) separations are developed, presented and discussed. These apply to systems, whose retention behavior is characterized by a generalized Langmuir isotherm. By allowing for negative terms in the denominator of the classical Langmuir isotherm, this newly introduced adsorption model captures a broad class of competitive or synergistic adsorption, including anti-Langmuir behavior for both adsorbates, and mixed cases where one species behaves in a Lagmuirian and the other in an anti-Langmuirian manner. By extending classical equilibrium theory results for the binary Langmuir isotherm, and by generalizing the approach followed earlier to derive SMB design criteria for the binary and multi-component Langmuir isotherm, exact algebraic equations for the boundary of the complete separation region in the operating parameter space are derived for all possible generalized Langmuir isotherm. The effect of changing feed composition on the shape of the complete separation region and on the position of the optimal operating point is analyzed and discussed. (c) 2006 Elsevier B.V. All rights reserved.

Keywords: Simulated Moving Bed, Generalized Langmuir Isotherm, Equilibrium Theory, Gradient Operation, Varicol Processes, Separation, Chromatography, Adsorption, Units, Optimization

? Kumar, K.V. and Rocha, F. (2009), On the effect of a non-ionic surfactant on the surface of sucrose crystals and on the crystal growth process by inverse gas chromatography. *Journal of Chromatography A*, **1216** (48), 8528-8534.

Full Text: [2009\J Chr A1261, 8528.pdf](2009/J%20Chr%20A1261,%208528.pdf)

Abstract: The effect of Hodag CB6, a widely used non-ionic surfactant in sugar crystallization process, on the surface properties of sucrose was studied in detail by inverse gas chromatography (IGC) experiments. IGC experiments were performed with pure sucrose crystals. surfactant coated sucrose crystals. and crystals grown in the presence of surfactant at 313.05 and 323.05 K. The surfactant promotes the specific interactions with the polar probes. The sorption of basic. acidic and amphoteric probes onto pure and surfactant coated sucrose was found to be endothermic and in the case of neutral probes was found to be exothermic. The surfactant increases both the acidity and basicity of the sucrose surface with the latter effect being significant. The role of interfacial tension on the growth kinetics of sucrose crystals was studied using IGC for different surfactant concentrations. IGC results with the surfactant coated sucrose were used to interpret the thermodynamic effect of surfactants during the crystal growth process. The dispersive component of the surface energy, gamma(D)(s), of surfactant coated sucrose crystals was found to be lower than that of pure sucrose crystals and was found to be in the range of 33.49-35.27 mJ/m2. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: Acid, Adsorption, Chromatography, Crystal Growth, Crystallization, Dispersive Energy, Endothermic, Energy, Fibers, Inverse Gas Chromatography, Kinetics, Polymers, Sorption, Specific Interactions, Sucrose, Surfactant, Thermodynamic, Thermodynamics

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Full Text: [2010\J Chr A1217, 7303.pdf](2010/J%20Chr%20A1217,%207303.pdf)

Abstract: A novel enrichment technique, adsorptive mu-extraction (A mu E), is proposed for trace analysis of polar solutes in aqueous media. The preparation, stability tests and development of the analytical devices using two geometrical configurations, i.e. bar adsorptive mu-extraction (BA mu E) and multi-spheres adsorptive mu-extraction (MSA mu E) is fully discussed. From the several sorbent materials tested, activated carbons and polystyrene divinylbenzene phases demonstrated the best stability, robustness and to be the most suitable for analytical purposes. The application of both BA mu E and MSA mu E devices proved remarkable performance for the determination of trace levels of polar solutes and metabolites (e.g. pesticides, disinfection by-products, drugs of abuse and pharmaceuticals) in water matrices and biological fluids. By comparing A mu E techniques with stir bar sorptive extraction based on polydimethylsiloxane phase, great effectiveness is attained overcoming the limitations of the latter enrichment approach regarding the more polar solutes. Furthermore, convenient sensitivity and selectivity is reached through A mu E techniques, since the great advantage of this new analytical technology is the possibility to choose the most suitable sorbent to each particular type of application. The enrichment techniques proposed are cost-effective, easy to prepare and work-up, demonstrating robustness and to be a remarkable analytical tool for trace analysis of priority solutes in areas of recognized importance such as environment, forensic and other related life sciences. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Sample Enrichment Techniques, Adsorptive Micro-Extraction (A mu E), Bar Adsorptive Micro-Extraction (BA mu E), Multi-Spheres Adsorptive Micro-Extraction (MSA mu E), Analytical Separation Techniques, Polar Compounds, Trace Analysis, Bar Sorptive Extraction, Sample Preparation, Polyurethane Foams, Polymeric Phases, Water Matrices, Optimization

? Erzengin, M., Ünlü, N. and Odabaşı, M. (2011), A novel adsorbent for protein chromatography: Supermacroporous monolithic cryogel embedded with Cu2+-attached sporopollenin particles. *Journal of Chromatography A*, **1218** (3), 484-490.

Full Text: [2011\J Chr A1218, 484.pdf](2011/J%20Chr%20A1218,%20484.pdf)

Abstract: The aim of this study is to prepare supermacroporous cryogels embedded with Cu2+-attached sporopollenin particles (Cu2+-ASP) having large surface area for high protein adsorption capacity. Super-macroporous poly(2-hydroxyethyl methacrylate) (PHEMA)-based monolithic cryogel column embedded with Cu2+-ASP was prepared by radical cryo-copolymerization of 2-hydroxyethyl methacrylate (HEMA) with N,N’-methylene-bis-acrylamide (MBAAm) as cross-linker directly in a plastic syringe for affinity purification of human serum albumin (HSA). Firstly, Cu2+ ions were attached to sporopollenin particles (SP), then the supermacroporous PHEMA cryogel with embedded Cu2+-ASP was produced by free radical polymerization using N,N,N’,N’-tetramethylene diamine (TEMED) and ammonium persulfate (APS) as initiator/activator pair in an ice bath. Embedded particles (10 mg) in PHEMA-based cryogel column were used in the adsorption/desorption of HSA from aqueous solutions. Optimum conditions of adsorption experiments were performed at pH 8.0 phosphate buffer, with flow rate of 0.5 mL/min, and at 5ºC. The maximum amount of HSA adsorption from aqueous solution was very high (677.4 mg/g SP) with initial concentration 6 mg/mL It was observed that HSA could be repeatedly adsorbed and desorbed to the embedded Cu2+-ASP in PHEMA cryogel without significant loss of adsorption capacity. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption, Desorption, Albumin, Ammonium, Aqueous Solution, Aqueous Solutions, Beads, Buffer, Capacity, Chromatography, Column, Concentration, Cryogels, Cu2+, Experiments, Flow, Flow Rate, Free Radical, Heavy-Metal Ions, Human, Human Serum Albumin, Ice, Imprinted Particles, Ion Affinity-Chromatography, Ions, Lysozyme, Metal Chelate, Particle Embedding, Particles, pH, Phosphate, Polymerization, Protein, Protein Adsorption, Purification, Removal, Rights, Serum, Solution, Solutions, Sporopollenin, Surface, Surface Area

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Denizli, A., Kocakulak, M. and Pişkin, E. (1998), Bilirubin removal from human plasma in a packed-bed column system with dye-affinity microbeads. *Journal of Chromatography B*, **707** (1-2), 25-31.

Full Text: J Chr B707, 25

Abstract: A dye-ligand, Cibacron Blue F3GA, was covalently coupled with the poly (EGDMA-HEMA) microbeads. The affinity sorbent carrying 16.5 µmol Cibacron Blue F3GA per gram polymer was then used to remove bilirubin from human plasma in a packed-bed column system. Bilirubin adsorption from human plasma on the unmodified poly (EGDMA-HEMA) microbeads was 0.32 mg/g. while much higher adsorption values, up to 24.2 mg/g, were obtained with the dye-attached microbeads. The bilirubin adsorption capacity of the microbeads decreased with an increase in the recirculation rate of plasma. Bilirubin adsorption increased with increasing temperature, and the maximum adsorption achieved at 37°C (32.5 mgbilirubin/g polymer). Bilirubin molecules interacted directly with the immobilized Cibacron Blue F3GA molecules. Contribution of albumin adsorption on bilirubin adsorption was also significant.

Keywords: Immobilized Polyhydroxyethylmethacrylate Microbeads, Human-Immunoglobulin-G, Resin Hemoperfusion, Hepatic-Failure, Polymer Resins, Amino-Acid, A.Dsorption, Sorption, Albumin, Pendants, Hyperbilirubinemia, Cibacron Blue F3Ga, Affinity Microbeads, Bilirubin

Arıca, M.Y., Yılmaz, M., Yalçın, E. and Bayramoğlu, G. (2004), Affinity membrane chromatography: Relationship of dye-ligand type to surface polarity and their effect on lysozyme separation and purification. *Journal of Chromatography B*, **805** (2), 315-323.

Full Text: [J\J Chr B805, 315.pdf](J/J%20Chr%20B805,%20315.pdf)

Abstract: Two different dye-ligands, i.e. Procion Brown MX-5BR (RB-10) and Procion Green H-4G (RG-5) were immobilised onto poly(2-hydroxyethylmethacrylate) (pHEMA) membranes. The polarities of the affinity membranes were determined by contact angle measurements. Separation and purification of lysozyme from solution and egg white were investigated. The adsorption data was analysed using two adsorption kinetic models the first order and the second order to determine the best-fit equation for the separation of lysozyme using affinity membranes. The second-order equation for the adsorption of lysozyme on the RB-10 and RG-5 immobilised membranes systems is the most appropriate equation to predict the adsorption capacity for the affinity membranes. The reversible lysozyme adsorption on the RB-10 and RG-5 did not follow the Langmuir model, but obeyed the Temkin and Freundlich isotherm model. Separation and purification were monitored by determining the lysozyme activity using *Micrococcus lysodeikticus* as substrate. The purities of the eluted lysozyme, as determined by HPLC, were 76 and 92% with recovery 63 and 77% for RB-10 and RG-5 membranes, respectively. For the separation and purification of lysozyme the RG-5 immobilised membrane provided the best results. The affinity membranes are stable when subjected to sanitization with sodium hydroxide after repeated adsorption–elution cycles.

Keywords: Surface Polarity, Lysozymes, Dye-Ligands

Arıca, M.Y., Yalçın, E. and Bayramoğlu, G. (2004), Preparation and characterisation of surfaces properties of poly(hydroxyethylmethacrylate-co-methacrylolyamido-histidine) membranes: application for purification of human immunoglobulin G. *Journal of Chromatography B*, **807** (2), 315-325.

Full Text: [J\J Chr B807, 315.pdf](J/J%20Chr%20B807,%20315.pdf)

Abstract: In this study, an affinity membrane containing L-histidine as an amino acid ligand was used in separation and purification of human immunoglobulin G (HIgG) from solution and human serum. The polarities and the surface free energies of the affinity membranes were determined by contact angle measurements. HIgG adsorption and purification onto the affinity membranes from aqueous solution and human serum were investigated in a batch and a continuous system. Effect of different system parameters such as ligand density, adsorbent dosage, pH, temperature, ionic strength and HIgG initial concentration on HIgG adsorption were investigated. The maximum adsorption capacity of p(HEMA-MAAH-4) membranes for HIgG was 13.06 mg ml−1. The reversible HIgG adsorption on the affinity membrane obeyed both the Langmuir and Freundlich isotherm models. The adsorption data was analysed using the first- and second-order kinetic model and the experimental data was well described by the first-order equations. In the continuous system, the purity of the eluted HIgG, as determined by HPLC, was 93% with recovery 58% for p(HEMA-MAAH-4) membrane. The affinity membranes are stable when subjected to sanitization with sodium hydroxide after repeated adsorption-elution cycles.

Keywords: Poly(Hydroxyethylmethacrylate-Co-Methacrylolyamido-Histidine), Immunoglobulin G

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Arıca, M.Y., Yilmaz, M., Yalçın, E. and Bayramoğlu, G. (2004), Affinity membrane chromatography: Relationship of dye-ligand type to surface polarity and their effect on lysozyme separation and purification. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **805** (2), 315-323.

Full Text: [J\J Chr B805, 315.pdf](J/J%20Chr%20B805,%20315.pdf)

Abstract: Two different dye-ligands, i.e. Procion Brown MX-5BR (RB-10) and Procion Green H-4G (RG-5) were immobilised onto poly(2-hydroxyethylmethacrylate) (pHEMA) membranes. The polarities of the affinity membranes were determined by contact angle measurements. Separation and purification of lysozyme from solution and egg white were investigated. The adsorption data was analysed using two adsorption kinetic models the first order and the second order to determine the best-fit equation for the separation of lysozyme using affinity membranes. The second-order equation for the adsorption of lysozyme on the RB-10 and RG-5 immobilised membranes systems is the most appropriate equation to predict the adsorption capacity for the affinity membranes. The reversible lysozyme adsorption on the RB-10 and RG-5 did not follow the Langmuir model, but obeyed the Temkin and Freundlich isotherm model. Separation and purification were monitored by determining the lysozyme activity using Micrococcus lysodeikticus as substrate. The purities of the eluted lysozyme, as determined by HPLC, were 76 and 92% with recovery 63 and 77% for RB-10 and RG-5 membranes, respectively. For the separation and purification of lysozyme the RG-5 immobilised membrane provided the best results. The affinity membranes are stable when subjected to sanitization with sodium hydroxide after repeated adsorption-elution cycles. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Surface Polarity, Lysozymes, Dye-Ligands, Protein Adsorption, Ionic-Strength, Elovich Equation, Cadmium Ions, Bone Char, Exchange, Poly(2-Hydroxyethylmethacrylate)/Chitosan, Adsorbents, Cellulose, Matrices

Arıca, M.Y., Yalçın, E. and Bayramoglu, G. (2004), Preparation and characterisation of surfaces properties of poly(hydroxyethylmethacrylate-co-methacrylolyamido-histidine) membranes: application for purification of human immunoglobulin G. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **807** (2), 315-325.

Full Text: [J\J Chr B807, 315.pdf](J/J%20Chr%20B807,%20315.pdf)

Abstract: In this study, an affinity membrane containing L-histidine as an amino acid ligand was used in separation and purification of human immunoglobulin G (HIgG) from solution and human serum. The polarities and the surface free energies of the affinity membranes were determined by contact angle measurements. HIgG adsorption and purification onto the affinity membranes from aqueous solution and human serum were investigated in a batch and a continuous system. Effect of different system parameters such as ligand density, adsorbent dosage, pH, temperature, ionic strength and HIgG initial concentration on HIgG adsorption were investigated. The maximum adsorption capacity of p(HEMA-MAAH-4) membranes for HIgG was 13.06 mg ml-1. The reversible HIgG adsorption on the affinity membrane obeyed both the Langmuir and Freundlich isotherm models. The adsorption data was analysed using the first- and second-order kinetic model and the experimental data was well described by the first-order equations. In the continuous system, the purity of the eluted HIgG, as determined by HPLC, was 93% with recovery 58% for p(HEMA-MAAH-4) membrane. The affinity membranes are stable when subjected to sanitization with sodium hydroxide after repeated adsorption-elution cycles. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Affinity Membranes, Chromatography, Contact Angle, Elovich Equation, Hollow-Fiber Membranes, Human Plasma, Human Serum, Immunoglobulin G, Ion-Exchange, L-Histidine, Methacrylolyamido-Histidine), Poly(Hydroxyethylmethacrylate-Co-, Protein Separation, Purification

Andaç, M., Say, R. and Denizli, A. (2004), Molecular recognition based cadmium removal from human plasma. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **811** (2), 119-126.

Full Text: [J\J Chr B811, 119.pdf](J/J%20Chr%20B811,%20119.pdf)

Abstract: Molecularly imprinted polymers (MIPs) are easy to prepare, stable, inexpensive and capable of molecular recognition. MIPs can be considered as affinity separation media. Cadmium is a carcinogenic and mutagenic element. There is no specific treatment available for acute or chronic metal poisoning. Besides supportive therapy and hemodialysis, metal poisoning is often treated with commercially available chelating agents including EDTA and dimercaprol. However, there is histopathological evidence for increased toxicity in animals when these agents are utilized. The aim of this study is to prepare ion-imprinted polymers, which can be used for the selective removal of Cd2+ ions from Cd2+- overdosed human plasma. N-Methacryloly-(L)-cysteinemethylester (MAC) was chosen as the complexing monomer. In the first step, Cd2+ was complexed with MAC and the Cd2+- imprinted p(HEMA-MAC) beads were synthesized by suspension polymerization. After that, the template (i.e., Cd2+ ions) were removed using 0.1 M thiourea solution. The specific surface area of the Cd2+-imprinted poly(HEMA-MAC) beads was found to be 19.4 m2/g with a size range of 63-140 μm in diameter and the swelling ratio was 78%. According to the elemental analysis results, the beads contained 42.1 μmol MAC/g polymer. The maximum adsorption capacity was 32.5 μmol Cd2+/g beads. The relative selectivity coefficients of imprinted beads for Cd2+/Pb2+ and Cd2+/Zn2+ were 7.8 and 1683 times greater than non-imprinted matrix, respectively. The Cd2+-imprinted poly(HEMA-MAC) beads could be used many times without decreasing their adsorption capacities significantly. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Ion-Imprinting, Molecular Recognition, Cadmium Removal, Metal Detoxification, Affinity Binding, Solid-Phase Extraction, Imprinted Polymers, Suspension Polymerization, Beads, Microbeads, Preconcentration, Microspheres, Membranes, Column

? Odabaşı, M., Özkayar, N., Özkara, S., Ünal, S. and Denizli, A. (2004), Pathogenic antibody removal using magnetically stabilized fluidized bed. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **826** (1-2), 50-57.

Full Text: [2005\J Chr B826, 50.pdf](2005/J%20Chr%20B826,%2050.pdf)

Abstract: Magnetic poly(2-hydroxyethyl methacrylate) (mPHEMA) beads were used in the removal of anti-dsDNA antibodies from systemic lupus erythematosus (SLE) patient plasma in a magnetically stabilized fluidized bed. mPHEMA beads, in the size range of 80-120 μm, were produced by suspension technique. Then, DNA was immobilized onto mPHEMA beads by carbodiimide activation. Magnetic beads were contacted with blood in in vitro systems. Loss of blood cells and clotting times were followed. mPHEMA beads were characterized by scanning electron microscopy (SEM). Important results obtained in this study are as follows: the mPHEMA beads have a spherical shape and porous structure. Loss of cells in the blood contacting with mPHEMA/DNA was negligible. The anti-dsDNA adsorption capacity decreased significantly with the increase of the flow-rate. With increasing anti-dsDNA antibody concentration, the amount of antibody adsorbed per unit mass increased, then reached saturation. Maximum anti-dsDNA antibody adsorption capacity was found to be 97.8 mg/g. Pathogenic antibody molecules could be repeatedly adsorbed and desorbed with these magnetic beads without noticeable loss in their antibody adsorption capacity. Because of the good blood-compatibility, mPHEMA is hopeful for the treatment of SLE by magnetically stabilized fluidized bed systems in the future. (c) 2005 Elsevier B.V. All rights reserved.

Keywords: Antibody Removal, Magnetic Adsorbents, Affinity Beads, DNA, SLE, Systemic-Lupus-Erythematosus, Immobilized Polyhydroxyethylmethacrylate Microbeads, Protein-A-Immunoadsorption, Human-Immunoglobulin-G, DNA Antibodies, Cholesterol Removal, Affinity Sorption, Human Plasma, Adsorption, Beads

? Altintaş, E.B., Tüezmen, N., Candan, N. and Denizli, A. (2007), Use of magnetic poly(glycidyl methacrylate) monosize beads for the purification of lysozyme in batch system. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **853** (1-2), 105-113.

Full Text: [2007\J Chr B853, 105.pdf](2007/J%20Chr%20B853,%20105.pdf)

Abstract: The hydrophobic affinity ligand L-tryptophan immobilized magnetic poly(glycidyl methacrylate) [m-poly(GMA)] beads in monosize form (1.6 mu m in diameter) were used for the affinity purification of lysozyme from chicken egg white. The m-poly(GMA) beads were prepared by dispersion polymerization in the presence of Fe3O4 nano-powder. The epoxy groups of the m-poly(GMA) beads were converted into amino groups with 1,6 diaminohexane (i.e., spacer arm). L-tryptophan was then covalently immobilized on spacer arm attached m-poly(GMA) beads. Elemental analysis of immobilised L-tryptophan for nitrogen was estimated as 42.5 mu mol/g polymer. Adsorption studies were performed under different conditions in a batch system (i.e., medium pH, protein concentration and temperature). Maximum lysozyme adsorption amount of m-poly(GMA) and m-poly(GMA)-L-tryptophan beads were 1.78 and 259.6 mg/g, respectively. The applicability of two kinetic models including pseudo-first order and pseudo-second order model was estimated on the basis of comparative analysis of the corresponding rate parameters, equilibrium adsorption capacity and correlation coefficients. Results suggest that chemisorption processes could be the rate-limiting step in the adsorption process. It was observed that after 10 adsorption-elution cycle, m-poly(GMA)-L-tryptophan beads can be used without significant loss in lysozyme adsorption capacity. Purification of lysozyme from egg white was also investigated. Purification of lysozyme was monitored by determining the lysozyme activity using Micrococcus lysodeikticus as substrate. It was found to be successful in achieving purification of lysozyme in a high yield of 76% with a purification fold of 71 in a single step. The specific activity of the eluted lysozyme (62,580 U/mg) was higher than that obtained with a commercially available pure lysozyme (Sigma (60,000 U/mg). (c) 2007 Elsevier B.V. All rights reserved.

Keywords: Activity, Adsorption, Adsorption Capacity, Adsorption Process, Affinity, Affinity Ligand, Analysis, Arm, Batch, Batch System, Beads, Capacity, Charge Induction Chromatography, Chelate Affinity Adsorbent, Chemisorption, Chicken Egg-White, Comparative Analysis, Concentration, Correlation, Diameter, Dispersion, Equilibrium, Equilibrium Adsorption, Groups, Hydrophobic, Hydrophobic Interaction Chromatography, Immobilized, Kinetic, Kinetic Models, L-Tryptophan, Ligand, Lysozyme, Lysozyme Purification, Magnetic, Magnetic Monosize Beads, Membranes, Methacrylate, Model, Models, Nitrogen, Order, Parameters, pH, Phase, Poly(Glycidyl Methacrylate), Polymer, Polymerization, Precipitation, Process, Protein, Pseudo Second Order, Pseudo-First Order, Pseudo-First-Order, Pseudo-Second Order, Pseudo-Second Order Model, Pseudo-Second-Order, Purification, Rate, Rate Limiting, Rate Limiting Step, Rate-Limiting Step, Separation, Spacer, Spacer Arm, Spacer-Arm, Substrate, Temperature, Yield

? Zhang, B., Yang, R.Y., Zhao, Y. and Liu, C.Z. (2008), Separation of chlorogenic acid from honeysuckle crude extracts by macroporous resins. *Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences*, **867** (2), 253-258.

Full Text: [2008\J Chr B867, 253.pdf](2008/J%20Chr%20B867,%20253.pdf)

Abstract: Chlorogenic acid, one of the most bioactive compounds rich in the Chinese medicinal herb honeysuckle, is a natural antioxidant and serves as anti-inflammatory, anti-tumor, anti-mutagenic and anti-carcinogenic agent. An efficient preparative separation process of chlorogenic acid from honeysuckle crude extracts has been developed in the present study. HPD-850 resin offers the best adsorption capacity, and adsorption and desorption ratios for chlorogenic acid among the nine macroporous resins tested, and its adsorption rate at 25°C fit best to the Langmuir isotherm. The adsorption capacity of HPD-850 resin was found to depend strongly on the pH value of the initial adsorption solution. The dynamic adsorption and desorption experiments have been carried out on a HPD-850 resin packed column to optimize the separation process of chlorogenic acid from honeysuckle crude extracts. After one run treatment with HPD-850 resin, the chlorogenic acid content in the final product was increased 4.46-fold from 11.2% to 50.0%, with a recovery yield of 87.9%. The preparative separation of chlorogenic acid can be easily and efficiently achieved via adsorption and desorption on HPD-850 resin, and the method developed will provide a potential approach for large-scale separation and purification of chlorogenic acid for its wide pharmaceutical use. (c) 2008 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Chlorogenic Acid, Desorption, Macroporous Resins, Preparative Separation, Microwave-Assisted Extraction, Eucommia-Ulmoides Leaves, Aqueous Extract, Tochu Tea, Antimutagenicity, Adsorption

# Title: Journal of Chronic Diseases

Full Journal Title: Journal of Chronic Diseases

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Schroede, H.A. (1965), Cadmium as a factor in hypertension. *Journal of Chronic Diseases*, **18** (7), 647-656.

Abstract: Most human subjects dying from hypertensive complications showed in their kidneys either increased concentrations of cadmium or increased ratios of cadmium to zinc, compared to subjects dying of a variety of other major diseases. Within the limits of 358 kidneys analyzed, this alteration occurred in both the United States and in foreign countries around the world.

# Title: Journal of Cleaner Production

Full Journal Title: [Journal of Cleaner Production](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6022&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=d5c3af39e138b5af2dc7331dc4797a5b)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Al-Asheh, S., Banat, F. and Al-Rousan, D. (2003), Beneficial reuse of chicken feathers in removal of heavy metals from wastewater. *Journal of Cleaner Production*, **11** (3), 321-326.

Full Text: [J\J Cli Epi11, 321.pdf](J/J%20Cli%20Epi11,%20321.pdf)

Abstract: Natural and chemically treated chicken feathers (CF) were tested for their ability, as adsorbents, to remove copper and zinc from wastewater. Alkaline solutions of 0.2 N NaOH were found to be the best for the sorption process and a 0.6 wt% solution of dodecyl sulfate, as anionic surfactant, also gave best adsorption results. Treatment of CF with alkaline solutions adsorb more metal ions than those treated with the anionic surfactant followed by the untreated CF. Generally, the kinetics of the removal process by all tested sorbents was fast. The Freundlich isotherm model was found to represent the equilibrium results, of all adsorbents toward copper and zinc, reasonably well.

Keywords: Adsorbents, Adsorption, Adsorption, Alkaline Treatment, Anionic Surfactant, Bark, Chicken Feathers, Copper, Freundlich Isotherm, Heavy Metals, Ions, Metal, Metal Ions, Metals, Removal, Sorption, Water

? Boons, F., Spekkink, W. and Mouzakitis, Y. (2011), The dynamics of industrial symbiosis: A proposal for a conceptual framework based upon a comprehensive literature review. *Journal of Cleaner Production*, **19** (9-10), 905-911.

Abstract: There is increasing evidence that throughout the world, firms, governmental agencies and NGOs are seeking to stimulate industrial symbiosis. This concept and its application have also been the topic of extensive research. Up till now, this work lacks a more comprehensive theoretical framework, and this paper fills this gap. We provide a theoretical basis for understanding the dynamics through which regional industrial systems change their connectiveness in an attempt to reduce their ecological impact. We position our framework within the field of industrial symbiosis based on a comprehensive literature search in the ISI Web of Science database for publications that listed ‘industrial symbiosis’, ‘eco-industrial park’, or a combination of ‘industrial-ecology’ and ‘regional’ as a topic. The framework conceptualizes industrial symbiosis as a process at two levels: (1) the level of the regional industrial system (RIS), and (2) the societal level where the concept and routines of industrial symbiosis diffuse. We link the dynamics at these levels to changes in ecological impact and increase in institutional capacity. We conclude with a research agenda based on the variables and their basic relationships specified in our framework. The main line of research we propose is to systematically investigate how institutional capacity evolves over time in regional industrial systems and how it affects the ecological impact of such systems. We also propose to investigate how insights from existing literature about stimulating and impeding factors to industrial symbiosis can be understood in terms of mechanisms of transmission and how these mechanisms interact to create nationally distinct patterns of diffusion of industrial symbiosis. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: China, Circular Economy, Concept Diffusion, Diffusion, Ecology, Guitang Group, Impact, Industrial Networks, Industrial Symbiosis, Institutional Capacity, ISI, Literature, Literature Review, Park Development, Program, Publications, Quantitative Assessment, Regional-Development, Research, Review, Science, Sustainable Development, Systems, Web of Science

# Title: Journal of Climate

Full Journal Title: Journal of Climate

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Collins, W.D., Bitz, C.M., Blackmon, M.L., Bonan, G.B., Bretherton, C.S., Carton, J.A., Chang, P., Doney, S.C., Hack, J.J., Henderson, T.B., Kiehl, J.T., Large, W.G., McKenna, D.S., Santer, B.D. and Smith, R.D. (2006), The Community Climate System Model version 3 (CCSM3). *Journal of Climate*, **19** (11), 2122-2143.

Full Text: [2006\J Cli19, 2122.pdf](2006/J%20Cli19,%202122.pdf)

Abstract: The Community Climate System Model version 3 (CCSM3) has recently been developed and released to the climate community. CCSM3 is a coupled climate model with components representing the atmosphere, ocean, sea ice, and land surface connected by a flux coupler. CCSM3 is designed to produce realistic simulations over a wide range of spatial resolutions, enabling inexpensive simulations lasting several millennia or detailed studies of continental-scale dynamics, variability, and climate change. This paper will show results from the configuration used for climate-change simulations with a T85 grid for the atmosphere and land and a grid with approximately 1 degrees resolution for the ocean and sea ice. The new system incorporates several significant improvements in the physical parameterizations. The enhancements in the model physics are designed to reduce or eliminate several systematic biases in the mean climate produced by previous editions of CCSM. These include new treatments of cloud processes, aerosol radiative forcing, land-atmosphere fluxes, ocean mixed layer processes, and sea ice dynamics. There are significant improvements in the sea ice thickness, polar radiation budgets, tropical sea surface temperatures, and cloud radiative effects. CCSM3 can produce stable climate simulations of millennial duration without ad hoc adjustments to the fluxes exchanged among the component models. Nonetheless, there are still systematic biases in the ocean-atmosphere fluxes in coastal regions west of continents, the spectrum of ENSO variability, the spatial distribution of precipitation in the tropical oceans, and continental precipitation and surface air temperatures. Work is under way to extend CCSM to a more accurate and comprehensive model of the earth’s climate system.

Keywords: Arctic Sea-Ice, Atmosphere Model, National-Center, Thickness Distribution, Aerosol Distributions, Dynamical Core, Surface Albedo, Energy Budget, Ocean, Simulation

# Title: Journal of Clinical Endocrinology & Metabolism

Full Journal Title: Journal of Clinical Endocrinology & Metabolism

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Elamin, M.B., Murad, M.H., Mullan, R., Erickson, D., Harris, K., Nadeem, S., Ennis, R., Erwin, P.J. and Montori, V.M. (2008), Accuracy of diagnostic tests for Cushing’s syndrome: A systematic review and metaanalyses. *Journal of Clinical Endocrinology & Metabolism*, **93** (5), 1553-1562.

Full Text: 2008\J Cli End Met93, 1553.pdf

Abstract: Context: The diagnosis of Cushing’s syndrome (CS) requires the use of tests of unregulated hypercortisolism that have unclear accuracy. Objective: Our objective was to summarize evidence on the accuracy of common tests for diagnosing CS. Data Sources: We searched electronic databases (MEDLINE, EMBASE, Web of Science, Scopus, and citation search for key articles) from 1975 through September 2007 and sought additional references from experts. Study Selection: Eligible studies reported on the accuracy of urinary free cortisol (UFC), dexamethasone suppression test (DST), and midnight cortisol assays vs. reference standard in patients suspected of CS. Data Extraction: Reviewers working in duplicate and independently extracted study characteristics and quality and data to estimate the likelihood ratio (LR) and the 95% confidence interval (CI) for each result. Data Synthesis: We found 27 eligible studies, with a high prevalence [794 (9.2%) of 8631 patients had CS] and severity of CS. The tests had similar accuracy: UFC (n = 14 studies; LR+ 10.6, CI 5.5-20.5; LR- 0.16, CI 0.08-0.33), salivary midnight cortisol (n = 4; LR+ 8.8, CI 3.5-21.8; LR- 0.07, CI 0-1.2), and the 1-mg overnight DST (n = 14; LR+ 16.4, CI 9.3-28.8; LR- 0.06, CI 0.03-0.14). Combined testing strategies (e. g. a positive result in both UFC and 1-mg overnight DST) had similar diagnostic accuracy (n = 3; LR+ 15.4, CI 0.7-358; LR- 0.11, CI 0.007-1.57). Conclusions: Commonly used tests to diagnose CS appear highly accurate in referral practices with samples enriched with patients with CS. Their performance in usual clinical practice remains unclear.

Keywords: Accuracy, Citation, Cortisol, Databases, Dexamethasone-Suppression Test, Diagnosis, Dst, Embase, Extraction, Hypercortisolism, Medline, Midnight Serum Cortisol, Nighttime Salivary Cortisol, Obese, Practice, Prevalence, Ratio, Review, Science, Scopus, Sources, Specificity, States, Systematic, Systematic Review, Test-Performance, Web of Science

? Murad, M.H., Coto-Yglesias, F., Wang, A.T., Sheidaee, N., Mullan, R.J., Elamin, M.B., Erwin, P.J. and Montori, V.M. (2009), Drug-induced hypoglycemia: A systematic review. *Journal of Clinical Endocrinology & Metabolism*, **94** (3), 741-745.

Full Text: 2009\J Cli End Met94, 741.pdf

Abstract: Context: Drug-induced hypoglycemia is a significant adverse effect that may cause important morbidity. Objective: The aim of the study was to systematically review the literature for drugs reported to cause hypoglycemia and assess the quality of evidence and strength of association supporting this causal link. Data Sources: We searched electronic databases (MEDLINE, EMBASE, Web of Science, and SCOPUS) and the drug information system Micromedex through November 2007 and sought additional references from experts. Study Selection: Studies were eligible if they reported hypoglycemia as a side effect of a drug not used to treat hyperglycemia, regardless of their design, language, size, or follow-up duration. We excluded hypoglycemia caused by industrial exposures, nonpharmacological chemical exposures, alcohol, herbs, nutritional supplements, and in vitro and animal studies. Data Extraction: Reviewers extracted study characteristics and methodological quality and, when possible, data to estimate the odds of developing hypoglycemia when exposed to the offending agent. Data Synthesis: We found 448 eligible studies that described 2696 cases of hypoglycemia associated with 164 different drugs. The quality of evidence supporting associations between drugs and hypoglycemia was mostly very low due to methodological limitations and imprecision. The most commonly reported offending drugs were quinolones, pentamidine, quinine, beta blockers, angiotensin-converting enzyme agents, and IGF. Conclusions: Very low quality evidence substantiates the association between hypoglycemia and the use of numerous nondiabetic drugs. (J Clin Endocrinol Metab 94: 741-745, 2009).

Keywords: Alcohol, Databases, Drug, Embase, Events, Extraction, Follow-Up, Heparin, Hyperglycemia, Hypoglycemia, Information, Literature, Medline, Metaanalysis, Morbidity, Pentamidine Isethionate, Pneumocystis-Carinii Pneumonia, Randomized-Trials, Review, Science, Scopus, Sources, Sulfonylurea, Systematic, Systematic Review, Web of Science

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Full Text: 2009\J Cli End Met94, 3676.pdf

Abstract: Context: Women with primary or secondary adrenal insufficiency report a decreased health-related quality of life (HRQOL) despite traditional adrenal replacement therapy. Dehydroepiandrosterone (DHEA) has been studied as an agent to improve HRQOL in these patients. Objective: We sought to conduct a systematic review and meta-analysis of randomized controlled trials of DHEA effects on HRQOL in women with adrenal insufficiency. Data Sources: We searched electronic databases (MEDLINE, EMBASE, Cochrane CENTRAL, Web of Science, CINAHL, and PsycInfo) and reference lists of eligible studies through July 2008. Study Selection: Eligible trials randomly assigned women with primary or secondary adrenal insufficiency to either DHEA or control and measured the effect of treatment on HRQOL. Data Extraction: Reviewers working independently and in duplicate assessed the methodological quality of trials and collected data on patient characteristics, interventions, and outcomes. Data Synthesis: We found 10 eligible trials that measured HRQOL and depression, anxiety, and sexual function. Random-effects meta-analysis showed a small improvement in HRQOL in women treated with DHEA compared with placebo [effect size of 0.21; 95% confidence interval, 0.08 to 0.33; inconsistency (I(2)) = 32%]. There was a small beneficial effect of DHEA on depression; effects on anxiety and sexual well-being were also small and not statistically significant. Conclusions: DHEA may improve, in a small and perhaps trivial manner, HRQOL and depression in women with adrenal insufficiency. There was no significant effect of DHEA on anxiety and sexual well-being. The evidence appears insufficient to support the routine use of DHEA in women with adrenal insufficiency. (J Clin Endocrinol Metab 94: 3676-3681, 2009).

Keywords: Addisons-Disease, Androgen Replacement, Anxiety, Cochrane, Control, Databases, Dehydroepiandrosterone Replacement, Depression, Embase, Extraction, Health-Related Quality of Life, Hrqol, Interventions, Medline, Meta-Analysis, Outcomes, Primary, Quality, Quality of Life, Randomized Controlled Trials, Review, Science, Sources, Subjective Health-Status, Systematic, Systematic Review, Therapy, Traditional, Treatment, Web of Science, Women

? Dekkers, O.M., Lagro, J., Burman, P., Jorgensen, J.O., Romijn, J.A. and Pereira, A.M. (2010), Recurrence of hyperprolactinemia after withdrawal of dopamine agonists: Systematic review and meta-analysis. *Journal of Clinical Endocrinology & Metabolism*, **95** (1), 43-51.

Full Text: 2010\J Cli End Met95, 43.pdf

Abstract: Context: Dopamine agonists are the treatment of choice for prolactinomas and symptomatic idiopathic hyperprolactinemia. However, the optimal treatment strategy and treatment duration is not clear in all details. Objective: The aim of the study was to assess the effect of dopamine agonist withdrawal in patients with idiopathic hyperprolactinemia and prolactinomas. Data Sources: PUBMED, the Cochrane Library, the Web of Science, and EMBASE were searched electronically. No restriction was made with respect to language. Study Selection: Studies reporting the proportion of normoprolactinemic patients after withdrawal of dopamine agonist or studies in which this proportion could be calculated were eligible. Both observational studies and clinical trials were eligible. Nineteen studies were included in the meta-analysis, with a total of 743 patients. Data Extraction: Data extraction was performed by two reviewers independently. Data Synthesis: The pooled proportion of patients with persisting normoprolactinemia after dopamine agonist withdrawal was 21% in a random effects model [95% confidence interval (CI), 14-30%; I(2) 81%). Stratified analysis showed higher proportions of treatment success in idiopathic hyperprolactinemia (32%; 95% CI, 5-80%), compared with both microprolactinomas (21%; 95% CI, 10-37%), and macroprolactinomas (16%; 95% CI, 6-36%). In a random effects meta-regression adjusting for cause of hyperprolactinemia, a longer treatment duration was associated with treatment success (P = 0.015), whereas the use of cabergoline showed a trend of effect (P = 0.07). Conclusions: This meta-analysis showed that hyperprolactinemia will recur after dopamine agonist withdrawal in a considerable proportion of patients. The probability of treatment success was highest when cabergoline was used for at least 2 yr. (J Clin Endocrinol Metab 95: 43-51, 2010).

Keywords: Analysis, Bromocriptine Treatment, Cabergoline Therapy, Clinical Trials, Cochrane, Dopamine, Drug-Withdrawal, Embase, Extraction, Follow-Up, Heart-Disease, Hyperprolactinemia, Long-Term Treatment, Meta-Analysis, Microprolactinomas, Model, Observational Studies, Pituitary-Tumors, Prolactin Levels, Pubmed, Recurrence, Review, Science, Serum Prolactin, Sources, Strategy, Success, Systematic, Systematic Review, Treatment, Trend, Web of Science

? Muthusamy, K., Elamin, M.B., Smushkin, G., Murad, M.H., Lampropulos, J.F., Elamin, K.B., bu Elnour, N.O., Gallegos-Orozco, J.F., Fatourechi, M.M., Agrwal, N., Lane, M.A., Albuquerque, F.N., Erwin, P.J. and Montori, V.M. (2010), Adult height in patients with congenital adrenal hyperplasia: A systematic review and metaanalysis. *Journal of Clinical Endocrinology & Metabolism*, **95** (9), 4161-4172.

Full Text: 2010\J Cli End Met95, 4161.pdf

Abstract: Context: Treatment for patients with congenital adrenal hyperplasia (CAH) may affect the final height of these patients. Objective: Our objective was to determine the distribution of achieved height in patients with classic CAH diagnosed at infancy or early childhood and treated with glucocorticoids. Data Sources: We searched MEDLINE, EMBASE, Cochrane Library, ISI Web of Science, and Scopus through September 2008; the reference sections of included studies; and expert files. Study Selection: Eligible studies included patients diagnosed with CAH before age 5 and followed to final height. Data Extraction: Reviewers working in duplicate independently extracted data on study characteristics and outcomes and determined each study’s risk of bias. Data Synthesis: The SD score (SDS) for final height and corrected height (defined as final height SDS - midparental height SDS) were estimated from each study and pooled using random-effects metaanalysis. The I(2) statistic was used to assess inconsistency in results across studies. Results: We found 35 eligible studies, most of which were retrospective single-cohort studies. The final height SDS achieved by CAH patients was -1.38 (-1.56 to -1.20; I(2) = 90.2%), and the corrected height SDS was -1.03 (-1.20 to -0.86; I(2) = 63.1%). This was not significantly associated with age at diagnosis, gender, type and dose of steroid, and age of onset of puberty. Mineralocorticoid users had a better height outcome in comparison with the nonusers (P = 0.02). Conclusion: Evidence derived from observational studies suggests that the final height of CAH patients treated with glucocorticoids is lower than the population norm and is lower than expected given parental height. (J Clin Endocrinol Metab 95: 4161-4172, 2010).

Keywords: Adult, Bias, Body-Mass Index, Bone-Mineral Density, Classical 21-Hydroxylase Deficiency, Cochrane, Diagnosis, Embase, Experience, Extraction, Final Height, Gender, Glucocorticoid Treatment, Growth Velocity, Hormone Analog, ISI, Medline, Observational Studies, Outcome, Outcomes, Pubertal Development, Review, Risk, Science, Scopus, Sources, Systematic, Systematic Review, Therapy, Web of Science

? Müller, H.L. (2011), Consequences of craniopharyngioma surgery in children. *Journal of Clinical Endocrinology & Metabolism*, **96** (7), 1981-1991.

Full Text: [2011\J Cli End Met96, 1981.pdf](2011/J%20Cli%20End%20Met96,%201981.pdf)

Abstract: Context: Childhood craniopharyngioma, a rare embryogenic tumorous malformation of the sellar region, is characterized by survival rates ranging from 91 to 98%. However, quality of survival is frequently impaired due to proximity to optical, pituitary, and hypothalamic structures. Long-term sequelae substantially reduce the quality of life of approximately 50% of long-term survivors, notably extreme obesity owing to hypothalamic involvement and/or surgical-or radiation-induced lesions. Evidence Acquisition and Synthesis: This report reviews the current understanding of diagnostic and treatment options and their consequences on the prognosis and quality of life in patients with childhood craniopharyngioma based on publications from PubMed, Science Citation Index Expanded, EMBASE, and Scopus from the year 1980 onward. Conclusions: Total resection is the treatment of choice in patients with favorable tumor localization, with extreme care taken to preserve hypothalamic-pituitary and optical nerve functions. When tumor localization is unfavorable, i.e. involvement of hypothalamic or optic structures, a limited resection followed by local irradiation is recommended. Optimal timing of recurrence-inhibiting irradiation after incomplete resection is currently under investigation in an international trial. The rarity of the disease, coupled with limited surgical options, dictates that treatment and long-term monitoring of consequences should be confined to experienced multidisciplinary teams. (J Clin Endocrinol Metab 96: 1981-1991, 2011).

Keywords: Body-Mass Index, Childhood-Onset Craniopharyngioma, Citation, Embase, Follow-up, Gastric Bypass-Surgery, Hypothalamic Obesity, Increased Daytime Sleepiness, Involvement, Obesity, Pediatric Craniopharyngiomas, Publications, Pubmed, Quality-of-Life, Radiation-Therapy, Science, Science Citation Index, Scopus, Stereotactic Conformal Radiotherapy

? Appelman-Dijkstra, N.M., Kokshoorn, N.E., Dekkers, O.M., Neelis, K.J., Biermasz, N.R., Romijn, J.A., Smit, J.W.A. and Pereira, A.M. (2011), Pituitary dysfunction in adult patients after cranial radiotherapy: Systematic review and meta-analysis. *Journal of Clinical Endocrinology & Metabolism*, **96** (8), 2330-2340.

Full Text: [2011\J Cli End Met96, 2330.pdf](2011/J%20Cli%20End%20Met96,%202330.pdf)

Abstract: Context: Cranial radiotherapy is an important cause of hypopituitarism. The prevalence of hypopituitarism varies considerably between studies. Objective: We conducted a systematic review and meta-analysis of reported prevalences of hypopituitarism in adults radiated for nonpituitary tumors. Data Sources: We searched PubMed, EMBASE, Web of Science, and the Cochrane Library to identify potentially relevant studies. Study Selection: Studies were eligible for inclusion with the following criteria: 1) cranial radiotherapy for nonpituitary tumors and/or total body irradiation for hematological malignancies; 2) adult population (>18 yr old); and 3) report on endocrine evaluation. Data Extraction: Data review was done by two independent reviewers. Besides extraction of base-line and treatment characteristics, also endocrine tests, definitions, and cutoff values used to define pituitary insufficiency were extracted. Results: Eighteen studies with a total of 813 patients were included. These included 608 patients treated for nasopharyngeal cancer (75%) and 205 for intracerebral tumors. The total radiation dose ranged from 14 to 83 and 40 to 97 Gy for nasopharyngeal and intracerebral tumors, respectively. The point prevalence of any degree of hypopituitarism was 0.66 [95% confidence interval (CI), 0.55-0.76]. The prevalence of GH deficiency was 0.45 (95% CI, 0.33-0.57); of LH and FSH, 0.3 (95% CI, 0.23-0.37); of TSH, 0.25 (95% CI, 0.16-0.37); and of ACTH, 0.22 (95% CI, 0.15-0.3), respectively. The prevalence of hyperprolactinemia was 0.34 (95% CI, 0.15-0.6). There were no differences between the effects of radiotherapy for nasopharyngeal vs. for intracerebral tumors. Conclusion: Hypopituitarism is prevalent in adult patients after cranial radiotherapy for nonpituitary tumors. Therefore, all patients treated by cranial radiotherapy should have structured periodical assessment of pituitary functions. (J Clin Endocrinol Metab 96: 2330-2340, 2011).

Keywords: Acth, Adult, Adults, Assessment, Cancer, Childhood Brain-Tumors, Cochrane, Definitions, Embase, Endocrine, Evaluation, Extraction, Growth-Hormone Deficiency, Head, Hypopituitarism, Intracranial Tumors, Irradiation, Meta Analysis, Meta-Analysis, Nasopharyngeal Carcinoma, Neck, Patients, Periodical, Prevalence, PUBMED, Radiation-Therapy, Radiotherapy, Review, Science, Sources, Systematic, Systematic Review, Treatment, Web of Science

? Bolland, M.J., Wang, T.K.M., Grey, A., Gamble, G.D. and Reid, I.R. (2011), Stable bone density in HAART-treated individuals with HIV: A meta-analysis. *Journal of Clinical Endocrinology & Metabolism*, **96** (9), 2721-2731.

Full Text: [2011\J Cli End Met96, 2721.pdf](2011/J%20Cli%20End%20Met96,%202721.pdf)

Abstract: Context: Longitudinal studies of bone mineral density (BMD) in HIV have reported conflicting results. Objective: We investigated whether temporal changes in BMD differ by highly active antiretroviral therapy (HAART) status at baseline Data sources: Data sources included MEDLINE, EMBASE, and the Web of Science for English language studies (1966 to September 2010) and conference abstracts (1997-2010). Study selection: Longitudinal studies reporting BMD at least 48 wk apart in adult patients with HIV with a comparable uninfected control group were eligible. Uncontrolled studies were included in secondary analyses. Data extraction: Data were independently extracted by two researchers. Data synthesis: Data were pooled using random-effects models. In the primary analysis of six controlled studies (follow-up 1.5-2.7 yr), there were no significant differences in the percent change from baseline in BMD at the total hip or femoral neck between HIV cohorts and controls and a decrease of 0.6%(95% confidence interval = -1.1 to -0.1) at the spine in the HIV cohorts. In the secondary analysis of 37 studies (31 uncontrolled, six controlled), cohorts treated with HAART at baseline had stable or slight increases in BMD at 1 yr, stable or slight decreases in BMD at 2 yr, and stable BMD at 2.5 yr or later. In cohorts that were HAART-naive/untreated at baseline, there was accelerated loss of BMD at all time points, and the annualized rate of BMD change was greatest at 1 yr, but thereafter decreased. Conclusion: BMD is stable in HIV cohorts established on HAART, whereas cohorts initiating HAART have short-term accelerated BMD loss followed by a longer period of BMD stability/increases. Routine monitoring of BMD in many HAART-treated patients may not be necessary. (J Clin Endocrinol Metab 96: 2721-2731, 2011).

Keywords: Active Antiretroviral Therapy, Adult, Analysis, Antiretroviral, Antiretroviral Therapy, Bone, Bone Mineral Density, Control, Controlled Studies, Embase, Follow-up, HAART, HIV, HIV-1-Infected Patients, Infected Patients, Medline, Men, Mineral Density, Monitoring, Patients, Points, Primary, Randomized Controlled-Trial, Researchers, Risk-Factors, Science, Spine, Synthesis, Tenofovir DF, Therapy, Vitamin-D, Web of Science, Women

? Burgers, A.M.G., Biermasz, N.R., Schoones, J.W., Pereira, A.M., Renehan, A.G., Zwahlen, M., Egger, M. and Dekkers, O.M. (2011), Meta-analysis and dose-response metaregression: Circulating insulin-like growth factor I (IGF-I) and mortality. *Journal of Clinical Endocrinology & Metabolism*, **96** (9), 2912-2920.

Full Text: 2011\J Cli End Met96, 2912.pdf

Abstract: Context: IGF-I plays a central role in metabolism and growth regulation. High IGF-I levels are associated with increased cancer risk and low IGF-I levels with increased risk for cardiovascular disease. Objective: Our objective was to determine the relationship between circulating IGF-I levels and mortality in the general population using random-effects meta-analysis and dose-response metaregression. Data Sources: We searched PubMed, EMBASE, Web of Science, and Cochrane Library from 1985 to September 2010 to identify relevant studies. Study Selection: Population-based cohort studies and (nested) case-control studies reporting on the relation between circulating IGF-I and mortality were assessed for eligibility. Data Extraction: Data extraction was performed by two investigators independently, using a standardized data extraction sheet. Data Synthesis: Twelve studies, with 14,906 participants, were included. Overall, risk of bias was limited. Mortality in subjects with low or high IGF-I levels was compared with mid-centile reference categories. All-cause mortality was increased in subjects with low as well as high IGF-I, with a hazard ratio(HR) of 1.27(95% CI = 1.08-1.49) and HR of 1.18(95% CI = 1.04-1.34), respectively. Dose-response metaregression showed a U-shaped relation of IGF-I and all-cause mortality (P = 0.003). The predicted HR for the increase in mortality comparing the 10th IGF-I with the 50th percentile was 1.56 (95% CI = 1.31-1.86); the predicted HR comparing the 90th with the 50th percentile was 1.29 (95% CI = 1.06-1.58). A U-shaped relationship was present for both cancer mortality and cardiovascular mortality. Conclusions: Both low and high IGF-I concentrations are associated with increased mortality in the general population. (J Clin Endocrinol Metab 96: 2912-2920, 2011).

Keywords: All-Cause, Bias, Body-Composition, Cancer, Cancer Death, Cardiovascular, Cardiovascular Disease, Cardiovascular-Disease, Case-Control, Case-Control Studies, Cochrane, Cohort Studies, Disease, Dose-Response, Embase, Extraction, Factor (IGF)-I, Factor-Binding Protein-3, GH Deficiency, Growth, Life-Style, Meta Analysis, Meta-Analysis, Mortality, Older-Adults, Pubmed, Risk, Science, Sources, Synthesis, Web of Science

# Title: Journal of Clinical Epidemiology

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? Valentine, J.L., He, S.Y., Reisbord, L.S. and Lachenbruch, P.A. (1992), Health response by questionnaire in arsenic-exposed populations. *Journal of Clinical Epidemiology*, **45** (5), 487-494.

Full Text: [1992\J Cli Epi45, 487.pdf](1992/J%20Cli%20Epi45,%20487.pdf)

Abstract: The health status of populations exposed to arsenic through drinking water was determined by a mailed questionnaire. Participants were selected from three communities located in Nevada with 1977 tap water arsenic levels of approximately 0.1 mg/l and one California community with 1977 levels around 0.39 mg/l. The questionnaire responses were obtained in 1979 from the four exposed communities and compared to those of a Wyoming community whose tap water levels of arsenic were less than 0.001 mg/l in 1979. No difference in health status for gastrointestinal, neurological, musculoskeletal, circulatory and skin disorders was found. The average number of years of consumption given by length of residence was 6-16 years. We conclude that the health status of these arsenic-exposed populations has not been adversely affected.

Keywords: Arsenic, Symptom Response, Body Burden, Mailed Questionnaire, Health, Status, Drinking Water, Home Interview, Mail, Telephone

? Linde, K., Scholz, M., Ramirez, G., Clausius, N., Melchart, D. and Jonas, W.B. (1999), Impact of study quality on outcome in placebo-controlled trials of homeopathy. *Journal of Clinical Epidemiology*, **52** (7), 631-636.

Full Text: [1999\J Cli Epi52, 631.pdf](1999/J%20Cli%20Epi52,%20631.pdf)

Abstract: We investigated the influence of indicators of methodological quality on study outcome in a set of 89 placebo-controlled clinical trials of homoeopathy in three different ways: (1) The results of studies meeting single criteria (explicit statement of random allocation, allocation concealment, double-blinding, completeness of follow-up) of methodological quality were compared with those of studies not meeting the criteria in univariate and multivariate analyses; (2) The results of studies scoring above and below predefined scores in two quality assessment scales were compared; (3) Primary studies were consecutively entered into a cumulative metaanalysis according to the summary scores derived from the quality assessment scales. All analyses were performed using meta-regression methods. Studies that were explicitly randomized and were double-blind as well as studies scoring above the cut-points yielded significantly less positive results than studies not meeting the criteria. In the cumulative meta-analyses, there was a trend for increasing effect sizes when more studies with lower-quality scores were added. However, there was no linear relationship between quality scores and study outcome. We conclude that in the study set investigated, there was clear evidence that studies with better methodological quality tended to yield less positive results. Because summarizing disparate study features into a single score is problematic, meta-regression methods simultaneously investigating the influence of single study features seem the best method for investigating the impact of study quality on outcome, (C) 1999 Elsevier Science Inc.

Keywords: Study Quality, Meta-Analysis, Homeopathy, Randomized Controlled Trials, Bias, Randomized Controlled Trials, Clinical-Trials, Critical-Look, Metaanalysis, Scores

Pittler, M.H., Abbot, N.C., Harkness, E.F. and Ernst, E. (2000), Location bias in controlled clinical trials of complementary/alternative therapies. *Journal of Clinical Epidemiology*, **53** (5), 485-489.

Full Text: [J\J Cli Epi53, 485.pdf](J/J%20Cli%20Epi53,%20485.pdf)

Abstract: To systematically investigate location bias of controlled clinical trials in complementary/alternative medicine (CAM). *Methods:* Literature searches were performed to identify systematic reviews and meta-analyses, which were used to retrieve controlled clinical trials. Trials were categorised by whether they appeared in CAM-journals or mainstream medical (MM)-journals, and by their direction of outcome, methodological quality, and sample size. *Results:* 351 trials were analysed. A predominence of positive trials was seen in non-impact factor CAM- and MM-journals, 58 / 78 (74%) and 76 / 102 (75%) respectively, and also in low impact factor CAM- and MM-journals. In high impact factor MM-journals there were equal numbers of positive and negative trials, a distribution significantly (P < 0.05) different from all other journal categories. Quality scores were significantly lower for positive than negative trials in non-impact factor CAM-journals (P < 0.02). A similar trend was seen in low-impact factor CAM journals, but not to a level of significance (P = 0.06). There were no significant differences between quality scores of positive and negative trials published in MM-journals, except for high impact factor journals, in which positive trials had significantly lower scores than negative trials (P = 0.048). There was no difference between positive and negative trials in any category in terms of sample size. *Conclusion:* More positive than negative trials of complementary therapies are published, except in high-impact factor MM-journals. In non-impact factor CAM-journals positive studies were of poorer methodological quality than the corresponding negative studies. This was not the case in MM-journals which published on a wider range of therapies, except in those with high impact factors. Thus location of trials in terms of journal type and impact factor should be taken into account when the literature on complementary therapies is being examined.

Keywords: Location Bias, Alternative Medicine, Chiropractic Medicine, Acupuncture, Homeopathy, Herbal Medicine, Publication Bias

? Kjaergard, L.L. and Gluud, C. (2002), Citation bias of hepato-biliary randomized clinical trials. *Journal of Clinical Epidemiology*, **55** (4), 407-410.

Full Text: [2002\J Cli Epi55, 407.pdf](2002/J%20Cli%20Epi55,%20407.pdf)

Abstract: The objective of this study was to assess whether trials with a positive (i.e., statistically significant) outcome are cited more often than negative trials. We reviewed 530 randomized clinical trials on hepato-biliary diseases published in I I English-language journals indexed in MEDLINE from 1985-1996. From each trial, we extracted the statistical significance of the primary study outcome (positive or negative), the disease area, and methodological quality (randomization and double blinding). The number of citations during two calendar years after publication was obtained from Science Citation Index. There was a significant positive association between a statistically significant study outcome and the citation frequency (beta, 0.55, 95% confidence interval, 0.39-0.72). The disease area and adequate generation of the allocation sequence were also significant predictors of the citation frequency. We concluded that positive trials are cited significantly more often than negative trials. The association was not explained by disease area or methodological quality. (C) 2002 Elsevier Science Inc. All rights reserved.

Keywords: Bias, Citation, Citations, Clinical Trials, Journal Citation Reports, Journals, Medline, Meta-Analysis, Publication, Publication Bias, Quality, Randomized Clinical Trials, Reviews, Science Citation Index, Statistical, Systematic Reviews

? Albrecht, J., Meves, A. and Bigby, M. (2005), Case reports and case series from *Lancet* had significant impact on medical literature. *Journal of Clinical Epidemiology*, **58** (12), 1227-1232.

Full Text: [2005\J Cli Epi58, 1227.pdf](2005/J%20Cli%20Epi58,%201227.pdf)

Abstract: Background and Objectives: Case reports and case series are often the first evidence of innovative treatment, but clinical trials need to follow to substantiate this evidence. The objective of this article was to evaluate case reports or case series describing innovative treatment concerning their impact. Methods: Case reports and case series (n <= 10) from a high-impact journal, The Lancet, published from 1 January 1996 to 30 June 1997, were evaluated according to predefined criteria. To assess publication impact, Pubmed, Science Citation Index, the Register of Current Controlled Clinical Trials, and the Cochrance Controlled Clinical Trials Register were searched. Results: Sixty-four case reports and 39 case series were identified. They were cited in average 17 times (median 6,5; range 0-336). Twenty-Four follow-up trials were identified, nine in the register of current controlled clinical trials. Conclusion: Case reports and case series can be well received, and have significant influence on subsequent literature and possibly on clinical practice. Many were followed by clinical trials. Often, though, they report rare conditions for which trials may not be feasible, and more or less explicitly transfer established treatment into other conditions. Overall, there is a strong publication bias favoring positive results, and opportunity should be created for publication of follow-up reports. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Amnesty, Bias, Bone-Marrow Transplantation, Case Reports, Case Series, Citation, Clearance, Clinical Research, Clinical Trials, Criteria, Donor, Elsevier, Hepatitis-B Virus, Impact, Impact Factor, Journal, Literature, Medical, Medical Literature, Mycophenolate-Mofetil, Positive, Publication, Publication Bias, Qualitative Research, Review, Science, Science Citation Index, Treatment, Trials

? Wiebe, N., Vandermeer, B., Platt, R.W., Klassen, T.P., Moher, D. and Barrowman, N.J. (2006), A systematic review identifies a lack of standardization in methods for handling missing variance data. *Journal of Clinical Epidemiology*, **59** (4), 342-353.

Full Text: 2006\J Cli Epi59, 342.pdf

Abstract: Background and Objectives: To describe and critically appraise available methods for handling missing variance data in meta-analysis (MA). Methods: Systematic review. MEDLINE, EMBASE, Web of Science, MathSciNet, Current Index to Statistics, BMJ SearchAll, The Cochrane Library and Cochrance Colloquium proceedings, MA texts and references were searched. Any form of text was included: MA, method chapter, or otherwise. Descriptions of how to implement each method, the theoretic basis and/or ad hoc motivation(s), and the input and output variable(s) were extracted and assessed. Methods may be: true imputations, methods that obviate the need for a standard deviation (SD), or methods that recalculate the SD. Results: Eight classes of methods were identified: Algebraic recalculations, approximate algebraic recalculations, imputed study-level SDs, imputed study-level SDs from nonparametric summaries, imputed study-level correlations (e.g., for change-from-baseline SD), imputed MA-level effect sizes, MA-level tests, and no-impute methods. Conclusion: This work aggregates the ideas of many investigators. The abundance of methods suggests a lack of consistency within the systematic review community. Appropriate use of methods is sometimes suspect; consulting a statistician, early in the review process, is recommended. Further work is required to optimize method choice to alleviate any potential for bias and improve accuracy. Improved reporting is also encouraged. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Accuracy, Adults, Bias, Cochrane, Data Analysis,Statistical, Data Collection, Efficacy, Embase, Imputation, Management, Medline, Meta-Analysis, Metaanalysis, Methods, Nonparametric, Publication Bias, Randomized-Trials, Review, Science, Systematic, Systematic Review, Web of Science

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Full Text: [2006\J Cli Epi59, 437.pdf](2006/J%20Cli%20Epi59,%20437.pdf)

Abstract: objective: Propensity score (PS) analyses attempt to control for Confounding in nonexperimental studies by adjusting for the likelihood that a given patient is exposed. Such analyses have been proposed to address confounding by indication, but there is little empirical evidence that the), achieve better control than conventional multivariate outcome modeling. Study Design and Methods: Using PubMed and Science Citation Index, we assessed the use Of propensity scores over time and critically evaluated Studies published through 2003. Results: Use of propensity scores increased from a total of 8 reports before 1998 to 71 in 2003. Most of (lie 177 published studies abstracted assessed medications (N = 60) or Surgical interventions (N = 51), mainly in cardiology and cardiac surgery (N = 90). Whether PS methods or conventional outcome Models were used to control for confounding had little effect On results ill those Studies ill Which such comparison was possible. only 9 of 69 studies (13%) had an effect estimate that differed by more than 20% from that obtained with a conventional outcome model in all PS analyses presented. Conclusions: Publication of results based on propensity score methods has increased dramatically, but there is little evidence that these methods yield substantially different estimates compared with conventional multivariable methods. (C)2006 Elsevier Inc. All riglits reserved.

Keywords: Acute Myocardial-Infarction, Aortic-Valve-Replacement, Bias, Citation, Clinical Effectiveness, Comparison, Confounding, Converting-Enzyme-Inhibitors, Coronary-Artery-Bypass, Critically-ILL Patients, Design, Elsevier, Epidemiology, Indication, Ischemic Mitral Regurgitation, Long-Term Survival, Methods, Model, Modeling, Models, Multicenter Retrolective Cohort, Nonsteroidal Antiinflammatory Drugs, Propensity Score, Publication, Quality-of-Life, Review, Science, Science Citation Index, Statistical Methods, Surgery

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Full Text: [2007\J Cli Epi60, 324.pdf](2007/J%20Cli%20Epi60,%20324.pdf)

Abstract: Limitations are important to understand for placing research findings in context, interpreting the validity of the scientific work, and ascribing a credibility level to the conclusions of published research. This goes beyond listing the magnitude and direction of random and systematic errors and validity problems. Acknowledgment of limitations requires an interpretation of the meaning and influence of errors and validity problems on the published findings. An examination of the full-text files of the first 50 articles published in 2005 in the six most-cited research journals and in two recently launched leading open-access journals showed that only 67 articles (17%) used at least one word denoting limitations in the context of the presented scientific work. Only four articles (1%) used the word limitation in their abstract; none referred to limitations of the present work that materially affected conclusions. Only five articles had a separate section on limitations. Conversely, 243 articles (61%) used words detected by the roots error, valid, bias, reproducib, or false and 289 articles (72%) used words with the root importan. Among the 25 top-cited journals’ instructions to the authors and editorial policies, only one encourages discussion of limitations; importance, novelty, and lack of error are typically encouraged. Limitations should be better covered and discussed in research articles. To facilitate this, journals should give better guidance and promote the discussion of limitations. Otherwise, we are facing an important loss of context for the scientific literature. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Authors, Bias, Bias, Clinical-Research, Discussion, Error, Errors, Instructions to Authors, Journals, Limitations, Research

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Full Text: [2007\J Cli Epi60, 651.pdf](2007/J%20Cli%20Epi60,%20651.pdf)

Abstract: Objective: To investigate the rationale, potential problems and solutions of using composite endpoints (CEPs) for the assessment of intervention effects. Study Design and Setting: This study is a systematic review. We searched MEDLINE, EMBASE, and the Science Citation Index, for publications appearing between 1980 and September 2005, and reviewed potentially informative textbooks. Eligible articles provided a commentary, analysis, or discussion of CEPs for any of the following areas: (1) rationale, (2) interpretation or meaning, (3) advantages, (4) limitations or conceptual problems, and (5) recommendations for use. Results: Seventeen articles and one textbook proved eligible. Decreases in sample size requirements and ability to assess the net effect of an intervention were the most commonly cited advantages. Authors noted the risk of misinterpretation when heterogeneity among components with respect to either patient importance or magnitude of treatment effects as the most salient disadvantage. There were discrepancies between authors concerning the usefulness of CEPs to avoid bias from competing risks and when the direction of the effect of therapy differs across components. Conclusion: Methodologists have given limited attention to CEPs and their views are sometimes contradictory. Further work is needed to establish the role of CEPs in research and in guiding clinical practice. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Acute Myocardial-Infarction, Authors, Citation, Clinical Trials, Clinical-Trials, Combined Outcomes, Composite Endpoints, Endpoints, Issues, Lessons, Medline, Outcomes, Outcomes, Overview, Publications, Research, Review, Systematic Review, Therapy, Validity

? Nieminen, P., Rucker, G., Miettunen, J., Carpenter, J. and Schumacher, M. (2007), Statistically significant papers in psychiatry were cited more often than others. *Journal of Clinical Epidemiology*, **60** (9), 939-946.

Full Text: [2007\J Cli Epi60, 939.pdf](2007/J%20Cli%20Epi60,%20939.pdf)

Abstract: Objective: Citations by other researchers are important in the dissemination of research findings. We aimed to investigate whether preferential citation of statistically significant articles exists in the psychiatric literature. Study Design and Settings: We analyzed all original research papers published in 1996 in four psychiatric journals. Using a standardized questionnaire, from each paper, we extracted the primary outcome and its statistical significance. The number of citations, excluding authors’ “self-citations,” received by April 2005 was obtained. Regression analysis was used to relate citation frequency to statistical significance, adjusting for confounders. Results: Of 448 extracted papers, 368 used statistical significance testing and 287 (77.8%) reported P < 0.05. The median number of citations for papers reporting “significant” and “nonsignificant” results was 33 vs. 16. After adjustment for journal, study design, reporting quality, whether outcome confirmed previous findings and study size, the ratio of the number of citations per article for articles reporting “P < 0.05” on the primary outcome to those reporting “P > 0.05” was 1.63 (95% confidence interval [CI]: 1.32, 2.02, P < 0.001). Conclusion: Authors cite studies based on their P-value rather than intrinsic scientific merit. This practice skews the research evidence. Systematic study registration and inclusion in meta-analysis should be encouraged. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Analysis, Authors, Bibliometrics, Citation, Citation Bias, Citation Bias, Citations, Clinical-Research, Data Interpretation, Empirical-Evidence, Impact Factors, Indicators, Journals, Literature, Medical Journals, Papers, Performance, Psychiatry, Publication Bias, Publication Bias, Quality, Randomized-Trials, Research, Review Literature, Study Design, Testing

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Full Text: [2008\J Cli Epi61, 357.pdf](2008/J%20Cli%20Epi61,%20357.pdf)

Abstract: Objective: To estimate the yield from searching a range of bibliographic databases and additional sources to identify test accuracy studies for systematic reviews. Study Design and Setting: We examined eight systematic reviews and their database searches: MEDLINE, EMBASE, BIOSIS, Science Citation Index, LILACS, Pascal, and CENTRAL. We used studies included in each systematic review as the “gold standard,” against which yield was estimated. For each database, we classified studies in each gold standard set as being (1) included in the database and identified by searches, (2) included and not identified, and (3) not included in the database. Results: No search identified all studies in any gold standard set. EMBASE, Science Citation Index, and BIOSIS contained studies that were not on MEDLINE. Over 20% of studies in the gold standard sets were not identified by searching MEDLINE. Six studies on LILACS were not on any other database. Eight gold standard studies were not included in any of the databases, and a further 22 were not identified by the electronic search strategies. Conclusions: Systematic reviews of test accuracy studies should search a range of databases. Even searches designed to be very sensitive, that do not use study design filters, can fail to identify relevant studies. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Bibliographic, Bibliographic Databases, Citation, Databases, Diagnostic-Accuracy, Filters, Information Retrieval, Literature Searching, Medline, Preterm Birth, Relevant, Review, Strategies, Systematic Review, Test Accuracy Studies

? Papatheodorou, S.I., Trikalinos, T.A. and Ioannidis, J.P.A. (2008), Inflated numbers of authors over time have not been just due to increasing research complexity. *Journal of Clinical Epidemiology*, **61** (6), 546-551.

Full Text: [2008\J Cli Epi61, 546.pdf](2008/J%20Cli%20Epi61,%20546.pdf)

Abstract: Objective: To examine trends in and determinants of the number of authors in clinical studies. Study Design and Setting: We analyzed determinants of the number of authors in 633 articles of randomized trials and 313 articles of nonrandomized studies included in large meta-analyses (seven and six topics, respectively). Analyses were adjusted for topic. We also evaluated 310 randomly sampled case reports that had an abstract and described a single case. Results: After adjusting for topic and other determinants, for both randomized trials and nonrandomized studies, the number of authors increased by 0.8 per decade (P < 0.001). Topic was a strong determinant of the number of authors; other independent factors included journal impact factor, multinational authorship, and (for randomized trials) article length and sample size. Trials from South Europe (+1.1 authors) and North America (+0.9) and nonrandomized studies from South Europe (+1.8) had more authors than studies from North Europe (P < 0.001). For case reports, only geographic location and article length were significantly related with author numbers. Conclusion: The number of authors in articles of randomized and nonrandomized studies has increased over time, even after adjusting for the topic, size, and visibility of a study. The academic coinage of authorship may be suffering from inflation. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Authorship, Case Reports, Clinical, Clinical Studies, Complexity, Europe, Impact, Impact Factor, Journal, Journal Impact, Journal Impact Factor, Length, Location, North, P, Randomized, Research, Rights, Sample Size, Size, Suffering, Trends, Visibility

? Falagas, M.E., Grigoria, T. and Ioannidou, E. (2009), A systematic review of trends in the methodological quality of randomized controlled trials in various research fields. *Journal of Clinical Epidemiology*, **62** (3), 227-231.

Full Text: 2009\J Cli Epi62, 227.pdf

Abstract: Objectives: We sought to evaluate the trends in the methodological quality of randomized controlled trials in various medical fields. Study Design and Setting: Relevant studies were retrieved by the PUBMED and the ISI Web of science databases. Results: Thirty-five out of 457 retrieved studies met the inclusion criteria. Twenty-one out of 35 selected studies reported significant improvement in at least one methodological quality factor. Overall quality scores were increased in 13 out of 26 studies providing relevant data. The most commonly separately examined key quality factors were allocation concealment and blinding in 13 out of 21 studies that reported relevant data. Allocation concealment was the quality characteristic most commonly reported as significantly improving during the reviewed period (in five out of eight studies reporting relevant comparative data). Conclusion: Certain aspects of methodological quality have improved significantly over time, but others remain stagnant. Further efforts to improve study design, conduct, and reporting of randomized controlled trials are warranted. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Allocation Concealment, Anesthesia, Bias, Blinding, Clinical Trials, Consort, Consort Statement, Controlled Clinical-Trials, Databases, Dual Assessment, Intention To Treat, ISI, Journals, Low-Back-Pain, Medical, Metaanalyses, Pubmed, Randomized Controlled Trials, Research, Review, Rheumatoid-Arthritis, Science, Secular Changes, Surgery, Systematic, Systematic Review, Trends, Web of Science

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Full Text: [2009\J Cli Epi62, 831.pdf](2009/J%20Cli%20Epi62,%20831.pdf)

Abstract: Objective: To study variations in the number of times trials of nicotine replacement therapy (NRT) were cited, and which characteristics of trials predicted the number of citations and the impact factors of journals in which articles were published. Study Design and Setting: We used all 105 randomized controlled trials in the Cochrane review of NRT for smoking cessation. We obtained impact factors from the Journal Citation Reports and the number of citations from ISI Web of Knowledge and Google Scholar. Results: Trials were cited from 0 to 632 times (median 23 times). Trials were cited more often when results were statistically significant than when they were not (median = 41 vs. 17 times, P < 0.001), and when impact factors were higher (10.2 more citations per impact factor point, P < 0.001). Patch trials were cited more often than gum trials (median = 29 vs. 17 times, P = 0.001), and trials funded by the pharmaceutical industry were cited more often than other trials (median = 28 vs. 16.5 times, P = 0.001). Trials with statistically significant results were published in journals with higher impact factors than trials with nonsignificant results (median impact factor = 2.80 vs. 1.81, P = 0.011). Conclusion: Citations were biased toward trials with positive results and toward trials published in high-impact-factor journals. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Bias, Bibliographic, Bibliometrics, Citation, Citations, Google Scholar, Impact Factor, Index, Knowledge, Metaanalysis, Nicotine, Quality, Randomized-Trials, Review, Science, Smoking, Smoking-Cessation, Tobacco, Tobacco Use Disorder

? Slobogean, G.P., Verma, A., Giustini, D., Slobogean, B.L. and Mulpuri, K. (2009), MEDLINE, EMBASE, and Cochrane index most primary studies but not abstracts included in orthopedic meta-analyses. *Journal of Clinical Epidemiology*, **62** (12), 1261-1267.

Full Text: 2009\J Cli Epi62, 1261.pdf

Abstract: Objective: To test the hypothesis that all primary studies used in orthopedic meta-analyses are indexed in MEDLINE or EMBASE. Study Design and Setting: Using MEDLINE from 1995 to 2005, we retrieved all published meta-analyses of orthopedic surgical interventions. The primary studies in each meta-analysis were defined as the “gold standard” set. MEDLINE and EMBASE were searched for each primary study, and a recall rate was calculated. Secondary searches were performed using Web of Science (WoS), the Cochrane databases, and CINAHL. Results: High recall rates were achieved searching MEDLINE (90%) and EMBASE (81%) for the gold standard set, and the combined search retrieved 91%. Titles not indexed by MEDLINE or EMBASE included 45 abstracts, eight journal articles, and three unpublished studies. Searching the Cochrane databases yielded 36 titles not in MEDLINE or EMBASE. Using all three databases produced 97% recall of the primary studies; WoS and ClNAHL did not increase the recall rate. Conclusions: These results suggest that a very high percentage of primary research in orthopedics can be found using the major databases. Additional database searches are unlikely to increase the yield of published manuscripts; however, conference proceedings and journal supplements should still be searched to ensure that relevant remaining reports are identified. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Bias, Bibliographic Databases, Cochrane, Databases, Embase, Health-Care, Information Retrieval, Interventions, Journal, Literature Searching, Medline, Meta-Analysis, Orthopedic Surgery, Primary, Randomized Controlled-Trials, Research, Science, Search, Surgical, Systematic Review, Systematic Reviews, Web of Science

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Full Text: [2011\J Cli Epi64, 331.pdf](2011/J%20Cli%20Epi64,%20331.pdf)

Abstract: Objective: To identify the scientific and nonscientific factors associated with rates of citation in the orthopedic literature. Study Design and Setting: All original clinical articles published in three general orthopedics journals between July 2002 and December 2003 were reviewed. Information was collected on variables plausibly related to rates of citation, including scientific and nonscientific factors. The number of citations at 5 years was ascertained and linear regression was used to identify factors associated with rates of citation. Results: In the multivariate analysis, factors associated with increased rates of citation at 5 years were high level of evidence (22.2 citations for level I or II vs. 10.8 citations for level III or IV; P = 0.0001), large sample size (18.8 citations for sample size of 100 or more vs. 7.9 citations for sample size of 25 or fewer; P < 0.0001), multiple institutions (15.2 citations for two or more centers vs. 11.1 citations for single center; P = 0.023), self-reported conflict of interest disclosure involving a nonprofit organization (17.4 citations for nonprofit disclosure vs. 10.6 citations for no disclosure; P = 0.027), and self-reported conflict of interest disclosure involving a for-profit company (26.1 citations for for-profit disclosure vs. 10.6 citations for no disclosure; P = 0.011). Conclusion: High level of evidence, large sample size, representation from multiple institutions, and conflict of interest disclosure are associated with higher rates of citation in orthopedics. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Analysis, Articles, Bibliometrics, Citation, Citation Rates, Citations, Clinical, Conflict of Interest, Disclosure, Evidence, General, Impact Factor, Institutions, IV, Journal Impact Factor, Journals, Level of Evidence, Linear Regression, Literature, Mar, Multivariate, Multivariate Analysis, Organization, Orthopedic Surgery, P, Rates, Regression, Representation, Rights, Sample Size, Size

? Eveleigh, R.M., Muskens, E., van Ravesteijn, H., van Dijk, I., van Rijswijk, E. and Lucassen, P. (2012), An overview of 19 instruments assessing the doctor-patient relationship: Different models or concepts are used. *Journal of Clinical Epidemiology*, **65** (1), 10-15.

Full Text: [2012\J Cli Epi65, 10.pdf](2012/J%20Cli%20Epi65,%2010.pdf)

Abstract: Objectives: The doctor-patient relationship has been linked to patient satisfaction, treatment adherence, and treatment outcome. Many different instruments have been developed to assess this relationship. The large variety makes it difficult to compare results of different studies and choose an instrument for future research. This review aims to provide an overview of the existing instruments assessing the doctor patient relationship. Study Design and Setting: We performed a systematic search in PubMed, PsychInfo, EMBASE, and Web of Science for questionnaires measuring the doctor-patient relationship. We appraised each instrument ascertaining the questionnaires focused on the doctor-patient relationship. We compared the content and psychometric characteristics of the instruments. Results: We found 19 instruments assessing the doctor-patient relationship. The instruments assess a variety of dimensions and use diverse conceptual models for the doctor-patient relationship. The instruments found also vary in terms to which they have been psychometrically tested. Conclusion: We have provided an overview of 19 instruments assessing the doctor-patient relationship. The selection of an instrument for future research should be based on the model or conceptual basis of the doctor-patient relationship that is most applicable to the study objectives and the health care field in which it will be applied. (C) 2012 Elsevier Inc. All rights reserved.

Keywords: Adherence, Agnew-Relationship-Measure, Care, Communication, Doctor-Patient Relationship, Embase, Empathy Care Measure, Health Care, Hong-Kong, Instruments, Mental-Health, Model, Outcome, Overview, Patient Satisfaction, Physician Scale, Psychometric Properties, Pubmed, Questionnaire, Questionnaires, Research, Review, Science, Systematic, Therapeutic Alliance, Therapeutic Alliance, Treatment, Treatment Outcome, Trust, Trust, Web of Science, Working Alliance Inventory

# Title: Journal of Clinical Gastroenterology

Full Journal Title: Journal of Clinical Gastroenterology

ISO Abbreviated Title: J. Clin. Gastroenterol.

JCR Abbreviated Title: J Clin Gastroenterol

ISSN: 0192-0790

Issues/Year: 8

Journal Country/Territory: United States

Language: English

Publisher: Lippincott Williams & Wilkins

Publisher Address: 530 Walnut St, pHiladelphia, PA 19106-3621

Subject Categories:

Gastroenterology & Hepatology: Impact Factor

? McGee, M. and Jensen, G.L. (2000), Nutrition in the elderly. *Journal of Clinical Gastroenterology*, **30** (4), 372-380.

Abstract: Older people are growing in prevalence and their nutrition-related concerns adversely impact upon health, function, and life quality. Changes in body composition and organ system function alter nutrient requirements. The purpose of this review is to examine changes in nutritional requirements with aging and to highlight practical approaches to nutritional screening, assessment, and intervention. A multidisciplinary approach with individualized care is recommended. Health care providers who work with older people must be attentive to nutrition, because appreciable comorbidity and unfavorable outcomes may accompany either under-or overnutrition.

Keywords: Body-Mass Index, Protein-Calorie Undernutrition, Dwelling Older Persons, Human Growth-Hormone, Knee Osteoarthritis, Nursing-Home, Energy-Requirements, Osteo-Arthritis, National-Health, Risk Factor, Nutrition, Geriatric, Screening, Assessment

? Baggish, J.S. (2009), Recommendations for probiotic use-2008 cited data do not support “A” recommendation for infectious diarrhea in adults. *Journal of Clinical Gastroenterology*, **43** (8), 793.

Full Text: [2009\J Cli Gas43, 793.pdf](2009/J%20Cli%20Gas43,%20793.pdf)

Keywords: Children, Metaanalysis, Recommendation

# Title: Journal of Clinical Investigation

Full Journal Title: Journal of Clinical Investigation

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0021-9738

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Holmes, K.V. (2003), SARS coronavirus: a new challenge for prevention and therapy. *Journal of Clinical Investigation*, **111** (11), 1605-1609.

Keywords: Mouse Hepatitis-Virus, Human Enteric Coronaviruses, Spike Protein, Replication, Complexes

? Neill, U.S. (2008), Publish or perish, but at what cost? *Journal of Clinical Investigation*, **118** (7), 2368.

Full Text: [2008\J Cli Inv118, 2368.pdf](2008/J%20Cli%20Inv118,%202368.pdf)

Abstract: The academic scientific enterprise rewards those with the longest CVs and the most publications. Under pressure to generate voluminous output, scientists often fall prey to double publishing, self plagiarism, and submitting the “minimal publishable unit.” Are these ethical gray areas, or true transgressions?

Keywords: Plagiarism, Pressure, Publications, Self-Plagiarism

# Title: Journal of Clinical Lipidology

Full Journal Title: Journal of Clinical Lipidology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kostis, W.J., Moreyra, A.E., Cheng, J.Q., Dobrzynski, J.M. and Kostis, J.B. (2011), Continuation of mortality reduction after the end of randomized therapy in clinical trials of lipid-lowering therapy. *Journal of Clinical Lipidology*, **5** (2), 97-104.

Abstract: BACKGROUND: Long-term follow-up of clinical trials with lipid-lowering medications has suggested a continuation of event reduction after study completion. OBJECTIVE: To evaluate the persistence of the benefit of lipid-lowering therapy in decreasing mortality after the end of clinical trials, when all patients were advised to take the same open-label lipid-lowering therapy. METHODS: Through searches of MEDLINE, the Cochrane Library, the Central Register of Controlled Trials, Web of Science, and ClinicalTrials.gov until June 2010 we identified randomized clinical trials of lipid-lowering agents with a second report describing results after the end of the trial. RESULTS: Among the 459 trials reviewed, only 8 including 44,255 patients and 8144 deaths qualified for the meta-anlaysis. All-cause and cardiovascular mortality were lower in the active intervention group during the first phase (0.84, 95% confidence interval [Cl] 0.76-0.93; P = .0006 and 0.72, 95% Cl 0.63-0.82, P < .0001, respectively) when 71 +/- 23% of the patients randomized to receive active therapy actually received it compared with 13 +/- 5% of patients who received active therapy although they were randomized to placebo (P = .0001). The lower mortality among those initially randomized to active therapy persisted during the second phase (odds ratio 0.90, 95% Cl 0.84-0.97, P = .0035, and 0.82 95% CI 0.73-0.93, P =.0014), when patients in both randomized groups received active therapy in the same proportions (5 +/- 2% for both groups). Numerous sensitivity analyses support the conclusions of the paper. CONCLUSION: The decrease in mortality with lipid-lowering therapy in clinical trials persists after discontinuation of randomized therapy when patients in the treatment and placebo groups receive active therapy. (C) 2011 National Lipid Association. All rights reserved.

Keywords: Average Cholesterol Concentrations, Cardiac Outcomes, Cardiovascular, Clinical Trials, Cochrane, Coronary-Heart-Disease, Follow-Up, Intervention, Legacy Effect, Lipid-Lowering Therapy, Long, Medline, Metaanalysis, Mortality, Niacin, Primary-Prevention Trial, Randomized Clinical Trials, Ratio, Renal-Transplant Recipients, Scandinavian Simvastatin Survival, Science, Statins, Statins, Therapy, Treatment, Web of Science

# Title: Journal of Clinical Microbiology

Full Journal Title: Journal of Clinical Microbiology

ISO Abbreviated Title: J. Clin. Microbiol.

JCR Abbreviated Title: J Clin Microbiol

ISSN: 0095-1137

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Journal Country/Territory: United States

Language: English

Publisher: Amer Soc Microbiology

Publisher Address: 1325 Massachusetts Avenue, NW, Washington, DC 20005-4171

Subject Categories:

Microbiology: Impact Factor

? Mulders, M.N., van Loon, A.M., van der Avoort, H.G., Reimerink, J.H., Ras, A., Bestebroer, T.M., Drebot, M.A., Kew, O.M. and Koopmans, M.P. (1995), Molecular characterization of a wild poliovirus type 3 epidemic in The Netherlands (1992 and 1993). *Journal of Clinical Microbiology*, **33** (12), 3252-3256.

Abstract: An outbreak of poliomyelitis due to wild poliovirus type 3 (PV3) occurred in an unvaccinated community in The Netherlands between September 1992 and February 1993. The outbreak involved 71 patients. The aim of this study was to characterize the virus at the molecular level and to analyze the molecular evolution of the epidemic virus. Molecular analysis was carried out by sequencing the VP1/2A junction region (150 nucleotides) of 50 PV3 strains isolated in association with this outbreak and the entire VP1 gene of 14 strains. In addition, the sequence of the VP1/2A junction region of strains from geographical regions endemic for PV3 (Egypt, India, and Central Asia) was analyzed and compared with the nucleotide sequence of the epidemic strain from The Netherlands. The earliest isolate was obtained from river water sampled 3 weeks before diagnosis of the first poliomyelitis patient and was found by VP1/2A sequence analysis to be genetically identical to the strain isolated from the first patient. Sequence divergence among the strains from the epidemic in The Netherlands was less than 2%. The closest genetic similarity (97.3%) was found with an Indian isolate (New Delhi, December 1991), indicating the likely source of the virus. A more than 99% sequence similarity was found in the VP1/2A region. Finally, the sequence information was used to design primers for the specific and highly sensitive molecular detection of PV3 strains during the epidemic.

Keywords: Polymerase Chain-Reaction

? Dauendorffer, J.N., Guillemin, I., Aubry, A., Truffot-Pernot, C., Sougakoff, W., Jarlier, V. and Cambau, E. (2003), Identification of mycobacterial species by PCR sequencing of quinolone resistance-determining regions of DNA gyrase genes. *Journal of Clinical Microbiology*, **41** (3), 1311-1315.

Abstract: The determination of the amino acid sequence of quinolone resistance-determining regions (QRDRs) in the A and B subunits of DNA gyrase is the molecular test for the detection of fluoroquinolone resistance in mycobacteria. We looked to see if the assignment of mycobacterial species could be obtained simultaneously by analysis of the corresponding nucleotide sequences. PCR sequencing of gyrA and gyrB QRDRs was performed for 133 reference and clinical strains of 21 mycobacterial species commonly isolated in clinical laboratories. Nucleotide sequences of gyrA and gyrB QRDRs were species specific, regardless of fluoroquinolone susceptibility

Keywords: Complex, Differentiation, Lipa Mycobacteria, Ofloxacin, Polymorphism Analysis, Rapid Identification, Ribosomal-RNA Gene, Slowly Growing Mycobacteria, Susceptibility, Tuberculosis

? Xu, H.B., Jiang, R.H., Sha, W., Li, L. and Xiao, H.P. (2010), PCR-single-strand conformational polymorphism method for rapid detection of rifampin-resistant mycobacterium tuberculosis: Systematic review and meta-analysis. *Journal of Clinical Microbiology*, **48** (10), 3635-3640.

Abstract: The reference standard methods for drug susceptibility testing of Mycobacterium tuberculosis, such as culture on Lowenstein-Jensen or Middlebrook 7H10/11 medium, are very slow to give results; and due to the emergence of multidrug-resistant M. tuberculosis and extensively drug-resistant M. tuberculosis, there is an urgent demand for new, rapid, and accurate drug susceptibility testing methods. PCR-single-strand conformational polymorphism (PCR-SSCP) analysis has been proposed as a rapid method for the detection of resistance to rifampin, but its accuracy has not been systematically evaluated. We performed a systematic review and meta-analysis to evaluate the accuracy of PCR-SSCP analysis for the detection of rifampin-resistant tuberculosis. We searched the MEDLINE, EMBASE, Web of Science, BIOSIS, and LILACS databases and contacted authors if additional information was required. Ten studies met our inclusion criteria for rifampin resistance detection. We applied the summary receiver operating characteristic (SROC) curve to perform the meta-analysis and to summarize diagnostic accuracy. The sensitivity of PCR-SSCP analysis for the rapid detection of rifampin-resistant tuberculosis was 0.79 (95% confidence interval [CI], 0.75 to 0.82), the specificity was 0.96 (95% CI, 0.94 to 0.98), the positive likelihood ratio was 16.10 (95% CI, 5.87 to 44.13), the negative likelihood ratio was 0.20 (95% CI, 0.10 to 0.40), and the diagnostic odds ratio was 100.93 (95% CI, 31.95 to 318.83). PCR-SSCP analysis is a sensitive and specific test for the rapid detection of rifampin-resistant M. tuberculosis. Additional studies in countries with a high prevalence of multidrug-resistant M. tuberculosis and also cost-effectiveness analysis are required in order to obtain a complete picture on the utility of this method for rapid drug resistance detection in M. tuberculosis.

Keywords: Accuracy, Analysis, Authors, Cost-Effectiveness, Culture, Databases, Diagnostic-Test, DNA, Drug, Drug Resistance, Drug Sensitivity, Drug Susceptibility Testing, Gene, Information, Meta-Analysis, Mutations, Odds Ratio, Polymerase-Chain-Reaction, Polymorphism, Prevalence, Ratio, Resistance, Review, Science, Sequence-Analysis, Susceptibility, Systematic, Systematic Review, Tests, Tuberculosis, Web of Science

# Title: Journal of Clinical Nursing

Full Journal Title: Journal of Clinical Nursing

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ng, W.Q. and Neill, J. (2006), Evidence for early oral feeding of patients after elective open colorectal surgery: A literature review. *Journal of Clinical Nursing*, **15** (6), 696-709.

Full Text: 2006\J Cli Nur15, 696.pdf

Abstract: Aim. To review research on early oral feeding following elective, open colorectal surgery. Background. Fasting following gastrointestinal surgery is a traditional surgical practice, based on fears of causing postoperative complications if oral intake begins before bowel function returns, but fasting following elective surgery is questionable as a best practice. Methods. Searches in Journals@Ovid CINAHL, MEDLINE, PUBMED, Web of Science and The Cochrane Library for primary studies, published during 1995-2004, used the keywords: ‘surgery’, ‘postoperative’, ‘elective, ‘colorectal’, ‘bowel, ‘colon’, ‘oral’, ‘enteral’, ‘feeding’, ‘early’, ‘traditional’. Studies of adults undergoing elective, open colorectal surgery who were allowed fluids and food before bowel function returned (early feeding) were included. Outcomes of interest were safety, tolerability, duration of gastrointestinal ileus and length of hospital stay. Critical appraisal of randomized and controlled studies was undertaken following inclusion. Results. Fifteen studies comprising 1352 patients were reviewed. All studies concluded early feeding was safe, based on complications rates. Total complications were 12.5% (range 0-25%) for 935 early feeding patients, with no increased risk of anastomotic leak, aspiration pneumonia, or bowel obstruction. For all studies an average of 86% patients (range 73-100%) tolerated early feeding. Studies demonstrating faster resolution of postoperative ileus or shorter hospitalization were associated with multimodal perioperative care, including early mobilization, epidural analgesia and comprehensive patient education. Appraisal of five randomized trials revealed no blinding and inadequate randomization. Conclusions. This review supports early oral feeding after elective, open colorectal surgery and challenges the traditional practice of fasting patients until return of bowel function. Early feeding was safe, well-tolerated and easy to implement. Reduced length of ileus and shorter hospitalization may occur with multimodal protocols. Relevance to clinical practice. Nurses can highlight this new evidence for other health professionals, advocate development of clinical protocols featuring early feeding and participate in multi-disciplinary, multi-method research regarding benefits of early feeding.

Keywords: Adults, Analgesia, Cochrane, Controlled Studies, Critical, Development, Early Feeding, Education, Elective Colorectal Surgery, Fasting, Gastrointestinal, Gastrointestinal Surgery, Hospital, Hospitalization, Interest, Interventions, Literature, Literature Review, Medline, Methods, Nurses, Nursing, Open Colon Resection, Outcomes, Patient Education, Postoperative Complications, Practice, Primary, Program, Prospective Randomized-Trial, Pubmed, Quality, Recovery, Research, Review, Risk, Safety, Science, Statement, Stay, Surgery, Surgical, Traditional, Web of Science

? Jonsdottir, H. (2008), Nursing care in the chronic phase of COPD: A call for innovative disciplinary research. *Journal of Clinical Nursing*, **17** (7B), 272-290.

Full Text: 2008\J Cli Nur17, 272.pdf

Abstract: Aim. The literature on nursing care in nurse clinics that focus on chronic management of chronic obstructive pulmonary disease (COPD) is analysed and synthesised with the purpose of advancing research of practice in nurse clinics. Background. Along with the rising prevalence of COPD and a growing recognition of long-lasting, comprehensive and complex healthcare needs of people with COPD and their families, nurses are challenged to restructure their practice. Methods. An integrated review was conducted. The databases searched were NCBI’s PUBMED database, Scopus, CINAHL and Web of Science from 1996 to 2006. Terms searched were ‘COPD’ and ‘nurse managed clinic’ with all subheadings. A nurse had to be primary in managing and providing the services and the methodological approach was inclusive. Results. of 385 potentially relevant papers, 20 papers reporting 16 studies met the inclusion criteria. The methodological approach was diverse with randomised controlled trials being most common. Significant benefits from experimental treatments were seldom demonstrated. Nursing care in the chronic phase of COPD has mainly been conceptualised as: home-based respiratory care; self-management educational programmes and telephone service with influences of specialisation in respiratory nursing care on patients’ outcomes as an emphasis as well. Family focus was not found in any of the studies. Conclusion. Research on nurse clinics that focus on the chronic phase of COPD is in its infancy. Innovative research that addresses the structure and content of the nursing care is essential. Relevance to clinical practice. Nursing care in nurse clinics that focus on the chronic phase of COPD needs to be based on nursing knowledge, evidence based, comprehensive, family-centred, focused on health and the health experience and be situated within the service system. Diversity, creativity and nursing values should prevail when developing nurse clinics for the purpose of creating possibilities to attend to the whole of patients’ and their families’ needs and experiences.

Keywords: Chronic Illness, Chronic Obstructive Pulmonary Disease, Community, Copd, Creativity, Databases, Disease, Diversity, Exacerbations, Families, Home-Care, Integrated Review, Intervention, Knowledge, Literature, Management, Methods, Nurse Clinic, Nurse-Led Clinics, Nurses, Nursing, Obstructive Pulmonary-Disease, Outcomes, Papers, Partnership, Perspective, Practice, Prevalence, Primary, Pubmed, Quality, Research, Respiratory Care, Review, Science, Scopus, Self-Management, Self-Management Program, Service, Significant, Web of Science

? O’Connor, M., Bucknall, T. and Manias, E. (2009), A critical review of daily sedation interruption in the intensive care unit. *Journal of Clinical Nursing*, **18** (9), 1239-1249.

Full Text: 2009\J Cli Nur18, 1239.pdf

Abstract: Daily sedation interruption (DSI) has been proposed as a method of improving sedation management of critically ill patients by reducing the adverse effects of continuous sedation infusions. To critique the research regarding daily sedation interruption, to inform education, research and practice in this area of intensive care practice. Literature review. MEDLINE, CINAHL and Web of Science were searched for relevant key terms. Eight research-based studies, published in the English language between 1995-December 2006 and three conference abstracts were retrieved. of the eight articles and three conference abstracts reviewed, five originated from one intensive care unit (ICU) in the USA. The research indicates that DSI reduces ventilation time, length of stay in ICU, complications of critical illness, incidence of post-traumatic stress disorder and is reportedly used by 15-62% of ICU clinicians in Australia, Europe, USA and Canada. DSI improves patients’ physiological and psychological outcomes when compared with routine sedation management. However, research relating to these findings has methodological limitations, such as the use of homogenous samples, single-centre trials and retrospective design, thus limiting their generalisability. DSI may provide clinicians with a simple, cost-effective method of reducing some adverse effects of sedation on ICU patients. However, the evidence supporting DSI is limited and cannot be generalised to heterogeneous ICU populations internationally. More robust research is required to assess the potential impact of DSI on the physical and mental health of ICU survivors.

Keywords: Adverse Effects, Adverse Outcomes, Analgesics, Canada, Critical Illness, Critically Ill Patients, Daily Sedation Interruption, Disorder, Duration, Education, Europe, ICU, Ill Patients, Impact, Intensive Care, Intensive Care Unit, Length of Stay, Literature Review, Management, Mechanically Ventilated Patients, Mental Health, Outcomes, Posttraumatic Stress, Posttraumatic Stress Disorder, Posttraumatic-Stress-Disorder, Practice, Protocol, Quality-Of-Life, Randomized-Trial, Research, Review, Science, Sedation Protocol, Stress, Web of Science

? Oermann, M.H., Shaw-Kokot, J., Knafl, G.J. and Dowell, J. (2010), Dissemination of research into clinical nursing literature. *Journal of Clinical Nursing*, **19** (23-24), 3435-3442.

Full Text: [2010\J Cli Nur19, 3435.pdf](2010/J%20Cli%20Nur19,%203435.pdf)

Abstract: Aim. The purpose of our study was to describe the dissemination of research into the clinical nursing literature. Background. The literature provides a means of transferring knowledge from a research study through citations of the work by other authors. Design. This was a citation analysis study to explore the dissemination of research into the clinical nursing literature, beginning with the publication of an original research study and including all of the citations to that article through 2009. Methods. The authors searched five academic nursing research journal titles, using CINAHL, for original research reports that had clinical relevance and were published between 1990-1999. The search process yielded a final data set of 28 research articles. For each of the articles, the authors searched three databases, CINAHL, Web of Science(R) and Google Scholar, to determine the citation patterns from the date of publication to August 2009. Results. All of the research studies were cited in articles published in clinical journals although there was a wide range in the number of citations, from 3-80. The 28 research articles had a total of 759 citations; 717 (94.5%) of those citations were in articles published in clinical nursing journals. The median length of time between publication of the original study and the first citation was 1.5 years. Some of the studies were still being cited for 18 years after publication of the original work. Conclusions. All of the original research reports examined in this study were cited in articles in clinical journals, disseminating the research beyond the original work to reach clinicians. Relevance to clinical practice. Clinical nursing journals keep readers up-to-date and informed about new practices in nursing and serve another important role: they disseminate research that is clinically relevant by publishing original studies and papers that cite research reports.

Keywords: Analysis, Anxiety, Articles, Bibliometric Analysis, Citation, Citation Analysis, Citations, Data, Databases, Dissemination, Google Scholar, Impact, Journal, Journals, Literature, Nurses, Nursing, Process, Publication, Publishing, Relaxation, Research, Science

? Thompson, D.R., Chair, S.Y., Chan, S.W., Astin, F., Davidson, P.M. and Ski, C.F. (2011), Motivational interviewing: A useful approach to improving cardiovascular health? *Journal of Clinical Nursing*, **20** (9-10), 1236-1244.

Full Text: 2011\J Cli Nur20, 1236.pdf

Abstract: Aim. To review and synthesise, systematically, the research findings regarding motivational interviewing and to inform education, research and practice in relation to cardiovascular health. Background. Motivational interviewing is designed to engage ambivalent or resistant clients in the process of health behaviour change, and it has been widely used in different clinical conditions such as substance abuse, dietary adherence and smoking cessation. Motivational interviewing has also been proposed as a method for improving modifiable coronary heart disease risk factors of patients. Design. Systematic review. Method. Eligible studies published in 1999-2009 were identified from the following databases: CINAHL, MEDLINE, PsycINFO, Cochrane Library, EBSCO, Web of Science, EMBASE and British Nursing Index. A manual search was conducted of bibliographies of the identified studies and relevant journals. Two researchers independently reviewed the studies. Results. Four meta-analyses, one systematic review and three literature reviews of motivational interviewing and five primary studies of motivational interviewing pertaining to cardiovascular health were identified. Despite a dearth of primary studies in cardiovascular health settings, there appears to be strong evidence that motivational interviewing is an effective approach focusing on eliciting the person’s intrinsic motivation for change of behaviour. Conclusion. Motivational interviewing is an effective approach to changing behaviour. It offers promise in improving cardiovascular health status. Relevance to clinical practice. This review indicates that motivational interviewing is a useful method to help nurses improve health behaviour in people with coronary risk factors.

Keywords: Adherence, Cardiovascular, Cardiovascular Health, Care Settings, Cochrane, Coronary Heart Disease, Databases, Disease, Disease Risk, Education, Health Behaviour, Health Behaviour Change, Health Status, Heart-Failure, Intervention, Journals, Literature, Motivational Interviewing, Nurses, Nursing, Practice, Primary, Randomized Controlled-Trial, Research, Researchers, Review, Risk, Risk Factors, Science, Smoking, Systematic, Systematic Review, Web of Science

# Title: Journal of Clinical Oncology

Full Journal Title: [Journal of Clinical Oncology](http://jco.ascopubs.org/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Furuse, K., Fukuoka, M., Kawahara, M., Nishikawa, H., Takada, Y., Kudoh, S., Katagami, N., and Ariyoshi, Y. (1999), Phase III study of concurrent versus sequential thoracic radiotherapy in combination with mitomycin, vindesine, and cisplatin in unresectable stage III non-small-cell lung cancer. *Journal of Clinical Oncology*, **17** (9), 2692-2699.

Full Text: [1999\J Cli Onc17, 2692.pdf](1999/J%20Cli%20Onc17,%202692.pdf)

Abstract: Purpose: A phase III study was performed to determine whether concurrent or sequential treatment with radiotherapy (87) and chemotherapy (CT) improves survival in unresectable stage III non-small-cell lung cancer (NSCLC). Patients and Methods: Patients were assigned to the two treatment arms. In the concurrent arm, chemotherapy consisted of cisplatin (80 mg/m(2) on days 1 and 29), vindesine (3 mg/m(2) on days 1, 8, 29, and 36), and mitomycin (8 mg/m2 on days 1 and 29). RT began on day 2 at a dose of 28 Gy (2 Gy per fraction and 5 fractions per week for a total of 14 fractions) followed by a rest period of 10 days, and then repeated, In the sequential arm, the same CT was given, but PT was initiated after completing CT and consisted of 56 Gy (2 Gy per fraction and 5 fractions per week for a total of 28 fractions). Results: Three hundred twenty patients were entered onto the study. Pretreatment characteristics were well balanced between the treatment arms. The response rate for the concurrent arm was significantly higher (84.0%) than that of the sequential arm (66%) (P = .0002), The median survival duration was significantly superior in patients receiving concurrent therapy (16.5 months), as compared with those receiving sequential therapy(13.3 months) (P = .03998). Two-, 3-, 4-, and 5-year survival rates in the concurrent group (34.6% 22.3%, 16.9%, and 15.8%, respectively) were better than those in the sequential group (27.4%, 1 4.7%, 10.1%, and 8.9% respectively). Myelosuppression was significantly greater among patients on the concurrent arm than on the sequential arm (P = .0001). Conclusion: In selected patients with unresectable stage III NSCLC, the concurrent approach yields a significantly increased response rate and enhanced median survival duration when compared with the sequential approach.

Keywords: Combined-Modality Treatment, Cooperative-Oncology-Group, Randomized Trial, Chemotherapy, Radiation

Notes: highly cited

? Takada, M., Fukuoka, M., Kawahara, M., Sugiura, T., Yokoyama, A., Yokota, S., Niskiwaki, Y., Watanabe, K., Noda, K., Tamura, T., Fukuda, H., Saijo, N. and the Members of the Japan Clinical Oncology Group (2002), Phase III study of concurrent versus sequential thoracic radiotherapy in combination with cisplatin and etoposide for limited-stage small-cell lung cancer: Results of the Japan Clinical Oncology Group Study 9104. *Journal of Clinical Oncology*, **20** (14), 3054-3060.

Full Text: [2002\J Cli Onc20, 3054.pdf](2002/J%20Cli%20Onc20,%203054.pdf)

Abstract: Purpose: To evaluate the optimal timing for thoracic radiotherapy (TRT) in limited-stage small-cell lung cancer (LS-SCLC), the Lung Cancer Study Group of the Japan Clinical Oncology Group conducted a phase III study in which patients were randomized to sequential TRT or concurrent TRT. Patients and Methods: We treated 231 patients with LS-SCLC. TRT consisted of 45 Gy over 3 weeks (1.5 Gy twice daily), and the patients were randomly assigned to receive either sequential or concurrent TRT. All patients received four cycles of cisplatin plus etoposide every 3 weeks (sequential arm) or 4 weeks (concurrent arm). TRT was begun on day 2 of the first cycle of chemotherapy in the concurrent arm and after the fourth cycle in the sequential arm. Results: Concurrent radiotherapy yielded better survival than sequential radiotherapy (P = .097 by log-rank test). The median survival time was 19.7 months in the sequential arm versus 27.2 months in the concurrent arm. The 2-, 3-, and 5-year survival rates for patients who received sequential radiotherapy were 35.1%, 20.2%, and 18.3%, respectively, as opposed to 54.4%, 29.8% and 23.7%, respectively, for the patients who received concurrent radiotherapy. Hematologic toxicity was more severe in the concurrent arm. However, severe esophagitis was infrequent in both arms, occurring in 9% of the patients in the concurrent arm and 4% in the sequential arm. Conclusion: This study strongly suggests that cisplatin plus etoposide and concurrent radiotherapy is more effective for the treatment of LS-SCLC than cisplatin plus etoposide and sequential radiotherapy. (C) 2002 by American Society of Clinical Oncology.

Keywords: Radiation-Therapy, Randomized Trial, Chemotherapy, Irradiation, Carcinoma, Cyclophosphamide, Doxorubicin, Vincristine

Notes: highly cited

? Fukuoka, M., Yano, S., Giaccone, G., Tamura, T., Nakagawa, K., Douillard, J.Y., Nishiwaki, Y., Vansteenkiste, J., Kudoh, S., Rischin, D., Eek, R., Horai, T., Noda, K., Takata, I., Smit, E., Averbuch, S., Macleod, A., Feyereislova, A., Dong, R.P. and Baselga, J. (2003), Multi-institutional randomized phase II trial of gefitinib for previously treated patients with advanced non-small-cell lung cancer. *Journal of Clinical Oncology*, **21** (12), 2237-2246.

Full Text: [2003\J Cli Onc21, 2237.pdf](2003/J%20Cli%20Onc21,%202237.pdf)

Abstract: Purpose: To evaluate the efficacy and tolerability of two doses of gefitinib (Iressa [ZD 1839]; AstraZeneca, Wilmington, DE), a novel epidermal growth factor receptor tyrosine kinase inhibitor, in patients with pretreated advanced non-small-cell lung cancer (NSCLC).

Patients and Methods: This was a randomized, double-blind, parallel-group, multicenter phase II trial. Two hundred ten patients with advanced NSCIC who were previously treated with one or two chemotherapy regimens (at least one containing platinum) were randomized to receive either 250-mg or 500-mg oral doses of gefitinib once daily.

Results: Efficacy was similar for the 250- and 500-mg/d groups. Objective tumor response rates were 18.4% (95% confidence interval [CI], 11.5 to 27.3) and 19.0% (95% CI, 12.1 to 27.9); among evaluable patients, symptom improvement rates were 40.3% (95% CI, 28.5 to 53.0) and 37.0% (95% CI, 26.0 to 49.1); median progression-free survival times were 2.7 and 2.8 months, and median over-all survival times were 7.6 and 8.0 months, respectively. Symptom improvements were recorded for 69.2% (250 mg/d) and 85.79/6 (500 mg/d) of patients with a tumor response. Adverse events (AEs) at both dose levels were generally mild (grade 1 or 2) and consisted mainly of skin reactions and diarrhea. Drug-related toxicities were more frequent in the higher-dose group. Withdrawal due to drug-related AEs was 1.9% and 9.4% for patients receiving gefitinib 250 and 500 mg/d, respectively.

Conclusion: Gefitinib showed Clinically meaningful antitumor activity and provided symptom relief as second- and third-line treatment in these patients. At 250 mg/d, gefitinib had a favorable AE profile. Gefitinib 250 mg/d is an important, novel treatment option for patients with pretreated advanced NSCLC.

Keywords: Growth-Factor Receptor, Functional Assessment, Chemotherapy, Docetaxel, Therapy, Progression, Care

? Woodward, W.A., Vinh-Hung, V., Ueno, N.T., Cheng, Y.C., Royce, M., Tai, P., Vlastos, G., Wallace, A.M., Hortobagyi, G.N. and Nieto, Y. (2006), Prognostic value of nodal ratios in node-positive breast cancer. *Journal of Clinical Oncology*, **24** (18), 2910-2916.

Full Text: 2006\J Cli Onc24, 2910.pdf

Abstract: Purpose The American Joint Committee on Cancer staging system for breast cancer was recently updated to reflect the impact of increasing the absolute number of positive lymph nodes on prognosis. However, numerous studies suggest that nodal ratios (absolute number of involved nodes-number of nodes resected) may have greater prognostic value than absolute numbers of involved nodes. Here we examine the data supporting the use of nodal ratios in breast cancer prognosis and consider the potential advantages and disadvantages of including nodal ratios in breast cancer staging. Methods A systematic review of the literature was conducted using the following search engines: http://www.google.com; Thomson’s ISI Web of Science; PUBMED. Results In multiple reports from both prospective and retrospectively collected data sets, nodal ratios have been shown to be significant predictors of outcome, including locoregional recurrence and overall survival. These studies span all stages of breast cancer and include various treatments as well as various statistical approaches. Conclusion There is considerable data supporting the use of nodal ratios in breast cancer prognosis. A thorough and methodological evaluation of the potential prognostic importance of nodal ratios in large multicenter data sets is merited and is currently being undertaken by the International Nodal Ratio Working Group.

Keywords: American-Joint-Committee, Breast Cancer, Cancer, Dissection, Evaluation, High-Dose Chemotherapy, Impact, ISI, Literature, Lymph-Nodes, Methods, Non-Sentinel Node, Outcome, Postoperative Radiotherapy, Prognosis, Pubmed, Recurrence, Review, Risk, Science, Statistical, Stem-Cell Transplantation, Survival, Systematic, Systematic Review, Web of Science

# Title: Journal of Clinical Pathology

Full Journal Title: Journal of Clinical Pathology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Start, R.D., Firth, J.A., Macgillivray, F. and Cross, S.S. (1995), Have declining clinical necropsy rates reduced the contribution of necropsy to medical research? *Journal of Clinical Pathology*, **48** (5), 402-404.

Full Text: [1995\J Cli Pat48, 402.pdf](1995/J%20Cli%20Pat48,%20402.pdf)

Abstract: Aims-To examine trends in necropsy based research output for a period of 27 years during which there has been a progressive decline in clinical necropsy rates. Methods-The numbers of necropsy based research papers published between 1966 and 1993 were determined using the CD-Plus Medline computed literature database. Results-The number of necropsy based research papers containing necropsy or a synonym in the title increased by 220% between 1966 and 1993. When papers including necropsy or a synonym in the abstract, but not in the title, were included, the proportion of all indexed papers increased from 0.35% in 1975, when abstracts were first included, to 0.53% in 1993. Analysis of the subject material indicated that necropsy based research has constantly reflected trends and advances in clinical medicine. Neuroscience related research represented the largest subject category which may reflect the difficulties in obtaining human tissue from sources other than necropsy. Conclusions-The modern necropsy continues to provide valuable information for all clinical and laboratory based disciplines. The decline in clinical necropsy rates would not yet appear to have undermined the contribution of the necropsy to research.

Keywords: Audit, Author, Autopsy, Clinical Medicine, Contribution, Human, Information, Literature, Necropsy, Necropsy Rates, Papers, Research, Research Output, Research Papers, Subject Category, Trends

Van Diest, P.J., Holzel, H., Burnett, D. and Crocker, J. (2001), Impactitis: new cures for an old disease. *Journal of Clinical Pathology*, **54**, 817-819.

Full Text: [2001\J Cli Pat54, 817.pdf](2001/J%20Cli%20Pat54,%20817.pdf)

? Kakkar, N. (2004), Authorship trends in the *Indian Journal of Pathology and Microbiology*: Going the global way? *Journal of Clinical Pathology*, **57** (6), 670.

Full Text: [2004\J Cli Pat57, 670.pdf](2004/J%20Cli%20Pat57,%20670.pdf)

Keywords: Trends

? Fritzsche, F.R., Oelrich, B., Dietel, M., Jung, K. and Kristiansen, G. (2008), European and US publications in the 50 highest ranking pathology journals from 2000 to 2006. *Journal of Clinical Pathology*, **61** (4), 474-481.

Full Text: [2008\J Cli Pat61, 474.pdf](2008/J%20Cli%20Pat61,%20474.pdf)

Abstract: Aims: To analyse the contributions of the 15 primary member states of the European Union and selected non-European countries to pathological research between 2000 and 2006. Methods: Pathological journals were screened using ISI Web of Knowledge database. The number of publications and related impact factors were determined for each country. Relevant socioeconomic indicators were related to the scientific output. Subsequently, results were compared to publications in 10 of the leading biomedical journals. Results: The research output remained generally stable. In Europe, the UK, Germany, France, Italy and Spain ranked top concerning contributions to publications and impact factors in the pathological and leading general biomedical journals. With regard to socioeconomic data, smaller, mainly northern European countries showed a relatively higher efficiency. Of the lager countries, the UK is the most efficient in that respect. The rising economic powers of China and India were consistently in the rear. Conclusions: Results mirror the leading role of the USA in pathology research but also show the relevance of European scientists. The scientometric approach in this study provides a new fundamental and comparative overview of pathology research in the European Union and the USA which could help to benchmark scientific output among countries.

Keywords: Approach, Authorship, Bibliometric Analysis, Biomedical, Biomedical Journals, China, Country, Data, Database, Economic, Efficiency, Europe, European Union, France, General, Germany, Impact, Impact Factor, Impact Factors, India, Indicators, ISI, Italy, Journals, Medical Journals, Pathology, Primary, Publications, Ranking, Relevance, Research, Research Productivity, Role, Scientific Output, Scientometric, Spain, UK, Union, US, USA

# Title: Journal of Clinical Periodontology

Full Journal Title: [Journal of Clinical Periodontology](http://www3.interscience.wiley.com/journal/118533209/home)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Trenter, S.C. and Walmsley, A.D. (2003), Ultrasonic dental scaler: Associated hazards. *Journal of Clinical Periodontology*, **30** (2), 95-101.

Full Text: 2003\J Cli Per30, 95.pdf

Abstract: Background: The ultrasonic dental scaler is a valuable tool in the prevention of periodontal disease; however, this equipment has a number of hazards with which it is associated. These include heating of the tooth during scaling, vibrational hazards causing cell disruption, possible platelet damage by cavitation, associated electromagnetic fields that can interrupt pacemakers, auditory damage to patient and clinician and the release of aerosols containing dangerous bacteria. Objective: To collate the research reported on the various hazards associated with the ultrasonic dental scaler and discuss possible future research areas. Data Sources: The scientific literature was searched using Web of Science, EMBASE and MEDLINE, and the results of these were then hand-searched to eliminate nonrelevant papers. Conclusions: This review outlines some of the research conducted into these areas of associated hazard in order to assess their significance in the clinical situation, and discusses ideas for future research. Suggestions of recommendations are given, which have been previously investigated for their aid in reducing possible hazards, to ensure the safe working of ultrasonic scalers in the dental practice.

Keywords: Aerosol, Aerosols, Auditory, Bacteria, Cavitation, Cavitational Activity, Contamination, Disease, Embase, Human-Teeth, Instrumentation, Interference, Literature, Papers, Periodontal Disease, Personnel, Practice, Prevention, Reduction, Research, Review, Root Surface, Science, Sources, Ultrasound, Vibration, Vibration, Web of Science

? Nieri, M., Saletta, D., Buti, J., Pagliaro, U., Guidi, L., Rotundo, R. and Prato, G. (2009), From initial case report to randomized clinical trial through 20 years of research in periodontal therapy. *Journal of Clinical Periodontology*, **36** (1), 39-43.

Full Text: [2009\J Cli Per36, 39.pdf](2009/J%20Cli%20Per36,%2039.pdf)

Abstract: Nieri M, Saletta D, Buti J, Pagliaro U, Guidi L, Rotundo R, Pini Prato G. From initial case report to randomized clinical trial through 20 years of research in periodontal therapy. J Clin Periodontol 2009; 36: 39-43. doi: 10.1111/j.1600-051X.2008.01341.x. Case reports (CRs) are often the first publication of a new treatment, but randomized clinical trials (RCTs) are needed to confirm the data. The aim of this study was to evaluate how many therapies published as CRs were followed by RCTs of these therapies over a 20-year period. Two researchers conducted a search through international periodontal journals and found the CRs on periodontal treatments published from 1984 to 1986. Subsequent electronic searches made it possible to verify how many of the treatments published as CRs were also investigated through RCTs over the following 20 years. Thirty-one different therapies were selected out of the 33 published CRs; 15 (48%) of these 31 treatments were investigated by RCTs over the next 20 years. As 52% of the CRs were not validated by RCTs, practitioners should view their results with caution.

Keywords: Bibliometry, Case Report, Case Series, Graft, Intrabony Defects, Juvenile Periodontitis, Osseous Defects, Periodontal Research, Periodontal Therapy, Placement, Publication Bias, Randomized Clinical Trial, Research, Root Coverage, Science Citation Index, Surgical-Treatment, Tricalcium Phosphate Implants

# Title: Journal of Clinical Psychiatry

Full Journal Title: Journal of Clinical Psychiatry

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JCR Abbreviated Title:

ISSN: 0160-6689

Issues/Year:

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Publisher Address:

Subject Categories:

: Impact Factor

? Ingenhoven, T., Lafay, P., Rinne, T., Passchier, J. and Duivenvoorden, H. (2010), Effectiveness of pharmacotherapy for severe personality disorders: Meta-analyses of randomized controlled trials. *Journal of Clinical Psychiatry*, **71** (1), 14-25.

Full Text: 2010\J Cli Psy71, 14.pdf

Abstract: Context: There has been little systematic attempt to validate current pharmacologic treatment algorithms and guidelines for severe personality disorder. Objective: We evaluated studies on the effectiveness of psychoactive drugs on specific symptom domains for borderline and/or schizotypal personality disorder. Data sources: The literature was searched for placebo-controlled randomized clinical trials (PC-RCTs) on the effectiveness of psychopharmacologic drugs in personality disorder patients. The PUBMED, PsychINFO, PiCarta, Cochrane, and Web of Science databases were searched using the search terms borderline personality, schizotypal personality, personality disorder, cluster A, cluster B, treatment, drug, pharmacotherapy, antipsychotic, antidepressant, mood stabilizer, effect, outcome, review, and meta-analysis for studies published between 1980 and December 2007, and references were identified from bibliographies from articles and books. Study selection: Placebo-controlled randomized clinical trials on the efficacy of antipsychotics, antidepressants, and mood stabilizers regarding cognitive-perceptual symptoms, impulsive-behavioral dyscontrol, and affective dysregulation (with subdomains depressed mood, anxiety; anger, and mood lability) were selected in patients with well defined borderline and/or schizotypal personality disorder. Studies whose primary emphasis was on the treatment of Axis I disorders were excluded. Meta-analyses were conducted using 21 retrieved studies. Results: Antipsychotics have a moderate effect on cognitive-perceptual symptoms (5 PC-RCTs; standardized mean difference [SMD] = 0.56) and a moderate to large effect on anger (4 PC-RCTs; SMD = 0.69). Antidepressants have no significant effect on impulsive-behavioral dyscontrol and depressed mood. They have a small but significant effect on anxiety (5 PC-RCTs; SMD = 0.30) and anger (4 PC-RCTs; SMD = 0.34). Mood stabilizers have a very large effect on impulsive-behavioral dyscontrol (6 PC-RCTs; SMD = 1.51) and anger (7 PC-RCTs; SMD = 1.33), a large effect on anxiety (3 PC-RCTs; SMD = 0.80), but a moderate effect on depressed mood (5 PC-RCTs; SMD = 0.55). Mood lability as an outcome measure was seldomly assessed. Mood stabilizers have a more pronounced effect on global functioning (3 PC-RCTs; SMD = 0.79) than have antipsychotics (5 PC-RCTs; SMD = 0.37). The effect of antidepressants on global functioning is negligible. Conclusions: Drug therapy tailored to well-defined symptom domains can have a beneficial effect on patients with severe personality disorder. The findings from this study raise questions on current pharmacologic algorithms. J Clin Psychiatry 2010,71(1):14-25 (C) Copyright 2010 Physicians Postgraduate Press, Inc.

Keywords: Aggression, Antidepressants, Antipsychotics, Anxiety, Borderline-Patients, Clinical Trials, Cochrane, Copyright, Databases, Dialectical Behavior-Therapy, Disorder, Divalproex Sodium, Double-Blind, Drug, Effectiveness, Efficacy, Female-Patients, Guidelines, Haloperidol, Literature, Meta-Analysis, Mood, Olanzapine, Outcome, Personality, Pharmacotherapy, Placebo, Primary, Pubmed, Randomized Clinical Trials, Review, Science, Symptoms, Systematic, Therapy, Topiramate Treatment, Treatment, Web of Science

? Dlabac-de Lange, J.J., Knegtering, R. and Aleman, A. (2010), Repetitive transcranial magnetic stimulation for negative symptoms of schizophrenia: Review and meta-analysis. *Journal of Clinical Psychiatry*, **71** (4), 411-418.

Abstract: Background: Repetitive transcranial magnetic stimulation (rTMS) has been proposed as a treatment for the negative symptoms of schizophrenia. During the past decade, several trials have reported on the efficacy of rTMS treatment; however, the results were inconsistent. Objective: To assess the efficacy of prefrontal rTMS for treating negative symptoms of schizophrenia. Data Sources: A literature search was performed in PUBMED, ISI Web of Science, and EMBASE for the years 1985 through July 2008. The search terms used (language not specified) were “transcranial magnetic stimulation,” “negative symptoms,” and “schizophrenia?’ A cross-reference search of eligible articles was performed to identify studies not found in the computerized search. Study Selection: Studies selected were randomized controlled trials assessing the therapeutic efficacy of prefrontal rTMS for negative symptoms in schizophrenia. Data Extraction: Effect sizes (Cohen d) of each study were calculated. The overall standardized mean difference was calculated under a random effects model with 95% confidence intervals. Data Synthesis: Nine trials, involving 213 patients, were included in the meta-analysis. The overall mean weighted effect size for rTMS versus sham was in the small-to-medium range and statistically significant (d = 0.43; 95% CI, 0.05-0.80). When including only the studies using a frequency of stimulation of 10 Hz, the mean effect size increased to 0.63 (95% CI, 0.11-1.15). When including only the studies requiring participants to be on a stable drug regimen before and during the study, the mean weighted effect size decreased to 0.34 (95% CI, 0.01-0.67). Studies with a longer duration of treatment (>= 3 weeks) had a larger mean effect size when compared to studies with a shorter treatment duration: d=0.58 (95% CI, 0.19-0.97) and d=0.32 (95% CI, -0.3 to 0.95), respectively. Conclusions: The results of this meta-analysis warrant further study of rTMS as a potential treatment of negative symptoms of schizophrenia. J Clin Psychiatry 2010;71(4):411-418 (C) Copyright 2010 Physicians Postgraduate Press, Inc.

Keywords: Auditory Hallucinations, Cognitive Dysfunction, Confidence Intervals, Copyright, Double-Blind, Drug, Efficacy, Embase, Extraction, Frequency, ISI, Literature, Major Depression, Meta-Analysis, Model, Motor Cortex, Pharmacological-Treatment, Prefrontal Cortex, Pubmed, Randomized Controlled Trials, Review, Schizophrenia, Science, Sources, Striatal Dopamine Release, Symptoms, Syndrome Scale Panss, Treatment, Web of Science, Working-Memory

? Sarris, J., Mischoulon, D. and Schweitzer, I. (2012), Omega-3 for bipolar disorder: Meta-analyses of use in mania and bipolar depression. *Journal of Clinical Psychiatry*, **73** (1), 81-86.

Full Text: 2012\J Cli Psy73, 81.pdf

Abstract: Objective: Studies using augmentation of pharmacotherapies with omega-3 in bipolar disorder have been conducted; however, to date a specific meta-analysis in this area has not been published. Thus, we present the significant findings from meta-analyses of omega-3 in the treatment of bipolar depression and bipolar mania. Data Sources: Pub Med, CINAHL, Web of Science, and Cochrane Library databases were searched for clinical trials up to September 1, 2010, using the search terms bipolar disorder OR bipolar depression OR bipolar mania OR mania OR hypomania OR cyclothymia with the search terms omega 3 OR essential fatty acids OR polyunsaturated fatty acids OR DHA OR EPA OR fish oil OR flax oil. Clinical trial registries and gray literature (published or unpublished data not readily accessible via main databases) were also searched. Data Selection: The analysis included randomized controlled studies 4 weeks or longer, with a sample size >10, written in English, using omega-3 for diagnosed bipolar depression or mania. No criteria were set for age, gender, or ethnicity. Data Extraction: A random-effects model was used. The model analyzed the standard mean difference between treatment and placebo between baseline and endpoint, combining the effect size (Hedges g) data. Funnel plot and heterogeneity analyses (I(2)) were also performed. Data Synthesis:The findings of 5 pooled datasets (n=291) on the outcome of bipolar depression revealed a significant effect in favor of omega-3 (P=.029), with a moderate effect size of 0.34. On the outcome of mania, 5 pooled datasets (n=291) revealed a nonsignificant effect in favor of omega-3 (P=.099), with an effect size of 0.20. Minor heterogeneity between studies on the outcome of bipolar depression was found (I(2)=30%; P=.213), which was not present on the outcome of bipolar mania (I(2)=0%; P=.98). Funnel plot symmetry suggested no significant likelihood of publication bias. Meta-regression analysis between sample size and effect size, however, revealed that studies with smaller sample sizes had larger effect sizes (P=.05). Conclusions: The meta-analytic findings provide strong evidence that bipolar depressive symptoms may be improved by adjunctive use of omega-3. The evidence, however, does not support its adjunctive use in attenuating mania. J an Psychiatry 2012;73(1):81-86 (C) Copyright 2011 Physicians Postgraduate Press, Inc.

Keywords: Adjunctive, Analysis, Association, Author, Bias, Bipolar Depression, Bipolar Disorder, Brain, Clinical Trial, Clinical Trials, Cochrane, Controlled Studies, Copyright, Databases, Depression, Dha, Disorder, Double-Blind, Efficacy, English, Ethnicity, Extraction, Fatty Acids, Fatty-Acid Supplementation, Fish, Gender, Literature, Mania, Meta Analysis, Meta-Analysis, Model, Mood Disorders, Omega-3, Omega-3-Fatty-Acids, Open-Label, Outcome, Placebo-Controlled Trials, Polyunsaturated Fatty Acids, Psychiatry, Pub Med, Publication, Publication Bias, Rating-Scale, Science, Selection, Sources, Symptoms, Treatment, Web of Science, Web-of-Science

# Title: Journal of Clinical Psychiatry

Full Journal Title: [Journal of Clinical Psychiatry](http://c.wanfangdata.com.cn/Periodical-lcjsyxzz.aspx)

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JCR Abbreviated Title:

ISSN: 1005-3220

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Jie, Y.L. and Tang, X.X. (2007), Bibliometric analysis of mental disorders. *Journal of Clinical Psychiatry*, 1**7** (1), 10-12.

Full Text: [2007\Chi Jou Cli Psy17, 10.pdf](2007/Chi%20Jou%20Cli%20Psy17,%2010.pdf)

Abstract: Objective: To investigate the status and development trend of the research on mental disorders in China and abroad. Method: The method of subject-word retrieval was used to select the articles on mental disorders from two databases, PubMed and CBMWeb. The bibliometric analysis was performed. Results: The research structure of mental disorders in China was similar to that abroad. The researches abroad emphasized on treatment for mental disorders, while the researches in China emphasized on etiology. In recent

Keywords: Mental Disorders, Bibliometric Analysis

# Title: Journal of Clinical Psychology

Full Journal Title: [Journal of Clinical Psychology](http://www3.interscience.wiley.com/cgi-bin/jhome/31171)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0021-9762

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sprock, J. and Herrmann, D. (2000), Relative size of the literatures for psychopathological disorders: Number of articles pertaining to DSM-IV diagnostic categories. *Journal of Clinical Psychology*, **56** (4), 491-504.

Full Text: [2000\J Cli Psy56, 491.pdf](2000/J%20Cli%20Psy56,%20491.pdf)

Abstract: A computerized search of the 1991-1997 PsycLIT database was used to quantify the size of the literature for each of the DSM-IV mental disorders. The search included DSM-IV, IIIR diagnoses and alternative terms for the disorders to provide a complete assessment. Generally it was found that major disorders and those with neurophysiological components were investigated a great deal (there were over 10,000 articles for both major depression and schizophrenia) while there were few articles concerning rare or newly introduced disorders. Within diagnostic groups certain disorders received the preponderance of research attention. Factors related to the degree to which a mental disorder is investigated are discussed. These findings should stimulate consideration of whether clinical research is directing its efforts in a way that best promotes understanding of the nature and treatment of mental disorders. (C) 2000 John Wiley & Sons. Inc.

Keywords: Bibliometric, Brain, Classification, DSM-IV Mental Disorders, Literature Search, Models, Progress, Psychiatric-Disorders, Psychopathology, Research, Schizophrenia, System, Taxonomy

# Title: Journal of Clinical Rehabilitative Tissue Engineering Research

Full Journal Title: Journal of Clinical Rehabilitative Tissue Engineering Research

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1673-8225

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Wang, D., Sun, Y., Sun, J.L. and Liang, S.Z. (2011), Bibliometric analysis of the scientific literature addressing stem cell transplantation research. *Journal of Clinical Rehabilitative Tissue Engineering Research*, **15** (40), 7565-7568.

Full Text: [2011\J Cli Reh Tis Eng Res15, 7565.pdf](2011/J%20Cli%20Reh%20Tis%20Eng%20Res15,%207565.pdf)

Abstract: BACKGROUND: Bibliometric analysis of stem cell transplantation research is rare. OBJECTIVE: In order to summarize the current status and frontier of stem cell transplantation, to analyze the stem cell transplantation literatures with the method of bibliometric analysis. METHODS: The stem cell transplantation literatures from 2001 to 2010 were analyzed based on Web of Science with the method of bibliometric analysis. The distribution of publication years, country, institution, journal, cited times were discussed. RESULTS AND CONCLUSION: During 2001-01 to 2010-12, 22437 literatures addressing stem cell transplantation were added to SCI in an annual increase manner. Papers from China in 2010 were 406 fewer than those of the United States (486). The United States had the most papers, 11 core research institutions and 13 kinds of core journals and 12 article classical literatures in stem cell transplantation area. The dynamic and development trend of stem cell transplantation was drawn, which provide some proposes for China’s in-depth research.

# Title: Journal of Clinical Ultrasound

Full Journal Title: Journal of Clinical Ultrasound

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Chen, R.C., Chu, D.C., Chiang, C.H. and Chou, C.T. (2009), Bibliometric analysis of ultrasound research trends over the period of 1991 to 2006. *Journal of Clinical Ultrasound*, **37** (6), 319-323.

Full Text: [2009\J Cli Ult37, 319.pdf](2009/J%20Cli%20Ult37,%20319.pdf)

Abstract: Purpose. The objective of this study is to conduct a bibliometric analysis of all ultrasound-related publications in the Science Citation Index (SCI). Method. A search on the databases of the SCI was performed covering the period of 1991-2006. All selected documents stated ultrasound as a part of the title, abstract, or keywords in the two fields of acoustics and radiology, nuclear medicine, and medical imaging. Analyzed parameters included authorship, total number of publications in each year, document type, and the authors’ keywords. The data were recorded by publication year except the authors’ keywords, which were grouped into four periods: 1991-1994, 1995-1998, 1999-2002, and 2003-2006. Results. A total of 17,775 documents were found, of which 85% were original articles. The yearly production increased from 740 (1991) to 1,208 (2006). The United States dominated with the most publications. The trend towards prenatal research declined in the last 4 years, while Doppler ultrasound research increased during 1999-2006. Conclusions. Periodic performance of bibliometric analysis of the ultrasound journals may reveal research trends. The most represented topics of ultrasound research are Doppler, prenatal diagnosis, MRI, contrast medium, and vascular studies. © 2009 Wiley Periodicals, Inc. J Clin Ultrasound, 2009.

Keywords: Bibliometric Analysis, Ultrasound Research, ISI Web, SCI

# Title: Journal of Coastal Conservation

Full Journal Title: Journal of Coastal Conservation

ISO Abbreviated Title:

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Journal Country/Territory:

Language:

Publisher:

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Subject Categories:

: Impact Factor

? Russell, M., Rogers, J., Jordan, S., Dantin, D., Harvey, J., Nestlerode, J. and Alvarez, F. (2011), Prioritization of ecosystem services research: Tampa bay demonstration project. *Journal of Coastal Conservation*, **15** (4), 647-658.

Full Text: [2011\J Coa Con15, 647.pdf](2011/J%20Coa%20Con15,%20647.pdf)

Abstract: The Tampa Bay Ecosystem Services Demonstration Project (TBESDP) is part of the U.S. Environmental Protection Agency’s Ecosystem Services Research Program. The principal objectives of TBESDP are to (1) quantify the ecosystem services of the Tampa Bay watershed, (2) determine the value of ecosystem services to society, (3) predict the supply of ecosystem services under future scenarios of population growth and climate change, and (4) apply this knowledge through models and tools that will support the best informed environmental decisions possible. The scope and complexity of this project required intensive effort to establish which services can be quantified by applying existing models, data, and scientific literature and which services will require supporting research. Research priorities were assessed by: (1) developing and refining conceptual models of major ecosystems in the Tampa Bay region, (2) gathering input from stakeholders about the relative importance and values of various ecosystem services, (3) preparing and reviewing a bibliometric analysis of the volume of scientific literature relevant to the ecosystems and services of interest, and (4) evaluating an integrated analysis of importance, value, and availability of scientific information. This analysis led us to focus on two research priorities, seagrass-habitat functions as support for fishery production, and wetlands as regulators of water quality.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Climate Change, Conceptual Models, Ecosystem Services, Environmental, Growth, Information, Interest, Knowledge, Literature, Priorities, Prioritization, Quality, Research, Research Priorities, Reviewing, Scientific Information, Scientific Literature, Tampa Bay, Valuation, Valuation, Water, Wetlands

# Title: Journal of Coastal Research

Full Journal Title: Journal of Coastal Research

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? O’shea, S.K., Holland, F. and Bilodeau, A. (2010), Modeling the effects of salinity and ph on the cadmium bioabsorptive properties of the microalgae *Isochrysis galbana* (T-Iso) in coastal waters. *Journal of Coastal Research*, **26** (1), 59-66.

Full Text: [2010\J Coa Res26, 59.pdf](2010/J%20Coa%20Res26,%2059.pdf)

Abstract: The changes in cadmium ion bioabsorptive properties were investigated for the brown microalgae Isochrysis galbana (T-Iso) in various saline solutions (0, 10, 20, 30, 40, and 50 parts per thousand, or ppt) and pH environments (pH 3, 4, 5, 6, 7, and 8) modeling those of coastal and intertidal waters. Optimal saline growth conditions for T-Iso were observed at 30 ppt. Under these optimal saline conditions, the effective concentration at 50% lethality for cadmium ion for T-Iso is 2.3 parts per million (ppm), with a maximum intracellular absorption of 8.6 fg/cell. T-Iso maximal surfacial cadmium binding was determined from Langmuir isotherm plots; Q(max) = 98 mg/g (pH 6.00, 0 ppt), falling to 19 mg/g in higher salinities (pH 6.00, 50 ppt). The Freundlich constants n and K-f followed a similar cadmium binding trend: at 0 ppt, *K*f = 16.6 and n = 2.83, while at higher salinities (50 ppt), the values dramatically decreased to K-f = 3.64 and n = 1.34. Direct relationships between In Q(max) (98, 70, 45, 28, 23, and 19) and In K-f (16.6, 12.8, 8.36, 4.63, and 3.64) versus respective salinity (0, 10, 20, 30, 40, and 50 ppt) produced linear correlations. The pseudo-second-order binding kinetic rate in distilled water is 8.5×10-3 g/mg/min, while in saline conditions (30 ppt) the rate decreased to 4.4×10-3 g/mg/min. The percentage of adsorption loading capacity of the algae in the water column increases with initial cadmium exposure: the highest percentage of adsorbance (C-0 = 25 ppm) in 0 ppt is 92%, while under equivalent conditions in saline water (50 ppt), adsorption falls to 31%.

Keywords: Absorption, Adsorption, Adsorption-Isotherms, Algae, Binding, Biosorption, Biosorption, Brown, Cadmium, Cadmium Binding, Cadmium Ion, Capacity, Changes, Coastal, Column, Concentration, Correlations, Exposure, Fresh, Saline Water Interface, Freundlich, Green, Growth, Heavy-Metals, Isotherm, Kinetic, Langmuir, Langmuir Isotherm, Loading, Microalgae, Microalgae T-Isochrysis, Modeling, pH, Pseudo Second Order, Pseudo-Second-Order, Salinity, Seaweeds, Solutions, Toxicity, Trend, Vulgaris, Water, Waters

? Panda, U.C., Rath, P., Bramha, S. and Sahu, K.C. (2010), Application of factor analysis in geochemical speciation of heavy metals in the sediments of a Lake System-Chilika (India): A case study. *Journal of Coastal Research*, **26** (5), 860-868.

Full Text: [2010\J Coa Res26, 860.pdf](2010/J%20Coa%20Res26,%20860.pdf)

Abstract: The geochemical association of some trace metals (Fe, Mn, Ni, Cu, Cr, and Pb) were sequentially extracted from bulk sediments of the Chilika lagoon, India. The low elemental concentration, except Pb, in the exchangeable phase suggests poor availability to bottom dwellers. However, slightly higher abundance of Pb in the exchangeable phase at station 4 (9.9%) and station 6 (9.5%) is mainly related with waste from major fishing jetties. The carbonate-bound phase reflects heavy metal distribution of detrital origin along with biological decomposition in the lagoon. A relatively higher percentage of Mn in the reducible phase is attributed to the flocculation of its colloids. The concentrations of Cu, Ni, and Pb show their higher affinity to the organic-bound fraction. The absolute metal concentrations in the residual fraction was Fe > Mn > Ni > Cu > Pb > Cr, which reflects the predominance of physical weathering, a high erosion rate, and a high sedimentation rate in the lagoon. According to Risk Assessment Code, Pb, Cr, and Mn at almost all sites remain in the medium-risk category and can pose some environmental problems, mainly to the benthic community. Multivariate statistics (i.e., factor analysis, FA) was applied to the data set of geochemical fractionation of heavy metals in sediments of a coastal wetland. In this study we present the usefulness of the FA technique for evaluation and interpretation of a large, complex metal fractionation dataset and the apportionment of pollution sources and factors, with a view toward better information on chemical processes occurring in brackish environments. The roles of textural characteristics, organic precipitation, oxy-hydroxide formation and the processes of flocculation and adsorption into fine sediments in different geochemical phases were evaluated. The interpretation of the distribution of metals in different phases related to the relative location of sampling and the environmental characteristics of the fluvial as well as the lagoonal environment.

Keywords: Trace Metals, Sediment, Sequential Extraction, Factor Analysis, Chilika Lake, India, Principal Component Analysis, Water-Quality, Trace-Metals, Sequential Extraction, Statistical Approach, River Sediments, East-Coast, Area, Lagoon, Fractionation

# Title: Journal of Cognitive and Behavioral Psychotherapies

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? Roig, M. (2008), The debate on self-plagiarism: Inquisitional science or high standards of scholarship? *Journal of Cognitive and Behavioral Psychotherapies*, **8** (2), 245-258.

Full Text: [2008\J Cog Beh Psy8, 245.pdf](2008/J%20Cog%20Beh%20Psy8,%20245.pdf)

Abstract: Reusing one’s previously published work without alerting the reader of its prior publication constitutes self-plagiarism and it is a practice that is strictly forbidden by most scientific and scholarly journals. There arc circumstances that may justify the publication of an entire article or of portions of an article that had been previously published in another journal. Guidance on these matters is readily available and specifies the conditions under which secondary publication can take place. However, the mission of most scholarly journals is to publish original research. With some exceptions (e.g., translation into another language), few journals seem willing to grant the right to publish their material elsewhere or exercise the option to publish an article that had been previously published in another periodical. One area of contention for which little guidance is available is the practice of reusing verbatim portions of text from authors’ previously published articles. I argue that such a practice should be avoided because it is not consistent with the high standards expected of scholars and scientists.

Keywords: Duplicate Publication, Ethics in Research, Exercise, Journal, Journals, Language, Publication, Research, Self-Plagiarism

? David, D. (2008), Scientists as Schrodinger’s cat: Replay to Roig’s “the debate on self-plagiarism: Inquisitional science or high standards of scholarship?”. *Journal of Cognitive and Behavioral Psychotherapies*, **8** (2), 259-261.

Full Text: [2008\J Cog Beh Psy8, 259.pdf](2008/J%20Cog%20Beh%20Psy8,%20259.pdf)

Abstract: In which self-plagiarism is concerned, considering the current state in the field, there are only two ways to go. The first way to go is to agree upon three minimal criteria for ethical writing (1. a new publication based on an old one is intended to target a new audience; 2. copyright laws are respected; and 3. it is made clear to the reader and in the author’s CVs that the new paper reproduces old ones or parts of them) and to follow them in order to allow for the full expression of the humanistic spirit of science (i.e., disseminating knowledge produced to solve various problems). The second way to go is to elaborate clear rules and guidelines to avoid self-plagiarism, endorsed by all the major actors in the field; from that point on self-plagiarism can be considered misconduct. However, these rules cannot be applied retrospectively, to a time when they did not exist and/or were not lawful. All things considered, the current state of the field is unfair for scientists! As there are no clear lawful regulations regarding self-plagiarism, most scientists are like Schrodinger’s cats, neither guilty nor not-guilty! It depends on who, on how, and on if someone is looking..!.

Keywords: Ethics, Publication, Research, Science, Self-Plagiarism

? Roig, M. (2008), Reply to David’s “scientists as schrödinger’s cat”. *Journal of Cognitive and Behavioral Psychotherapies*, **8** (2), 263-267.

Full Text: [2008\J Cog Beh Psy8, 263.pdf](2008/J%20Cog%20Beh%20Psy8,%20263.pdf)

Abstract: The rules regarding the various forms of self-plagiarism, as well as those that apply to other areas of responsible research conduct could always benefit from further clarification. However, it may not be possible to formulate guidance that covers every possible scenario. An ethically mindful attitude toward full disclosure and transparency in scientific research and publication may be more useful than the formulation of additional guidance.

Keywords: Authorship, Ethics in Research, Publication, Research, Scientific Research, Self-Plagiarism

# Title: Journal of Colloid and Interface Science

Full Journal Title: [Journal of Colloid and Interface Science](http://www.sciencedirect.com/science?_ob=PublicationURL&_cdi=6857&_pubType=J&_auth=y&_acct=C000053193&_version=1&_urlVersion=0&_userid=1495547&md5=8bd405e1806f5130e865d1376de5e2b7), [Journal of Colloid and Interface Science](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=00219797)

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Dubinin, M.M. (1967), Adsorption in micropores. *Journal of Colloid and Interface Science*, **23** (4), 487-499.

Full Text: [J\J Col Int Sci23, 487.pdf](J/J%20Col%20Int%20Sci23,%20487.pdf)

Notes: highly cited

? McClella, A.L. and Harnsber, H.F. (1967), Cross-sectional areas of molecules adsorbed on solid surfaces. *Journal of Colloid and Interface Science*, **23** (4), 577-599.

Full Text: [1960-80\J Col Int Sci23, 577.pdf](1960-80/J%20Col%20Int%20Sci23,%20577.pdf)

Haque, R. and Sexton, R. (1968), Kinetic and equilibrium study of adsorption of 2, 4- dichlorophenoxy acetic acid on some surfaces. *Journal of Colloid and Interface Science*, **27** (4), 818-827.

Full Text: [J\J Col Int Sci27, 818.pdf](J/J%20Col%20Int%20Sci27,%20818.pdf)

Abstract: A detailed equilibrium and kinetic study of the adsorption of 2,4-dichlorophenoxy acetic acid (2,4-D) on some mineral surfaces such as clays, silica gel, sand, alumina, and humic acid has been made. The equilibrium data have been explained with the Freundlich type isotherm, and a fit of the kinetic data with a theory proposed by Fava and Eyring was tried. The heat of adsorption as a function of surface coverage has been calculated. The heat of adsorption changes exponentially with the amount of 2,4-D sorbed. In most cases the heat changes are small, but the heat changes for silica gel and sand are larger compared to other surfaces. This has been discussed in the light of weak hydrogen bonding between 2,4-D and the surface material. Humic acid and illite adsorb more 2,4-D than other surfaces. The rate constant varies from 10−3 to 10−5 sec−1 depending on the surface. The activation energy in most of the cases is almost negligible. The rate data indicate a physical type adsorption.

Baret, J.F. (1969), Theoretical model for an interface allowing a kinetic study of adsorption. *Journal of Colloid and Interface Science*, **30** (1), 1-12.

Full Text: [J\J Col Int Sci30, 1.pdf](J/J%20Col%20Int%20Sci30,%201.pdf)

Abstract: In order to describe adsorption kinetics at an interface several models have been used; in some of these (1–3) the diffusion phenomenon takes a prominent part; others (4–6), on the contrary, consider only the exchange process in the neighborhood of the interface. For the latter ones it is necessary to lay down assumptions about the nature of the adsorbed layer. The sole model of adsorbed layer used in kinetic studies is, so far as we know, that of Langmuir, *viz.*, a localized and ideal layer. What we intend to do in this paper is to show how the adsorption laws with respect to time can be deduced from other assumptions (mobile layer, adsorbed molecules with interactions) widely described in studies of the adsorption equilibrium (7, 8).

This precise knowledge of the nature of the adsorbed layer allows us to deduce without ambiguity “the interfacial equation of state, “ and therefore in the case of liquid-liquid or gas-liquid interfaces we can obtain theoretical relations linking interfacial tension with time.

Some experimental facts (7–9) show that in the adsorbed layer some molecules are localized and the rest are mobile, with an equilibrium existing between these two interfacial states. Also we have constructed a mixed model which includes these two types of adsorbed molecules.

In using the method recently described in a previous paper (10) we have, in Section V, introduced the diffusion effect on adsorption kinetics by means of Fick’s law.

Lamond, T.G. and Price, C.R. (1969), Size of carbon black micropores deduced from nitrogen and dye adsorption. *Journal of Colloid and Interface Science*, **31** (1), 104-110.

Full Text: [J\J Col Int Sci31, 104.pdf](J/J%20Col%20Int%20Sci31,%20104.pdf)

Abstract: Methylene blue and victoria pure blue BO dyes were used to probe the porous structure of a series of carbon blacks, prepared by fluidized bed activation of a high abrasion furnace black. The dye adsorption results indicated that the minimum pore size present in the activated carbon black samples was of the order of 20 Å, which is in sharp contrast with the value of 9.0 Å obtained from the analysis of the nitrogen adsorption data in terms of the t method proposed by de Boer. The significance of these results in terms of the pore sizes and surface areas calculated from nitrogen adsorption isotherms for other microporous adsorbents is discussed. Evidence is also presented to show that the increase in external surface area values following activation results from the decreased weight of the particles and not from a decrease in particle size.

? Mattson, J.S., Mark, Jr., H.B., Malbin, M.D., Weber, Jr., W.J. and Crittend, J.C. (1969), Surface chemistry of active carbon: Specific adsorption of phenols. *Journal of Colloid and Interface Science*, **31** (1), 116-130.

Full Text: [1960-80\J Col Int Sci31, 116.pdf](1960-80/J%20Col%20Int%20Sci31,%20116.pdf)

Abstract: The characteristics of the uptake of phenol and nitrophenols by active carbon have been investigated. The measurements of solution equilibrium parameters as well as surface structural characteristics determined by infrared internal reflection spectroscopy are presented. A charge-transfer interaction is postulated which explains the observed adsorption and spectroscopic characteristics on the basis of the electron densities in the sorbate molecule, as well as the types and concentrations of surface functional groups present on the carbon.

Felter, R.E. and Ray, Jr., L.N. (1970), Polymer adsorption studies at solid-liquid interface using gel permeation chromatography. I. Molecular weight distribution along adsorption isotherm. *Journal of Colloid and Interface Science*, **32** (2), 349-360.

Full Text: [J\J Col Int Sci32, 349.pdf](J/J%20Col%20Int%20Sci32,%20349.pdf)

Abstract: Poly(vinyl chloride) was adsorbed onto CaCO3 from dilute chlorobenzene solution. An isotherm was completed which was consistent with the Langmuir theory based on monolayer coverage. A technique employing gel permeation chromatography was described and used to observe the molecular weight distribution (MWD) both in solution directly and in the adsorbed layer indirectly. With the use of this technique, the MWD of polymer in the adsorbed layer was shown to reach a point of equilibrium with the solution polymer within 1 hr. High molecular weight polymer was shown to be preferentially adsorbed. The MWD in the adsorbed layer was narrower than the MWD in the initial solution. The MWD in the adsorbed layer was also shown to be independent of solution concentration on the isotherm limiting plateau and at concentrations considerably below the limiting plateau. Two separate molecular weight functions appeared to be involved in the adsorption process. One function involved an increase in the amount of polymer adsorbed with increase in polymer molecular weight from a polymer molecular weight near 10,000. Beyond a certain critical molecular weight the amount adsorbed appeared to be almost independent of molecular weight. The molecular weight dependence is explained in terms of polymer attachments to the surface.

Marsh, H. and Rand, B. (1970), The characterization of microporous carbons by means of the Dubinin-Radushkevich equation. *Journal of Colloid and Interface Science*, **33** (1), 101-116.

Full Text: [J\J Col Int Sci33, 101.pdf](J/J%20Col%20Int%20Sci33,%20101.pdf)

Abstract: The Dubinin-Radushkevich (D-R) equation of adsorption predicts a Rayleigh distribution of adsorption free energy with adsorption (micropore) volume. Only when this distribution is present in microporous solids will a completely linear D-R plot result.

Adsorption data of carbon dioxide at 195°K and nitrogen and argon at 77°K on various microporous polymer carbons are interpreted in terms of the D-R equation and distributions of free energy with pore volume. In no case is the complete Rayleigh distribution found to apply and corresponding deviations from linear D-R plots occur. Highly activated carbons show a bimodal distribution of free-energy values to nitrogen and argon at 77°K, but not to CO2 at 195°K. Tentative suggestions for this behavior are presented.

Notes: IIsotherm

? Bhambhani, M.R., Cutting, P.A., Sing, K.S.W. and Turk, D.H. (1972), Analysis of nitrogen adsorption isotherms on porous and nonporous silicas by the BET and αs methods. *Journal of Colloid and Interface Science*, **38** (1), 109-117.

Full Text: [1960-80\J Col Int Sci38, 109.pdf](1960-80/J%20Col%20Int%20Sci38,%20109.pdf)

Abstract: Nitrogen adsorption isotherms were determined on a wide range of porous and nonporous silicas. Isosteric heats of adsorption were calculated from the isotherms (over the temperature range −192° to −178°C) on representative materials. Standard data for nitrogen adsorption at −196°C on nonporous hydroxylated silica are tabulated for the *p*/*po* range 0.001–0.90. The results indicate that certain high-area silicas are truly nonporous, but some grades of commercial Aerosil are porous.

Surface areas are calculated from the isotherms by means of the BET method and the new α*s*-method. The latter is a graphical procedure in which the amount adsorbed is plotted against α*s* for the standard adsorption data, where α*s* is the ratio of the amount adsorbed (at the given *p*/*p*0) to the amount adsorbed at *p*/*p*0 = 0.4. Deviations of the a,-plots from linearity are explained in terms of micropore filling and capillary condensation. In the absence of micropore filling, the surface areas calculated from the slope of the α*s*-plots are in excellent agreement with the BET-areas. Enhanced isosteric heats and C values are associated with micropore filling; the isotherm is therefore distorted in the BET range and the BET-area is not valid. In certain cases, when micropore filling and monolayer coverage at low *p*/*p*0 are followed by multilayer formation and capillary condensation at higher *p*/*p*0, a nearly linear α*s*-plot results, but again neither the BET-area nor the α*s*-area can provide a meaningful value of the internal surface area.

Kimizuka, H., Tahara, T., Abood, L.G. and Kaibara, K. (1972), Adsorption kinetics of surface-active agent at an interface. *Journal of Colloid and Interface Science*, **40** (1), 27-34.

Full Text: [J\J Col Int Sci40, 27.pdf](J/J%20Col%20Int%20Sci40,%2027.pdf)

Abstract: A simple diffusion theory does not adequately account for the adsorption of surface active ions, nor does it take into account the energy barrier to adsorption. It is shown that the adsorption of alkyl sulfate ions at an air-water interface is proportional to the square root of time and the rate constant is proportional to the equilibrium adsorption, regardless of the presence or absence of inorganic electrolytes. A theoretical treatment of adsorption kinetics is presented, which takes explicit account of the diffusion process and presupposes an adsorption potential as well as an absorption barrier. A new equation suitable for the treatment of experimental data is derived.

James, R.O. and Healy, T.W. (1972), Adsorption of hydrolyzable metal ions at the oxide-water interface. I. Co(II) adsorption on SiO2 and TiO2 as model systems. *Journal of Colloid and Interface Science*, **40** (1), 42-52.

Full Text: [J\J Col Int Sci40, 42.pdf](J/J%20Col%20Int%20Sci40,%2042.pdf)

Abstract: Complete isotherms of adsorption density vs. pH and concentration have been determined for Co(II) adsorption on SiO2 (point-of-zero charge pHPZC = 2.0) and TiO2 (pHPZC = 5.6). Isotherms for Fe(III), Cr(III), and Ca(II) on SiO2 have also been determined as a function of pH at fixed added concentration.

The adsorption data indicate that the primary hydration sphere of free or hydrolyzed metal ions is not altered in the adsorption process. While a specific adsorption potential of ca. −5 kcal mole−1 exists for Co2+ adsorption on TiO2, for SiO2, it is −2 kcal mole−1, or less.

Adsorption does not show a simple plateau monolayer behavior, but rather a steady trend with pH and concentration to saturation at the precipitation condition. The qualitative correlation between adsorption and hydrolysis is shown to break down when examined in detail. A complete description is shown to require many interactions for all hydrolysis products and the free ion.

James, R.O. and Healy, T.W. (1972), Adsorption of hydrolyzable metal ions at the oxide-water interface. II. Charge removal of SiO2 and TiO2 colloids by adsorbed Co(II), La(III) and Th(IV) as model systems. *Journal of Colloid and Interface Science*, **40** (1), 53-64.

Full Text: [J\J Col Int Sci40, 53.pdf](J/J%20Col%20Int%20Sci40,%2053.pdf)

Abstract: The detailed electrophoretic mobility behavior, supplemented by streaming potential data, for SiO2 in aqueous solutions of Co(II), La(III), and Th(IV) has been determined as a function of metal ion concentration, pH, ionic strength, and percentage solids. The several charge reversals (CR) observed are, in order of increasing pH, shown to represent the point-of-zero charge (PZC) on the SiO2 substrate (CR 1), the pH of surface nucleation of metal hydroxide (CR 2), and at high pH, the PZC of the metal hydroxide coating (CR 3).

Notes: highly cited

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Full Text: [J\J Col Int Sci40, 65.pdf](J/J%20Col%20Int%20Sci40,%2065.pdf)

Abstract: A detailed quantitative model for the adsorption of hydrolyzable metal ions at the oxide—water interface is presented in terms of the competition between the free energy changes faavorble to adsorption, i.e., coulombic and chemical energy changes, and the unfavorable change in solvation energy. Because of the quadratic dependence of solvation energy changes on the charge of the ion, this term decreases the adsorption of highly charged species. As hydrolysis occurs and the ionic charge is lowered, the coulombic and chemical energy contributions dominate the adsorption energy change and adsorption is abruptly enhanced. If the oxide has a dielectric constant similar to that of the solvent then solvation energy changes are minimal and do not prevent adsorption of unhydrolyzed species.

Kimizuka, H., Abood, L.G., Nishida, S. and Kaibara, K. (1972), Kinetic and static effects of alkali ions on calcium adsorption to stearic acid monolayers. *Journal of Colloid and Interface Science*, **41** (2), 385-387.

Full Text: [J\J Col Int Sci41, 385.pdf](J/J%20Col%20Int%20Sci41,%20385.pdf)

Misra, D.N. (1973), Jovanovich adsorption isotherm for heterogeneous surfaces. *Journal of Colloid and Interface Science*, **43** (1), 85-88.

Full Text: [J\J Col Int Sci43, 85.pdf](J/J%20Col%20Int%20Sci43,%2085.pdf)

Abstract: The adsorption isotherms for heterogeneous surfaces have been obtained from certain arbitrary but solvable energy distribution functions if the Jovanovich isotherm represents the individual homotattic sites. All synthetic isotherms are exactly analogous to the ones derived in the Langmuir case providing the distribution functions are the same. This fact may appear surprising considering the fundamental differences between the two adsorption equations.

Breeuwsma, A. and Lyklema, J. (1973), Physical and chemical adsorption of ions in the electrical double layer on hematite (α-Fe2O3). *Journal of Colloid and Interface Science*, **43** (2), 437-448.

Full Text: [J\J Col Int Sci43, 437.pdf](J/J%20Col%20Int%20Sci43,%20437.pdf)

Abstract: A study has been made of the adsorption on hematite (α-Fe2O3) of alkali, alkali earth, chloride, nitrate, sulphate and phosphate ions. Use has been made of colloid chemical techniques such as direct determination of surface charge and countercharge and stability studies. In most cases, the results can be explained satisfactorily in terms of the Gouy-Stern theory. All bivalent ions studied produce a shift in the point of zero charge. In Ba(NO3)2 solutions, a restabilization region was observed, indicating superequivalent adsorption of Ba2+. No such irregular series could be observed with K2SO4 or monovalent electrolytes. pHosphate adsorbs very strongly. The isotherms are of the “High Affinity” type. The affinity decreases with decreasing charge contrast between phosphate ions and hematite surface. At high phosphate concentrations, the maximally adsorbed amount of phosphate, if plotted as a function of pH passes through a maximum at pH = pK2. pHosphate ions can also produce restabilization of hematite sols. The sorption process probably proceeds through an exchange against surface OH− or H2O groups. Under given conditions, phosphate ions can be considered as “potential determining.”

? Hanna, K.M., Odler, I., Brunauer, S., Hagymassy, Jr., J. and Bodor, E.E. (1973), Pore structure analysis by oxygen adsorption. I. t-curves and methods of analysis. *Journal of Colloid and Interface Science*, **45** (1), 27-37.

Full Text: [1960-80\J Col Int Sci45, 27.pdf](1960-80/J%20Col%20Int%20Sci45,%2027.pdf)

Abstract: Two new approaches to pore structure analysis were developed by Brunauer and his coworkers: a method for the analysis of micropores, and a method for the analysis of wider pores in which capillary condensation occurs. The two methods were then applied to the analysis of a variety of porous adsorbents, using nitrogen and water vapor adsorption-desorption isotherms, and the pore structure results were compared. The present work was undertaken primarily to find out whether a given adsorbate at two different temperatures gives the same results for the same adsorbent. Oxygen was selected as the adsorbate partly because two temperatures for the isotherms, 77.3 and 90 K, were conveniently available, partly in order to compare the oxygen results with the nitrogen and water vapor results.

The prerequisite for the analysis is to have appropriate *t*-curves, i.e., curves which give the statistical thickness of the film adsorbed on nonporous adsorbents as a function of the relative pressure. Using four nonporous adsorbents, *t*-curves were determined for oxygen at 77.3 and 90K. Besides presenting the *t*-curves, the paper also describes the methods of analysis employed at the two temperatures.

? Hanna, K.M., Odler, I., Brunauer, S., Hagymassy, Jr., J. and Bodor, E.E. (1973), Pore structure analysis by oxygen adsorption. II. Analysis of five silica gels. *Journal of Colloid and Interface Science*, **45** (1), 38-54.

Full Text: [1960-80\J Col Int Sci45, 38.pdf](1960-80/J%20Col%20Int%20Sci45,%2038.pdf)

Abstract: Complete pore structure analyses were performed for five silica gels by oxygen adsorption at two temperatures: 77 and 90 K. In previous work, the pore structures of the same silica gels were analyzed by nitrogen and water vapor adsorption. The methods of analysis for all three adsorbates were the “corrected modelless” method and the “MP-method,” or micropore analysis method, developed by Brunauer and his coworkers. The entire pore systems of all five silica gels were accessible to all three adsorbates. The two criteria of correct analysis, i.e., the agreement between cumulative pore surface and BET surface, and the agreement between cumulative pore volume and the volume adsorbed at ps, were very well satisfied.

Oxygen gave the same pore structure results at both temperatures. The pore volume distribution curves of nitrogen, oxygen at 77, and oxygen at 90 K were the same within experimental error for both the micropores and wide pores.

The results gave strong confirmation of both methods of analysis. Furthermore, the micropore analysis results confirmed not only the method of analysis but also the correctness of the surface of micropores obtained by the BET equation.

Haber, J., Najbar, J., Pawelek, J. and Pawlikowska-Cźubak, J. (1973), Thermodynamics and kinetics of adsorption of *n*-heptane on type 5A molecular sieves. *Journal of Colloid and Interface Science*, **45** (2), 252-258.

Full Text: [J\J Col Int Sci45, 252.pdf](J/J%20Col%20Int%20Sci45,%20252.pdf)

Abstract: Adsorption isotherms of *n*-heptane on type 5A zeolite were determined in the temperature range 150–400°C and the kinetics of desorption was measured The heat of adsorption, determined chromatographically, was 10.9 kcal/mole in the temperature range below the critical temperature of *n*-heptane and about 3 kcal/mole above.

Experimental data can be well described by the Riekert isotherm with two molecules per cell below the critical temperature and one molecule (Langmuir isotherm) above. Desorption can be described by a first order rate equation with an activation energy of 5.8 kcal/mole.

Wade, W.H. (1974), Adsorption-kinetics for CCl4 on teflon. *Journal of Colloid and Interface Science*, **47** (3), 676-681.

Full Text: [J\J Col Int Sci47, 676.pdf](J/J%20Col%20Int%20Sci47,%20676.pdf)

Abstract: Measured adsorption isotherms for carbon tetrachloride on Teflon have adsorption kinetics strongly dependent on the temperature. Three “adsorptive” components have been identified. Two of these have activation energies indicative of diffusion into the bulk of the Teflon.

Notes: highly cited

Giles, C.H., Smith, D. and Huitson, A. (1974), A general treatment and classification of solute adsorption isotherm. I. Theoretical. *Journal of Colloid and Interface Science*, **47** (3), 755-765.

Full Text: [J\J Col Int Sci47, 755.pdf](J/J%20Col%20Int%20Sci47,%20755.pdf)

Abstract: A theoretical basis is developed for the classification of adsorption isotherms for solutes in dilute solution which relates their characteristic shapes to parameters of the solvent and any second solute. Three of the four main classes (S, L, H) are accounted for by differences in relative magnitude of the activation energies of desorption of solutes and solvent. The S-shaped isotherm is also accounted for by an addition concentration-dependence of this parameter, implying cooperative adsorption. The subgroups of each class are also explained. The linear (C) isotherm is explained by penetration of substrate micropores by solute, with or without solvent, whereby new absorption sites are opened up; the theory predicts the experimentally found sharp inflection to a plateau in the C-curves. Curves of the other classes can also in some cases show a linear branch above the turning point, representing conditions like those for C-curves. The theoretical treatment is valid whether the adsorbing surface is energetically uniform, or, as in most systems, nonuniform. [Conference Paper; 1 Ref]. Conference Information: Chemistry and Characterization of Polymer Surfaces; 8-13 April 1973; Dallas, TX, USA; Sponsored by American Chem. Soc.

Notes: highly cited

Giles, C.H., D’Silva, A.P. and Easton, I.A. (1974), A general treatment and classification of the solute adsorption isotherm. Part. II. Experimental interpretation. *Journal of Colloid and Interface Science*, **47** (3), 766-778.

Full Text: [J\J Col Int Sci47, 766.pdf](J/J%20Col%20Int%20Sci47,%20766.pdf)

Abstract: For pt.I see ibid., vol.47, no.3, 755 (1974). The solute adsorption isotherm classification is illustrated by a number of further experiments which help to clarify some earlier obscurities and enable an isotherm to assist (a) in interpreting the adsorption mechanism and the solute orientation (b) in identifying the presence of associated solute and of an impurity, and (c) in measuring the specific surface area of a solid. The production of the S-curve by either cooperative adsorption or by a competitive effect of an impurity in the solvent is illustrated and discussed. Thus p-nitrophenol is adsorbed from dry benzene by both silica and graphite. Traces of water in the solvent reduce the adsorption on silica by competition and change the curve from L- to S-shape but have no effect on adsorption on graphite, where competition is negligible. The adsorption of aromatic hydrocarbons by alumina, which usually gives S-curves, is discussed. Cooperative adsorption can give the H-type of curve if the cooperating molecules move as a large unit from solvent to substrate, as in J-aggregate adsorption of cyanine dyes on silver halides. Examples of adsorption giving C-type (linear) curves are quoted. [Conference Paper; 1 Ref]. Conference Information: Chemistry and Characterization of Polymer Surfaces; 8-13 April 1973; Dallas, TX, USA; Sponsored by American Chem. Soc.

Rand, B. (1974), Microporosity of spheron 6-comparison of 3 methods of interpretation of nitrogen adsorption isotherm. *Journal of Colloid and Interface Science*, **48** (2), 183-186.

Full Text: [J\J Col Int Sci48, 183.pdf](J/J%20Col%20Int%20Sci48,%20183.pdf)

Dubinin, M.M. (1974), Improvement of adsorption-isotherm reduction based methods for determining specific surface areas of adsorbents containing no micropores. *Journal of Colloid and Interface Science*, **49** (1), 5-9.

Full Text: [J\J Col Int Sci49, 5.pdf](J/J%20Col%20Int%20Sci49,%205.pdf)

Abstract: De Boer’s *t*-method and its modifications are convenient versions of a method for reducing adsorption isotherms of nitrogen vapor on adsorbents for which one of the specific surface areas is known. The closer the adsorption isotherms correspond to each other, the better the agreement between the specific surface areas determined by the BET-method (*S*BET), de Boer’s *t*-method (1) and Sing’s α-method (*S*α). For the same adsorption isotherms, of course, *SBET* = *S*1 = *S*α. In this case, the initial section of the *t*- or α-curve is expressed by the 2-constant BET equation with closely agreeing constants *c* for the standard curve and the adsorption isotherm of the adsorbent under study.

The theoretical principles of determination of the specific surface areas of adsorbents by the adsorption reduction method proceed from Brunauer’s multilayer adsorption theory. The possibility is shown of calculating from an experimental *t*- or α-curve, a “corrected” curve corresponding to the condition of similarity for the adsorption isotherm under consideration and leading to a quantitative agreement between *SBET*, *St*, and *S*α

Blank, M., Lee, B.B. and Britten, J.S. (1975), Adsorption kinetics of ovalbumin monolayers. *Journal of Colloid and Interface Science*, **50** (2), 215-222.

Full Text: [J\J Col Int Sci50, 215.pdf](J/J%20Col%20Int%20Sci50,%20215.pdf)

Abstract: The adsorption kinetics of ovalbumin monolayers has been studied using simultaneous measurements of surface potential and surface tension. Both measures show that the adsorption rate is greatest at the IEP, and decreases when the molecule is charged. The rate also increases with the concentration of dissolved ovalbumin and with the ionic strength. These results are consistent with an adsorption rate that varies inversely with the surface pressure and is controlled by an asymmetric electrical barrier. The kinetic data also point up the important changes that occur in the properties of ovalbumin films at a surface pressure of about 5 dyn/cm.

Eagan, J.D. and Anderson, R.B. (1975), Kinetics and equilibrium of adsorption on 4A zeolite. *Journal of Colloid and Interface Science*, **50** (3), 419-433.

Full Text: [J\J Col Int Sci50, 419.pdf](J/J%20Col%20Int%20Sci50,%20419.pdf)

Abstract: Adsorption isotherms for Ar, 02, N2, CO, CO2, CH4, and C2H6 on 4A zeolite at three or more temperatures were determined. An adsorption equation based on a 2-dimensional virial equation in terms of integer powers of the reciprocal of (*A* - σ) was shown to fit the equilibrium data accurately with three constants for C2H6 and two constants for other gases. Here *A* is the area per molecule and σ is the area of the molecule in a close-packed situation.

Rates of adsorption and desorption of Ar, N2, CO, CH4, and C2H6 on 4A zeolite were determined over ranges of temperature in which the rate was moderately fast. Electron microscopy showed that the particles were cubes, and their size-distribution was determined. The conventional Fick’s law rate equation for cubes was used to produce a generalized rate curve for the particle size distribution of the adsorbent. This curve was applied to the last 20% of the rate curve to obtain a diffusivity that could be related to the final amount adsorbed. This procedure also avoids the initial rapid portion of the adsorption, in which large variations of adsorbent temperature from that of the bath often occur.

The diffusivities increased with amount adsorbed by a small extent for Ar and CH4 and by larger amounts for N2, CO, and C2H6. The activation energy for diffusion, as well as the heat of adsorption, were nearly independent of amount adsorbed for Ar and CH4, but these quantities decreased substantially with coverage for N2, CO, and C2H6. The dependence upon amount adsorbed of diffusivity and activation energy seemed related to the shape of the adsorption isotherm; those for Ar and CH4 were nearly linear, whereas isotherms for the other gases had large curvatures. The activation energy for diffusion varied with coverage in the same way as heat of adsorption.

? Giles, C.H., Forrester, S.D. and Hojiwala, B.J. (1975), Adsorption and catalysis at solid sulfur dioxide interface in atmosphere - Examination of statistical data. *Journal of Colloid and Interface Science*, **50** (3), 588-601

Full Text: [1960-80\J Col Int Sci50, 588.pdf](1960-80/J%20Col%20Int%20Sci50,%20588.pdf)

Abstract: From the official analytical data for sulfur dioxide and smoke in air pollution for one winter and one summer month covering residential and industrial areas in Great Britain, regression lines are computed. These reveal a large deficiency which is of very high significance of sulfur dioxide relative to smoke in winter compared with summer; the data show clearly that the deficiency is not due to the increase in domestic smoke in winter. Several reasons for the deficiency are examined semiquantitatively, and it is suggested that adsorption of sulfur dioxide occurs on solid particles followed by its catalytic oxidation by oxygen to sulfur trioxide. The amount of sulfur dioxide to be accounted for is far too high to be explained by simple adsorption on smoke particles. The catalysis may be due to traces of metals. The data also reveal that whatever may be the mechanism by which the sulfur dioxide is removed, it becomes less effective as the amount of smoke present increases, in all situations. It is suggested that a cause of this change might be the progressive covering of the very active surface of natural inorganic dust, possibly including meteoric dust, in the atmosphere by the less catalytically active smoke particles as their concentration rises.

Keywords: Adsorption, Catalysis

Walker, J. and Cortes, J. (1975), Parametric expressions for calculating pore distribution from nitrogen adsorption isotherm in case of open cylindrical pores. *Journal of Colloid and Interface Science*, **51** (2), 292-300.

Full Text: [J\J Col Int Sci51, 292.pdf](J/J%20Col%20Int%20Sci51,%20292.pdf)

Abstract: A study has been made of the consequences of applying Anderson’s equation to derive the *F(t)* function for adsorption and capillary condensation in open cylindrical pores, in J. H. de Boer’s model.

It was found that the general equations are expressed in terms of three parameters that describe the system and can be derived from the experimental adsorption isotherm. For the determination of the pore distribution in a solid from the adsorption branch of the isotherm, it is then shown that the upper limit of the interval of radii that must be considered for this calculation can be derived naturally from the deduced equations and the experimental results.

Tewari, P.H. and Lee, W. (1975), Adsorption of Co(II), at the oxide-water interface. *Journal of Colloid and Interface Science*, **52** (1), 77-88.

Full Text: [J\J Col Int Sci52, 77.pdf](J/J%20Col%20Int%20Sci52,%2077.pdf)

Abstract: Adsorption of Co(II) on TiO2, ZrO2, NiFe2O4, and A12O3 increases abruptly between pH 6 and 8 and is endothermic. The isosteric heat of adsorption decreases with increasing surface coverage.

The isoelectric point (IEP) of the oxides has been determined from electrophoretic mobility (EM) data. The EM values of the oxides do not change on the addition of 10−3 or 10−4 mole/kg Co(II) below the IEP, but above it the normally negatively charged particles assume positive zeta potential due to adsorbed cobalt and they finally attain values similar to that of Co(OH)2. The standard free energy change for the specific adsorption of Co(II) on the oxides has been calculated from adsorption density and electrophoretic mobility data using the Stern-Grahame expression for specific adsorption.

At 30°C an x-ray photoelectron spectrum (XPS) of cobalt adsorbed on ZrO2 or Al2O3 corresponds closely to that for Co(OH)2. At 200°C, the adsorbed surface cobalt forms CoA12O4 with the substrate, as is shown by the similarity between the x-ray photoelectron spectra of CoAl2O4 and Al2O3 with adsorbed cobalt.

Adsorption, EM, and XPS data show that the abrupt increased adsorption of Co(II) with solution pH is due to its hydrolysis, and that an increasing surface coverage by adsorption produces surface precipitation of Co(OH)2 under conditions that do not cause precipitation in the bulk solution. At higher temperatures the adsorbed cobalt reacts with the substrate producing compounds like spinels and aluminates.

Yates, D.E. and Healy, T.W. (1975), Mechanism of anion adsorption at the ferric and chromic oxide/water interfaces. *Journal of Colloid and Interface Science*, **52** (2), 222-228.

Full Text: [J\J Col Int Sci52, 222.pdf](J/J%20Col%20Int%20Sci52,%20222.pdf)

Abstract: Potentiometric titration studies of adsorption of nitrate, sulfate, and phosphate on goethite and α-chromia have been conducted to examine whether or not anion adsorption in these systems involves ligand exchange with surface groups. Both the extent and rate of adsorption are consistent with a ligand exchange mechanism for the adsorption of phosphate on goethite but this mechanism is kinetically inhibited on α-chromia, where a much lower adsorption of phosphate is observed. The adsorption of nitrate and sulfate is similar in both extent and rate on both oxides, so that ligand exchange cannot be of primary importance in their adsorption mechanisms.

Coughlan, B., Kilmartin, S., Mcentee, J. and Shaw, R.G. (1975), Interpretation of zeolitic CO2 equilibria using a theoretical isotherm equation. *Journal of Colloid and Interface Science*, **52** (2), 386-390.

Full Text: [J\J Col Int Sci52, 386.pdf](J/J%20Col%20Int%20Sci52,%20386.pdf)

Abstract: CO2 sorption in zeolites *X, Y*, and *A* enriched with univalent, divalent, and trivalent cations is discussed with reference to a theoretical isotherm equation developed by Ruthven. Henry’s law constants and initial heats of sorption are presented. The data for the reasonably energetically homogeneous systems Li*A*-49, Na*A*, Cr*A*-23, *YA*-28, Co*Y*, Mn*Y*, Cr*Y*-25, and *YY*-21/CO2 fit the equation well up to ~50% saturation; for these systems sorbate mobility is indicated in good agreement with an analysis of the sorption data using the Volmer and Langmuir ideal models.

Jaroniec, M. (1975), Adsorption of gas-mixtures on heterogeneous surfaces: Analytical solution of integral equation for Jovanovic adsorption isotherm. *Journal of Colloid and Interface Science*, **53** (3), 422-428.

Full Text: [J\J Col Int Sci53, 422.pdf](J/J%20Col%20Int%20Sci53,%20422.pdf)

Abstract: New adsorption isotherms for binary gas mixtures on heterogeneous surfaces have been obtained by using the generalized integral equation for the overall adsorption isotherm. The isotherms have been derived from certain arbitrary but solvable energy distribution functions if the Jovanovic mixed isotherm represents the individual homotattic sites. From mathematical analysis of the generalized integral equation, it follows that the mixed Jovanovic equation used as the local adsorption isotherm is most convenient with regard to analytical and numerical calculations.

Fleer, G.J. and Lyklema, J. (1976), Polymer adsorption and its effect on stability of hydrophobiccolloids. III. Kinetics of flocculation of silver iodide sols. *Journal of Colloid and Interface Science*, **55** (1), 228-238.

Full Text: [J\J Col Int Sci55, 228.pdf](J/J%20Col%20Int%20Sci55,%20228.pdf)

Abstract: In a previous study on the flocculation of silver iodide sols by polyvinyl alcohol (PVA) it was demonstrated that the extent of flocculation depends critically on the way in which sol particles and polymer are mixed. Optimal flocculation was shown to occur if a two-portion method of mixing is applied in which equal numbers of polymer-covered and uncovered particles are brought together. The observations could be fully explained by a bridging model of flocculation. In this study the kinetics of the flocculation process has been investigated with a stopped flow spectrophotometer. The *coagulation* of AgI-sols by low molecular weight electrolytes was found to be a bimolecular process. Critical coagulation concentrations were found that matched closely those reported in the literature. The *flocculation* of sol by polymer brought about by mixing of polymer-covered and uncovered particles, follows also bimolecular kinetics. In this case only 50% of the collisions leads to aggregation and the fast flocculation rate is just half the rate of fast coagulation. In accordance with previous results, the critical flocculation concentration of electrolytes with univalent and bivalent counterions was shown to be much lower than the corresponding critical coagulation concentration. Comparison of the kinetics of our two-portion method with the one-portion method (in which the total amount of polymer is added to the total amount of sol) leads to the conclusion that absorbing PVA molecules need a few seconds to form a layer that can effectively protect the sol particles. Thus, the rate of flocculation can provide information on the rate of adsorption. This study underlines again that the way of mixing is a very important parameter in the flocculation of hydrophobic sols by polymers.

Hoel, H. and Stumm, W. (1976), Interaction of Pb2+ with hydrous γ-Al2O3. *Journal of Colloid and Interface Science*, **55** (2), 281-288.

Full Text: [J\J Col Int Sci55, 281.pdf](J/J%20Col%20Int%20Sci55,%20281.pdf)

Abstract: Significant adsorption of Pb(II) on to hydrous γ-Al2O3 from dilute solutions is observed even at pH values far below the zero point of charge. The specific binding of Pb2+ on hydrous γ-Al2O3 in dilute electrolyte is interpreted as surface complex formation. The amphoteric properties of the coordinating surface are characterized in 0.1 *M* NaC1O4 in terms of a two-protic acid-base system (pH*ZPC* = 8.3). The extent of Pb2+ interaction with the Al2O3 surface was determined both from measurements of residual [Pb2+] with a Pb2+ electrode and from the displacement of alkalimetric titration curves by the presence of Pb(II). The complex forming properties of the surface coordination reaction can be quantified by the equilibria: ≡ AlOH + Pb2+ right arrow over left arrow≡ AlOPb+ + H+; 2 ≡ AlOH +Pb2+ right arrow over left arrow(≡ AlO)2Pb + 2H+. Hydrolysis need not be invoked to describe the interaction.

Zogorski, J.S., Faust, S.D. and Haas, Jr., J.H. (1976), The kinetics of adsorption of phenols by granular activated carbon. *Journal of Colloid and Interface Science*, **55** (2), 329-341.

Full Text: [J\J Col Int Sci55, 329.pdf](J/J%20Col%20Int%20Sci55,%20329.pdf)

Abstract: The removal of phenols from aqueous solution via activated carbon adsorption is a feasible approach to diminishing the concentration of these contaminants in drinking waters. However, both the kinetics of adsorption and the extent of adsorption at equilibrium are dependent on the physical and chemical characteristics of the adsorbate, adsorbent, and experimental system. Results of laboratory scale studies conducted to delineate the effect of such parameters on the kinetics of adsorption of phenols are reported. Parameters evaluated include: hydronium ion concentration, temperature, initial adsorbate concentration, size of adsorbent, competitive adsorption, and type of adsorbate. In addition, the nature of the rate limiting step in the adsorption process of phenols is described.

Notes: highly cited

? Schindler, P.W., Fürst, B., Dick, R. and Wolf, P.U. (1976), Ligand properties of surface silanol groups. I. Surface complex-formation with Fe3+, Cu2+, Cd2+, and Pb2+. *Journal of Colloid and Interface Science*, **55** (2), 469-475.

Full Text: [1960-80\J Col Int Sci55, 469.pdf](1960-80/J%20Col%20Int%20Sci55,%20469.pdf)

Abstract: The adsorption of Fe(III), Cu(II), Cd(II), and Pb(II) from aqueous solutions of constant ionic strength at silica-water interfaces was investigated by potentiometric titrations at 25°. The experimental results are explained in terms of surface complex formation involving deprotonated surface silanol groups as ligands:

Si-OH+MZ+(Si-O)M)(Z− 1)++H+; \*K18,

2Si-OH+MZ+(Si-O)2M)(Z− 2)++2H+; \*β28, A linear correlation was found between log \*K18(\*β28) and log \*K1(\*β2) where \*K1(\*β2) are the stability constants of hydroxo complexes.

Tewari, P.H. and Campbell, A.B. (1976), Temperature dependence of point of zero charge of cobalt and nickel oxides and hydroxides. *Journal of Colloid and Interface Science*, **55** (3), 531-539.

Full Text: [J\J Col Int Sci55, 531.pdf](J/J%20Col%20Int%20Sci55,%20531.pdf)

Abstract: The points of zero charge (pzc) of well characterized Co(OH)2, Co3O4, Ni(OH)2, and NiO have been determined between 25 and 80°C. The pzc have been measured by three independent methods: (I) by finding the solution pH which does not change on addition of the oxide, (II) by electrometric titration of the oxide suspensions, and (III) by electrophoretic mobility (em) measurements. The pzc values differ with the extent of the equilibration. The em and the titration methods give similar pzc values but they are higher than the ones obtained for the primary equilibrium. The pzc values decrease with increasing temperature and this change is in the direction of the change of 0.5p*Kw*, the neutral point of water. For NiO and Co3O4, the value of (pzc − 0.5p*Kw*) remains constant at all the temperatures studied and the magnitude of the change of pzc is explained by the change in the ionization constant of water, *Kw*, with temperature. Similarly for Co(OH)2 and Ni(OH)2, the pzc values obtained from the titration method give a constant (pzc − 0.5p*Kw*) and the change is explained by the change of *Kw*. However, the pzc derived from the primary equilibrium decreases more than the corresponding change in 0.5p*Kw*. Thus the potential on Ni(OH)2 and Co(OH)2 changes more than can be accounted for by the change in 0.5p*Kw*. The results are discussed with reference to the equation for the temperature dependence of pzc derived by Bérubé and De Bruyn.

Joos, P. and Bogaert, R.V. (1976), Alternating electric current across a nitrobenzene-water interface. I. Adsorption kinetics. *Journal of Colloid and Interface Science*, **56** (2), 206-212.

Full Text: [J\J Col Int Sci56, 206.pdf](J/J%20Col%20Int%20Sci56,%20206.pdf)

Abstract: The passage of an electric current through an ideal nonpolarizable interface is considered. Our system consists of two bulk phases, water and nitrobenzene; in both phases some surface active electrolyte, cetyltrimethyl ammonium bromide, was dissolved. The concentrations of this electrolyte in both phases were in equilibrium. A theory is developed when an ac flows through such an interface, yielding a relation between the amplitude of the variation in interfacial tension and the phase shift between variation of the ac and the variation in interfacial tension, as a function of the thermodynamic and kinetic parameters of the system. It was assumed that the adsorption is diffusion controlled. This theory was experimentally verified. Concerning the phase angles moderate agreement was obtained, but agreement was excellent for the amplitude of the variation in interfacial tension.

Sanjeevi, R., Ramanthan, N. and Viswanathan, B. (1976), Pore size distribution in collagen fiber using water vapor adsorption studies. *Journal of Colloid and Interface Science*, **57** (2), 207-211.

Full Text: [J\J Col Int Sci59, 207.pdf](J/J%20Col%20Int%20Sci59,%20207.pdf)

Abstract: The pore size distribution in collagen fibers was determined using the sorption characteristics of water vapor. Collagen fibers were found to have pores of radius ~55 Å and micropore analysis showed that collagen has micropores of radius ~4.5 Å. When the noncollagenous components were removed, the ~55 Å radius pore was absent and there was a new pore of radius ~75 Å. Neither the removal of noncollagenous components nor tanning caused any change in the micropore structure.

Schechter, R.S., Wade, W.H. and Wingrave, J.A. (1977), Sorption isotherm hysteresis and turbidity phenomena in mesoporous media. *Journal of Colloid and Interface Science*, **59** (1), 7-23.

Full Text: [J\J Col Int Sci59, 7.pdf](J/J%20Col%20Int%20Sci59,%207.pdf)

Abstract: Based on equilibrium sorption isotherm studies of porous Vycor discs whose circular faces were coated with a clear epoxy resin, it was possible to study the variable sorbed vapor disposition coincident with sorption isotherm hysteresis. Along the adsorption isotherm, condensate lenses were found to be more or less randomly distributed uniformly throughout the Vycor, but upon subsequent desorption, the absence of cavitation allowed the porous Vycor disc to remain condensate saturated. The desorption isotherm was, therefore, nearly horizontal until, at a sufficiently low vapor pressure, the outermost liquid-vapor interfaces became unstable. The resulting instability caused rheon jump desorption, which proceeded radially inward over an unusually small relative pressure range. This desorption process left behind residual isolated condensate ganglia in the outer portion of the porous medium in metastable equilibrium with a condensate saturated central core. After descending approximately two-thirds of the near vertical desorption isotherm, the condensate saturated core had evaporated and the remainder of the desorption hysteresis isotherm was primarily ganglia evaporation. Nonuniform desorption behavior was sensibly absent along descending scanning curves because each curve began at a partially saturated adsorption state containing randomly distributed vapor regimes from which internal rheon jump desorption could begin. This nonuniform desorption, observed with porous Vycor, may apply to a variety of porous media, thereby negating any simple application of the Kelvin equation in computing pore size distributions for these media. Such a calculation, which assumes that all pores communicate with the vapor, would lead to a considerable error in that the number of larger pores is greatly underestimated.

? Stoeckli, H.F. (1977), Generalization of Dubinin-Radushkevich equation for filling of heterogeneous micropore systems. *Journal of Colloid and Interface Science*, **59** (1), 184-185.

Full Text: [1960-80\J Col Int Sci59, 184.pdf](1960-80/J%20Col%20Int%20Sci59,%20184.pdf)

Perram, J.W. and Smith, E.R. (1977), Anew adsorption isotherm for study of interfacial and biological phenomena. *Journal of Colloid and Interface Science*, **59** (1), 197-199.

Full Text: [J\J Col Int Sci59, 197.pdf](J/J%20Col%20Int%20Sci59,%20197.pdf)

Dondi, F., Gonnord, M. and Guiochon, G. (1977), Chromatographic determination of gas-solid adsorption isotherms by step and pulse method. II. Choice of a model for adsorption isotherm of benzene and cyclohexane on graphitized carbon black. *Journal of Colloid and Interface Science*, **62** (2), 316-328.

Full Text: [J\J Col Int Sci62, 316.pdf](J/J%20Col%20Int%20Sci62,%20316.pdf)

Abstract: Different models of adsorption isotherm have been applied to the study of the adsorption of benzene and cyclohexane on graphitized thermal carbon black by the step and pulse gas chromatographic method. It is shown that within the precision of the experimental results, a good description of the adsorption of benzene is obtained with all the models tested, although a polymolecular adsorption mechanism seems preferable. At the low coverage range (θ< 0.25) where experiments have been carried out, the monomolecular adsorption model of Van der Waals describes the cyclohexane adsorption with as much accuracy as the polymolecular Hill model, while all other models fail. Both the Hill and Van der Waals equations assume lateral interactions. In both cases, benzene and cyclohexane adsorption, and with the additional aid of results derived from the virial form, we can determine the mobility of the adsorbed film in the range of temperatures studied. A new independent method of determination of the Henry constant is described. The results are, in this case, in excellent agreement with those obtained by the conventional gc elution method, which demonstrates the homogeneity of the surface studied.

? Giles, C.H. and Mciver, N. (1977), Adsorption of dyes and Gibbs equation - Investigation by monolayer technique. *Journal of Colloid and Interface Science*, **62** (2), 329-335

Full Text: [1960-80\J Col Int Sci62, 329.pdf](1960-80/J%20Col%20Int%20Sci62,%20329.pdf)

Abstract: The Gibbs adsorption equation has been applied to: (i) solutions of a monosulfonate dye (I) and a tetrasulfonate dye (II) using surface tension measurements at the air/water interface; and to surface film pressure measurements of (ii) a protein (edestin) monolayer, a model for protein fibers, over solutions of I in pH 4 buffer; and (iii) a cellulose monolayer over solutions of II. Surface excess values for the dyes at the interfaces have been calculated, using for the monolayers, Pethica’s adaptation of the Gibbs equation. The results are in agreement with the interpretation of the dye/monolayer reactions made from the changes in slope of the pressure/area curves produced by the presence of the dyes. Thus I appears to penetrate the film between the protein chains, and II to orient beneath the cellulose molecules, and parallel thereto. The adsorption of II beneath the film is reduced by coulombic repulsion between the dye anions and the negatively charged cellulose.

Keywords: Adsorption, Dyes

Notes: IIsotherm

Smith, A.N., Posner, A.M. and Quirk, J.P. (1977), A model describing the kinetics of dissolution of hydroxyapatite. *Journal of Colloid and Interface Science*, **62** (3), 475-494.

Full Text: [J\J Col Int Sci62, 475.pdf](J/J%20Col%20Int%20Sci62,%20475.pdf)

? Ditl, P., Coughlin, R.W. and Jere, E.H. (1978), Mass transfer kinetics of adsorption on suspended solid particles. *Journal of Colloid and Interface Science*, **63** (3), 410-420.

Full Text: [1960-80\J Col Int Sci63, 410.pdf](1960-80/J%20Col%20Int%20Sci63,%20410.pdf)

Abstract: A theoretical kinetic model for adsorption from an agitated liquid phase to solid spherical particles suspended therein has been formulated, solved numerically and compared with the results of experiment. Important aspects of the model include the fact that it accounts for the influence of forced convection as well as the influence of adsorbate concentration changes in the bulk liquid on the mass transfer. The integration of the general equations has been carried out for systems in which equilibrium is described by Langmuir, Freundlich and linear adsorption isotherms. Results of the analysis are presented in the form of graphical relations between dimensionless quantities, which permit the description of concentration changes in the vessel vs time for systems under a wide range of conditions of practical interest. Results obtained theoretically have been applied to adsorption of dextrose and urea on ordinary and on oxidized active carbon from dilute aqueous solutions. Very good agreement between theory and experiment has been observed. Adsorption equilibrium of these systems and the influence of temperature on adsorption kinetics has been investigated as well. The adsorption of dextrose and urea are of practical importance because these substances occur as polutants in wastewater; adsorption of urea on active carbon is also of importance since this process can be applied to the removal of urea from dialysate in artificial kidney machines, thereby improving the speed and efficiency of treatment.

Davis, J.A., James, R.O. and Leckie, J.O. (1978), Surface ionization and complexation at the oxide/water interface. I. Computation of electrical double layer properties in simple electrolytes. *Journal of Colloid and Interface Science*, **63** (3), 480-499.

Full Text: [1960-80\J Col Int Sci63, 480.pdf](1960-80/J%20Col%20Int%20Sci63,%20480.pdf)

Abstract: A new method for determination of intrinsic ionization and complexation constants of oxide surface sites from potentiometric titration data is reported. Using these experimental properties and the stoichiometry of surface reactions, surface charge, σo, adsorption density, Γi, and diffuse layer potentials, ψd, at the oxide/water interface are calculated. The numerical method permits simultaneous calculation of all surface and solution equilibrium states in both simple and complex electrolyte/colloid systems. This allows generalization to dilute ion adsorption in systems with complex solution chemistry.

In electrolyte solutions of moderate or high concentration, the surface charge is dominated by surface complex formation of ionizable surface sites and electrolyte ions. In very dilute simple salt solutions the surface ionization reactions are more important. H+ and OH− are the principal potential determining ions (p.d.i.), but the electrolyte ions have a minor effect on the calculated surface potential, ψ0. The electrolyte ions and p.d.i. have a joint role in determining the magnitude of the surface charge via their reactions with surface sites. The important experimental parameters which characterize these contributions are ΔpKcumptex = p\*Kcationint − p\*Kanionint and ΔpKa = pKa2int − pKa1int.

Notes: highly cited

? Norde, W. and Lyklema, J. (1978), Adsorption of human-plasma albumin and bovine pancreas ribonuclease at negatively charged polystyrene surfaces. I. Adsorption isotherms. Effects of charge, ionic strength, and temperature. *Journal of Colloid and Interface Science*, **66** (2), 257-265.

Full Text: [1960-80\J Col Int Sci66, 257.pdf](1960-80/J%20Col%20Int%20Sci66,%20257.pdf)

Abstract: This paper describes the adsorption of human plasma albumin (HPA) and bovine pancreas ribonuclease (RNase) on polystyrene latices. The latices are homodisperse and emulsifier-free. Their surface charge is entirely due to sulfate groups. Important variables are the temperature, the pH, the KNO3 concentration, and the surface charge on the latex. All isotherms reach well-defined plateaus, but otherwise HPA and RNase behave differently. HPA isotherms sometimes show steps or kinks, their initial slopes increase with temperature (except at low temperature at the isoelectric point), and the plateau values are more or less symmetrical with respect to the isoelectric point. RNase isotherms are of the “high affinity” type, with plateaus that are little sensitive to pH. Interpretation of the data points to an increase in entropy as one of the main driving forces of the process. The pronounced differences in adsorption behavior of HPA and RNase are attributed to the relatively easy adaptability of HPA molecules to changing conditions as compared with the relatively great conformational stability of RNase, so that adsorption reflects the structural coherence of the dissolved proteins.

Keywords: Adsorption

Davis, J.A. and Leckie, J.O. (1978), Surface ionization and complexation at the oxide/water interface. II. Surface properties of amorphous iron oxyhydroxide and adsorption of metal ions. *Journal of Colloid and Interface Science*, **67** (1), 90-107.

Full Text: [J\J Col Int Sci67, 90.pdf](J/J%20Col%20Int%20Sci67,%2090.pdf)

Abstract: The site-binding model for the electrical double layer of hydrous oxides reported in a previous paper is applied to the adsorption of metal ions from dilute solution and to complex heterogeneous systems, i.e., amorphous iron oxyhydroxide. More than one stoichiometric surface reaction is usually needed to describe the adsorption behavior of dilute heavy metal ions. If mass law equations for surface reactions of metal ions are corrected for effects of the electrostatic field at the interface, the calculated adsorption density depends upon the type of surface species formed. It is shown that calculations with surface reactions involving hydrolytic complexes of metal ions, e.g., Pb(II), Cd(II), Cu(II), Ag(I), are more consistent with experimental adsorption data than complexation by bidentate surface sites. A table of intrinsic surface complexation constants for various metal ions and oxide substrates is presented. Similar to results reported earlier for major electrolyte ions, the stability constants of surface complexes of heavy metal ions with the silica surface are significantly less than for other oxide surfaces. Empirical surface parameters for model calculations with iron oxyhydroxide are derived and the results are compared with experimental adsorption data for Cu(II) and Ag(I).

Ashida, M., Sasaki, M., Kan, H., Yasunaga, T., Hachiya, K. and Inoue, T. (1978), Kinetics of proton adsorption-desorption at TiO2-H2O interface by means of pressure-jump technique. *Journal of Colloid and Interface Science*, **67** (2), 219-225.

Full Text: [J\J Col Int Sci67, 219.pdf](J/J%20Col%20Int%20Sci67,%20219.pdf)

Abstract: Single relaxation was found in TiO2 (anatase) suspension by means of the pressure-jump technique with electrical conductance detection. The reciprocal relaxation time observed changed markedly with pH to show a minimum at pH 3.5. The relaxation was attributed to proton adsorption-desorption on the surface of TiO2 particle. It was well expressed by a Langmuir-type adsorption-desorption rate equation. The adsorption and desorption rate constants were 4×10−4 dm3 cm−2 sec−1 and 8×10−9 mole cm−2 sec−1, respectively. The experimental value of adsorption energy was in agreement with the theoretical one calculated on the basis of Fick’s first law.

Ikeda, S., Tsunoda, M.A. and Maeda, H. (1978), Application of Gibbs adsorption-isotherm to aqueous-solutions of a non-ionic-cationic surfactant. *Journal of Colloid and Interface Science*, **67** (2), 336-348.

Full Text: [J\J Col Int Sci67, 336.pdf](J/J%20Col%20Int%20Sci67,%20336.pdf)

Abstract: The Gibbs adsorption isotherm has been developed for aqueous solutions containing a weak base, HCl and NaCl, which behave as ideal solutions. Expressions for surface excesses of weak base, sodium ion and chloride ion are derived as functions of derivatives of surface tension with respect to the concentrations of weak base, HCl and NaCl. Dimethyldodecylamine oxide is chosen as a base, and the surface tension of its aqueous solutions has been measured at different degrees of neutralization and at different NaCl concentrations. The surface excesses of surfactant, sodium ion, and chloride ion are obtained as functions of surfactant concentration by means of the derived equations. Furthermore, possible surface hydrolysis of the surfactant is evaluated on the basis of an appropriate postulate.

Weatherwax, R.C. and Caulfield, D.F. (1978), Pore structure of papers wet stiffened by formaldehyde crosslinking. 1. Results from water isotherm. *Journal of Colloid and Interface Science*, **67** (3), 498-505.

Full Text: [J\J Col Int Sci67, 498.pdf](J/J%20Col%20Int%20Sci67,%20498.pdf)

Abstract: Kraft paper was crosslinked with formaldehyde by liquid- and gas-phase methods. The water sorption isotherms, fiber saturation points, and acetal contents were determined. From these data it was concluded that (i) crosslink effectiveness was related to the relative vapor pressure of water during the crosslinking reaction, (ii) the dimensional stabilization per crosslink decreased with increasing reaction times, and (iii) strong alkaline swelling agents could penetrate all portions of the crosslinked papers.

Elliott, H.A. and Huang, C.P. (1979), The adsorption characteristics of Cu(II) in the presence of chelating agents. *Journal of Colloid and Interface Science*, **70** (1), 29-45.

Full Text: [J\J Col Int Sci70, 29.pdf](J/J%20Col%20Int%20Sci70,%2029.pdf)

Abstract: The adsorption characteristics of Cu(II) in the presence of chelating agents was investigated in the laboratory. The results showed that the presence of chelating agents improved the extent of Cu(II) adsorption, although ligand: Cu(II) RATIO = 1: 1 seemed to be important to assure optimum Cu(II) adsorption, at least in the Cu(II)-NTA-γ-Al2O3 system. Electrostatic interaction appeared to be an important mechanism for complexed Cu(II) adsorption. However, a finite adsorption of Cu(II) complexes of NTA, glycine, and aspartic acid was observed at the pHzpc of γ-Al2O3. This suggests the presence of specific chemical interaction. The adsorbed Cu(II) species in the presence of chelating agents, such as NTA, is the complexed form, i.e., CuNTA−. A model has been proposed to qualitatively explain the attachment of CuNTA− species onto γ-Al2O3 surface.

Notes: highly cited

? Lecloux, A. and Pirard, J.P. (1979), The importance of standard isotherms in the analysis of adsorption isotherms for determining the porous texture of solids. *Journal of Colloid and Interface Science*, **70** (2), 265-281.

Full Text: [1960-80\J Col Int Sci70, 265.pdf](1960-80/J%20Col%20Int%20Sci70,%20265.pdf)

Abstract: The basic principle of the *t*- and αs-methods is to compare the adsorption isotherm under test to a standard isotherm in a reduced form, corresponding to a nonporous reference solid. It is demonstrated that the standard isotherm has to be chosen according to the intensity of the adsorbentadsorbate interactions, expressed by the *C*BET constant. A set of experimental reference isotherms, corresponding to definite ranges of the *C*BET constant value between 20 and about 3000, is proposed. These isotherms are shown to be very well fitted by the *n*-layers-BET equation, with *n* nearly equal to 4. It is also shown that the *t*- and αs-methods are strictly relevant to the BET theory and that these two methods are two equivalent ways of analyzing adsorption isotherms. In particular, the microporosity of solids can be assessed, within the limits of the BET model, provided that the reference isotherm is correctly chosen. All these results are proved to be valid whatever the nature of the adsorbent-adsorbate pair used. Some isotherms obtained with N2, Ar, CO, O2, CO2 are reported.

Graham, D.E. and pHillips, M.C. (1979), Proteins at liquid interfaces. I. Kinetics of adsorption and surface denaturation. *Journal of Colloid and Interface Science*, **70** (3), 403-414.

Full Text: [J\J Col Int Sci70, 403.pdf](J/J%20Col%20Int%20Sci70,%20403.pdf)

Abstract: The rates of change of film pressure (π) and surface concentration (Γ) of protein during the adsorption of β-casein, bovine serum albumin (BSA), and lysozyme at the air-water interface have been monitored by the Wilhelmy plate and surface radioactivity methods, respectively. The increases in π and Γ for the relatively flexible β-casein molecule occur simultaneously with both parameters attaining their steady-state values at about the same time. In contrast, π and Γ follow different time courses for the globular lysozyme molecule; Γ can reach a steady state value while π is still increasing significantly. The kinetics indicate that initially adsorption is diffusion-controlled but at higher surface coverages there is an energy barrier to adsorption. Under these conditions, the ability of the protein molecules to create space in the existing film and penetrate and rearrange in the surface is rate-determining. Two kinetic regions exist: the relaxation time τ1 (typically ~2 hr when Γ ~2 mg m−2) describes the adsorption when both π and Γ are increasing whereas τ2 (in the range 1–8 hr for all three proteins) relates to the situation when π is increasing at constant Γ because the protein molecules are changing conformation in the surface.

Notes: highly cited

? Graham, D.E. and Phillips, M.C. (1979), Proteins at liquid interfaces. II. Adsorption isotherms. *Journal of Colloid and Interface Science*, **70** (3), 415-426.

Full Text: [1960-80\J Col Int Sci70, 415.pdf](1960-80/J%20Col%20Int%20Sci70,%20415.pdf)

Abstract: Adsorption isotherms for the three proteins β-casein, bovine serum albumin, and lysozyme at the air-water and oil-water interfaces have been determined independently using ellipsometry and surface radioactivity methods; the surface pressure and surface potential were also monitored. Saturated monolayer coverage occurs via irreversible adsorption of 2–3 mg M−2 of protein; the resultant films generate surface pressures of about 20 mN m−1 and are 50–60 Å thick. Molecules adsorbed in the first layer dominate the film pressures so that further adsorption causes no change in the pressure although the film thickness can increase to more than 100 Å. The molecules which give rise to this increase in film thickness are reversibly adsorbed with respect to aqueous substrate exchange. The experimental isotherm data and the Langmuir adsorption isotherm are in close agreement at low protein concentrations. However, comparison with the Gibbs adsorption equation is not valid, although reasonable agreement can be achieved if some account is taken of the fact that the protein molecules in the first layer are irreversibly adsorbed.

? Graham, D.E. and Phillips, M.C. (1979), Proteins at liquid interfaces. III. Molecular structures of adsorbed films. *Journal of Colloid and Interface Science*, **70** (3), 427-439.

Full Text: [1960-80\Col Int Sci70, 427.pdf](1960-80/Col%20Int%20Sci70,%20427.pdf)

Abstract: The adsorption data presented in the preceding paper (Part II of this series) have been used to deduce the molecular structures of β-casein, bovine serum albumin (BSA), and lysozyme films at the air-water and oil-water interfaces. The hydrophobic, disordered β-casein molecules are more surface-active than the globular BSA and lysozyme molecules. β-Casein is in an all-train configuration at low surface pressures (π < 8 mN m−1) at the air-water interface and can be described by Singer’s equation of state for linear polymers. At higher π values, loop formation ensues, and the loops increase in density at the expense of the trains until in the close-packed, condensed state the ratio of amino acid residues in loop and train configurations is about 2:1. This conformational change does not occur at the oil-water interface because loops already form at low π; enhanced loop formation in the nonaqueous phase is favored because oil molecules solvate the hydrophobic residues. Multilayer formation occurs at high substrate protein concentrations (> 10−2 wt%) giving films thicker than 100 Å. Although the primary layer is irreversibly adsorbed, molecules in subsequent layers are reversibly adsorbed. Lysozyme molecules are denatured at low π values (π < 8 mN m−1), and at higher values essentially native molecules (which are reversibly adsorbed) coexist in the surface film. Much residual native structure remains even in the denatured film because lysozyme is very resistant to denaturation. At the oil-water interface, the adsorbed lysozyme molecules are denatured to a greater extent than those at the air-water interface; native molecules are not stable at this interface. The adsorbed BSA molecules contain residual native structure, but there is no abrupt conformational change in the film at a particular packing density. The structure at the air-water interface is intermediate to those of lysozyme and β-casein. BSA has the same π-A curve as lysozyme at the oil-water interface.

Derjaguin, B.V. (1979), Dependence of the wetting tension on the meniscus curvature and the isotherm of the disjoining pressure of the liquid interlayer adjacent to it. *Journal of Colloid and Interface Science*, **71** (2), 431-433.

Full Text: [J\J Col Int Sci71, 431.pdf](J/J%20Col%20Int%20Sci71,%20431.pdf)

Davis, J.A. and Leckie, J.O. (1980), Surface ionization and complexation at the oxide/water interface. 3. Adsorption of anions. *Journal of Colloid and Interface Science*, **74** (1), 32-43.

Full Text: [J\J Col Int Sci74, 32.pdf](J/J%20Col%20Int%20Sci74,%2032.pdf)

Abstract: The site-binding model for the electrical double layer of hydrous oxides reported in a previous paper is applied to adsorption of anions from dilute solution. Generally, more than one stoichiometric surface reaction is needed to describe the adsorption behavior of divalent weak acid anions. If mass law equations for surface reactions are corrected for effects of the electrostatic field at the interface, the calculated adsorption density depends upon the type of surface species formed. It is shown that calculations which consider formation of surface complexes by protonated anionic forms, e.g., HCrO4−, HSeO4−, HSO4−, are more consistent with experimental adsorption data than complexation by bidentate surface sites. Modeling results predict that adsorbed anions are more easily protonated than those in bulk water, and a qualitative explanation for this phenomenon is presented. The model applies over a wide range of solute concentrations and accounts for effects of changes in composition of the supporting electrolyte. In addition calculated results for a shift in pHPZC upon specific adsorption of sulfate are in reasonable agreement with other experimental studies.

Lockhart, N.C. (1980), Electrical properties and the surface characteristics and structure of clays. II. Kaolinite: A nonswelling clay. *Journal of Colloid and Interface Science*, **74** (2), 520-529.

Full Text: [J\J Col Int Sci74, 520.pdf](J/J%20Col%20Int%20Sci74,%20520.pdf)

Abstract: The conductivity and permittivity of sodium kaolinite are measured with respect to frequency (10–105 Hz), concentration (0.1 to 100 g solid per 100 ml sample), and temperature (293–318°K). The Stern/Gouy model of the colloid double layer is applied, together with the Schwarz theory for polarization due to bound surface ions. The total surface change on kaolinite, as in the preceding paper on swelling clays, is quantitatively accounted for by the combined conductivity and permittivity results. An edge-to-edge (EE) and edge-to-face (EF) associated structure made up of face-to-face (FF) aggregates of multilayer clay platelets is indicated, with microscopic dimensions similar to the individual particle sizes, though much smaller than is suggested by the macroscopic sedimentation rates. The macroscopic structure is probably closer to a microporous “honeycomb” than a macroporous “capillary” system. The conductivity results and mechanisms are applied to electrophoresis and electroosmosis, and the permittivity results and mechanisms are correlated with dielectrophoresis. The problem of electrokinetic dewatering in both swelling and nonswelling clays is discussed, referring to the results of the accompanying paper on swelling clays.

Ashida, M., Sasaki, M., Hachiya, K. and Yasunaga, T. (1980), Kinetics of adsorption-desorption of OH- on TiO2-H2O interface by means of pressure-jump technique. *Journal of Colloid and Interface Science*, **74** (2), 572-574.

Full Text: [J\J Col Int Sci74, 572.pdf](J/J%20Col%20Int%20Sci74,%20572.pdf)

Dubinin, M.M. and Stoeckli, H.F. (1980), Homogeneous and heterogeneous micropore structures in carbonaceous adsorbents. *Journal of Colloid and Interface Science*, **75** (1), 34-42.

Full Text: [J\J Col Int Sci75, 34.pdf](J/J%20Col%20Int%20Sci75,%2034.pdf)

Abstract: Microporous carbonaceous adsorbents obtained by moderate activation possess a rather narrow pore-size distribution, and their microporous structure may be considered to be practically homogeneous. In the case of high degrees of burn-off and of extreme activation, micropores of various sizes are formed, including large ones such as supermicropores. The distribution of the micropore volume with respect to their dimensions becomes broader, a characteristic feature of heterogeneous micropore structures. For adsorbents with homogeneous micropore structures close to carbonaceous molecular sieves, the equation of the theory of volume filling of micropores (TVFM) applies with *n* = 2 over a large range of relative pressures. In the case of slit-shaped micropores, their half-width is proportional to the inverse of the characteristic energy of adsorption, *E*0. The constant of proportionality is obtained from the molecular sieve properties of the carbonaceous adsorbents, and in the case of active carbons of industrial origin it may be regarded as a constant, with a good approximation. The development of the adsorption theory for carbonaceous adsorbents with heterogeneous micropore structures has made it possible to express the distribution of the micropore volume according to their dimensions. It is also shown that the adsorption properties of such materials can be approximated with great accuracy by a two-term equation of TVFM, with N = 2. A possible alternative is also considered for carbonaceous adsorbents with heterogeneous micropore structures, and for which the adsorption equation contains a term with exponent *n* = 3.

Nagy, L.G., Foti, G. and Schay, G. (1980), Kinetic studies in solid/liquid adsorption equilibrium using the isotopic molecular exchange method. *Journal of Colloid and Interface Science*, **75** (2), 338-345.

Full Text: [J\J Col Int Sci75, 338.pdf](J/J%20Col%20Int%20Sci75,%20338.pdf)

Buzek, F. and Rathousky, J. (1981), Stoichiometry and kinetics of the reaction of silica with organosilicon compounds. *Journal of Colloid and Interface Science*, **79** (1), 47-55.

Full Text: [J\J Col Int Sci79, 47.pdf](J/J%20Col%20Int%20Sci79,%2047.pdf)

Abstract: The stoichiometry and kinetics of the reaction of silica (Cab-O-Sil M5) with organosilicon modifiers have been studied. Different methylchlorosilanes react to give the same surface coverage. The reaction of hydroxyl groups present on surfaces which have been annealed at 400 and 600°C is complete only with multifunctional methylchlorosilanes. The course of the reaction can be described by the Elovich equation (logarithmic rate law), according to which the activation energy is dependent on the surface coverage. The use of methyltrimethoxysilane and hexamethyl-disilazane leads to the physical adsorption of starting compounds and, to a lesser extent, also to side reactions of reaction products. An increase in the adsorbed amount is accompanied by a decrease in reaction rate. Isotherms of water on modified silica surfaces were investigated. The surface modified by trimethylchlorosilane exhibits the lowest activity although not all of the surface hydroxyl groups have been reacted.

Tóth, J. (1981), A uniform interpretation of gas/solid adsorption. *Journal of Colloid and Interface Science*, **79** (1), 85-95.

Full Text: [J\J Col Int Sci79, 85.pdf](J/J%20Col%20Int%20Sci79,%2085.pdf)

Abstract: The uniform interpretation of gas/solid physical adsorption means that the different types of isotherms can be described by means of a single isotherm equation derived from the dynamical character of adsorption. The equation applicable to all types of isotherms (the general isotherm equation or GIE) takes into account the surface heterogeneity and the lateral and vertical interaction energies of the molecules adsorbed. Furthermore it can be demonstrated that in special cases the GIE transforms into already well-known or quite new isotherm equations applicable to single isotherms (for types I and III).

Sheindorf, Ch., Rebhun, M. and Sheintch, M. (1981), A Freundlich-type multicomponent isotherm. *Journal of Colloid and Interface Science*, **79** (1), 136-142.

Full Text:[J\J Col Int Sci79, 136.pdf](J/J%20Col%20Int%20Sci79,%20136.pdf)

Abstract: A multicomponent adsorption isotherm is derived based on the assumption that an exponential distribution of adsorption energies exists for each component. A prerequisite for the application of the isotherm is that each component individually obey the Freundlich isotherm. The preexponential coefficients and the exponents of the monocomponent isotherms are parameters of the multicomponent isotherm. The isotherm of each component in a *k*-component system employs (*k* − 1) competition coefficients which should be determined experimentally or from thermodynamic data. The proposed isotherm is successfully employed for describing adsorption equilibria data in aqueous-solid systems.

Benjamin, M.M. and Leckie, J.O. (1981), Multiple-site adsorption of Cd, Cu, Zn and Pb on amorphous iron oxyhydroxide. *Journal of Colloid and Interface Science*, **79** (1), 209-221.

Full Text: [J\J Col Int Sci79, 209.pdf](J/J%20Col%20Int%20Sci79,%20209.pdf)

Abstract: Adsorption of Cd, Zn, Cu, and Pb onto amorphous iron oxyhydroxide was measured as a function of pH, metal ion concentration, and adsorbent concentration. For each metal, there is a narrow pH band where fractional adsorption increases from near nil to near 100%. For fixed adsorbent concentration, the pH region of the pH-adsorption edge is independent of total adsorbate concentration when adsorption density is less than 10−5.0, 10−3.7, and 10−2.3 moles adsorbate per mole Fe for adsorption of Cd, Cu, and Zn, respectively. At larger adsorption densities for these three metals and over the entire range of adsorption densities studied for Pb, the pH region of the adsorption edge becomes more alkaline as total adsorbate concentration increases. In no case did adsorption density attain a maximum, limiting value. The results suggest that the surface is composed of many groups of binding sites. The strength of binding between a given metal and the surface may vary by an order of magnitude or more from one site to another. At small adsorption densities all types of sites are available in excess, and adsorption can be described by the Langmuir isotherm. However, at higher adsorption densities, availability of the strongest binding sites decreases, leading to a decrease in the apparent adsorption equilibrium constant. This phenomenon occurs under conditions where only a few percent of all surface sites are occupied, and is inconsistent with available single-site models.

McKay, G., Allen, S.J., McConvey, I.F. and Otterburn, M.S. (1981), Transport processes in the sorption of colored ions by peat particles. *Journal of Colloid and Interface Science*, **80** (2), 323-339.

Full Text: [J\J Col Int Sci80, 323.pdf](J/J%20Col%20Int%20Sci80,%20323.pdf)

Abstract: A three-step model has been proposed for the adsorption of Astrazone Blue dye (Basic Blue 69) on peat. The initial rate of uptake of dye ions due to physical adsorption and chemisorption (ion exchange) has been correlated using a surface mass transfer coefficient. These coefficients have been determined and expressed in the dimensionless mass transfer form, *Sh*/*Sc*0.33, as a function of agitation, initial dye concentration, peat particle size range, dye solution temperature, and mass of peat.

Badmann, R., Stockhausen, N. and Setzer, M.J. (1981), The statistical thickness and the chemical potential of adsorbed water films. *Journal of Colloid and Interface Science*, **82** (2), 534-542.

Full Text: [1981\J Col Int Sci82, 534.pdf](1981/J%20Col%20Int%20Sci82,%20534.pdf)

Abstract: Adsorption of water vapor at 293°K was investigated on nonporous calcium silicate, cement raw material, and porous hardened cement paste (hcp). Two parameters are sufficient to fit the entire set of data from 1 to 95% relative humidity (r.h.) for the nonporous samples. The statistical thickness of the adsorbed water film (t curve) is given for a hydrophilic adsorbent, using the BET C constant as parameter. For the case of water adsorbed on hcp, surface areas calculated by V-t plots using this t curve agree well with BET surface areas. As capillary condensation cannot be distinguished from adsorption above 95% r.h., our data are completed by ellipsometric measurements of H2O on fused silica surfaces in the high-humidity range. For the chemical potential μ of the adsorbate a simple mathematical expression is given and discussed. Frequently, the Frenkel-Halsey-Hill (F.H.H.) theory is used to describe adsorption phenomena, assuming dispersion forces as the dominant factor. The predictions according to the F.H.H. theory lie more than one order of magnitude below the experimental values. It is shown that hydrogen-oxygen bonding is more suitable to characterize adsorption phenomena of water on hydrophilic surfaces. For porous materials the influence of the opposite pore wall on the chemical potential is discussed.

? Bornzin, G.A. and Miller, I.F. (1982), The kinetics of protein adsorption on synthetics and modified natural surfaces. *Journal of Colloid and Interface Science*, **86** (2), 539-558.

Full Text: [1982\J Col Int Sci86, 539.pdf](1982/J%20Col%20Int%20Sci86,%20539.pdf)

Abstract: The kinetics of adsorption of albumin and fibrinogen from phosphate buffered saline (pH 7.35, 280 mosmol) was studied as a function of time, temperature, and bulk protein concentration on Cuprophan (regenerated cellulose), Silastic (silicone rubber), and Shiley heart valve xenografts under static conditions. Adsorption of both proteins on the synthetic~ appeared to be rapid, irreversible with respect to dilution, and at surface concentrations not exceeding what would be expected for a monolayer. A diffusion-limited model, using the Smoluchowski boundary condition, was derived and was shown to demonstrate the essential characteristics of sorption on synthetics. Both proteins adsorbed to the xenograft with a reversibly bound protein fraction and an irreversibly bound fraction. The reversible fraction was modeled well by a second-order kinetic (Langmuir) process far from saturation. Energies of activation were estimated to be about 3 and 6 kcal/mole for fibrinogen and albumin, respectively. Enthalpies of adsorption were very low, 0.4 kcal/mole for fibrinogen and 1.5 for albumin. The irreversibly bound fraction was modeled well as a diffusionlimited process far from saturation.

Jaroniec, M. (1982), Some remakes on Freunklich-type multicomponent isotherm. *Journal of Colloid and Interface Science*, **86** (2), 588-589.

Full Text: [J\J Col Int Sci86, 588.pdf](J/J%20Col%20Int%20Sci86,%20588.pdf)

Tamura, H., Matijević, E. and Meites, L. (1983), Adsorption of Co2+ ions on spherical magnetite particles. *Journal of Colloid and Interface Science*, **92** (2), 303-314.

Full Text: [J\J Col Int Sci92, 303.pdf](J/J%20Col%20Int%20Sci92,%20303.pdf)

Abstract: The amount of adsorption of Co2+ ions on spherical magnetite particles was measured as a function of the pH (5.5–8.0), the concentration of Co2+ ions (1.7×10−8−1.7×10−4 mole dm−3), the ionic strength (*I* = 10−4−10−1 mole dm−3), and the temperature (25–75°C). The amount of adsorption was found to increase with increasing pH, equilibrium concentration of Co2+ ions, and temperature, and with decreasing ionic strength. Acid-base titrations of magnetite dispersions were carried out to estimate the number of surface sites of −FeOH, −FeOH2+, and −FeO− types as a function of pH. The adsorption behavior can be explained quantitatively by considering a surface complex to form at the neutral site (−FeOH), combined with the release of one or two protons: CO2+ + −FeOH right harpoon-up over left harpoon-down−FeOCo+ + H+, *K*1*o*; Co2+ + 2−FeOH right harpoon-up over left harpoon-down−(FeO)2Co + 2H+, β2*o*. The values of the equilibrium constants *K*1*o* and β2*o*, which pertain to a surface on which the amount of cobalt is negligible, were found to be 3.6×10−3 and 3.4×10−2 dm−1 at 25°C, respectively.

Dabrowski, A., Jaroniec, M. and Tóth, J. (1983), Adsorption of Tóth’s equation to describe the single solute adsorption from dilute solution on solids. *Journal of Colloid and Interface Science*, **94** (2), 573-576.

Full Text: [J\J Col Int Sci94, 573.pdf](J/J%20Col%20Int%20Sci94,%20573.pdf)

McKay, G., Blair, H.S. and Gardner, J. (1983), Rate studies for the adsorption of dyestuffs onto chitin. *Journal of Colloid and Interface Science*, **95** (1), 108-119.

Full Text: [J\J Col Int Sci95, 108.pdf](J/J%20Col%20Int%20Sci95,%20108.pdf)

Abstract: The rate of adsorption of dyestuffs onto chitin in the initial stages of the adsorption process depends on the film mass transfer coefficient. A model has been developed to enable the film mass transfer coefficients to be determined. The analysis is based on a nonlinear equilibrium isotherm and utilizes a computer program to predict theoretical concentration versus time curves. The overall average external mass transfer coefficients are 2.8×10−3, 2.9×10−3, 3.8×10−3, and 0.9×10−3 cm sec−1 for Acid Blue 25, Acid Blue 158, Mordant Yellow 5, and Direct Red 84, respectively. Equilibrium data for the adsorption of four dyestuffs onto chitin are presented and are analyzed using the Langmuir, Freundlich, and general isotherm expressions. The adsorption capacity of chitin at monolayer coverage is 190 mg dye g−1 chitin and 200 mg dye g−1 chitin for Acid Blue 25 and Acid Blue 158, respectively. For the two dyes which are not acidic, namely, Mordant Yellow 5 and Direct Red 84, the adsorption capacities are 50 mg dye g−1 chitin and 40 mg dye g−1 chitin, respectively.

Moon, H. and Lee, W.K. (1983), Intraparticle diffusion in liquid-phase adsorption of phenols with activated carbon in finite batch adsorber. *Journal of Colloid and Interface Science*, **96** (1), 162-171.

Full Text: [J\J Col Int Sci96, 162.pdf](J/J%20Col%20Int%20Sci96,%20162.pdf)

Abstract: Liquid-phase adsorption of phenols with activated carbon were studied in a batch adsorber. The experimental data were analyzed by the two proposed models, the pore diffusion model and the surface diffusion model with an effective diffusion coefficient as a model parameter. The amount adsorbed for each adsorbate was predicted fairly well by both models. Introducing the flux equation for the combined diffusion mechanism, it was shown that the surface diffusion contributed more to intraparticle diffusion than the pore diffusion in the adsorption system studied. The dependence of surface diffusion coefficients. *D*s on the amount adsorbed, Image, can be represented by the simple empirical equation. The less favorably adsorbed adsorbate has stronger concentration dependence of *D*s on Image.

Furusawa, K. and Yamamoto, K. (1983), Adsorption of monodisperse polystyrene onto porous glass. II. Study of the exchangeability of adsorbed polymer layer. *Journal of Colloid and Interface Science*, **96** (1), 268-274.

Full Text: [J\J Col Int Sci96, 268.pdf](J/J%20Col%20Int%20Sci96,%20268.pdf)

Abstract: Exchangeability in the adsorption layer of one polymer by another was analyzed for different molecular weight combinations of polystyrene using gel permeation chromotography. The adsorption layers formed by small molecules are exchanged effectively by the solution of large molecules and the degree of exchange is dependent on the difference in their molecular weights. Furthermore, the degree of exchange extensively influences the solution concentration at which the corresponding adsorption is carried out, i.e., the polymer layer formed at the higher concentration is exchanged more easily than the layers at lower concentrations. This can be explained as follows: the polymer molecules in the dilute solution arrive at the sparsely populated surface, adopting a flat conformation, but the polymer molecules in the concentrated solution, especially when later arrivals come to the surface, occupy a smaller number of sites and make an extended loop conformation, which is exchanged more easily than are molecules in a flat conformation.

Schwarz, J.A., Driscoll, C.T. and Bhanot, A.K. (1984), The zero point of charge of silica-alumina oxide suspensions. *Journal of Colloid and Interface Science*, **97** (1), 55-61.

Full Text: [J\J Col Int Sci97, 55.pdf](J/J%20Col%20Int%20Sci97,%2055.pdf)

Abstract: The pHzpc (pH at the zero point of charge) of a series of seven silica—alumina oxide supports, previously heat treated to 500°C, were determined by potentiometric titrations. Rigorous experimental procedures in support preparation and standardization have allowed us to compare the pHzpc of each of the oxides with the weight fraction of the pure components. The pHzpc of this homologous series varied linearly with the weight fraction of the pure components. These results are in direct agreement with a mass weighting model suggested by G. A. Parks (Advances in Chemical Series 67, ACS, Washington, D. C.) for calculating the pHzpc for any composition of a mixed oxide system.

House, W.A., Born, G., Brauer, P., Franke, S., Henneberg, K.H., Hofer, P. and Jaroniec, M. (1984), Studies of the surface heterogeneity of high disperse silica chemically modified by sodium and potassium oxides using low temperature nitrogen adsorption data. *Journal of Colloid and Interface Science*, **99** (2), 493-506.

Full Text: [J\J Col Int Sci99, 493.pdf](J/J%20Col%20Int%20Sci99,%20493.pdf)

Abstract: The surface heterogeneity of high disperse silicas modified chemically by treatment with sodium and potassium hydroxide is investigated using the HILDA algorithm and also the condensation approximation. IR reflection spectroscopy studies of the samples are also performed. The specific surface area of the silicas decreases and the density of high energy adsorption sites increases with increasing alkali content. The changes in the IR reflection spectra and heterogeneity distributions are explained in terms of the disruption of siloxane groups on the surface and the formation of Si---O− groups. The effects of aging are also studied.

Jaroniec, M. and Marczewski, A.W. (1984), Relationships defining dependence between adsorption parameters of Dubinin-Astakhov and generalized Langmuir equations. *Journal of Colloid and Interface Science*, **101** (1), 280-281.

Full Text: [J\J Col Int Sci101, 280.pdf](J/J%20Col%20Int%20Sci101,%20280.pdf)

Aizenbud, B., Volterra, V. and Priel, Z. (1985), Kinetic model for the irreversible adsorption of macromolecules at a liquid-solid interface. *Journal of Colloid and Interface Science*, **103** (1), 133-138.

Full Text: [J\J Col Int Sci103, 133.pdf](J/J%20Col%20Int%20Sci103,%20133.pdf)

Abstract: A model is proposed which deals with adsorption of macromolecules on solid-liquid interface as a function of time, concentration of the polymer in solution, and the nature of the polymer surface affinity. It is shown that a good fit between experimental and theoretical results exists by using only one adjustable parameter. Calculations were made on (i) the partial depletion of the boundary as a function of the distance from the surface at different times; and (ii) the fraction of surface covered as a function of time for various typical protein (Collagen) concentrations.

Perona, M.J. and Leckie, J.O. (1985), Proton stoichiometry for the adsorption of cations on oxide surfaces. *Journal of Colloid and Interface Science*, **106** (1), 64-69.

Full Text: [J\J Col Int Sci106, 64.pdf](J/J%20Col%20Int%20Sci106,%2064.pdf)

Abstract: A thermodynamic derivation, based upon the Gibbs equation, is presented which permits the determination of the proton stoichiometry for the adsorption of a cation, B2+, by an oxide surface from the pH shift of the adsorption isotherm (log[B2+] plotted vs log ΓB at constant pH). The method allows the determination of the proton stoichiometry at relatively low adsorbate concentrations, 10−5 *M* or less, as well as its dependence upon the surface coverage. The method is applied to the adsorption of Cd2+, Cu2+, Pb2+, and Zn2+ by amorphous hydrous ferric oxide, and agreement with experimental values of the proton stoichiometry is reasonable.

Farley, K.J., Dzombak, D.A. and Morel, F.M.M. (1985), A surface precipitation model for the sorption of cations on metal oxides. *Journal of Colloid and Interface Science*, **106** (1), 226-242.

Full Text: [J\J Col Int Sci106, 226.pdf](J/J%20Col%20Int%20Sci106,%20226.pdf)

Abstract: A new model for the sorption of cations on metal oxides is formulated which allows for a continuum between surface reactions and precipitation. The model extends the surface complexation approach by considering precipitation on the solid to be described by the formation of a solid solution whose composition varies continuously between that of the original solid and a pure precipitate of the sorbing cation. The ability of the surface precipitation model to describe the equilibrium sorption of metal cations on amorphous iron hydroxide is demonstrated. The model can also be extended to describe cation competition and anion sorption.

Harding, I.H. and Healy, T.W. (1985), Adsorption of aqueous cadmium(II) on amphoteric latex colloids. I. General kinetics and thermodynamics. *Journal of Colloid and Interface Science*, **107** (2), 362-370.

Full Text: [J\J Col Int Sci107, 362.pdf](J/J%20Col%20Int%20Sci107,%20362.pdf)

Abstract: The general kinetics and thermodynamics of adsorption of Cd(II) (aq) onto amphoteric latex colloids have been obtained. Adsorption is demonstrated to be reversible, and, if the polymer colloids are prepurified by ultrafiltration techniques, the adsorption is shown to be a true equilibrium process. The total adsorption density-equilibrium concentration isotherms indicate a model wherein each Cd2+ ion is located above two to three surface COO− groups with primary and part of the secondary solvation shells of the adsorbing cation still intact.

Harding, I.H. and Healy, T.W. (1985), Adsorption of aqueous cadmium(II) on amphoteric latex colloids. II. Isoelectric point effects. *Journal of Colloid and Interface Science*, **107** (2), 371-381.

Full Text: [J\J Col Int Sci107, 371.pdf](J/J%20Col%20Int%20Sci107,%20371.pdf)

Abstract: Adsorption of Cd(II) (aq) onto amphoteric latex polymer colloids is strongly controlled by the isoelectric point (i.e.p.) of the latex. The onset of adsorption is at the i.e.p. and percentage adsorption-pH isotherms normalize completely on a ΔpH (pH relative to the i.e.p.) scale. The master curve and all isotherms for nine latices (i.e.p. range pH 4.9-8.0) are considered in terms of the James-Healy model (R. O. James and T. W. Healy, *J. Colloid Interface Sci.* 40, 65 (1972)) and, separately, the adsorption constants for ion exchange and surface hydrolysis schemes are determined. The modeling supports a strong interaction of partly desolvated Cd2+ and to a lesser extent CdOH+, or, a weaker interaction of fully solvated Cd2+ and Cd(OH)+.

Notes: highly cited

Dzombak, D.A. and Morel, F.M.M. (1986), Sorption of cadmium on hydrous ferric oxide at high sorbate/sorbent ratios: Equilibrium, kinetics and modeling. *Journal of Colloid and Interface Science*, **112** (2), 588-598.

Full Text: [J\J Col Int Sci112, 588.pdf](J/J%20Col%20Int%20Sci112,%20588.pdf)

Abstract: Equilibrium and kinetics data for cadmium sorption on hydrous ferric oxide are presented for a wide range of sorbate/sorbent ratios. The equilibrium data follow a Langmuir isotherm at low Cd2+ concentrations (<10−6 *M*), a Freundlich isotherm at low to moderate concentrations (10−6–10−3 *M*), and exhibit a maximum sorption density at the highest concentrations. A two-site surface complexation model is needed to fit the equilibrium data. To describe the expected transition from adsorption to precipitations as Cd(OH)2(s) saturates, the surface precipitation model (Farley, K. J., Dzombak, D. A., and Morel, F. M. M., *J. Colloid Interface Sci.* 106, 226, 1985) can be incorporated in the two-site complexation model without addition of fitting parameters. The kinetics of cadmium sorption slow considerably as the sorbate/sorbent ratio is increased, and these results are consistent with the equilibrium data in that rate expressions based on two site types are necessary to fit the kinetics data corresponding to high sorbate/sorbent ratios.

Hayes, K.F. and Leckie, J.O. (1987), Modeling ionic strength effects on cation adsorption at hydrous oxide/solution interfaces. *Journal of Colloid and Interface Science*, **115** (2), 564-572.

Full Text: [J\J Col Int Sci1157, 564.pdf](J/J%20Col%20Int%20Sci1157,%20564.pdf)

Fuerstenau, D.W. and Asseo-Asare, K. (1987), Adsorption of copper, nickle and cobalt by oxide adsorbents from aqueous ammoniacal solutions. *Journal of Colloid and Interface Science*, **118** (2), 524-542.

Full Text: J Col Int Sci118, 524

Caturla, F., Martín-Martínez, J.M., Molina-Sabio, M., Fodriguez-Reinoso, F. and Torregrosa, R. (1988), Adsorption of substituted phenols on activated carbon. *Journal of Colloid and Interface Science*, **124** (2), 528-234.

Full Text: [J\J Col Int Sci124, 528.pdf](J/J%20Col%20Int%20Sci124,%20528.pdf)

Abstract: The adsorption of phenol and the substituted phenols, 4-nitrophenol, 2,4-dinitrophenol, 4-chlorophenol, and 2,4-dichlorophenol in aqueous solution, has been determined at 298 K on a series of activated carbons, prepared from olive stones, having a wide range of burn-off (8–52%) and micropore size distributions. The adsorption process is controlled predominantly by the porosity of carbon when the microporosity is narrow in range. If the ragne of microporosity is wide then the adsorption process is affected by the chemical nature of the carbon and by the nature of the substituent group in the phenol. The adsorption isotherm of 2,4-dinitrophenol is a step function, which is interpreted as being due to the coexistence of neutral and anionic adsorbate species, and not due to a change in the orientation of the neutral adsorbate species.

Ortona, O., Vitagliano, V. and Robinson, B.H. (1988), Dye interactions with surfactants in colloidal dispersions. *Journal of Colloid and Interface Science*, **125** (1), 271-278.

Full Text:[J\J Col Int Sci125, 271.pdf](J/J%20Col%20Int%20Sci125,%20271.pdf)

Abstract: Stacking of the metachromatic dye acridine orange has been observed spectrophotometrically in surfactant-containing colloidal dispersions, including water-in-oil microemulsions, bilayer systems in water, and aqueous micellar solutions. A quantitative indication of dye-stacking has been obtained through measurement of the dimerization equilibrium constant. In all cases, the dye is located within the surfactant “pseudo-phase.” Dye-stacking is much weaker than in aqueous solution, but is comparable to that in nonaqueous solvents.

Hayes, K.F., Papelis, C. and Leckie, J.O. (1988), Modeling ionic-strength effects on anion adsorption at hydrous oxide/solution interfaces. *Journal of Colloid and Interface Science*, **125** (2), 717-726.

Full Text: [J\J Col Int Sci125, 717.pdf](J/J%20Col%20Int%20Sci125,%20717.pdf)

Abstract: The effects of changes in ionic strength on the adsorption behavior of selenite (SeO32−) and selenate (SeO42−) on goethite and hydrous ferric oxide have been modeled using a generalized version of the triple-layer surface complexation model. Selenite adsorption, which is relatively unaffected by changes in ionic strength, is best modeled assuming that selenite forms an inner-sphere (surface coordination) complex; selenate adsorption, which is markedly reduced by increasing ionic strength, is best modeled assuming that selenate forms an outer-sphere (ion-pair) surface complex. The modeling results suggest that it is possible to distinguish between inner-sphere and outer-sphere anion surface complexes by studying the effects of ionic strength on anion partitioning.

Allen, S.J., McKay, G. and Khader, K.Y.H. (1988), The adsorption of acid dye onto peat from aqueous solution: Solid diffusion model. *Journal of Colloid and Interface Science*, **126** (2), 517-524.

Full Text: [J\J Col Int Sci126, 517.pdf](J/J%20Col%20Int%20Sci126,%20517.pdf)

Abstract: Adsorption rates of Acid Blue 25 onto peat in a batch adsorption system have been studied. A two-resistance mass transfer model based on film resistance and homogeneous solid-phase diffusion has been presented. The experimental results and theoretical model output are in close agreement over a vast range of operating conditions using a single external mass transfer coefficient and a single effective solid diffusivity for a peat size range.

Huang, J.X. and Guiochon, G. (1989), Competitive adsorption behavior in HPLC: *cis*-and *trans*-androsterone on silica. *Journal of Colloid and Interface Science*, **128** (2), 577-591.

Full Text: [J\J Col Int Sci128, 577.pdf](J/J%20Col%20Int%20Sci128,%20577.pdf)

Abstract: The adsorption isotherms of *cis*- and *trans*-androsterone have been measured by frontal analysis in the system CH2Cl2/acetonitrile and phosphate-treated silica. Although the single-component isotherm of each isomer can be fairly well accounted for by the simple Langmuir model, the behavior of binary mixtures of the two isomers cannot be represented correctly by the simple competitive Langmuir isotherm model. More complex isotherm equations are required.

Huang, C.P. and Rhoads, E.A. (1989), Adsorption of Zn(II) onto hydrous aluminosilicates. *Journal of Colloid and Interface Science*, **131** (2), 289-306.

Full Text: [J\J Col Int Sci131, 289.pdf](J/J%20Col%20Int%20Sci131,%20289.pdf)

Abstract: The adsorption characteristics of Zn(II) onto various hydrous aluminosilicates were investigated. Two major types of aluminosilicates, namely, *amorphous* (Zeosyl 100, Zeo 49, Zeolex 23, and Blazer) and *crystalline* (Zeolite A and Mordenite), and two pure oxides (SiO2 and Al2O3) were studied. These solids were characterized for their pHzpc and cation-exchange capacity (CEC). Isomorphous substitution and constant potential sites are the two major contributing factors to CEC. CEC increases with decreasing Si/Al ratio, with Zeolite A, Mordenite, Blazer, and Zeo 23 exhibiting a CEC 2 to 10 times that of Zero 49, Zeosyl 100, SiO2, and Al2O3. The CEC of pure oxide is mainly contributed by the capacity of the electrical double layer. Both constant charge sites and constant potential sites play an equally important role in Zn(II) adsorption. When adsorption takes place at constant charge sites, the reaction follows a simple ion-exchange process and is most pronounced in the low pH region. Adsorption onto constant potential sites is brought about by specific chemical interactions. Surface precipitation to some extent also contributes to Zn(II) adsorption, especially in the alkaline pH regionl.

Seki, H., Suzuki, A. and Kashiki, I. (1990), Adsorption of lead ions on immobilized humic acid. *Journal of Colloid and Interface Science*, **134** (1), 59-65.

Full Text: [J\J Col Int Sci134, 59.pdf](J/J%20Col%20Int%20Sci134,%2059.pdf)

Abstract: A fundamental study of the recovery of lead from dilute solution was carried out. Humic acid (HA) was immobilized by calcium alginate gel containing activated carbon powder. To understand the adsorption mechanism of lead on the adsorbent (HA-gel), a model for complexation between divalent metal ions and carboxyl groups on organic polymers was proposed. A general model could be proposed from this work. The results show that the complexation constant of the lead-humic acid system and the number of available sites for complexation of humic acid was not influenced by immobilization. However, the alginate gel used as an immobilizing agent affected the rate of adsorption to a remarkable extent.

Fokkink, L.G.J., de Keizer, A. and Lyklema, J. (1990), Temperature dependence of cadmium adsorption on oxides. I. Experimental observations and model analysis. *Journal of Colloid and Interface Science*, **135** (1), 118-131.

Full Text: [J\J Col Int Sci135, 118.pdf](J/J%20Col%20Int%20Sci135,%20118.pdf)

Abstract: The influence of temperature on the adsorption of cadmium on rutile (TiO2) and hematite (α-Fe2O3) is measured at different values of the (initial) surface charge density and salt concentration. The formation of cadmium hydroxo-complexes in solution is simultaneously investigated. Experimental adsorption results are analyzed in terms of the Frumkin-Fowler-Guggenheim model, using a Gouy-Stern double layer picture. Thermodynamic analysis points to a great similarity between the binding of Cd2+ with hydroxyl groups on the surface and with OH− ions in solution. Both processes are entropically driven.

Nederlof, M.M., van Riemsdijk, W.H. and Koopal, L.K. (1990), Determination of adsorption affinity distributions: A general framework for methods related to local isotherm approximations. *Journal of Colloid and Interface Science*, **135** (2), 410-426.

Full Text: [J\J Col Int Sci135, 410.pdf](J/J%20Col%20Int%20Sci135,%20410.pdf)

Abstract: A family of methods is presented for the determination of the adsorption affinity distribution function for a heterogeneous surface from single component adsorption data. It is possible to deal with different types of local isotherms and with random and patchwise heterogeneity. The general concept is that an approximation of the local isotherm is used to solve the integral adsorption equation analytically for the distribution function without making a priori assumptions about the distribution. The method is worked out for FFG type equations as local isotherm with an interaction parameter incorporated. Examples are given for the Langmuir local isotherm. The simplest member of this family of local isotherm approximations (LIA) is the step function (STEP), known as the condensation approximation (CA). The first order affinity spectrum (AS1) strongly resembles the CA distribution. Both methods result in general in a too wide affinity distribution. An alternative is the use of a linear approximation (LINA) of the local isotherm. These LINA methods cause a widening and an asymmetric deformation of the true distribution. The asymptotically correct condensation approximation (ACCA) is a member of this group. A substantially better approximation is achieved by considering the local isotherm and its approximations on a logarithmic concentration (or mole fraction) scale (LOGA). The distributions obtained with the Rudzinski Jagiello (RJ) method and the second order affinity spectrum (AS2) method can be interpreted as members of the LOGA group. Parameter optimization in the LOGA case has resulted in two other solutions which are better approximations than the RJ and AS2 method.

Högfeldt, E. and Marinsky, J.A. (1990), On the hydrogen-sodium ion exchange on peat. *Journal of Colloid and Interface Science*, **135** (2), 583-585.

Full Text: [J\J Col Int Sci135, 583.pdf](J/J%20Col%20Int%20Sci135,%20583.pdf)

Lundström, I. and Elwing, H. (1990), Simple kinetic models for exchange reaactions on solid surfaces. *Journal of Colloid and Interface Science*, **136** (1), 68-84.

Full Text: [J\J Col Int Sci136, 68.pdf](J/J%20Col%20Int%20Sci136,%2068.pdf)

Abstract: Kinetic models for the exchange reactions between protein molecules adsorbed on a solid surface and in solution are developed. The expected protein adsorption kinetics is calculated. Dynamic phenomena taking place on the surface are considered in the sense that molecules may be transformed into a nonexchangeable form. Some microscopic details related to spontaneous desorption and exchange reactions are discussed. Some general conclusions are made about different types of surfaces. It is thus concluded that a surface may cause unwanted biological effects due to both a too strong binding of protein molecules and a too weak binding. The results obtained from the model calculations are in qualitative agreement with experimental results. They particularly emphasize the importance of slow dynamic phenomena taking place after the initial adsorption of protein molecules.

Aranovich, G.L. (1991), New polymolecular adsorption isotherm. *Journal of Colloid and Interface Science*, **141** (1), 30-43.

Full Text: [J\J Col Int Sci141, 30.pdf](J/J%20Col%20Int%20Sci141,%2030.pdf)

Abstract: A new polymolecular adsorption isotherm is proposed. Its principal advantage is that, unlike the known isotherms, it is qualitatively adequate in limiting cases, can be derived from a consistent realistic model, and fits the experimental data in a broad concentration range. The use of the new isotherm is legitimate both for polymolecular adsorption of vapors and for adsorption from solutions with limited solubilities of components. In traditional terms, the new isotherm has the form

Image

where *x* is relative concentration. This is the first, and at present the only isotherm which is qualitatively correct in limiting cases. The use of the new isotherm, e.g., in determining the surface area of disperse and porous materials, makes it possible to obtain more substantiated and reliable results.

Moreau, M., Valentin, P., Vidalmadjar, C., Lin, B.C. and Guiochon, G. (1991), Adsorption-isotherm model for multicomponent adsorbate adsorbate interactions. *Journal of Colloid and Interface Science*, **141** (1), 127-136.

Full Text: [J\J Col Int Sci141, 127.pdf](J/J%20Col%20Int%20Sci141,%20127.pdf)

Abstract: A multicomponent competitive isotherm equation taking into account adsorbate-adsorbate interactions is derived using a statistical approach. The calculation assumes independence between the local configurations. The model is tested for single component adsorption. It describes satisfactorily the S-shaped isotherms observed for various gases and vapors (alkanes, nitrogen, carbon dioxide, rare gases) adsorbed on graphitized carbon black at temperatures higher than the two-dimensional critical temperature.

Fendorf, S.E., Sparks, D.L., Fendorf, M. and Gronsky, R. (1992), Surface precipitation reactions on oxide surfaces. *Journal of Colloid and Interface Science*, **148** (1), 295-298.

Full Text: [J\J Col Int Sci148, 295.pdf](J/J%20Col%20Int%20Sci148,%20295.pdf)

Abstract: Retention of heavy metal ions on solid surfaces is an important process for many catalytic and electrochemical reactions and for maintaining environmental quality. Determining reaction mechanisms is essential for understanding such processes. However, various mechanisms have been proposed for the sorption of cationic heavy metals on oxide surfaces. In this study, we provide direct evidence using high-resolution transmission electron microscopy (HRTEM) for the formation of a surface precipitate prior to bulk solution precipitation. Furthermore, the type of surface present influenced the onset of surface precipitation. At pH 5 and 400 μ*M* Al(III), a surface precipitate was observed on MnO2 (the birnessite phase) but was not apparent on TiO2 (the rutile phase). Thus, surface precipitation reactions must be considered in modeling the sorption mechanisms of hydrolyzable metal ions on oxide surfaces.

Keywords: Hydrolyzable Metal-Ions, Electrical Double-Layer, Water Interface, Manganese-Dioxide, Model, Adsorption, Oxidation, Co(II)

Müller, B. and Sigg, L. (1992), Adsorption of lead(II) on the goethite surface: Voltammetric evaluation of surface complexation parameters. *Journal of Colloid and Interface Science*, **148** (2), 517-532.

Full Text: [J\J Col Int Sci148, 517.pdf](J/J%20Col%20Int%20Sci148,%20517.pdf)

Abstract: The adsorption of Pb(II) to the goethite surface was investigated in dilute solutions in the pH range 6.6–8.2. Increments of goethite suspension were added to dilute (2.41×10−7*M*) Pb(II) solutions at constant pH in a titration procedure. Differential pulse anodic stripping voltammetry (DPASV) was used to determine the concentration of free, nonadsorbed Pb(II) in goethite suspensions without prior separation of the solution and solid phases. This procedure permits achievement of high adsorption density at relatively low total metal concentrations and correction for adsorption losses to the reaction vessel. Surface reaction parameters were obtained using different methods of interpretation of the experimental data. Surface complex formation constants for monodentate and bidentate surface complexes are

*FeOOH* + *Pb*+2 right arrow over left arrow*FeOOPb*++*H*+, *log* *KS*1= -0.52, 2 *FeOOH* + *Pb*+2 right arrow over left arrow(*FeOO*)2*Pb*+2*H*+, *log* β*S*2= -6.27 kg/dm3

Intrinsic acidity constants obtained from acid-base titrations are, respectively, log *Kal*5 = −6.7, and log *Ka*25 = −9.0; the exchangeable H+ of the goethite surface was determined as 0.135 mole/kg. The Pb(II) adsorption capacity of the goethite is 5.6×10−2 mole/kg (3.8×10−6 mole/m2). The average ligand number was found to be 1.25 and constant throughout the concentration range of adsorption. The determined surface reaction parameters describe the effect of changes in pH and solution composition on Pb(II) binding and give a consistent and comprehensive thermodynamic description of the adsorption process within variations of Pb(II) concentration and particles by factors of 3000 and 1000, respectively. The methods developed here can readily be applied to the determination of adsorption parameters of natural particulate matter.

Keywords: Anodic-Stripping Voltammetry, Metal Humate Interactions, Natural-Waters, Trace-Metals, Alpha-Feooh, Copper, Speciation, Cadmium, Oxides, Models

Elaissari, A., Haouam, A., Huguenard, C. and Pefferkorn, E. (1992), Kinetic factors in polymer adsorption at solid/liquid interfaces: Methods of study of the adsorption mechanism. *Journal of Colloid and Interface Science*, **149** (1), 68-83.

Full Text: [J\J Col Int Sci149, 68.pdf](J/J%20Col%20Int%20Sci149,%2068.pdf)

Abstract: The progress of surface coverage during polymer adsorption is investigated by determining the temporal variation of the polymer concentration in the liquid phase surrounding nonporous adsorbents. Three adsorption experiments are interpreted using results of computer simulations. Adsorption of a neutral polymer onto a nonionogenic adsorbent may be interpreted on the basis of a pure random sequential adsorption model where adsorption immobilizes the species at a fixed place. To interpret the adsorption kinetics of electrically charged polymers adsorbing onto charged surfaces, this model must be modified to take into account effects on the polymer trajectory of charge—charge interactions at large distances. This is done by allowing the adsorbing polymer to move around an already occupied area to search for a closely located free area. The two models correspond in fact to localized and mobile adsorption. For noncharged systems, [polystyrene/silica/carbon tetrachloride] and [block copolymer polystyrene-polyvinylpyridine/silica/toluene], adsorption implies the establishment of a large number of contact points between the active sites of the polymer and the silanol sites of the adsorbent. This contributes to immobilizing the adsorbed polymer on a given set of silanol sites. For a charged system, [polyvinylpyridine/polystyrene latex with carboxylic acid groups/water], adsorption corresponds to the deposit of solute macromolecules onto the adsorption plane, without great modification of the polymer conformation. This soft interaction allows one fixed macromolecule to escape from a first location when a second macromolecule competes for the same location. Adsorption should be viewed as mobile. Representation of the adsorption rate as a function of the surface coverage describes the differential adsorption entropy in the two situations of mobile and localized adsorption. On the contrary, the temporal variation of the amount of polymer adsorbed does not allow one to differentiate between the two adsorption mechanisms.

Keywords: Macromolecules, Desorption, Silica

? Sadana, A. and Sii, D. (1992), The binding of antigen by immobilized antibody: Influence of a variable adsorption rate coefficient on external diffusion limited kinetics. *Journal of Colloid and Interface Science*, **151** (1), 166-177.

Full Text: [1992\J Col Int Sci151, 166.pdf](1992/J%20Col%20Int%20Sci151,%20166.pdf)

Abstract: The influence of reaction-order and external mass-transfer limitations on the binding kinetics of antigen in solution to antibody covalently attached to a cylindrical fiber-optic biosensor is presented. Both singlestep and dual-step binding of antigen to antibody are considered. Nonspeciflc binding and heterogeneity in binding are also mentioned. An increase in the Damkohler number decreases the saturation level of the antigen close to the surface and the rate of antigen attachment to the antibody covalently bound on the surface for reactions of orders one, one and one-half, and two. As expected, an increase in the initial antigen concentration in solution increases the saturation level of the antigen close to the surface, and the rate of antigen attachment to the antibody covalently bound on the surface for all the reaction orders considered. Nondimensional plots presented in the analysis help extend the analysis to different antigenantibody systems. A decrease in the external diffusional limitations decreases the effect of reaction order on the saturation levels of antigen close to the surface and the rate of attachment of the antigen in solution to the antibody on the surface. A variable rate coefficient for adsorption provides a more realistic picture of the events occurring on the fiber-optic surface. A decreasing variable rate coefficient for adsorption has the same effect as that of a decreasing Damkohler number, and also introduces nonlinearity in the attachment of the antigen to the antibody immobilized on the surface.

Keywords: Adsorption, Diffusion, Immobilized, Kinetics, Linked Immunosorbent-Assay, Surface

Sarkar, D. and Chattoraj, D.K. (1993), Activation parameters for kinetics of protein adsorption at silica-water interface. *Journal of Colloid and Interface Science*, **157** (1), 219-226.

Full Text: [J\J Col Int Sci157, 219.pdf](J/J%20Col%20Int%20Sci157,%20219.pdf)

Abstract: The extent of adsorption of three different proteins, lysozyme, β-lactoglobulin, and hemoglobin, from aqueous solutions to the surface of silica powder have been studied as a function of time for various values of protein concentration, pH, and temperature. The rates of adsorption in all cases have been observed to fit the first-order equation with two kinetic constants *K*a1 and *K*a2. Using the Arrhenius equation, the activation energies Δ*E*\*1 and Δ*E*\*2 for protein adsorption have been evaluated. The corresponding values of enthalpy of activation (Δ*H*\*), entropy of activation (Δ*S*\*), and free energy of activation (Δ*G*\*) have been evaluated using Eyring’s equation of absolute reaction rate. It has been found that for *K*a1, Δ*H*\*1 > *T* ΔS\*1 and for *K*a2, *T*ΔS\*2 > Δ*H*\*2 for all three proteins. The values of Ka1 follow the order lysozyme > β-lactoglobulin > hemoglobin, but the activation energy, enthalpy of activation, entropy of activation, and free energy of activation are found to be of the same order for the adsorption of each of the three biopolymers.

Keywords: Solid-Liquid Interfaces, Surfaces, Reflection, Systems, Albumin, Salts

Rodda, D.P., Johnson, B.B. and Wells, J.D. (1993), The effect of temperature and pH on the adsorption of copper(II), lead(II) and zinc(II) onto goethite. *Journal of Colloid and Interface Science*, **161** (1), 57-62.

Full Text: [J\J Col Int Sci157, 161.pdf](J/J%20Col%20Int%20Sci157,%20161.pdf)

Abstract: Adsorption of copper(II), lead(II), and zinc(II) from aqueous solution (initially 10-4 or 10-5*M*) onto synthetic goethite (α-FeOOH) has been measured as a function of pH at several temperatures between 10 and 70°C. In all systems the adsorption edges shifted to lower pH as the temperature increased. The order of temperature dependence was found to be Zn > Cu ≈ Pb; this is shown to be consistent with the hypothesis that adsorption is closely related to cation hydrolysis. The James-Healy model for adsorption of hydrolyzed species, with the use of a single adjustable parameter, Δ*G*chem, for each cation, correctly predicted both the direction and magnitude of the temperature dependence of the pH range for adsorption, but failed to account for its concentration dependence.

Keywords: Oxide-Water Interface, Hydrolyzable Metal-Ions, Hydrous Ferric-Oxide, Aqueous-Solution, Desorption Behavior, Zero Charge, Dependence, Constants, Cadmium, Nickel

Tóth, J. (1994), Thermodynamical correctness of gas/solid adsorption isotherm equations. *Journal of Colloid and Interface Science*, **163** (2), 299-302.

Full Text: [J\J Col Int Sci163, 299.pdf](J/J%20Col%20Int%20Sci163,%20299.pdf)

Abstract: Based on a modified form of the Gibbs equation, two conditions of thermodynamical correctness have been defined. According to these conditions the change in the free energy of the surface-calculable from all isotherm equations-must have finite limiting values at THETA--> 0 and THETA-1. It has been proved that most of the known and widely used isotherm equations are, from a thermodynamic standpoint, incorrect. These incorrect relationships can be transformed into correct ones with the help of a differential equation including the change in the relative free energy of the surface. The transformation mentioned above modifies the original physical models of physical adsorption. (C) 1994 Academic Press, Inc.

Elimelech, M. (1994), Effect of particle-size on the kinetics of particle deposition under attractive double-layer interactions. *Journal of Colloid and Interface Science*, **164** (1), 190-199.

Full Text: [J\J Col Int Sci164, 190.pdf](J/J%20Col%20Int%20Sci164,%20190.pdf)

Abstract: The effect of particle size on the kinetics of particle deposition in the presence of attractive double layer interactions has been studied theoretically and experimentally. Particle deposition experiments were carried out with several model suspensions of positively charged latex particles and negatively charged glass beads using the packed bed column technique. The model particles used in the deposition experiments covered a wide size range, from 0.08 to 2.51 μm. Experimental deposition rates were compared to theoretical predictions based on a numerical solution of the convective diffusion equation with colloidal, hydrodynamic, and gravitational forces fully incorporated. Theoretical and experimental results reveal that the enhancement in particle deposition rate (i.e., the deposition rate in the presence of double layer interaction divided by the rate in the absence of double layer interaction) is dependent on particle size. At low ionic strengths, the enhancement in deposition rate passes through a maximum as the particle size increases. This maximum corresponds to particles with a size around 1 μm. It is also concluded that this maximum is determined by the interplay between the size of the particles and the range of the attractive double layer interactions. (C) 1994 Academic Press, Inc.

Keywords: Brownian Particles, Colloidal Particles, Water Filtration, Porous-Media, Adsorption, Hydrosols, Stability, Barriers, Systems, Surface

Dai, M.G. (1994), The effect of zeta-potential of activated carbon on the adsorption of dyes from aqueous-solution. 1. The adsorption of cationic dyes: Methyl green and methyl violet. *Journal of Colloid and Interface Science*, **164** (1), 223-228.

Full Text: [J\J Col Int Sci164, 223.pdf](J/J%20Col%20Int%20Sci164,%20223.pdf)

Abstract: The effect of the zeta (zeta) potential of activated carbon on the adsorption of cationic dyes from aqueous solution has been studied. The pH(zpc) of the zero-point charge of activated carbon has been measured by microelectrophoresis. Plots of saturated amount adsorbed for methyl green and methyl violet on activated carbon versus zeta potential have also been determined. The results show that the electrostatic interaction between cationic dyes and the surface of activated carbon has a great effect on adsorption capacity. When the zeta potential of activated carbon is lower than -30 mV, the electrostatic attraction between cationic dyes and the carbon surface greatly increases the adsorption capacity. However, when the potential of activated carbon is between -30 and +60 mV the electrostatic force between dyes and the carbon surface is diminished and the adsorption capacity of activated carbon is approximately unchanged. The capacity is significantly reduced due to the electrostatic repulsion between cationic dyes and the carbon surface when the zeta potential is higher than +60 mV. The adsorption kinetic and thermodynamic parameters as functions of pH have been determined. The mechanism for adsorption of cationic dyes on activated carbon has also been studied. (C) 1994 Academic Press. Inc.

Keywords: Fly-Ash, Removal, Time

Koopal, L.K., van Riemsdijk, W.H., de Wit, J.C.M. and Benedetti, M.F. (1994), Analytical isotherm equations for multicomponent adsorption to heterogeneous surfaces. *Journal of Colloid and Interface Science*, **166** (1), 51-60.

Full Text: [J\J Col Int Sci166, 51.pdf](J/J%20Col%20Int%20Sci166,%2051.pdf)

Abstract: Adsorptionon heterogeneous surfaces may be influenced not only bythe heterogeneity but also bylateralinteractions. For multicomponent solutionscompetition increases the complexity even further.Inpractice such complex systemsfrequently occur and toinvestigate thebehavior of these systems it is ratheruseful tohave analytical equations availablewhichcan describe the adsorption. Existing analyticalmono-and multicomponent binding equationsfor heterogeneous surfaces are brieflyreviewed. These equations arebasedon a high degree of ideality with respecttoboth the local isotherm and the affinitydistributionfor the different components. A newmore generallyvalid analyticalcompetitive binding equation isderived, using a nonideal local isotherm equation. Inthislocal isotherm all component-specificnonideality is incorporated; i.e., it includesboth lateralinteractions and component-specific heterogeneitycontributions. Underthese conditions the remainingadsorbate-surfaceinteractions can be characterized byan“intrinsic” affinity distribution that applies forallcomponents. The features of the new equation are discussedand illustratedon the basis of some modelcalculations. Themodel is tested in practice using cadmiumionbinding to fulvic acid at various pH values(dataof Saar and Weber, *Can. J. Chem.* 57, 1263, 1979).Thesedata cannot be modeledsatisfactorily with theclassical equation formulticomponent adsorption onheterogeneoussurfaces. The newly derived equation givesexcellentresults. (C) 1994 Academic Press, Inc.

Sundaram, N. (1994), On the singularity in the Dubinin adsorption isotherm. *Journal of Colloid and Interface Science*, **167** (1), 224-225.

Full Text: [J\J Col Int Sci167, 224.pdf](J/J%20Col%20Int%20Sci167,%20224.pdf)

Abstract: Tóth’s method (J. Colloid Interface Sci. 163, 299 (1994)) for correcting improper limiting behavior of gas-solid adsorption isotherm equations is shown to fail with the Dubinin isotherm (Dubinin, M.M. and Raduskevich, L.V., Dokl. Akad. Nauk. SSSR 55, 627 (1947). Rather, one must turn to series expansions as suggested by Sundaram (Langmuir 9, 1568 (1993)) to remove the singularity. (C) 1994 Academic Press, Inc.

Keywords: Gas

Bradley, R.H. and Rand, B. (1995), On the physical adsorption of vapors by microporous carbons. *Journal of Colloid and Interface Science*, **169** (1), 168-176.

Full Text: [J\J Col Int Sci169, 168.pdf](J/J%20Col%20Int%20Sci169,%20168.pdf)

Abstract: The physical adsorption of nonpolar and polar vapors by active carbons is discussed in relation to pore structure and pore wall chemistry. For nonpolar vapors the Dubinin-Radushkevich equation is used to derive micropore volumes (W-0), average adsorption energies (E(0),), and micropore widths (L) for a number of systems. These parameters are used to interpret the adsorption behavior of nitrogen which, because it is a relatively small molecule, is frequently used at 77 K to probe porosity and surface area. Results are presented for three carbons from differing precursors, namely, coal, coconut shells, and polyvinylidene chloride (PVDC) to illustrate the applicability of the technique. For the latter carbon increases in micropore size, induced by activation in carbon dioxide, and reductions in accessible pore volume caused by heat treatment in argon are also characterized and related to structural changes. The approach is then extended to the adsorption of larger hydrocarbon vapors, where the resulting W-0 values may require correction for molecular packing effects which occur in the lower relative pressure regions of the isotherms, i.e., during the filling of ultramicropores. These packing effects are shown to limit the use of the Polanyi characteristic curve for correlating isotherm data for several vapors, of differing molecular sizes, by one adsorbent. Data for the adsorption of water, which is a strongly polar liquid, have been interpreted using the Dubinin-Serpinsky equation. In particular the characteristic water adsorption value [a(0), ] of that equation is used to follow the changes in adsorption character of the PVDC carbons. Results indicate that activation in carbon dioxide increases the polarity of the carbon structure leading to a corresponding increase in the heat of immersion (Delta H-i). Heat treatment in argon appears to thermally desorb polar species leading to lower values of a(0), and (Delta H-i). (C) 1995 Academic Press, Inc.

Keywords: Activated Carbons, Adsorption, Micropore Structure, Surface Chemistry, Dubinin Theory, Active Carbons, Carbonaceous Adsorbents, Immersion, Volume, Water

Joos, P. (1995), Kinetic equations for transfer-controlled adsorption kinetics. *Journal of Colloid and Interface Science*, **171** (2), 399-405.

Full Text: [J\J Col Int Sci171, 399.pdf](J/J%20Col%20Int%20Sci171,%20399.pdf)

Abstract: Kinetic equations are presented for the adsorption of a surfactant from a liquid bulk phase to a liquid/liquid or air/liquid interface, for a situation where diffusion equilibrium between bulk and subsurface is established, and consequently the transfer of surfactant from the subsurface to the surface is the rate-determining step in the adsorption process. These equations are obtained in away very similar to that by which the Butler-Volmer equations are obtained in electrode kinetics, where also the reaction rate is the rate-determining step. Essential for both is that the standard free energy of the activated complex is split into a chemical part and a part which depends on the external force field (surface pressure for adsorption, electrical potential for transfer controlled electrochemical reactions), This part of the standard free energy of the activated complex is a fraction of the force-held-dependent part of the adsorption standard free energy, This reasoning leads f.i. to the Langmuir kinetic equation for the adsorption process, This Langmuir kinetic equation is extended for regular solution behavior and, for the case of an indifferent electrolyte, added to the surfactant system. These equations are in agreement with previous experimental observations, except for the regular system where experimental data are still lacking. (C) 1995 Academic Press, Inc.

Keywords: Adsorption Kinetics (Kinetic Adsorption Equation), Air-Water-Interface, Surfactants

Seki, H. and Suzuki, A. (1995), Adsorption of heavy metal ions onto insolubilized humic acid. *Journal of Colloid and Interface Science*, **171** (2), 490-494.

Full Text: [J\J Col Int Sci171, 490.pdf](J/J%20Col%20Int%20Sci171,%20490.pdf)

Abstract: A fundamental study of the application of humic acid (HA) to the recovery of cadmium and lead from dilute solutions was carried out. HA, which has an excellent complexing ability with heavy metals, was insolubilized by heating at 330℃ for 1 h and was used as an adsorbent. A metal-complexation model was used to compare the adsorption characteristics of insolubilized humic acid (IHA) with those of HA. The results showed that two different types of acidic groups were present on HA and the insolubilization process scarcely influenced the metal-complexation constant of acidic groups; however, the number of available metal binding sites on IHA was decreased to some extent.

Sharma, Y.C. (1995), Economic treatment of cadmium(II)-rich hazardous-waste by indigenous material. *Journal of Colloid and Interface Science*, **173** (1), 66-70.

Full Text: [J\J Col Int Sci173, 66.pdf](J/J%20Col%20Int%20Sci173,%2066.pdf)

Abstract: Cadmium removal by sorption onto Kemolit M3 (Wollastonite) was investigated. Metal species surface loading and pH are the important factors controlling metal removal. Generally the Cd2+ state is important in adsorption apart from Cd(OH)+ in the higher pH range, Lower surface loading produces higher metal removal and the alkaline range is favorable for the uptake of Cd(II). Maximum removal (98.2%) has been noted at pH 9.5, which has been attributed to the additive effects of electrostatic forces and surface complexation. The data fit the Langmuir isotherm well, indicating monolayer coverage. The intraparticle diffusion has been found to play a dominating role as compared to film diffusion. Mass transfer parameters have also been investigated. The role of pH, a master parameter governing the uptake of Cd(II) has been discussed in light of the surface complexation at the solid-liquid interface. (C) 1995 Academic Press, Inc.

Keywords: Aqueous-Solutions, Removal, Wollastonite, Adsorption, Surface.

Parida, K., Satapathy, P.K., Sahoo, A.K. and Das, N. (1995), Studies on Indian ocean manganese nodules. 1. Physicochemical characteristics and catalytic activity of ferromanganese nodules. *Journal of Colloid and Interface Science*, **173** (1), 112-118.

Full Text: [J\J Col Int Sci173, 112.pdf](J/J%20Col%20Int%20Sci173,%20112.pdf)

Abstract: The detailed physicochemical characterization of manganese nodules from seven stations of the central Indian Ocean has been carried out on the basis of chemical analyses, TG-DTA, XRD, surface oxygen, surface hydroxyl groups, surface acidity, nitrogen adsorption-desorption isotherms, and electrical conductivity, Analysis for the bulk oxidation; state indicates that more than 98% of the Mn is present as Mn(IV). The surface acidity, determined on the basis of irreversible adsorption of noninteracting amines, increases with increased number of surface hydroxyl groups. The surface area of samples dried at 110°C ranges from 97 to 130 m2/g, while the average pore diameter and cumulative pore volume range from 35 to 143 Angstrom and from 0.10 to 0.33 cm3/g, respectively. The various physicochemical characteristics have been correlated with catalytic activity for CO oxidation and H2O2 decomposition. (C) 1995 Academic Press, Inc.

Keywords: Oxidation-State, Co Oxidation, Decomposition, MnO2, H2O2, Oxides

Aranovich, G.L. and Donohue, M.D. (1995), A new approach to analysis of multilayer adsorption. *Journal of Colloid and Interface Science*, **173** (2), 515-520.

Full Text: [J\J Col Int Sci173, 515.pdf](J/J%20Col%20Int%20Sci173,%20515.pdf)

Abstract: A new approach to the analysis of vapor adsorption on solids is proposed. In this method the adsorption isotherm is represented as a (p) = f (p)/(1-p/ps)d where a (p) is the amount of vapor adsorbed, p is the pressure, ps is the saturation vapor pressure, f (p) is a function describing the adsorption in the first molecular layer, and d is an adjustable parameter. This model allows one to determine the specific surface area of disperse and porous materials in a way that is not limited by the functional form of the monolayer adsorption isotherm, f (p). In addition, this equation gives a new way to correlate adsorption data over the whole range of p/p (s). Comparison is made with experimental data for the systems Ar-KCl, N2-KCl, O2-KCl, N2-SiO2, and N2-Al2O3.

Milne, C.J., Kinniburgh, D.G., Dewit, J.C.M., Vanriemsdijk, W.H. and Koopal, L.K. (1995), Analysis of metal-ion binding by a peat humic-acid using a simple electrostatic model. *Journal of Colloid and Interface Science*, **175** (2), 448-460.

Full Text: [J\J Col Int Sci175, 448.pdf](J/J%20Col%20Int%20Sci175,%20448.pdf)

Abstract: Ion binding to humics can only be satisfactorily described if the chemical heterogeneity is explicitly included in the binding model, For proton binding, a model based on a bimodal Langmuir-Freundlich isotherm plus a cylindrical electrical double-layer model provides a good description, Data for Cd and Ca binding to a purified peat humic acid could not be satisfactorily described by merely shifting the affinity distribution along the affinity axis (the fully coupled case), Assuming that the low pH (“carboxylic”) and high pH (“phenolic”) parts of the distribution are shifted independently (the highly correlated case) gave a better description but the shift for the phenolic-type sites was so large that it appears that Cd2+ and Ca2+ are not able to compete effectively with protons for binding at these sites, The uncoupled case assumes that proton and metal binding occur on different sites and only interact through the common surface electrical field, This model did not fit the data well. However, when the metal concentration, M, was substituted by the ratio, M/(H)(x) (H is the concentrations of protons and x is an adjustable parameter), a good fit to the experimental data was obtained. It is likely that the incorporation of ion specific nonidealities into the fully coupled model would improve it.

Keywords: Humic Acid, Ion-Binding, Potentiometry, Cadmium, Calcium, Affinity Distributions, Selective Electrode, Adsorption Models, Cation Binding, Proton Binding, Fulvic-Acids, Substances, Heterogeneity, Complexation

Aranovich, G.L. and Donohue, M.D. (1995), An equation of state for multilayer adsorption. *Journal of Colloid and Interface Science*, **175** (2), 492-496.

Full Text: [J\J Col Int Sci175, 492.pdf](J/J%20Col%20Int%20Sci175,%20492.pdf)

Abstract: An equation of state for multilayer adsorption is derived. This equation gives the correct thermodynamic behavior at small pressures and at the saturation vapor pressure. The equation of state is analyzed for weakly attractive and strongly attractive surfaces and results are compared with experimental data. In addition, a new relationship is obtained for the exponent d which describes the singularity in the multilayer adsorption isotherm, It is shown that d depends on temperature, saturation vapor pressure, Henry’s coefficient, monolayer capacity, and surface tension.

Nowack, B. and Sigg, L. (1996), Adsorption of EDTA and metal-EDTA complexes onto goethite. *Journal of Colloid and Interface Science*, **177** (1), 106-121.

Full Text: [J\J Col Int Sci177, 106.pdf](J/J%20Col%20Int%20Sci177,%20106.pdf)

Abstract: The adsorption characteristics of a variety of divalent and trivalent metal-EDTA complexes onto goethite (alpha-FeOOH) were examined in aqueous solution. Uncomplexed EDTA is adsorbed as a binuclear complex at low pH and as a mononuclear complex at high pH. Adsorption is ligand-like with a high extent of adsorption at low pH. The process can be described by formation of inner-sphere complexes by the surface complexation model with constant capacitance. The EDTA complexes of the divalent metals Ca, Zn, Ni, Cu, Co, and Pb, which are quinquedentate in solution (free donor atoms bound to the metal ion), all showed the same ligand-like adsorption behavior. Their adsorption as a function of pH and concentration can be described by the formation of one type of ternary surface complex and can be fitted with the same equilibrium constant. Pd(II) EDTA, which is bidentate or quadridentate in solution, is adsorbed more strongly, but also in a ligand-like manner. The EDTA complexes of the trivalent metals LaEDTA and BiEDTA are adsorbed very strongly over the whole pH range. The sexidentatecomplex of Co(III) is weakly adsorbed at low pH outer-spherically, i.e., by electrostatic interaction only. Fe(III) EDTA is weakly adsorbed over the whole pH range with a predominant nonspecific surface complex at low pH and a specific complex at high pH.

Lee, E.M. and Koopal, L.K. (1996), Adsorption of cationic and anionic surfactants on metal oxide surfaces: Surface charge adjustment and competition effects. *Journal of Colloid and Interface Science*, **177** (2), 478-489.

Full Text: [J\J Col Int Sci177, 478.pdf](J/J%20Col%20Int%20Sci177,%20478.pdf)

Abstract: The adsorption of cationic and anionic surfactants on rutile is studied as a function of surfactant concentration and ionic strength in solution. The pH is kept constant for each series of isotherms. Special attention is given to the extent of adaptation of the surface charge as a function of surfactant adsorption. Experimental results are complemented with model calculations based on the self-consistent (mean) field lattice theory for adsorption and association (SCFA) to confirm the correctness of the given interpretation. The adsorption behavior of sodium nonyl benzene sulfonate (SNBS) and dodecyl or tetradecyl pyridinium chloride (DPC/TPC) on rutile is broadly similar. Isotherms can be divided in two regions by the (approximately) common intersection point (cip) between isotherms measured at different salt concentrations, Before the cip adsorption occurs head-on (hemi-micelles); after the cip both head-on and head-out adsorption (ad-micelles) occur. Intersection points similar to the cip occur in the proton excess and the net surface charge/surfactant charge plots. Although broadly similar in their adsorption behavior, the SNBS and DPC/TPC systems differ markedly if the charge situation near the interface is considered. SNBS follows simple rules; the strongly adsorbing SNBS head groups can compete easily with the salt ions for the surface sites. The point where the surface charge and the surfactant charge balance, the equivalence point, and the cip in the isotherms coincide. Moreover, the cip corresponds with the isoelectric point (IEP). The DPC and TPC systems behave in a more complicated way, due to their relatively weak interaction with the surface. The cip in the isotherms and the cip in the net surface/surfactant charge plots occur at much lower adsorption values than the equivalence point. Go-ions thus contribute at the cip to the charge balance in the surface region, In this situation the IEP will occur at lower adsorption values than the cip.

Farquhar, M.L., Charnock, J.M., England, K.E.R. and Vaughan, D.J. (1996), Adsorption of Cu(II) on the (0001) plane of mica: A REFLEXAFS and XPS study. *Journal of Colloid and Interface Science*, **177** (2), 561-567.

Full Text: [J\J Col Int Sci177, 561.pdf](J/J%20Col%20Int%20Sci177,%20561.pdf)

Abstract: Usingreflection extended X-ray absorption fine structurespectroscopy (REFLEXAFS) and X-rayphotoelectronspectroscopy (XPS) it has beenestablished that Cu(II) in low concentration in aqueous media canbechemisorbed onto the (0001) surfaceof muscovitemica. From the XPSstudies it is suggested that the Cuspeciesis in a similar bonding environment tothecopper in copper hydroxide. A depth profile ofthereacted mica surface was also carriedout using XPS andthis suggests thatthere had been no diffusion of theCuinto the mica surface. REFLEXAFS studies ofthereacted mica surface provided information aboutshellsof O, Al/Si, and Cu surroundinga central Cu absorber.The best-fitbond distances are as follows: O-Cu, 1.98 Å; Cu-Cu, 2.64 Å; Al/Si-Cu, 3.09 Å. Thisprovidesdirect evidence for Cu being bound to the surfaceataluminate or silicate groups andsuggests that the Cuspecies adsorbed ontothe surface are similar to thecopperspecies found in copper hydroxide, plancheite, and shattuckite. It is proposed that Cuischemisorbed at atomic imperfections, such as steps andkinks, on the mica surface. (C) 1996 Academic Press, Inc.

Keywords: Adsorption, REFLEXAFS, XPS, Copper(II), Mica, Surface Species, Chemisorption

? Tate, M.L., Kamath, Y.K., Wesson, S.P. and Ruetsch, S.B. (1996), Surface energetics of nylon 66 fibers. *Journal of Colloid and Interface Science*, **177** (2), 579-588.

Full Text: [1996\J Col Int Sci177, 579.pdf](1996/J%20Col%20Int%20Sci177,%20579.pdf)

Abstract: Surface energy of nylon 66 fibers is of considerable importance in the conversion of these fibers into consumer products such as tirecord, carpets, and various composite materials in combination with other polymers. Adhesion of nylon 66 fibers to rubber or the coupling agent in tirecord, or to the fluoropolymer used as a soil resist finish in carpets, depends on the surface energy of these fibers, If produced undrawn, nylon 66 fibers can be drawn later, up to 8x, to attain desirable fiber properties. Since hydrogen bonds rearrange during drawing it would be of interest to see if these changes also result in changes in surface energy. An attempt has been made to understand this aspect in this article, We have determined the dispersion and the acid-base (donor-acceptor) components of the surface energy of nylon 66 fibers by wettability measurements in appropriate probe liquids using the Wilhelmy principle, as well as by inverse gas chromatography (IGC), where interactions between the fiber surface and the probe molecules are studied in a chromatography column in which fibers form the stationary phase. By suitable data treatment these chromatograms could be converted to adsorption isotherms. The probe molecules were reasonably well matched to give comparable values by the two methods, Adsorption of site-specific fluorescent dyes showed increases in acid and basic surface groups by microfluorometry on drawn fibers. The density of the surface groups depended on the drawing environment, especially the one involving liquid water, The apparent discrepancy between microfluorometry results and the surface energy by wettability measurements resolved itself when the surface energy components were calculated by assuming that the entire work of adhesion results from hydrogen bonding interactions only, in solids with functional groups capable of forming strong hydrogen bonds, such as nylons,as suggested by Gutowski. (C) 1996 Academic Press, Inc.

Keywords: Acid-Base Interaction, Adsorption, Adsorption Isotherms, Dispersion, Dispersion Interaction, Donor-Acceptor Interaction, Drawing Of Synthetic Fibers, Dyes, Environment, Hydrogen Bonding, Inverse Gas Chromatography, Microfluorometry, Nylon Fibers, Polymers, Wettability, Work of Adhesion

Aranovich, G.L. and Donohue, M.D. (1996), Adsorption from binary solutions of nonelectrolytes. *Journal of Colloid and Interface Science*, **178** (1), 204-208.

Full Text: [J\J Col Int Sci178, 204.pdf](J/J%20Col%20Int%20Sci178,%20204.pdf)

Abstract: A lattice model for adsorption from binary solutions is developed using the Ono-Kondo equations, The resulting adsorption isotherm is derived and analyzed for systems with partial and complete miscibility. Results are compared with experimental data for the systems benzene-cyclohexane, benzene-heptane, benzene-nitrobenzene, and toluene-brombenzene on silica gel, as well as cyclohexane-nitrobenzene on alumina and sebacic acid-di-isopropyl ether on graphon.

? Filippov, L.K. and Filippova, N.L. (1996), Overshoots of adsorption kinetics. *Journal of Colloid and Interface Science*, **178** (2), 571-580.

Full Text: [1996\J Col Int Sci178, 571.pdf](1996/J%20Col%20Int%20Sci178,%20571.pdf)

Abstract: A new theoretical approach to studying overshoots in adsorption kinetics has been developed in which surface conformational kinetics are introduced onto a solid interface, It is found that these kinetics cause, under certain conditions, an overshoot or oscillation in both the surface concentration and adsorbed concentrations. The criterion for overshoot and oscillation depends on the ratio, epsilon, Of the rate constant of desorption, K-, and the rate constant of the conformational kinetics, K\*. Simple formulas for calculating the adsorption over a wide range of time for the kinetic-controlled, the kinetic-diffusion-controlled, and the kinetic-diffusion-conformational-controlled adsorption are derived. (C) 1996 Academic Press, Inc.

Keywords: Kinetic-Diffusion-Controlled Adsorption, Conformational Kinetics, Overshoot, and Oscillation, Desorption

Aranovich, G.L. and Donohue, M.D. (1996), Multilayer adsorption of slightly soluble organic compounds from aqueous solutions. *Journal of Colloid and Interface Science*, **178** (2), 764-769.

Full Text: [J\J Col Int Sci178, 764.pdf](J/J%20Col%20Int%20Sci178,%20764.pdf)

Abstract: Adsorption isotherms are analyzed for slightly soluble organic components from water for a wide range of reduced concentrations. It is shown that the behavior of these systems can be modeled by an equation of the form a = Ac/[ (1 + Bc) (1-c/c (0)) (d)] over the range of c/c (0) from about 0.05 to 0.9. Here a is the adsorption amount, c is the concentration of organic compound in the water, c (0) is a solubility limit for the organic compound, and A, B, and d are adjustable parameters. Comparison is made with experimental data for the adsorption of n-caproic acid, n-valeric acid, n-amyl alcohol, n-butyl alcohol, aniline, cyclohexanol, and phenol from aqueous solutions on carbon adsorbents.

Cao, E.H., Bryant, R. and Williams, D.J.A. (1996), Electrochemical properties of Na–Attapulgite. *Journal of Colloid and Interface Science*, **179** (1), 143-150.

Full Text: [1996\J Col Int Sci179, 143.pdf](1996/J%20Col%20Int%20Sci179,%20143.pdf)

Abstract: Analytical surface charge (σa), electrophoretic, and physicochemical properties of an homoionic form of Na–attapulgite show some similarity with those exhibited by homoionic sodium forms of the platy clay minerals kaolinite and illite. Both electrophoretic mobility (ue) and analytic or titratable surface charge show dependency on pH and electrolyte concentration (c). Transmission electron microscopic examination indicated that particles were 1000 nm long, lath-like, and of aspect ratios (length:width:thickness) 100:3:1. Estimates of (hydrodynamic) equivalent spherical particle diameter (dse), made with photon correlation spectroscopy (PCS), were found to be 400 nm and reflect extreme nonisometric particle shape. Failure of PCS at pH < 6.4 suggests the onset of colloidal instability in this region. The correlation betweenueand σawas found to be approximately linear in the range 3 < pH < 6.5 with more complex behavior at pH > 6.5. Apportionment of titratable charge to particle edges suggests a charge site density that is reasonable for the structure of this clay mineral.

Keywords: Attapulgite, Electrophoresis Surface Charge

Parida, K.M., Satapathy, P.K., Das, N.N. and Rao, S.B. (1996), Studies on Indian Ocean manganese nodules. II. Physico-chemical characteristics and catalytic activity of heat-treated marine manganese nodules. *Journal of Colloid and Interface Science*, **179** (1), 241-248.

Full Text: [J\J Col Int Sci179, 241.pdf](J/J%20Col%20Int%20Sci179,%20241.pdf)

Abstract: The effect of calcination temperature on the physico-chemical characteristics and catalytic activity of central Indian Basin manganese nodules have been investigated. TG, XRD, IR, and chemical analysis confirm the presence of amorphous oxyhydroxides of iron and delta-MnO2 or todorokite, which convert to alpha-Fe2O3 and gamma-Mn2O3 or Mn3O4 phases at greater than or equal to 400°C of calcination. The pore volume, average pore diameter, and pore size distribution practically remain unaffected up to 400°C of heat treatment. But in the temperature range 400 to 700°C, smaller pores coalesce to form larger ones and beyond 800°C the material becomes practically nonporous. The surface hydroxyl group and surface acidity are progressively decreased with a rise in calcination temperature. The surface area, surface oxygen, electrical conductivity, as well as catalytic activity for H2O2 decomposition and CO oxidation, however, follow a similar trend: a gradual increase up to 400°C of calcination and then a decrease with further increase in temperature of calcination. (C) 1996 Academic Press, Inc.

Keywords: Surface Characteristics, Catalytic Activity, Manganese Nodules, Physicochemical Properties, Crystalline Modifications, MnO2, Decomposition, Sediments, Oxidation, Oxides, Basin, H2O2

Lassen, B. and Malmsten, M. (1996), Competitive protein adsorption studied with TIRF and ellipsometry. *Journal of Colloid and Interface Science*, **179** (2), 470-477.

Full Text: [J\J Col Int Sci179, 470.pdf](J/J%20Col%20Int%20Sci179,%20470.pdf)

Abstract: Total internal reflection fluorescence (TIRF) and ellipsometry have been used to study competitive protein adsorption to a hydrophobic model surface prepared by radio frequency plasma deposition of hexamethyl disiloxane on silicon. Single, binary and ternary protein solutions of human serum albumin (HSA), IgG and fibrinogen (Fgn) at concentrations corresponding to 1/100 of those in blood plasma were investigated. It is shown that by employing the combination of ellipsometry and TIRF, information on both the total adsorbed amount and the composition of the adsorbed protein layer can be obtained, It was found that adsorbed HSA is not displaced by IgG and/or Fgn to any large extent. IgG and HSA dominate the adsorption from the ternary protein mixture, although fibrinogen is also present in the adsorbed layer to a smaller extent.

Hiemstra, T. and Vanriemsdijk, W.H. (1996), A surface structural approach to ion adsorption: The charge distribution (CD) model. *Journal of Colloid and Interface Science*, **179** (2), 488-508.

Full Text: [J\J Col Int Sci179, 488.pdf](J/J%20Col%20Int%20Sci179,%20488.pdf)

Abstract: An ion adsorption model for metal hydroxides has been developed which deals with the observation that in the case of inner sphere complex formation only part of the surface complex is incorporated into the surface by a ligand exchange reaction while the other part is located in the Stern layer. The charge distribution (CD) concept of Pauling, used previously in the multi site complexation (MUSIC) model approach, is extended to account for adsorbed surface complexes. In the new model, surface complexes are not treated as point charges, but are considered as having a spatial distribution of charge in the interfacial region, The new CD model can describe within a single conceptual framework all important experimental adsorption phenomena, taking into account the chemical composition of the crystal surface. The CD model has been applied to one of the most difficult and challenging ion adsorption phenomena, i.e., PO4 adsorption on goethite and successfully describes simultaneously the basic charging behavior of goethite, the concentration, pH and salt dependency of adsorption, the shifts in the zeta potentials and isoelectric point (IEP) and the OH/P exchange ratio, This is all achieved within the constraint that the experimental surface speciation found from in situ IR spectroscopy is also described satisfactorily.

Adolphs, J. and Setzer, M.J. (1996), A model to describe adsorption isotherms. *Journal of Colloid and Interface Science*, **180** (1), 70-76.

Full Text: [J\J Col Int Sci180, 70.pdf](J/J%20Col%20Int%20Sci180,%2070.pdf)

Abstract: A plot of the excess surface work that is the product of the adsorbed amount and the change in chemical potential versus the adsorbed amount yields a minimum at the monolayer capacity which is attributed to the first adsorbed molecular layer. The second parameter obtained is the change in chemical potential where adsorption sets in. An integral evaluation gives a linearized form from which both parameters can be found from slope and intercept. The model can be used for adsorption from gas and liquid phases. Regarding the precision and range of validity, the model is an improvement on other methods, especially the BET method.

Contescu, C., Popa, V.T. and Schwarz, J.A. (1996), Heterogeneity of hydroxyl and deuteroxyl groups on the surface of TiO2 polymorphs. *Journal of Colloid and Interface Science*, **180** (1), 149-161.

Full Text: [J\J Col Int Sci180, 149.pdf](J/J%20Col%20Int%20Sci180,%20149.pdf)

Abstract: Potentiometric titration data from pure rutile, anatase, and a commercial fumed titania (Degussa P25) were analyzed in terms of proton binding isotherms from which proton affinity distributions (PADs) of surface sites were obtained. As-received samples, whose thermal and storage history were not systematically controlled, as well as samples subjected to controlled calcination-rehydration-drying treatments were studied. The results indicated the occurrence of a limited number of surface groups on the two polymorphs. The behavior of pure rutile and anatase could be admired to simulate the acid-base behavior of the commercial sample; on this basis the surface of fumed titania consists largely of anatase-like structures with a small contribution (7%) of rutile-like groups. The region of v(OD) stretching vibrations of isolated-OD groups on extensively dehydroxylated samples was found to correlate with the pK’s determined from PADs, A qualitative assignment of measured pK values based on either the original MUSIC model (Hiemstra, T., de Wit, J.C.M. and van Riemsdijk, W.H., J. Colloid Interface Sci. 133, 105 (1989)) or a refined version of it is presented. (C) 1996 Academic Press, Inc.

Keywords: Titanium Oxides, Proton Affinity Distribution, Proton Binding, Hydroxyl Groups, Drift Spectra, Solid-Solution Interface, Oxide Surfaces, Zero Charge, Adsorption, Water, (Hydr)Oxides, Anatase, Models, Rutile, Sites

Aranovich, G.L. and Donohue, M.D. (1996), Adsorption of supercritical fluids. *Journal of Colloid and Interface Science*, **180** (2), 537-541.

Full Text: [J\J Col Int Sci180, 537.pdf](J/J%20Col%20Int%20Sci180,%20537.pdf)

Abstract: Adsorption isotherms for supercritical fluids are calculated using lattice theory. Results are compared with experimental data for methane on graphon and for carbon dioxide on coal, It is shown that the model reflects the peculiar features in adsorption isotherms of supercritical fluids (in particular, a maximum in the adsorption with increasing pressure), The analysis shows that there is two layer adsorption over a wide range of densities.

Keywords: Gibbs Adsorption, Supercritical Fluids, Ono-Kondo Equation, Methane on Graphon, Carbon Dioxide on Coal, Specific Surface Area, Wide Density Range, Physical Adsorption, Activated Carbon, Surface Excess, High-Pressure, Gases, Desorption, Graphite, Methane, Krypton

? Gooding, J.J., Compton, R.G., Brennan, C.M. and Atherton, J.H. (1996), The dyeing of nylon and cotton cloth with azo dyes: Kinetics and mechanism. *Journal of Colloid and Interface Science*, **180** (2), 605-613.

Full Text: [1996\J Col Int Sci180, 605.pdf](1996/J%20Col%20Int%20Sci180,%20605.pdf)

Abstract: The mechanism of the dyeing of cotton and nylon cloth by the azo dyes Orange G and Sunset Yellow FCF was investigated using a channel flow cell, The variation in dyeing with flow rate was found to proceed via a mechanism in which the flux of dye entering the cloth relative to the flux of dye to the cloth surface decreased with increasing flow rate, A mechanism is deduced in which the dye passes from bulk solution, through a porous surface layer within the cloth, before passing into the bulk cloth, Adsorption onto surface sites in this porous layer blocks the passage of further dye into the cloth, Kinetic parameters for such a mechanism are given. (C) 1996 Academic Press, Inc.

Keywords: Aqueous-Solution, Dissolution, Calcite, Electrode, Acid

Pohlmeier, A. and Rutzel, H. (1996), Kinetics and equilibrium of cadmium complexation with heterogeneous complexants: A stopped-flow study at Na-illite. *Journal of Colloid and Interface Science*, **181** (1), 297-305.

Full Text: [J\J Col Int Sci181, 297.pdf](J/J%20Col%20Int%20Sci181,%20297.pdf)

Abstract: Rapid kinetics and equilibrium of the ion exchange of Na+ by Cd2+ at illite are studied by the stopped-flow technique and DPASV, respectively, as an example for reactions at heterogeneous surfaces. For the first time both kinetics and equilibrium are analyzed for the same system by kinetic- and affinity-spectra, taking into consideration the heterogenity of binding sites. It is possible to calculate model independent kinetic spectra by means of the CONTIN program; the isotherm is evaluated by Sips’ distribution function. Monomodal distribution functions are found, characterized by mean values and half widths at half height in the range between 0.2 and 0.3 log(k/s-1) for the kinetics and 0.16 log(K/L mol-1) for the affinity. From both analyses the mean ion exchange coefficient is determined as 2.2±0.4 mol liter-1 and 1.5±0.4 mol liter-1, respectively. The kinetics are rapid; only one process is observed that is assigned to the binding of Cd2+ at the outer surface. The high activation-enthalpy of 35 kJ mol-1 proves that the exchange reaction of 2 Na+ by Cd2+ at the binding site is the rate-determining step and not the diffusion to the surface. The large negative activation-entropy of -105 J mol-1 K1 indicates that this rate-determining step is of associative nature. (C) 1996 Academic Press, Inc.

Keywords: Kinetics, Ion Exchange, Cadmium, Illite, Heterogeneity, Expectation-Maximization, Integral-Equations, Cation-Exchange, Adsorption, Dissociation, Spectrum

Aranovich, G.L. and Donohue, M.D. (1996), Universal singularities of multilayer adsorption isotherms and determination of surface area of adsorbents. *Journal of Colloid and Interface Science*, **181** (1), 313-318.

Full Text: [J\J Col Int Sci181, 313.pdf](J/J%20Col%20Int%20Sci181,%20313.pdf)

Abstract: The singularity in the adsorption isotherm for macroporous and nonporous adsorbents is considered as a universal function that can be characterized with two parameters: a coefficient of proportionality, K, and an exponent, d. It is shown that the value of K is proportional to the adsorbent surface area but does not depend on the nature of the adsorbent. This leads to a new method to determine the surface area of an adsorbent, S, that is independent of the form of the adsorption isotherm at low and moderate reduced pressures. Comparison with the BET areas for nitrogen shows that the new method gives the values of S which are very close to the BET results if K = 1.47×10-5 mol/m2 (for nitrogen), Analysis of adsorption data for macroporous adsorbents shows that the BET isotherm gives systematic deviations and that the experimental amount adsorbed is smaller than the value predicted by the BET equation (even in the range of the best agreement with experiment). These deviations lead to systematic error in the values of S of about 43%. Using K equal to Kf = 1/sigma N-A (= 1.025×10-5 mol/m2 for nitrogen), we are able to eliminate systematic error in the surface area determination. Here a is the area occupied by one molecule and N-A is the Avogadro number.

Keywords: Adsorption, Surface Area Determination, Multilayer Adsorption, Macroporous Adsorbents, Nitrogen Adsorption

Parida, K., Satapathy, K. and Das, N. (1996), Studies on Indian Ocean manganese nodules. 4. Adsorption of some bivalent heavy metal ions onto ferromanganese nodules. *Journal of Colloid and Interface Science*, **181** (2), 456-462.

Full Text: [J\J Col Int Sci181, 456.pdf](J/J%20Col%20Int%20Sci181,%20456.pdf)

Abstract: The adsorption behavior of M2+ ions (M = Cu, Co, Ni, and Pb) onto manganese nodules has been investigated at 3.5 less than or equal to pH less than or equal to 5, 6 (acetate-acetic acid buffer) and 30 less than or equal to T (degrees C) less than or equal to 50. Under identical conditions the adsorption capacity for different metal ions increased in the order Ni2+ < CO2+ < Cu2+ < Pb2+. In all cases the extent of adsorption increased with increasing pH and temperature. The behavior of various metal ions released from manganese nodules during adsorption has also been discussed.

Keywords: Adsorption, Heavy Metal Ions, Manganese Nodules, Aqueous-Solution, Oxides, Sorption, Montmorillonite, 300-Degrees-K, Temperature, Interface, Mechanism, Oxidation, Surfaces

? Parida, S.K. and Mishra, B.K. (1996), Adsorption of styryl pyridinium dyes on silica gel. *Journal of Colloid and Interface Science*, **182** (2), 473-477.

Full Text: [1996\J Col Int Sci182, 473.pdf](1996/J%20Col%20Int%20Sci182,%20473.pdf)

Abstract: The adsorption behavior of some monochromophoric and bischromophoric styryl pyridinium dyes on silica gel has been investigated. The effect of temperature, chain length, and substituent on the adsorption phenomena have been studied, The adsorption isotherms are found to be of S- and L-types, depending on the structure of the adsorbate, The rates of adsorption have been determined for all the adsorbates and variation in the rates has been explained in accordance with the structure of the adsorbates. The surface area of the dyes has been calculated using literature data and compared with coverage area/molecule. The result is explained through monolayer adsorption of the dyes. (C) 1996 Academic Press, Inc.

Keywords: Bischromophoric Dyes, Area of Coverage, Adsorption Isotherm, Monolayer Adsorption, Activation Parameters, Cyanine Dyes, Interface, Water

Johnson, D.O. and Stebe, K.J. (1996), Experimental confirmation of the oscillating bubble technique with comparison to the pendant bubble method: The adsorption dynamics of 1-decanol. *Journal of Colloid and Interface Science*, **182** (2), 526-538.

Full Text: [J\J Col Int Sci182, 526.pdf](J/J%20Col%20Int%20Sci182,%20526.pdf)

Abstract: A new oscillating bubble method is used to measure surfactant mass transfer kinetics at liquid-gas interfaces, A spherical bubble is formed, equilibrated, and oscillated radially with a small amplitude. The radial oscillations cause the gas-phase pressure to cycle about its equilibrium because of the periodic changes in bubble curvature and surface tension, The phase angle theta between the radial and the pressure oscillations and the amplitude ratio of these two quantities are measured as a function of forcing frequency omega’ and concentration C0’. These data are analyzed according to a linear analysis presented in part I of this research (J. Colloid Interface Sci, 168, 21, 1993), to find surfactant diffusivities and adsorption/desorption coefficients. The required input data are the equilibrium adsorption isotherm and the corresponding surface equation of state. For 1-decanol at the air-aqueous interface, equilibrium surface tension data are obtained by video-enhanced pendant bubble tensiometry and fitted to the generalized Frumkin model. The oscillating bubble method is then used to determine the mass transfer kinetics of 1-decanol. For omega’less than or equal to 1 rad/s, the mass transfer is diffusion-controlled. Diffusivities found from the oscillating bubble data are in agreement with those obtained from pendant bubble relaxation data. For elevated C0, ‘ and omega’greater than or equal to 1.0 rad/s, the mass transfer is controlled by both diffusion and the kinetics of adsorption-desorption. A mixed diffusion-kinetic model applied to these data fields a value for the desorption kinetic constant of alpha = 2.7 s-1. These results are consistent with the shift in controlling mechanism from pure diffusion control at dilute concentrations to mixed diffusion-kinetic control at elevated concentrations. (C) 1996 Academic Press, Inc.

Keywords: Surfactants, Bubbles, Pendant Bubble Method, Oscillating Bubble Method, Dynamic Surface Tension, Marangoni Effects, Adsorption Kinetics, Diffusion, 1-Decanol, Air-Water-Interface, Surface-Tension, Pulmonary Surfactant, Kinetics, Drops, Surfactometer, Elasticity, Behavior

van Riemsdijk, W.H., de Wit, J.C.M., Mous, S.L.J., Koopal, L.K. and Kinniburgh, D.G. (1996), An analytical isotherm equation (CONICA) for nonideal mono-and bidentate competitive ion adsorption to heterogeneous surfaces. *Journal of Colloid and Interface Science*, **183** (1), 35-50.

Full Text: [J\J Col Int Sci183, 35.pdf](J/J%20Col%20Int%20Sci183,%2035.pdf)

Abstract: Analytical isotherm equations for the competitive binding of protons and other cations to heterogeneous surfaces have been derived. These extend our earlier nonideal competitive adsorption (NICA) equation by considering bidentate as well as monodentate binding of ions, The protonation of these bidentate sites occurs in two Consecutive steps. The CONICA model equations separate the apparent heterogeneity into a generic heterogeneity characteristic of all of the surface sites and an ion-specific contribution characteristic of each type of ion, The CONICA model was combined with a simple Donnan model to account for electrostatic effects and was fitted both to proton binding at various ionic strengths and to the pH-dependent binding of Cu (pH 4, 6, and 8) to a purified peat humic acid. Model fits were good. The measured H+/Cu2+ exchange ratio is significantly greater than one for the whole pH range, which indicates the importance of the bidentate binding mechanism for copper. (C) 1996 Academic Press, Inc.

Keywords: Adsorption, Heterogeneity, Humic, Isotherm, Copper, Proton Binding, Simple Electrostatic Model, Water Oxide Interface, Humic Substances, Proton Binding, Acid

Quiñones, I. and Guiochon, G. (1996), Derivation and application of a Jovanovic-Freundlich isotherm model for single-component adsorption on heterogeneous surfaces. *Journal of Colloid and Interface Science*, **183** (1), 57-67.

Full Text: [J\J Col Int Sci183, 57.pdf](J/J%20Col%20Int%20Sci183,%2057.pdf)

Abstract: A new Jovanovic-Freundlich isotherm model is derived for describing single-component adsorption equilibria on heterogeneous surfaces, The equation is obtained by assuming that the rate of decrease of the fraction of the surface unoccupied by the adsorbate molecules is proportional to a certain power of the partial pressure of the adsorbate, The equation reduces to the Jovanovic equation when the surface becomes homogeneous, At low pressures, the equation reduces to the Freundlich isotherm but at high pressures, a monolayer coverage is achieved, This model has been applied successfully to the description of the adsorption behavior of a series of chlorinated hydrocarbons on a microporous silicagel, at different temperatures, The monolayer capacity and the heterogeneity parameter exhibit a weak temperature dependence, The third parameter of the model decreases exponentially with increasing temperature, The fit of the experimental data to the new model described is shown to be better than the comparable fits to classical isotherms used for heterogeneous surfaces, The energy distribution function corresponding to the model for Langmuir local adsorption behavior was derived using the Sips procedure and evaluated numerically in a few selected cases. This distribution is an exponential decay. (C) 1996 Academic Press, Inc.

Keywords: Adsorption, Freundlich Isotherm, Isotherm, Isotherm Model, Jovanovic Isotherm, Activated Carbon, Organic Solutes, Silica-Gel, Gas, Chromatography, Equilibria, Equations

Parida, K.M., Sahoo, A.K. and Das, N.N. (1996), Studies on Indian Ocean manganese nodules. Part V. Physicochemical characteristics and catalytic activity of rare earth oxide mixed manganese nodules. *Journal of Colloid and Interface Science*, **183** (2), 374-379.

Full Text: [J\J Col Int Sci183, 374.pdf](J/J%20Col%20Int%20Sci183,%20374.pdf)

Abstract: A series of rare earth oxide mixed manganese nodules (perovskite type mixed oxides) have been prepared by coprecipitation method followed by calcination at 900°C and characterized by different techniques. The effect of rare earth ions on the surface, textural and catalytic activity for the oxidation of CO, and decomposition of H2O2 have been discussed. The activity for CO oxidation followed an order: Pr greater than or equal to La > Nd > Yb > Dy > Tb > Sm > Tm > Gd > Eu > Ce. (C) 1996 Academic Press, Inc.

Keywords: Manganese Nodules, Carbon Monoxide Oxidation, Hydrogen Peroxide Decomposition, Perovskite, Lanthanide Oxides, Carbon-Monoxide Oxidation, Perovskite-Type Oxides, A-Site, H2O2 Decomposition, Co Oxidation, Fuel-Cells, Combustion, Strontium, Methane, MnO2

Venema, P., Hiemstra, T. and Vanriemsdijk, W.H. (1996), Multisite adsorption of cadmium on goethite. *Journal of Colloid and Interface Science*, **183** (2), 515-527.

Full Text: [J\J Col Int Sci183, 515.pdf](J/J%20Col%20Int%20Sci183,%20515.pdf)

Abstract: Recently a new general ion adsorption model has been developed for ion binding to mineral surfaces (Hiemstra and van Riemsdijk, 1996). The model uses the Pauling concept of charge distribution (CD) and is an extension of the multi-site complexation (MUSIC) approach. In the CD-MUSIC model the charge of an adsorbing ion that forms an inner sphere complex is distributed over its ligands, which are present in two different electrostatic planes. In this paper we have applied the CD-MUSIC model to the adsorption of metal cations, using an extended data set for cadmium adsorbing on goethite. The adsorption of cadmium and the cadmium-proton exchange ratio were measured as function of metal ion concentration, pH and ionic strength. The data could be described well, taking into account the surface heterogeneity resulting from the presence of two different crystal planes (the dominant 110 face and the minor 021 face). The surface species used in the model are consistent with recent EXAFS data. In accordance with the EXAFS results, high-affinity complexes at the 021 face were used in the model.

Keywords: Goethite, Exafs, Adsorption, Model, Electrostatics, Cadmium, Heterogeneity, Complexation, Metal Oxide, Ionic Strength, Proton Exchange, Surface Structure, Oxide-Water Interface, Solid-Solution Interface, Electrical Double-Layer, Surface Ionization, Metal-Ions, Complexation, (Hydr)Oxides, Stability, Model

Wingrave, J.A. (1996), Single cation adsorption equation for the solution-metal oxide interface. *Journal of Colloid and Interface Science*, **183** (2), 579-596.

Full Text: [J\J Col Int Sci183, 579.pdf](J/J%20Col%20Int%20Sci183,%20579.pdf)

Abstract: Simultaneous solution of the Gibbs-Lewis thermodynamic equations for equilibrium proton and cation complexation at the solution-metal oxide interface results in a single cation adsorption equation in closed mathematical form. The simple form of the cation adsorption equation allows direct assessment of cation adsorption dependence on: (1) solution pH, (2) protonation differences of metal oxide surfaces, (3) differences in adsorption affinity for different cations, (4) concentration of solid versus cations in the dispersion, etc. Experimental and calculated cation adsorption results are compared. From a knowledge of the cation adsorption behavior combined with electrostatic potential equations, the electrostatic behavior in an interfacial system can also be determined. The resulting solution and interfacial electrostatic potential equations are single equations in closed mathematical form expressed as explicit functions of solution and interfacial variables. The dependence of these variables on solution and interfacial electrostatic potential is also examined.

Ersoz, M., Vural, U.S., Yigitoglu, M. and Sezgin, M. (1996), Kinetic study of ligand exchange reaction of anions as ligands on DAE-sporopollenin. *Journal of Colloid and Interface Science*, **184** (1), 319-324.

Full Text: [J\J Col Int Sci184, 319.pdf](J/J%20Col%20Int%20Sci184,%20319.pdf)

Abstract: The specific rate coefficients and ligand sorption isotherms of Br and I- as ligands on diaminoethyl-sporopollenin were determined as a function of pH and temperature between 20 and 60°C. The ligand exchange rates were measured just after the rapid mixing of the ligand solution with the resin suspension. The data have also been analyzed to obtain activation parameters Delta G, Delta H, and Delta S for reaction in the corresponding mixture. A single ligand-exchange process was observed; the sorption of ligand increased with decreasing pH and hydrated radius of ligands and increasing temperature. A reaction mechanism which describe the ligand exchange reaction is proposed. (C) 1996 Academic Press, Inc.

Keywords: Ion-Exchange, Iminodiacetic Resin, Complexes, Sorption, Amines

Rodda, D.P., Johnson, B.B. and Wells, J.D. (1996), Modeling the effect of temperature on adsorption of lead(II) and zinc(II) onto goethite at constant pH. *Journal of Colloid and Interface Science*, **184** (2), 365-377.

Full Text: [J\J Col Int Sci184, 365.pdf](J/J%20Col%20Int%20Sci184,%20365.pdf)

Abstract: The influence of temperature and adsorbate concentration on the sorption of Zn(II) and Pb(II) by goethite was studied at fixed pH. Proton stoichiometry, measured by direct titration, was found to depend on the identity of the metal ion, the pH and the temperature. For Zn(II) the proton stoichiometry ranged from 1.55 at pH 6.5 and 10°C to 1.95 at pH 7.5 and 70°C, while for Pb(II) at pH 5.50 the value varied from 1.05 at 10°C to 1.4 at 70°. Three adsorption models-the Langmuir two-site model, the surface precipitation model of Farley, Dzombak and Morel (FDM) and the BET model-were applied to the data and the fitted parameters were used to determine the enthalpy and entropy of adsorption. Although the models assume rather different sorption reactions and therefore generate correspondingly different equilibrium constants, the estimated enthalpies of adsorption were all positive, between 4 and 30 kJ/mol. There was also fair agreement between the various estimates of the adsorption capacities, However, the models yield very different estimates of entropies of adsorption, these being positive (and generally in the range 100 to 160 JK-1mol-1) for the Langmuir and BET models but negative (in the range-80 to-160 JK-1mol-1) for the FDM model.

Rodda, D.P., Wells, J.D. and Johnson, B.B. (1996), Anomalous adsorption of copper(II) on goethite. *Journal of Colloid and Interface Science*, **184** (2), 564-569.

Full Text: [J\J Col Int Sci184, 564.pdf](J/J%20Col%20Int%20Sci184,%20564.pdf)

Abstract: The adsorption of copper(II) onto goethite is qualitatively different from that of other metal-mineral systems. At pH 5.0 the adsorption isotherms are sigmoid rather than hyperbolic and the corresponding graphs of *C/N* versus *C* (where *C* is concentration and *N* adsorption density) have distinct minima. At pH 5.5 the isotherms have the more usual shape. The experimental data can be fitted by a model In which monomeric CuOH+ and dimeric Cu2(OH)22+ compete for surface sites, the dimer adsorbing more strongly to the surface. As the concentration increases the proportion of the dimeric species increases, which leads to enhanced adsorption. At pH 5.5 adsorption of the monomer is sufficiently strong that normal behavior is observed at low concentrations, before there is sufficient dimer to compete effectively for sites. Data are presented for adsorption of Cu(II) to goethite at pH 5.0 and pH 5.5, at temperatures between 25 and 70℃. Adsorption is endothermic for both monomer and dimer. Enthalpies of adsorption range from 50 to 91 kJmol-1 and entropies from 240 to 470 JK-1mol-1.

Agashe, K.B. and Regalbuto, J.R. (1997), A revised physical theory for adsorption of metal complexes at oxide surfaces. *Journal of Colloid and Interface Science*, **185** (1), 174-189.

Full Text: [J\J Col Int Sci185, 174.pdf](J/J%20Col%20Int%20Sci185,%20174.pdf)

Abstract: The electric double-layer model of physical adsorption originally proposed by James and Healy in the early seventies (1-3) has largely been abandoned in favor of more complex triple-layer chemical adsorption models. Two refinements have been made to the original simpler double-layer model and results for the simulation of metal ion adsorption over silica, iron(III) oxide, chromium(III) oxide, and alumina are presented here. With a more accurate (non-Nernstian) description of surface potential (25, 26), and the more accurate solvation free energy term of Levine (8), good fits to the data are obtained with smaller or no adjustable “chemical” interaction terms. The interpretation of the revised model is directly contrary to the original double-layer model in that multivalent, unhydrolyzed ions are now predicted to adsorb preferentially to univalent hydrolysis products. This interpretation coincides with the results of more recent triple-layer models, indicating preferential adsorption of multivalent complexes. However, the revised physical adsorption model suggests that these adsorption phenomenon are usually physical (electrostatic) in nature and not chemical.

Tóth, J. (1997), Some consequences of the application of incorrect gas/solid adsorption isotherm equations. *Journal of Colloid and Interface Science*, **185** (1), 228-235.

Full Text: [J\J Col Int Sci185, 228.pdf](J/J%20Col%20Int%20Sci185,%20228.pdf)

Abstract: *Adsorption Equilibrium Data Handbook* (D. P. Valenzuela and A.L. Myers, Prentice-Hall, Englewood Cliffs, NJ, 1989) includes many data on single gas isotherms excellently described by the Tóth and UNILAN equations. This paper proves that in spite of the good mathematical applicability, the forms of the two mentioned equations-from a thermodynamic standpoint-are incorrect. As a consequence, the correct specific surface areas of the adsorbents cannot be calculated. The Tóth equation can be transformed to a correct relationship and from this modified form correct values of the specific surface areas and isosteric heats of adsorption can be calculated. This correct form does not violate the old principle of the dynamic equilibrium of physical adsorption.

Keywords: Adsorption, Thermodynamics, Isotherm Equations, Surface Area, Isosteric Heat

Axe, L., Anderson, P.R. (1997), Experimental and theoretical diffusivities of Cd and Sr in hydrous ferric oxide. *Journal of Colloid and Interface Science*, **185** (2), 436-448.

Full Text: [J\J Col Int Sci185, 436.pdf](J/J%20Col%20Int%20Sci185,%20436.pdf)

Abstract: Oxides of manganese, aluminum, and especially iron are important sorbents for inorganic contaminants. The sorption process can be characterized by two steps. The first step is a rapid, reversible reaction between the bulk aqueous phase and external surfaces. The slow, second step is the rate limiting mechanism wherein the contaminant diffuses through small pores along surface sites. Isotherm and constant boundary condition studies were conducted to evaluate the sorption process. Best fit experimental surface diffusivities ranged from 10-14 to 6×10-13 cm2/s. Using site activation theory and assuming a sinusoidal potential field along the pore surface, theoretical surface diffusion coefficients were estimated from the adsorption enthalpy. (C) 1997 Academic Press.

Keywords: Cadmium, Iron Oxides, Sorption, Strontium, Surface Diffusion

Lassen, B. and Malmsten, M. (1997), Competitive protein adsorption at plasma polymer surfaces. *Journal of Colloid and Interface Science*, **186** (1), 9-16.

Full Text: [J\J Col Int Sci186, 9.pdf](J/J%20Col%20Int%20Sci186,%209.pdf)

Abstract: Competitive adsorption from a ternary mixture of human serum albumin (HSA), human IgG and human fibrinogen (Fgn) at concentrations corresponding to blood plasma diluted 1/100 was investigated with the combination of Total Internal Reflection Fluorescence spectroscopy (TIRF) and ellipsometry. As substrates, three different plasma polymer surfaces, representing different surface charge and surface energy, were prepared from hexamethyldisiloxane (PP-HMDSO), acrylic acid (PP-AA) and 1,2-diaminocyclohexane (PP-DACH). In addition, adsorption from single and binary protein systems was investigated with ellipsometry. At the hydrophobic PP-HMDSO little or no displacement of any of the proteins was observed. The adsorbed layer was dominated by HSA and IgG, although Fgn was also present to a smaller extent. On PP-DACH and PP-AA, representing positively and negatively charged hydrophilic surfaces, respectively, Fgn completely dominated the adsorbed layer while HSA was almost absent and IgG was present only at a very low level.

? Liggieri, L., Ravera, F., Ferrari, M., Passerone, A. and Miller, R. (1997), Adsorption kinetics of alkylphosphine oxides at water/hexane interface. 2. Theory of the adsorption with transport across the interface in finite systems. *Journal of Colloid and Interface Science*, **186** (1), 46-52.

Full Text: [1960-80\J Col Int Sci186, 46.pdf](1960-80/J%20Col%20Int%20Sci186,%2046.pdf)

Abstract: A theoretical model is presented to describe the adsorption of surfactant molecules at the water/oil interface for the case when transport across the interface must be considered due to the solubility of the surfactant in both liquid phases (aqueous solution drop in an oil phase). The theory is based on a diffusion-controlled adsorption model and a numerical difference scheme is used to solve the problem for closed finite systems. By simulating adsorption-desorption processes, the influence of the geometrical and thermodynamic parameters on the dynamic adsorption behavior is studied. In particular, the effects of the volume ratio, surfactant concentration, diffusion coefficients, and distribution coefficient on the process are analyzed, The model allows quantitative interpretation of the experimental data obtained for an alkyldimethylphosphine oxide at the water/hexane interface. The interfacial tension signals, presenting a minimum under some conditions, are fitted by the theoretical curves. (C) 1997 Academic Press

Keywords: Adsorption Kinetics, Dynamic Interfacial Tension, Liquid/Liquid Interface, Mass Transfer, Alkylphosphine Oxides, Longitudinal-Waves, Liquid Interface, Exchange, Phases

Notes: highly cited

? Scheidegger, A.M., Lamble, G.M. and Sparks, D.L. (1997), Spectroscopic evidence for the formation of mixed-cation hydroxide phases upon metal sorption on clays and aluminum oxides. *Journal of Colloid and Interface Science*, **186** (1), 118-128.

Full Text: [1997\J Col Int Sci186, 118.pdf](1997/J%20Col%20Int%20Sci186,%20118.pdf)

Abstract: Retention of heavy metal ions on soil mineral surfaces is an important process for maintaining environmental quality. A thorough understanding of the kinetics and mechanisms of heavy metal sorption on soil mineral surfaces is therefore of fundamental importance. The present study examines the kinetics and mechanisms of Ni(II) sorption onto pyrophyllite, kaolinite, gibbsite, and montmorillonite. Ni sorption reactions were initially fast (15-40% of the initial Ni was removed within the first hour). Thereafter, the rate of sorption decreased significantly. X-ray absorption fine structure (XAFS) spectroscopy was used to determine the local structural environment of Ni(II). Data analysis reveals the presence of polynuclear Ni surface complexes. Ni-Ni bond distances (3.00-3.03 Angstrom) were distinctly shorter than in Ni(OH)(2)(s) (3.09 Angstrom). We propose that the reduction of the Ni-Ni distances is caused by the formation of mixed Ni/Al hydroxide phases. The XAFS spectra and derived structural parameters are similar to those in takovite (Ni6Al2(OH)(16)CO3. H2O), thus suggesting the presence of a Ni phase of similar structure. Even though dissolved Al could not be detected in our samples, Al could have been released into solution and incorporated into mixed Ni/Al hydroxide-like phases. The formation of such phases can explain the finding that the dissolution rates (Si-release) are strongly enhanced (relative to the dissolution rates of the clays alone) as long as Ni sorption is pronounced. We suspect that the release of Al into solution is the rate-determining step for the formation of mixed Ni/Al hydroxide-like phases in our study. Our study demonstrates that mixed Ni/Al hydroxide-like compounds can form when Ni is introduced into a suitable environment in which there is a source of hydrolyzed species of Al. One can speculate that the formation of mixed-cation hydroxide compounds also represents a plausible “sorption mode” for other divalent metal ions when silicates or oxides are present. It has been shown that similar mixed-cation hydroxide compounds can be synthesized when Mg(II), Ni(II), Co(II), Zn(II), or Mn(II) is added to suspensions containing Al(III), Fe(III), and Cr(III). Thus, the formation of mixed-cation hydroxide compounds should be considered when conducting metal sorption experiments, modeling metal surface complexation, determining speciation, and assessing the risk of the migration of contaminants in polluted sites. (C) 1997 Academic Press.

Keywords: Adsorption, Aqueous-Solutions, Desorption, Dissolution, Fine-Structure, Heavy Metal, Hydrous Ferric-Oxide, Kaolinite, Kinetics, Kinetics, Metal, Montmorillonite, Sorption, Surface Precipitation, Surface Precipitation, Water Interface, X-Ray-Absorption, XAFS

Naono, H., Hakuman, M. and Shiono, T. (1997), Analysis of nitrogen adsorption isotherms for a series of porous silicas with uniform and cylindrical pores: A new method of calculating pore size distribution of pore radius 1-2 nm. *Journal of Colloid and Interface Science*, **186** (2), 360-368.

Full Text: [J\J Col Int Sci186, 360.pdf](J/J%20Col%20Int%20Sci186,%20360.pdf)

Abstract: Two kinds of the porous silicas with uniform and cylindrical pores were prepared from calcined Na4SiO4, and cationic surfactants ([C16H33N(CH3)3]Cl and [C18H37N(CH3)3]BT) In this paper, we call these porous silicas PS-C16 and PS-C18. PS-C16 was calcined in vacuo at 873-1273 K in order to prepare a series of porous silicas having different pore sizes. All nitrogen adsorption isotherms for a series of the porous silicas show no hysteresis in the adsorption and desorption branches. The nitrogen adsorption isotherms were analyzed by the t method, and the pore surface area (S-p), the pore volume (V-p), and the core volume (V-c) were determined, The pore radius (r(p)), the core radius (r(c)), and the adsorbed thickness on the pore wall (t(pore)) were computed from the measured values of S-p, V-p, and V-c. We can determine the relationship between the Polanyi adsorption potential and the core radius in the range of r(c) = 0.6-1.2 nm. On the basis of the present data, we propose a new method of calculating the pore size distribution in the range of r(p) = 1-2 nm, (C) 1997 academic Press.

Keywords: Nitrogen Isotherm, Porous Silica, T-Plot, Honeycomb Pore Structure, Pore Size, Core Size, Polanyi Adsorption Potential, Water-Vapor, Mcm-41, Adsorbent

Bereket, G., Aroğuz, A.Z. and Özel, M.Z. (1997), Removal of Pb(II), Cd(II), Cu(II), and Zn(II) from aqueous solutions by adsorption on Bentonite. *Journal of Colloid and Interface Science*, **187** (2), 338-343.

Full Text: [J\J Col Int Sci187, 338.pdf](J/J%20Col%20Int%20Sci187,%20338.pdf)

Abstract: Removal of Pb(II), Cd(II), Zn(II), and Cu(II) from aqueous solutions using the adsorption process on bentonite has been investigated, In order to find out the effect of temperature on adsorption, the experiments were conducted at 20, 35 and 50°C. For all the metals, maximum adsorption was observed at 20°C. The rate of attaining equilibrium of adsorption of metal ions follows the order Zn(II) > Cu(II) > Cd(II) > Pb(II). Equilibrium modeling of the adsorption showed that adsorption of Pb(II), Cd(II) and Cu(II) were fitted to a Langmuir isotherm, while the adsorption of Zn(II) was fitted to a Freundlich isotherm, Dynamic modeling of the adsorption showed that the first order reversible kinetic model was held for the adsorption process, The overall rate constant k’, the adsorption rate constant k (1), the desorption rate constant k (2), and the equilibrium constant K-e for the adsorption process were calculated, From the results of the thermodynamic analysis, standard free energy ΔG°, standard enthalpy ΔH°, and standard entropy ΔS° of the adsorption process were calculated. (C) 1997 Academic Press.

Parida, K.M., Gorai, B. and Das, N.N. (1997), Studies on Indian Ocean manganese nodules. III. Adsorption of aqueous selenite on ferromanganese nodules. *Journal of Colloid and Interface Science*, **187** (2), 375-380.

Full Text: [J\J Col Int Sci187, 375.pdf](J/J%20Col%20Int%20Sci187,%20375.pdf)

Abstract: Adsorption of aqueous selenite (SeO32-) on Indian Ocean manganese nodules was studied as a function of time, temperature, pH, and concentrations of adsorbate and adsorbent in acetic acid-sodium acetate buffer medium. Analysis of adsorption data supports a heterogeneous nature for the surface of manganese nodules. The adsorption capacity of various manganese nodules for selenite was correlated with their chemical composition and surface properties. (C) 1997 Academic Press.

Keywords: Adsorption, Aqueous Selenite, Manganese Nodules, Anion Adsorption, Water Interface, Goethite, Oxide, Coprecipitation, Removal

Parida, K.M., Sahoo, A.K. and Das, N.N. (1997), Studies on Indian Ocean manganese nodules. VI. Physicochemical characterization and catalytic activity of strontium-lanthanum oxide mixed manganese nodules. *Journal of Colloid and Interface Science*, **187** (2), 453-458.

Full Text: [J\J Col Int Sci187, 453.pdf](J/J%20Col%20Int%20Sci187,%20453.pdf)

Abstract: A series of strontium-lanthanum oxide mixed manganese nodules were prepared and characterized by X-ray diffraction, nitrogen adsorption-desorption, electrical conductivity, and surface excess oxygen. X-ray diffraction patterns confirm the formation of perovskite-type oxides at low strontium content (x less than or equal to 0.5, in La1-xSrxMO3, where M denotes the transition metal present in nodules), whereas at 0.6 less than or equal to x less than or equal to 0.8, La2O3 and SrO are detected in addition to the perovskite-type oxides. The catalytic activities for hydrogen peroxide decomposition and carbon monoxide oxidation increase with an increase in Sr substitution for La, attain a maximum at x = 0.4, and then decrease with further increase in Sr. The activities have been correlated with various physicochemical properties. (C) 1997 Academic Press.

Keywords: Manganese Nodules, Carbon Monoxide Oxidation, Hydrogen Peroxide Decomposition, Perovskite, Strontium-Lanthanum Oxide, Perovskite-Type Oxides, Reduction-Oxidation, H2O2 Decomposition, Co Oxidation, Rare-Earth, Fuel-Cells, A-Site, LA1-XSRXCOO3, Combustion, Methane

Lin, C.F., Chang, K.S., Tsay, C.W., Lee, D.Y., Lo, S.L. and Yasunaga, T. (1997), Adsorption mechanism of gallium(III) and indium(III) onto γ-Al2O3. *Journal of Colloid and Interface Science*, **188** (1), 201-208.

Full Text: [J\J Col Int Sci188, 201.pdf](J/J%20Col%20Int%20Sci188,%20201.pdf)

Abstract: The adsorption mechanism of trivalent Ga and In onto gamma-Al2O3 was investigated using a triple-layer model simulation and pressure-jump technique, Bidentate Ga3+ and In3+ and monodentate GaOH2+/InOH2+ are the most likely surface species responsible for Ga(III)/In(III) adsorption, Sorption of Ga(III) and In(III) can be interpreted as an associative process, The adsorption pathway is a two-step mechanism: proton release from surface hydroxyl group (s) followed by coordination of Ga(III)/In(III) species to the depronated site (s), Intrinsic adsorption rate constants cannot be estimated with a liner free-energy relationship between the adsorption rate constant and the rate of water exchange, which is developed solely based on the dissociative sorption mechanism of divalent ions. (C) 1997 Academic Press.

Keywords: Amorphous Iron Oxyhydroxide, Water Interface, Metal-Ions, Desorption, Kinetics, Surface, Oxide, Complexation, Ga(III), In(III), γ-Al2O3, Adsorption, Water Exchange Rate, Linear Free Energy, Intrinsic Adsorption Rate Constants

Huang, C.P. and Cheng, W.P. (1997), Thermodynamic parameters of iron-cyanide adsorption onto gamma-Al2O3. *Journal of Colloid and Interface Science*, **188** (2), 270-274.

Full Text: [J\J Co Int Sci188, 270.pdf](J/J%20Co%20Int%20Sci188,%20270.pdf)

Abstract: In this study, we describe the adsorption of ferricyanide (Fe(CN)33-) on gamma-Al2O3 by a modified Langmuir adsorption isotherm. The modified Langmuir isotherm developed herein can accurately predict the apparent equilibrium constant (K-app) at different pH values and temperatures. In the experimental pH range of 5-6.5, adsorption capacity and apparent equilibrium constants decrease as the temperature increases. Because surface protonation increases as pH decrease, a more positively charged site on the surface increases the attraction force that exists between gamma-Al2O3 and the adsorbate. According to the Gibbs-Hehmholtz equation, these apparent equilibrium constants at various temperatures and pH conditions can be applied to determine enthalpy changes (Delta H-0) for the adsorption at different pH conditions. The result indicates that enthalpy change at different pH values is near -5 kcal/mol which indicates that the enthalpy change is in the order of hydrogen bonding and confirms the exothermic nature of the adsorption process. The results also indicate that other thermodynamic parameters change of ferricyanide adsorption. The positive entropy change (Delta S-0) has been explained from the viewpoint of exchange reaction in this study. The negative free energy change (Delta G(ads)(0)) for ferricyanide adsorption shows the spontaneous nature of the adsorption process. (C) 1997 Academic Press.

Keywords: Adsorption, Iron-Cyanide, Ferricyanide, Aluminum Oxide, Free Energy, Entropy, Enthalpy, Oxide-Water Interface, Aqueous-Solution, Temperature, pH, Behavior, Zinc(II), Goethite, Cadmium, Co(II), Ions

Haber-Pohlmeier, S. and Pohlmeier, A. (1997), Kinetics and equilibrium of the ion exchange of Cd2+ at Na-montmorillonite: Analysis of heterogeneity by means of the regularization technique CONTIN. *Journal of Colloid and Interface Science*, **188** (2), 377-386.

Full Text: [J\J Col Int Sci188, 377.pdf](J/J%20Col%20Int%20Sci188,%20377.pdf)

Abstract: Kinetics and equilibrium of the ion exchange of Cd2+ at Na-montmorillonite are investigated and analyzed for the first time by kinetic and affinity spectra. To obtain these distribution functions an inverse integral transformation is performed numerically by the program CONTIN with the integral adsorption equation. It employs the constrained regularization technique with a smoothing regularizer favoring parsimony of the solution and an automatic adjustment of the regularization strength by the statistical F test. A Langmuir equation as local isotherm is additionally built in the code for the first time so that CONTIN is now a very convenient and handy tool for the calculation of model independent kinetic and affinity spectra. Bimodal kinetic spectra are observed where the main process (80%) is the binding of Cd2+ at the outer surface. The mean rate coefficient k(mean) is 11 s-1 at 25°C and the HWHH of the distribution function of about 0.1 log k units proves the considerable degree of heterogeneity. An inner sphere complex is formed that is controlled by the ion exchange reaction itself, not by diffusion, as proven by temperature dependent measurements. The more heterogeneous slow process is caused by aggregation of the platelets and intercalation of Cd2+ into the interlayer space. A broad monomodal affinity spectrum is found with a mean value of log K-ex, K-mean = 0.5 and an asymmetry to the low affinity side. (C) 1997 Academic Press.

Keywords: Cadmium, Contin, Heterogeneity, Ion-Exchange, Isotherm, Kinetics, Montmorillonite, Energy-Distribution Function, Dynamic Light-Scattering, Integral-Equations, Expectation-Maximization, Affinity Distributions, Spectrum Method, Least-Squares, Adsorption, Dissociation, Resolution

Aranovich, G.L. and Donohue, M.D. (1997), Predictions of multilayer adsorption using lattice theory. *Journal of Colloid and Interface Science*, **189** (1), 101-108.

Full Text: [J\J Col Int Sci189, 101.pdf](J/J%20Col%20Int%20Sci189,%20101.pdf)

Abstract: Multilayer adsorption is calculated for a one-component vapor using ideas based on the Ono-Kondo lattice model. It is shown that this model predicts the common types of adsorption behavior: the Henry, Langmuir, and Frumkin equations as particular cases; multilayer isotherms including steps due to two-dimensional condensation; changes in the isotherm that occur when the temperature is varied from subcritical to supercritical conditions. In this paper, we investigate the adsorption isotherm as the concentration approaches saturation conditions. The analysis shows that at conditions near saturation the Gibbs adsorption has a weak divergence which can be described by either a logarithmic singularity or an exponential singularity with small exponent (less than 0.05).

Avranas, A., Retter, U., Lunkenheimer, K. and Lohse, H. (1997), On the adsorption of octanoic acid at the mercury/electrolyte and air/water interfaces. *Journal of Colloid and Interface Science*, **189** (2), 229-235.

Full Text: [J\J Col Int Sci189, 229.pdf](J/J%20Col%20Int%20Sci189,%20229.pdf)

Abstract: The adsorption of a purified solution of octanoic acid at the mercury/solution and air/water interfaces was studied. The equilibrium capacitance values were obtained by phase sensitive ac voltametry, From the concentration dependence of the capacitance and of the surface tension at 22 and 45°C, the adsorption isotherms were evaluated by applying the Frumkin isotherm, Adsorption energies, lateral interaction energies, and molecular surface areas obtained are compared for the two interfaces. (C) 1997 Academic Press.

Keywords: Octanoic Acid, Differential Capacitance, Surface Tension, Adsorption Isotherms, Frumkin Model of Adsorption, Surfactant Solutions, Dodecyl-Sulfate, Water Interface, Criterion, Polymers, Purity, Layer

Rusch, U., Borkovec, M., Daicic, J., van Riemsdijk, W.H. (1997), Interpretation of competitive adsorption isotherms in terms of affinity distributions. *Journal of Colloid and Interface Science*, **191** (1), 247-255.

Full Text: [J\J Col Int Sci191, 247.pdf](J/J%20Col%20Int%20Sci191,%20247.pdf)

Abstract: In the present study we evaluate affinity distributions for competitive adsorption isotherms which involve several components. In such a multicomponent situation, the affinity distribution becomes a function of several affinity constants, and already in the case of two components, little is known about their features. In the two-component situation, we have calculated the affinity distributions from the adsorption isotherms with a numerical inversion technique. This technique is based on a constrained least-squares algorithm and uses a regularization function which biases the resulting affinity distribution toward a smooth function. The applicability of the procedure was tested with a newly derived isotherm, which is based on a fully uncorrelated affinity distribution, and with the generalized Langmuir-Freundlich (LF) isotherm, which is known to have a perfectly correlated distribution. The present study demonstrates that the extended Henderson-Hasselbalch (HH) isotherm has an underlying affinity distribution, which displays a partial correlation, while the non-ideal competitive adsorption (NICA) isotherm has an affinity distribution with a varying degree of correlation. In the competitive situation, the affinity distribution thus provides an interesting means to characterize the corresponding isotherms. As an illustration of the present techniques, experimental data of metal ion binding for a humic acid are analyzed in the same context. (C) 1997 Academic Press.

Keywords: Adsorption Isotherm, Heterogeneity, Affinity Distribution, Regularized Least-Squares, Heterogeneous Surfaces, Humic Substances, Ion Adsorption, Complexation, Binding, Models, Sorbents, Mixtures, Acid

? Doğan, M., Alkan, M. and Çakir, Ü. (1997), Electrokinetic properties of perlite. *Journal of Colloid and Interface Science*, **192** (1), 114-118.

Full Text: [1997\J Col Int Sci192, 114.pdf](1997/J%20Col%20Int%20Sci192,%20114.pdf)

Abstract: Electrokinetic properties of expanded and unexpanded perlite samples have been investigated using the microelectrophoresis technique. Perlite samples yield practically no isoelectric point in the pH range of 3 to II. Both of the perlite samples remain negatively charged in the pH range studied. The expanded perlite has a more negatively charged surface than unexpanded perlite. NaCl, KNO3, NaNO3, Na2CO3, and Na2SO4 are indifferent electrolytes for perlite whereas AlCl3 and CaCl2 change the Interface charge from negative to positive. Acid-activation has no significant effect on the zeta potential of perlite. (C) 1997 Academic Press.

Keywords: Electrokinetic Properties, Zeta Potential, Perlite, Surface Charge, Adsorption

Baumgarten, E. and Kirchhausen-Düsing, U. (1997), Sorption of metal ions on alumina. *Journal of Colloid and Interface Science*, **194** (1), 1-9.

Full Text: [J\J Col Int Sci194, 1.pdf](J/J%20Col%20Int%20Sci194,%201.pdf)

Abstract: Precipitation and adsorption of metal ions (Co(II), Ni(II), Cu(II), and Cr(III)) on gamma-alumina were investigated experimentally. A surface chemical reaction model to calculate concentrations of aluminum ions, metal ions, and pH as variables depending on amount of alumina, volume of liquid and gas phase, initial metal concentration, and amount of acid or base added is presented. In the case of Co(II) the pH dependence of rest concentrations with and without alumina is equal; adsorption may be disregarded. For the other ions adsorption is important. Considering the charge of the surface does not improve the fit. In the pH region, where adsorption leads to lower rest concentrations than precipitation, adsorption may be described by a Henry isotherm. (C) 1997 Academic Press.

Keywords: Alumina, Adsorption, Cation Adsorption, Gamma-Alumina, Adsorption-Desorption, Gamma-Al2O3 Surface, Aqueous-Solution, Water Interface, Nickel, Catalysts, Copper, Model, Codeposition

Khan, A.R., Ataullah, R. and Al-Haddad, A. (1997), Equilibrium adsorption studies of some aromatic pollutants from dilute aqueous solutions on activated carbon at different temperatures. *Journal of Colloid and Interface Science*, **194** (1), 154-165.

Full Text: [J\J Col Int Sci194, 154.pdf](J/J%20Col%20Int%20Sci194,%20154.pdf)

Abstract: Aqueous solutions of phenol, p-chlorophenol, and p-nitrophenol have been used to determine the adsorption isotherm for single solute systems on activated carbon at different temperatures. The experimental program has been conducted to investigate the influence of concentration and temperature. All the reported equilibrium isotherm equations have been tried on present and published experimental data. A generalized isotherm equation which was proposed by Khan et al. (6, 10) and tested for bi-solute adsorption data has been modified for single-solute system. The temperature dependency has also been incorporated into a generalized equation. It has been noticed that the Radke and Prausnitz (7) and generalized isotherm equations could represent the entire data with a minimum average percentage error. The influence of different adsorbents, sorbate concentrations, and pH of aqueous solutions has also been discussed in detail. The temperature dependency has been investigated using both the Dubinin-Astakov (13) and the modified generalized equation. The generalized equation describes the experimental and published data adequately and provides a single value of differential molar heat of adsorption, ΔH-ads, for a single solute adsorption system. The Dubinin-Astakov isotherm equation has shown an increasing trend of ΔH-ads as the loading of adsorbent has increased. (C) 1997 Academic Press.

Keywords: Activated Carbon, Liquid Phase Adsorption, Adsorbent and Sorbate Properties, Organic Pollutants, Surface-Diffusion, Isotherm, Adsorbents, Equation, Solutes, Phase, Model

Espinosa-Jiménez, M., Ontiveros-Ortega, A. and Giménez-Martín, E. (1997), Surface energetics of the adsorption process of a cationic dye on leacril fabrics. *Journal of Colloid and Interface Science*, **194** (2), 419-426.

Full Text: [J\J Col Int Sci194, 419.pdf](J/J%20Col%20Int%20Sci194,%20419.pdf)

Abstract: In this paper are presented data on the zeta potential, adsorption processes, and energy of interaction between Leacril and a cationic dye, crystal violet (CV) in the process of dyeing of Leacril. The method for obtaining the values of zeta potential of the system is the streaming potential technique. Previous models of bundles of capillaries have been tested by comparison with precise values of the zeta potential of the system. The model that presents a higher confidence level is the Goring and Mason model. The zeta potential results reveal that the uptake of crystal violet on Leacril fibers takes place by means of electrostatic attraction between the cation of the dye and both the sulfonate and the sulfate end-groups of the Leacril. Given the hydrophobic character of the Leacril and the amphiphilic nature of the dye molecules, hydrophobic attractions between the fiber and the hydrophobic part of the crystal violet might account for the adsorption of the cationic dye onto the fibers even when hindered by electrostatic repulsion. The data for the adsorption of the dye on the fibers indicate that the adsorption is favored by increasing the temperature of the process. This could be due to increased ionization of the sulfonate and sulfate end-groups of the Leacril, with increasing temperature of adsorption. The behavior of the components of the interaction energy, between the Leacril and the dye, is analyzed in the present paper in light of van Oss’s theory. Using both the thin layer wicking and contact angle techniques, we have determined the values of the components of the surface-free energy of Leacril fabrics and of the crystal violet, respectively. The total interaction energy between the Leacril and the cationic dye has been obtained by means of sum of three components, the electrical, Delta G (EL), acid-base, Delta G (AB), and Lifshitz-van der Waals, Delta G (LW), respectively. Estimation of the electrical component makes use of the zeta potential of the system Leacril/cationic dye obtained by means of the streaming potential technique. Two approaches were followed in order to estimate the interfacial (excluding electrostatic) free energy of interaction Delta G (IF) between Leacril fibers and CV: (i) the determination of the interactions between the fiber and dye solutions of different concentrations and (ii) estimations of Delta G (IF) between fiber and dye molecules in the presence of water. These combined methods are in agreement with the experimental results obtained in this work. These methods explain qualitatively the adsorption of the cationic dye on Leacril in the entire range of concentrations of dye used in the present work. Based on the study of the interfacial interactions carried out in the present work the adsorption of crystal violet onto Leacril is favorable from a thermodynamic point of view.

Tamura, H., Katayama, N. and Furuichi, R. (1997), The Co2+ adsorption properties of Al2O3, Fe2O3, Fe2O3, TiO2, and MnO2 evaluated by modeling with the Frumkin isotherm. *Journal of Colloid and Interface Science*, **195** (1), 192-202.

Full Text: [J\J Col Int Sci195, 192.pdf](J/J%20Col%20Int%20Sci195,%20192.pdf)

Abstract: Adsorption of Co(II) ions on metal oxides is related to radioactive 60Co(II) (de)contamination of nuclear power plants, Co(II) ion retention in soils as a plant nutrient, concentration of Co(II) in deep-sea manganese nodules, and other applications. Here, the amount of adsorbed Co(II) on metal oxides was measured as a function of the pH and concentration of Co(II) ions, and the adsorption properties of metal oxides were evaluated with a model that considers simultaneous (1: 1), and (1: 2), exchange reactions between Co2+ aqua ions and surface hydroxyl protons obeying the Frumkin isotherm. The possibility of participation of mono-and polynuclear Co(II) hydroxo complexes in the adsorption was examined, and it was suggested that these species play no role under the conditions here. From the model parameters, it was found that the Co2+ adsorption ability of metal oxides increases in the order Al2O3 < Fe2O3 < TiO2 < Fe3O4, < MnO2, showing a good correlation to the electronegativity Xi of the lattice metal ions of the oxides. The Co2+ adsorption was divided into two processes (1), deprotonation of surface hydroxyl sites and (2), bonding of Co2+ to the deprotonated sites with a negative charge. With increasing Xi, process 1 increases possibly due to the decrease in the donor electron density responsible for covalent bonds with protons, while process 2 changes only slightly. It was suggested that process 2 is due to ionic bond formation (“electrostatic contact adsorption”), which is independent of the donor electron density, and the correlation of the overall process to Xi found here was ascribed to process 1 above. (C) 1997 Academic Press.

Keywords: Co(II) Ion, Metal Oxides, Adsorption, Electronegativity, Frumkin Isotherm, Modeling, Oxide-Water Interface, Hydrous Manganese Oxide, Hydrolyzable Metal-Ions, Exchange, Surface, Co(II), Particles, Sorption, Dioxide, Goethite

Wu, G., Koliadima, A., Her, Y.S. and Matijević, E. (1997), Adsorption of dyes on nanosize modified silica particles. *Journal of Colloid and Interface Science*, **195** (1), 222-228.

Full Text: [J\J Col Int Sci195, 222.pdf](J/J%20Col%20Int%20Sci195,%20222.pdf)

Abstract: The adsorption of several anionic dyes on nanosize alumina-modified silica particles of different compositions and modal sizes has been studied. These silica cores have the same surface properties as alumina dispersed in aqueous solutions. The negatively charged dyes are electrostatically attracted to positively charged cores and chemisorbed by forming a surface Al lake. The application of so obtained pigments in the preparation of color films and their optical characteristics are described. Copyright 1997 Academic Press.

Keywords: Adsorption of Dyes, Color Films, Nanosize Pigments, Silica/Dye Pigments

Tamura, H. and Furuichi, R. (1997), Adsorption affinity of divalent heavy metal ions for metal oxides evaluated by modeling with the Frumkin isotherm. *Journal of Colloid and Interface Science*, **195** (1), 241-249.

Full Text: [J\J Col Int Sci195, 241.pdf](J/J%20Col%20Int%20Sci195,%20241.pdf)

Abstract: Adsorption of divalent heavy metal ions, M(II), on metal oxides is important to determine the behavior of ions in waters and soils. The amount of adsorbed Pb(II), Cu(II), Zn(II), Co(II), Ni(II), and Mn(II) ions on the two oxides MnO2 and Fe2O3 was measured as a function of the pH and concentration of the ions under the conditions where no mono-and polynuclear hydroxo complexes play a role in the adsorption. The adsorption affinity of these ions for the oxides was evaluated with a model that considers simultaneous (1: 1), and (1: 2), exchange reactions between M2+ aqua ions and surface hydroxyl protons (surface complexation) obeying the Frumkin isotherm. From the model parameters, it was found that the affinity order for (1: 1), complex formation is Cu2+ > Mn2+ > Zn2+ > Co2+ > Ni2+ for MnO2 and Pb2+ > Cu2+ > Zn2+ > Co2+ for Fe2O3. A large affinity of Mn2+ for MnO2 was ascribed to the oxidation of this ion by MnO2. A good correlation between the stability constants of (1: 1), surface complexes and those of (1: 1), hydroxo complexes in solution was obtained. The adsorption affinities of ions here are the affinities for deprotonated hydroxyl sites with negative charge, since for all the ions the oxides are common and the deprotonation properties of hydroxyl sites are the same. The good correlation suggests that the two reactions are similar: From electrostatic theory including crystal field corrections, the both reactions could be regarded as due to ionic bond formation between the positive charge of metal ions and the negative charge of deprotonated sites on oxides or hydroxide ions in solution, as we have suggested previously. (C) 1997 Academic Press.

Keywords: Divalent Heavy Metal Ions, Metal Oxides, Hydroxo Complexes, Electrostatic Contact Adsorption, Ionic Bonding, Frumkin Isotherm, Modeling, Surface Hydroxyl-Groups, Manganese-Dioxide, Exchange Adsorption, Water Interface, Acid-Base, Particles, Complexes, Oxidation, Sites, TiO2

Filius, J.D., Hiemstra, T. and van Riemsdijk, W.H. (1997), Adsorption of small weak organic acids on goethite: Modeling of mechanisms. *Journal of Colloid and Interface Science*, **195** (2), 368-380.

Full Text: [J\J Col Int Sci195, 368.pdf](J/J%20Col%20Int%20Sci195,%20368.pdf)

Abstract: The adsorption of lactate, oxalate, malonate, phthalate, and citrate has been determined experimentally as a function of concentration, pH, and ionic strength. The data have been described with the CD-MUSIC model of Hiemstra and van Riemsdijk [J. Colloid Interface Sci. 179, 488-508 (1996)] which allows a distribution of charge of the organic molecule over the surface and the Stern layer. Simultaneously, the concentration, pH, and salt dependency as well as the basic charging behavior of goethite could be described well. On the basis of model calculations, a distinction is made between inner and outer sphere complexation of weak organic acids by goethite. The results indicate that the affinity of the organic acids is dominated by the electrostatic attraction. The intrinsic affinity constants for the exchange reaction of surface water groups and organic acids, expressed per bond, increases with increasing number of reactive groups on the organic molecule. Ion pair formation between noncoordinated carboxylic groups of adsorbed organic acids and cations of the background electrolyte proved to be important for the salt dependency. The knowledge obtained may contribute to the interpretation of the binding of larger organic acids like fulvic and humic acids. (C) 1997 Academic Press.

Keywords: Adsorption, Citrate, Goethite, Inner Sphere, Lactate, Malonate, MUSIC Model, Organic Acids, Outer Sphere, Oxalate, Oxides, pHthalate, Spectroscopy, Aqueous-Solution Interface, Carboxyl-Group Structures, Surface Complexation, Hydrous Oxides, Fulvic-Acid, Alpha-Feooh, Humic Substances, Suwannee River, pHosphate, Gibbsite

Seki, H., Suzuki, A. and Mitsueda, S.I. (1998), Biosorption of heavy metal ions on *Rhodobacter sphaeroides* and *Alcaligenes eutrophus* H16. *Journal of Colloid and Interface Science*, **197** (2), 185-190.

Full Text: [J\J Col Int Sci197, 185.pdf](J/J%20Col%20Int%20Sci197,%20185.pdf)

Abstract: A fundamental study of the application of bacteria to the recovery of toxic heavy metals from aqueous environments was carried out. The biosorption characteristics of cadmium and lead ions were determined with purple nonsulfur bacteria, *Rhodobacter sphaeroides* and hydrogen bacteria, *Alcaligenes eutrophus* H16 that were inactivated by steam sterilization. A simplified version of the metal binding model proposed by Plette et al. was used for the description of metal binding data. The results showed that the biosorption of bivalent metal ions to whole cell bodies of the bacteria was due to monodentate binding to two different types of acidic sites: carboxilic and phosphatic-type sites. The number of metal binding sites ofA. eutrophuswas 2.4-fold larger than that of *R. sphaeroides*.

Keywords: Biosorption, Heavy Metals, *Rhodobacter Sphaeroides*, *Alcaligenes Eutrophus*

Parida, K.M., Samal, A. and Das, N.N. (1998), Studies on Indian Ocean manganese nodules. 9. Catalytic oxidation of thiols to disulphides by central Indian Ocean ferromanganese nodules. *Journal of Colloid and Interface Science*, **197** (2), 236-241.

Full Text: [J\J Col Int Sci197, 236.pdf](J/J%20Col%20Int%20Sci197,%20236.pdf)

Abstract: The oxidation of thiols to corresponding disulfides by Indian Ocean ferromanganese nodules has been studied under varying experimental conditions. More than 90% conversion of thiols (2.5×10-3 mol) was achieved at 35°C using 0.1 g nodules, The oxides of Mn, Fe, Ca, Mg, and Al and surface oxygen in the nodules are most likely responsible for the oxidation of thiols. Under identical conditions the oxidative conversion of thiols decreases in the order 1-dodecanethiol < 1-hexanethiol < 1, 4-butanedithiol < alpha-toluenethiol. (C) 1998 Academic Press.

Keywords: Oxidation, Thiols, Disulfides and Manganese Nodules, Crystalline Modifications, Disulfides, MnO2

Churaev, N.V., Setzer, M.J. and Adolphs, J. (1998), Influence of surface wettability on adsorption isotherms of water vapor. *Journal of Colloid and Interface Science*, **197** (2), 327-333.

Full Text: [J\J Col Int Sci197, 327.pdf](J/J%20Col%20Int%20Sci197,%20327.pdf)

Abstract: Using an exponential form of an isotherm of adsorption the excess surface free energy of a solid surface covered with an adsorption or wetting film Δγsv was calculated on the basis of Gibbs equation starting from the state of an infinitely thick film. Isotherms of adsorption and of excess surface free energy were calculated for different values of two parameters that characterize the range of action of surface forces and corresponding decay length, In the case of partial wetting of a solid surface, isotherms consisting of two exponential terms were used, as was proposed earlier by A. Adamson. Equilibrium contact angles that are formed with droplets of bulk liquid were calculated using the Frumkin-Derjaguin approach in dependence on the parameters of isotherms. Calculations of contact angles that are formed between convex capillary menisci in thin pores, at relative vapor pressure lower than 1, have shown that a transition from partial wetting of a lone solid surface (at p/ps = 1), to complete wetting in thin pores (at p/ps < 1), may occur. Corresponding threshold values of relative vapor pressure and pore radii were calculated, In the case of complete wetting, corrections for capillary pressures that arise due to formation of a transition zone between wetting films and curved meniscus surfaces were estimated. The calculations are limited by the values of relative vapor pressure near saturation when thick enough wetting films are formed on pore surfaces. Due to the application of model isotherms with some adopted parameters, the results obtained are qualitative in nature, However, the methods of calculation developed for the excess free energy of solid surfaces covered with thin adsorption of thicker wetting films and of contact angles outside and inside thin pores may be of general interest. (C) 1998 Academic Press.

Keywords: Electrolyte-Solutions, Hydration Forces, Mica Surfaces, Contact Angles

Dai, M.G. (1998), Mechanism of adsorption for dyes on activated carbon. *Journal of Colloid and Interface Science*, **198** (1), 6-10.

Full Text: [J\J Col Int Sci198, 6.pdf](J/J%20Col%20Int%20Sci198,%206.pdf)

Abstract: Therelationship between saturated adsorption amount (*A*s) and pH and the relationshipbetweensaturated adsorption amount (*A*s) and ζ potentials for twocationic dyesand three anionic dyes on activatedcarbon havebeen studied. It has been found that *A*s of thedyes on activated carbonis correlated with theelectrostaticforces between charges on the carbonsurfaceand ionic dyes. The experimental resultsshowedthree distinct states regarding theeffect of ζ potentialon carbon surface. Inthe neutral potential statewhere ζ potential is nearly zero, theelectrostaticinteractions between the carbon surface and the dyesarenegligible and the adsorptionforces are mainlydispersion forces.Therefore, pH has no effect on *A*s. Inthe positive or negativepotential states, there existstheelectrostatic attractive or repulsiveforcesbetween activated carbon and the ionic dyes.Theadsorption forces are the sum or differenceof dispersionand electrostaticforces. The adsorption amount, *A*s, changes with ζ potential. Thedifferent types ofadsorption forcesin the three potential states revealthemechanism of adsorption for the dyes onactivatedcarbon. The conclusion is further supportedby thekinetic and thermodynamicparameters that were calculatedfrom theexperimental data. (C) 1998 Academic Press, Inc.

Keywords: Activated Carbon, Adsorption, ζ Potential, Dyes

Daughney, C.J. and Fein, J.B. (1998), The effect of ionic strength on the adsorption of H+, Cd2+, Pb2+, and Cu2+ by *Bacillus subtilis* and *Bacillus licheniformis*: A surface complexation model. *Journal of Colloid and Interface Science*, **198** (1), 53-77.

Full Text: [J\J Col Int Sci198, 53.pdf](J/J%20Col%20Int%20Sci198,%2053.pdf)

Abstract: Toquantify metal adsorption onto bacterial surfaces, recentstudies have applied surfacecomplexation theoryto model the specific chemical andelectrostaticinteractions occurring at thesolution-cellwall interface. However, to date, the effect ofionicstrength on these interactions hasnot beeninvestigated. In this study, we perform acid-base titrations ofsuspensionscontaining *Bacillus subtilis* or *Bacilluslicheniformis*in 0.01 or 0.1 M NaNO3, and we evaluatethe constantcapacitance and basic Sterndouble-layer modelsfor their ability to describeionic-strength-dependentbehavior. The constant capacitancemodelprovides the best description of theexperimentaldata. The constant capacitance modelparameters varybetween independentlygrown bacterial cultures, possiblydue tocell wall variation arising fromgeneticexchange during reproduction. We perform metal-*B.subtilis*and metal-*B. licheniformis*adsorption experimentsusing Cd, Pb, and Cu, and we solve for stabilityconstantsdescribing metal adsorption ontodistinctfunctional groups on the bacterial cell walls. We findthatthese stability constants varysubstantially butsystematicallybetween the two bacterial species at the twodifferentionic strengths. (C) 1998 Academic Press, Inc.

Keywords: Bacteria, Metal, Adsorption, Ionic Strength

Altin, O., Özbelge, H.O. and Doğu, T. (1998), Use of general purpose adsorption isotherms for heavy metal-clay mineral interactions. *Journal of Colloid and Interface Science*, **198** (1), 130-140.

Full Text: [J\J Col Int Sci198, 130.pdf](J/J%20Col%20Int%20Sci198,%20130.pdf)

Abstract: General purpose adsorption isotherm equations were fitted to the sorption data of lead and cadmium on both unmodified and Ca-saturated kaolinite and montmorillonite. Langmuir-Freundlich, Redlich-Petersen, Tóth, Dubinin-Radushkevich, competitive Langmuir, and some modified forms of these isotherms were fitted to experimental data, and their goodnesses of fit are compared. The adjustable parameters of the Langmuir- and Freundlich-based isotherms were estimated by nonlinear least-squares analysis. The application of these two isotherms which allow for the effect of surface heterogeneity for both multiple and single desorbing ions during the sorption process was also studied. It was concluded that Redlich-Petersen, Tóth, and original and modified forms of Dubinin-Radushkevich isotherms perform superior to the others both in high and lour concentration regions for both unmodified and Ca-saturated clays. Competitive Langmuir adsorption isotherm for Ca-saturated clays fitted web for Pb adsorption, while a change of slope was observed for Cd adsorption.

Keywords: Adsorption Isotherms, Heavy Metals, Clay Minerals, Ion-Exchange Reactions, Langmuir Equation, Lead Adsorption, Approximations, Derivation, Surfaces, Soils

Tvardovski, A.V. and Fomkin, A.A. (1998), Theory of adsorption in microporous adsorbents. *Journal of Colloid and Interface Science*, **198** (2), 296-299.

Full Text: [J\J Col Int Sci198, 296.pdf](J/J%20Col%20Int%20Sci198,%20296.pdf)

Abstract: It is shown that the known Dubinin-Radushkevich (DR) equation, which is widely used in engineering calculations of different technological processes and, in particular, in the field of chemical protection, follows from an earlier equation representing the interphase equilibrium condition for certain model prerequisites. A physical justification of the DR equation and its refinement is presented. (C) 1998 Academic Press.

Keywords: Adsorption, Microporous Adsorbents, Theory of Adsorption, The Dubinin-Radushkevich Equation, Isotherm

Fischer, D., Caseri, W.R. and Hähner, G. (1998), Orientation and electronic structure of ion exchanged dye molecules on mica: An X-ray absorption study. *Journal of Colloid and Interface Science*, **198** (2), 337-346.

Full Text: [J\J Col Int Sci198, 337.pdf](J/J%20Col%20Int%20Sci198,%20337.pdf)

Abstract: Dye molecules are frequently used to determine the specific surface area and the ion exchange capacity of high-surface-area materials such as mica. The organic molecules are often considered to be planar and to adsorb in a flat orientation. In the present study we have investigated the orientation and electronic structure of crystal violet (CV) and malachite green (MG) on muscovite mica, prepared by immersing the substrates for extended periods into aqueous solutions of the dyes of various concentrations. The K+ions of the mica surface are replaced by the organic cations via ion exchange. X-ray photoelectron spectroscopy reveals that only one amino group is involved in the interaction of CV and MG with the muscovite surface, i.e., certain resonance structures are abolished upon adsorption. With near edge X-ray absorption fine structure spectroscopy a significant tilt angle with respect to the surface was found for all investigated species. A flat orientation, as has often been proposed before, can effectively be ruled out. Hence, our results are in marked contrast to the often quoted orientation and suggest that the specific surface areas determined with dyes may, in general, be overestimated.

Keywords: Silicates, Muscovite Mica, Specific Surface Area, Ion Exchange, Triphenylmethane Dyes, Crystal Violet, Malachite Green, Orientation, X-ray Spectroscopy, NEXAFS, XPS

Parida, K.M. and Mohanty, S. (1998), Studies on Indian Ocean manganese nodules. VIII. Adsorption of aqueous phosphate on ferromanganese nodules. *Journal of Colloid and Interface Science*, **199** (1), 22-27.

Full Text: [J\J Col Int Sci199, 22.pdf](J/J%20Col%20Int%20Sci199,%2022.pdf)

Abstract: Adsorption of aqueous phosphate on Indian Ocean manganese nodules was studied as a function of time, pH, and concentrations of adsorbate and adsorbent in acetic acid-sodium acetate buffer medium. The adsorption of phosphate follows the Langmuir adsorption isotherm. The adsorption capacities of various manganese nodules for phosphate were correlated with the chemical composition and surface properties. (C) 1998 Academic Press.

Keywords: Manganese Nodules, Adsorption, pHosphate, Chemical Composition, Surface Area, Anion Adsorption, Goethite, Interfaces, Oxides, Soils, Model

Parida, K.M., Sahoo, A.K. and Das, N.N. (1998), Studies on Indian Ocean manganese nodules. XI. Physiochemical characterization and catalytic activity of silver oxide mixed manganese nodules. *Journal of Colloid and Interface Science*, **200** (2), 249-255.

Full Text: [J\J Col Int Sci200, 249.pdf](J/J%20Col%20Int%20Sci200,%20249.pdf)

Abstract: The promoting effect of Ag2O on the physicochemical properties and catalytic activity of manganese nodules has been investigated. The surface area and surface oxygen increased with addition of Ag2O, reaching a maximum at 1 mol% of Ag, and then decreased with further addition of Ag2O. The catalytic activity of manganese nodules substantially increased with addition of Ag2O over a wide range (0.25-25 mol% Ag). Addition of only 0.25 mol% of Ag to the nodule decreased the temperature of complete CO oxidation from 350°C to as low as 100°C. This enhanced activity was explained by the concerted action of Ag and Mn, where CO was preferentially adsorbed on Ag2O and oxidized. The reduced Ag was then reoxidized rapidly by oxygen transferred from Mn. The promoting effect of Ag2O on H2O2 decomposition and ketonization of acetic acid, however, was less pronounced, (C) 1998 Academic Press.

Keywords: Catalytic Activity, Silver Oxide, Manganese Nodules, Ketonization, Physicochemical Properties, Decomposition, Oxidation, MnO2, H2O2

Pan, G. and Liss, P.S. (1998), Metastable-equilibrium adsorption theory. II. Experimental. *Journal of Colloid and Interface Science*, **201** (1), 77-85.

Full Text: [J\J Col Int Sci201, 77.pdf](J/J%20Col%20Int%20Sci201,%2077.pdf)

Abstract: In a controlled simple aqueous system containing Zn-goethite, where a clear particle concentration effect (Cp effect) is observed, an increase in particle concentration (Cp) causes a simultaneous decrease in adsorption reversibility and in the adsorption isotherm. At the same time, Zn adsorbed under a lower Cp condition desorbs faster (indicating more adsorption reversibility) than that under a higher Cp condition. In another controlled simple aqueous system of Cd-goethite, where no Cp effect is observed, changes in Cp does not cause discernible changes in adsorption hysteresis and in the adsorption isotherm. Little difference in desorption rate is observed for the Cd adsorbed under different Cp conditions. The experiments were designed to avoid several important sources of error. Both the Cp effect and the non-Cp effect results are qualitatively explained and quantitatively described by the MEA theory(1). (C) 1998 Academic Press.

Keywords: Adsorption, Sorption-Desorption, Adsorption Isotherm, Particle Concentration Effect, Adsorption Kinetics, Adsorption Reversibility/Hysteresis, Adsorption pH Curve, Particle-Water, Solid-Liquid, Natural Waters, Soils, Sediments, Seawater, Zinc, Cadmium, Goethite, Goethite-Solution Interface, Hydrous Ferric-Oxide, Particle Concentration, Solids Concentration, Desorption Behavior, Suspended Matter, Aquatic Systems, Aqueous Systems, Sea-Water, Sorption

Shapiro, A.A. and Stenby, E.H. (1998), Potential theory of multicomponent adsorption. *Journal of Colloid and Interface Science*, **201** (2), 146-157.

Full Text: [J\J Col Int Sci201, 146.pdf](J/J%20Col%20Int%20Sci201,%20146.pdf)

Abstract: We develop a theory of multicomponent adsorption on the basis of the potential concept originally suggested by Polanyi. The mixture is considered as a heterogeneous substance segregated in the external field emitted by the adsorbent. The same standard equation of state, with no additional fitting parameters, is used for the segregated and for the bulk phases. With this approach, few parameters are needed to correlate pure component adsorption isotherms. These parameters may be used to predict adsorption equilibria of multicomponent mixtures without additional adjustment. A connection between the potential theory and the spreading pressure concept is established, and problems of the theory consistency are studied. Numerical algorithms are suggested for evaluation of the segregated state of the mixture in the potential field of adsorption forces. Comparison with experimental data shows good agreement and high degree of predictability of the theory developed, (C) 1998 Academic Press.

Keywords: Adsorption, Potential Theory, Multicomponent, Polanyi, Dubinin, Vacancy Solution Theory, Gas-Adsorption, Mixtures, Adsorbents, Equation

Vasudevan, D. and Stone, A.T. (1998), Adsorption of 4-nitrocatechol, 4-nitro-2-aminophenol, and 4-nitro-1, 2-phenylenediamine at the metal (Hydr)oxide/water interface: Effect of metal (Hydr)oxide properties. *Journal of Colloid and Interface Science*, **202** (1), 1-19.

Full Text: [J\J Col Int Sci202, 1.pdf](J/J%20Col%20Int%20Sci202,%201.pdf)

Abstract: Aromatic ligands possessing three combinations of phenolate and amino ligand donor groups ortho to one another have been used to compare the adsorption properties of six (hydr)oxide mineral preparations as a function of ligand concentration, surface loading, pH, and ionic strength. Strong adsorption of 4-nitrocatechol onto Ti(IV)-, Fe(III)-, and Al(III)-bearing surfaces, moderate adsorption of 4-nitro-2-aminophenol onto Ti(IV)-and Fe(III)-bearing surfaces and weak (to negligible) adsorption onto Al(III)-bearing surfaces, and negligible adsorption of 4-nitro-1, 2-phenylenediamine onto all surfaces was observed. Stoichiometries of surface complex formation and intrinsic equilibrium constants for adsorption (K-intr (s)) were determined using the computer program FITEQL. The charge-to-radius ratios of these + III and + IV surface-bound metals ions are high, yielding a strong ionic contribution to bonding and higher K-intr (s) values for anionic phenolate ligand donor groups than for neutral amino groups. In the case of Ti(IV) and Fe(III) surface metals, significant polarizability of the d orbital LUMO yields a weak-to-moderate covalent contribution to bonding with neutral amino groups. Even when differences in surface area, site density, and protonation equilibria are taken into account, extents of aromatic ligand adsorption onto (hydr)oxide minerals composed of the same metal ion are substantially different. Hence, differences in crystal and surface structure and differences in the stoichiometry of the solid (OH-vs. O2) significantly affect adsorption.

Parida, K. and Satapathy, P.K. (1998), Studies on Indian Ocean manganese nodules. XI. Physicochemical properties and catalytic activity of acetic-acid-treated manganese nodules. *Journal of Colloid and Interface Science*, **202** (2), 313-317.

Full Text: [J\J Col Int Sci202, 313.pdf](J/J%20Col%20Int%20Sci202,%20313.pdf)

Abstract: The effects of acetic acid treatment on the physicochemical properties and catalytic activity of manganese nodules have been studied. The surface area, surface oxygen, surface acidity, surface hydroxyl groups, electrical conductivity, etc., increase gradually with acid treatment up to 0.5 M and thereafter show a decreasing trend. The rate constants for H2O2 decomposition and catalytic activity for CO oxidation also follow a trend similar to that of the surface properties. (C) 1998 Academic Press.

Keywords: Acetic Acid Treatment, Physicochemical Properties, Catalytic Activity

Apak, R., Güçlü, K. and Turgut, M.H. (1998), Modeling of copper(II), cadmium(II), and lead(II) adsorption on red mud. *Journal of Colloid and Interface Science*, **203** (1), 122-130.

Full Text: [J\J Col Int Sci203, 122.pdf](J/J%20Col%20Int%20Sci203,%20122.pdf)

Abstract: The adsorption of toxic heavy metal cations, i.e., Cu(II), Cd(II), and Pb(II), on red muds has been modeled with the aid of a modified Langmuir approach assuming single-site adsorption and of a double-site binding model incorporating the effect of pH. For equilibrium concentrations of metal solutions between 0.03 and 5.8 mmol.dm-3 and equilibrium pH between 4.4 and 5.6, adsorption equilibrium constants corresponding to single-and double-site binding were found by linear and nonlinear least-squares approximation, respectively, and the double-site model was shown to conform better to experimental data. The contributions of the monomeric and dimeric hydroxo-complexes of Cu(II) to total copper adsorption at a fixed pH were also investigated. The Langmuir parameters of adsorption were found with the aid of the linearized Langmuir isotherm. This work aims to clarify heavy metal adsorption behavior on composite sorbents consisting of hydrated oxides. (C) 1998 Academic Press.

Keywords: Adsorption Modeling, Red Mud, Bauxite Waste, Adsorption of Copper(II), Cadmium(II), Lead(II), Modified Langmuir Model, pH

Biswas, S.C. and Chattoraj, D.K. (1998), Kinetics of adsorption of cationic surfactants at silica-water interface. *Journal of Colloid and Interface Science*, **205** (1), 12-20.

Full Text: [J\J Col Int Sci205, 12.pdf](J/J%20Col%20Int%20Sci205,%2012.pdf)

Abstract: The kinetics of adsorption of cationic surfactants (CTAB, MTAB and DTAB) at silica surface has been studied at various values of bulk surfactant concentration (C-2(t)), pH, ionic strength, and temperature and in presence of different electrolytes and urea. The adsorption process has been found to follow a two-step first-order kinetic rate equation with two different rate constants k(1) and k(2). From the variation of k(1) and k(2) with temperature, values of energies of activation E-a1 and E-a2 for both the kinetic steps have been evaluated. The corresponding values of enthalpies of activation (Delta H-1# and Delta H-2#), entropies of activation (Delta S-1# and Delta S-2#) have been evaluated using Eyring’s equation for absolute reaction rate. It has been found that for both the kinetic steps, Delta H-1# < T(av)Delta S-1# and Delta H-2# < T(av)Delta S-2# which means that activation reaction is largely entropy controlled. Again, for both kinetic steps, Delta H# varies linearly with T(av)Delta S#, and Delta G(1)# and Delta G(2)# vary between 70 and 88 kJ/mole of surfactant, respectively. Thus there is a entropy-enthalpy compensation effect in the adsorption process. (C) 1998 Academic Press.

Keywords: Adsorption Kinetics, Silica-Water Interface, Cationic Surfactants, Rate Constants, Acivation Parameters, Diffusion Coefficient, Solid-Liquid Interfaces, Inorganic Salts, Thermodynamics, Ellipsometry, Surfaces, Tension, Sucrose, Layers, Urea

Donohue, M.D. and Aranovich, G.L. (1998), Adsorption hysteresis in porous solids. *Journal of Colloid and Interface Science*, **205** (1), 121-130.

Full Text: [J\J Col Int Sci205, 121.pdf](J/J%20Col%20Int%20Sci205,%20121.pdf)

Abstract: Hysteresis has been observed in adsorption isotherms for a number of gas-solid systems and, generally, is attributed to adsorption in mesoporous materials with capillary condensation.This behavior is classified as Type IV or Type V in the IUPAC classification scheme. Here, lattice theory is used to predict adsorption behavior in pores. The Ono-Kondo theory is used withappropriate boundary conditions for fluid adsorption in infinite and semi-finite slit-like pores. It is shown that there can be phase transitions in the adsorbed phase which leadto hysteresis in kinetically controlled experiments. However, hysteresis in equilibrium behavior is exhibited only in pores of finite length. For finite-length pores, the interface geometry is predicted to be different during the processes of adsorption and desorption and this difference in interface shape leads to hysteresis. This simple molecular model is able to predict the change in the interface geometry without invoking the Kelvin equation or the macroscopic concept of surface tension.

Onganer, Y. and Temur, Ç. (1998), Adsorption dynamics of Fe(III) from aqueous solutions onto activated carbon. *Journal of Colloid and Interface Science*, **205** (2), 241-244.

Full Text: [J\J Col Int Sci205, 241.pdf](J/J%20Col%20Int%20Sci205,%20241.pdf)

Abstract: Granular activated carbon was utilized as adsorbent for the removal of Fe(III) ions from aqueous solutions at different temperatures and fixed pH. The batch adsorption kinetics has been described by the Lagergren equation which is a pseudo-first-order rate expression; the surface mass transfer coefficients and diffusion coefficients have been calculated at different temperatures. The intraparticle transport of Fe(III) within the pores of activated carbon was found to be the rate-limiting step, while the process of uptake obeyed the Langmuir model of adsorption. (C) 1998 Academic Press.

Keywords: Fe(III) Ions, Activated Carbon, Adsorption Dynamics, Temperature, Intraparticle Diffusion, China-Clay, Removal

? Kilduff, J.E., Karanfil, T. and Weber, Jr., W.J. (1998), Competitive effects of nondisplaceable organic compounds on trichloroethylene uptake by activated carbon. I. Thermodynamic predictions and model sensitivity analyses. *Journal of Colloid and Interface Science*, **205** (2), 271-279.

Full Text: [1998\J Col Int Sci205, 271.pdf](1998/J%20Col%20Int%20Sci205,%20271.pdf)

Abstract: Theoretical analyses were performed to investigate potential mechanisms affecting observed reductions in uptake of trichloroethylene from the aqueous phase by activated carbon loaded with nondisplaceable organic molecules. Isotherm sensitivity analysis and thermodynamically based competitive adsorption model predictions give a clear and consistent mechanistic interpretation. At low loadings of nondisplaceable organics, the most significant effect is to reduce the number of high-energy sites available to subsequently adsorbed TCE. The loss of high-energy sites causes a significant reduction in site-energy heterogeneity and reduces TCE uptake in low-equilibrium concentration regions (parts per billion) of the isotherm. As the loading of nondisplaceable compounds increases, further reductions in TCE uptake occur; however, further changes in the site-energy heterogeneity are distributed across a wide spectrum of site energies. This suggests a lowering of the average site energy, a reduction in the total number of sites, or both. In terms of TCE isotherms, this corresponds to a roughly constant percentage reduction in uptake over a wide range of equilibrium concentrations, displacing the isotherm downward relative to the uptake axis. (C) 1998 Academic Press.

Keywords: Activated Carbon, Adsorption, Displacement, Groundwater, Heterogeneity, Humic Substances, Ideal Adsorbed Solution Theory, Molecular-Weight, Site Energy Distribution, Size-Exclusion, Solute Adsorption, Tce, Thermodynamics, Trichlorobenzene, Trichloroethylene, Water

? Kilduff, J.E., Karanfil, T. and Weber, Jr., W.J. (1998), Competitive effects of nondisplaceable organic compounds on trichloroethylene uptake by activated carbon. II. Model verification and applicability to natural organic matter. *Journal of Colloid and Interface Science*, **205** (2), 280-289.

Full Text: [1998\J Col Int Sci205, 280.pdf](1998/J%20Col%20Int%20Sci205,%20280.pdf)

Abstract: An experimental program was carried out to verify theoretical predictions of competitive effects exerted by nondisplaceable organic compounds on the uptake of TCE by activated carbon. Experimental findings were consistent with isotherm sensitivity analyses and thermodynamically based competitive adsorption model predictions. At low loadings of both trichlorobenzene and a natural humic acid, the most significant effect of preloading was to reduce the number of high-energy sites available to TCE. The loss of these sites caused a significant reduction in the site-energy heterogeneity and reduced the extent of adsorption in the low-concentration region. At higher levels of preloading, further changes in the site-energy heterogeneity were small, and uptake was reduced by a roughly equal percentage across a wide range of equilibrium concentrations, suggesting the possibility of a pore blockage tin the case of humic acid) or pore filling tin the case of TCB) mechanism. Measurements of adsorbent surface area and pore volume confirmed that observed reductions in TCE uptake by preloaded carbon were associated with changes in the physical characteristics of the adsorbent. However, reductions in adsorbent surface area could only account for a significant fraction of the observed reduction in TCE uptake when either the amount preloaded was high or the TCE concentration was high, increasing the ability of TCE to compete for adsorption sites. (C) 1998 Academic Press.

Keywords: Activated Carbon, Adsorption, Adsorption Equilibria, Displacement, Humic Acid, Ideal Adsorbed Solution Theory, Macromolecules, Organic Matter, Site-Energy Distribution, Solute Adsorption, TCE, Thermodynamics, Trichlorobenzene, Trichloroethylene

Sujana, M.G., Thakur, R.S. and Rao, S.B. (1998), Removal of fluoride from aqueous solution by using alum sludge. *Journal of Colloid and Interface Science*, **206** (1), 94-101.

Full Text: [J\J Col Int Sci206, 94.pdf](J/J%20Col%20Int%20Sci206,%2094.pdf)

Abstract: The ability of treated alum sludge to remove fluoride from aqueous solution has been investigated. The studies were carried out as functions of contact time, concentration of adsorbent and adsorbate, temperature, pH, and effect of concentrations of other anions. The data indicate that treated alum sludge surface sites are heterogeneous in nature and that fits into a heterogeneous site binding model. The optimum pH for complete removal of fluoride from aqueous solution was found to be 6. The rate of adsorption was rapid during the initial 5 minutes, and equilibrium was attained within 240 minutes. The adsorption followed first-order rate kinetics. The present system followed the Langmuir adsorption isotherm model. The loading factor (i.e., the milligram of fluoride adsorbed per gram of alum sludge) increased with initial fluoride concentration, whereas a negative trend was observed with increasing temperature. The influence of addition of anions on fluoride removal depends on the relative affinity of the anions for the surface and the relative concentrations of the anions. (C) 1998 Academic Press.

Keywords: Alum Sludge, Adsorption, Chemical Composition, Fluoride, Removal, Anion Competition, Adsorption, Waste, Water

Pivovarov, S. (1998), Acid-base properties and heavy and alkaline earth metal adsorption on the oxide-solution interface: Non-electrostatic model. *Journal of Colloid and Interface Science*, **206** (1), 122-130.

Full Text: [J\J Col Int Sci206, 122.pdf](J/J%20Col%20Int%20Sci206,%20122.pdf)

Abstract: A new approach was applied to the description of acid-base properties and heavy and alkaline earth metal adsorption on the oxide-solution interface. The acid-base properties of hematite have been determined at different temperatures. The adsorption of protons and hydroxyl ions on the hematite surface has a temperature independent character. The proton and hydroxyl ion adsorption in NaCl media was explained by the reactions = H2O + H3O+ + Cl-= = H2OHCl + H2O = OH2 + OH-+ Na+ = = OHNa + H2O. The modified equation of the Frumkin-Fouler-Guggenheim isothermwas used to simulate the experimental data (theta, relative adsorption): log[theta (HCl)/ (1 – theta (HCl))]-log[H+]-log[Cl-] = log K<INF>HCl</INF>degrees + logB<INF>H</INF>[N theta< INF > HCl </INF >/ (1 + (N-1) theta<INF>HCl</INF>)]; <INF></INF> log[theta< INF> NaOH</INF >/ (1-theta< INF>NaOH</INF>)]-log[Na <SUP> + </SUP>]-log[OH <SUP>-</SUP>] = log K (NaOH) degrees + log B-OH[N theta (NaOH)/ (1 + (N-1) theta (NaOH)]. The model parameters were log B-H =-4.92±0.1, log B-OH =-2.61±0.05, N = 3.25±0.2. The site density of the hematite surface was determined to be 3.8±0.1 µmoles/m2. The values of the constants were log KO (HCl) degrees (25-100°C) = 9.50±0.1; log K (NaOH) degrees (25-100°C) = 5.93±0.1.

Seki, H. and Suzuki, A. (1998), Biosorption of heavy metal ions to brown algae, *Macrocystis pyrifera*, *Kjellmaniella crassiforia*, and *Undaria pinnatifida*. *Journal of Colloid and Interface Science*, **206** (1), 297-301.

Full Text: [J\J Col Int Sci206, 297.pdf](J/J%20Col%20Int%20Sci206,%20297.pdf)

Abstract: A fundamental study of the application of brown algae to the aqueous-phase separation of toxic heavy metals was carried out. The biosorption characteristics of cadmium and lead ions were determined with brown algae, *Macrocystis pyrifera*, *Kjellmaniella crassiforia*, and *Undaria pinnatifida*. A metal binding model proposed by the authors was used for the description of metal binding data. The results showed that the biosorption of bivalent metal ions to brown algae was due to bivalent binding to carboxylic groups on alginic acid in brown algae. (C) 1998 Academic Press.

Keywords: Dissolved Copper, Marine-Algae, Humic-Acid, Cadmium, Biomass, Lead, Adsorption, Alginate, Calcium, Removal, Biosorption, Heavy Metals, Brown Algae, *Macrocystis pyrifera*, *Kjellmaniella crassiforia*, *Undaria pinnatifida*

Zheng, Y.Z. and Gu, T.Y. (1998), Modified van der Waals equation for the prediction of multicomponent isotherms. *Journal of Colloid and Interface Science*, **206** (2), 457-463.

Full Text: [J\J Col Int Sci206, 457.pdf](J/J%20Col%20Int%20Sci206,%20457.pdf)

Abstract: A modified two-dimensional van der Waals equation model was proposed for the prediction of multicomponent gas-solid adsorption isotherms from corresponding single-component adsorption equilibrium data. The model was used to predict adsorption isotherms of CO-CO2 mixtures and CO2-N2 mixtures on Cu(I)-NaY zeolite. Experimental adsorption equilibrium data of the two systems were compared with results calculated from the model and three other models in the literature: the ideal adsorbed solution model, the vacancy solution theory of adsorption using the Flory-Huggins activity coefficient equation, and the two-dimensional van der Waals equation. The results indicated that the modified van der Waals equation predicted the experimental results better than the three other models for the two systems studied, especially for the CO-CO2 system, which involved chemical reaction during adsorption and exhibited azeotropic behavior. (C) 1998 Academic Press.

Keywords: Gas Adsorption, Isotherm, Zeolite, Equation of State, Adsorption, Carbon

Shapiro, A.A. and Stenby, E.I. (1998), Analysis of multicomponent adsorption close to a dew point. *Journal of Colloid and Interface Science*, **206** (2), 546-557.

Full Text: [J\J Col Int Sci206, 546.pdf](J/J%20Col%20Int%20Sci206,%20546.pdf)

Abstract: We develop the potential theory of multicomponent adsorption close to a dew point. The approach is based on an asymptotic adsorption equation (AAE) which is valid in a vicinity of the dew point. By this equation the thickness of the liquid film is expressed through thermodynamic characteristics of the bulk phase. The AAE makes it possible to study adsorption in the regions of both the normal and the retrograde condensation. A simple correlation of the Kelvin radius for capillary condensation and the thickness of the adsorbed film is established. Numerical testing shows good agreement between the AAE and the direct calculations, even if the mixture is not close to a dew point. (C) 1998 Academic Press.

Keywords: Adsorption, Potential Theory, Multicomponent, Dew Point, Adsorbents, Equation

Cheah, S.F., Brown Jr., G.E. and Parks, G.A. (1998), XAFS spectroscopy study of Cu(II) sorption on amorphous SiO2 and γ-Al2O3: Effect of substrate and time on sorption complexes. *Journal of Colloid and Interface Science*, **208** (1), 110-128.

Full Text: [J\J Col Int Sci208, 110.pdf](J/J%20Col%20Int%20Sci208,%20110.pdf)

Abstract: Wehave used X-ray absorption fine structure (XAFS) spectroscopy to investigate Cu(II) sorption complexes on high surface area amorphous silica (am-SiO2) and γ-Al2O3. For Cu(II) on γ-Al2O3, analysis of XAFSdatacollected after a solution-solid totalcontacttime of 80-170 h showed that monomeric Cu(II) speciespredominate at surface coverages of0.007 and 0.05 µmolm-2. Cu(II) on the γ-Al2O3 surface has aluminum secondneighbors atabout 2.8 Å. Geometricalconsiderationsindicate that this distance is consistentwithmodels of Cu(II) binding to the γ-Al2O3surface ininner-spherebidentate or monodentate modes on Al(O, OH)6octahedra. For Cu(II) sorbed onam-SiO2, analysis of XAFS datacollected after a solution-solid total contact timeof80-110 h showed that a dimericCu(II)-surfacecomplex predominates, along with a minoritymonomeric Cu(II) surface species, at 0.03 and 0.05 µmol m-2. The XAFS-derived Cu-Si distance is inthe rangeof 2.98 to 3.05 Å, suggesting that Cu(II) binds toam-SiO2in an inner-sphere, monodentate fashion. XAFSspectra of Cu(II) sorbed on am-SiO2 collected after 20-30h totalcontact time are quantitativelydifferentfrom those collected after 80-90 h contacttime. Analyses of these spectra indicate that theratio ofdimeric to monomeric Cu(II) surface complexes has increasedwithcontact time. A discussion of theprocessesresponsible for the different Cu(II) complexes on Am-SiO2 and γ-Al2O3 is presented. (C) 1998 Academic Press, Inc.

Keywords: Cu(II), SiO2, Al2O3, Surfaces, Cu Dimmer, Sorption, XAFS, Oxide-Water Interface, Sorption Kinetics

?Yang, C.H. (1998), Statistical Mechanical Study on the Freundlich Isotherm Equation. *Journal of Colloid and Interface Science*, **208** (2), 379-387.

Full Text: [J\J Col Int Sci208, 379.pdf](J/J%20Col%20Int%20Sci208,%20379.pdf)

Abstract: The Freundlich isotherm equation, in the form of θ = *KP*1/*n*, was derived by treating the model with the ensemble theory in statistical mechanics as a theoretical tool, the model being set up for the adsorption system with emphasis on two factors, namely the lateral interaction between the adsorbed molecules and the energetic surface heterogeneity. The validity of the derived equation was examined from different aspects. The above statistical mechanical derivation led to the theoretical prediction of the Freundlich isotherm equation being also applicable to the nearly homogeneous surfaces and the expressions of the empirical constants*K*and*n*in terms of the microscopic properties of molecules and temperature. With these expressions, the experimentally observed properties of the empirical constants*K*and*n*(such as temperature dependence) were interpreted and, in a statistical mechanical sense, the relationship between the macroscopic behavior of the adsorption system and the microscopic properties of molecules, of which the adsorption system is composed, was established. Besides, the expression for the empirical constant*n*led to the estimation of the relative importance of the above two factors to the adsorption capacity of the adsorption system.

Keywords: Statistical Mechanics, Freundlich Isotherm Equation, Lateral Interaction, Energetic Surface Heterogeneity, Microscopic Properties of Adsorbed Molecules

Wang, J.M., Huang, C.P., Allen, H.E., Cha, D.K. and Kim, D.W. (1998), Adsorption characteristics of dye onto sludge particulates. *Journal of Colloid and Interface Science*, **208** (2), 518-528.

Full Text: [J\J Col Int Sci208, 518.pdf](J/J%20Col%20Int%20Sci208,%20518.pdf)

Abstract: The dye adsorption characteristics of sludge particulates, both primary and secondary, were studied. Major factors such as pH, SS (suspended solid), and ionic strength on dye adsorption were evaluated. An anionic dye, new coccine acid red #18 was used as the adsorbate. Results show that dye adsorption is a fast process and can reach equilibrium in 30 min. Results also show that pH is the most important factor determining the dye adsorption. Decreasing pH can significantly increase the adsorption of the dye. Greater adsorption density can be achieved at SS less than 1 g/L. However, at SS concentration greater than 1 g/L, the dye adsorption density remains relatively unchanged. It is found that the increase in the ionic strength decreases the dye adsorption density. Dye adsorption can be described by a multilayer adsorption isotherm. The multilayer adsorption model allows the calculation of both the monolayer adsorption density (i.e., the maximum first layer adsorption density) and the equilibrium constants for the first layer and subsequent adsorption. Based on the monolayer adsorption capacity, it is possible to determine the specific surface area of various sludge particles.

Xu, Y.M., Wang, R.S. and Wu, F. (1999), Surface characters and adsorption behavior of Pb(II) onto a mesoporous titanosilicate molecular sieve. *Journal of Colloid and Interface Science*, **209** (2), 380-385.

Full Text: [J\J Col Int Sci209, 308.pdf](J/J%20Col%20Int%20Sci209,%20308.pdf)

Abstract: Removal of Pb2+ ions from aqueous solution using the adsorption process onto Ti-MCM-41 has been investigated. A simplified surface complexation model was used to calculate the conditional binding constants for surface complexation of Pb2+ ions onto Ti-MCM-41, Dynamic modeling of the adsorption showed that the first-order reversible kinetic model held for the adsorption process. The overall rate constant k’, the adsorption rate constant k(1), the desorption rate constant k(2), and the equilibrium constant K-e for the adsorption process were calculated from the results of the thermodynamic analysis, and standard free energy ΔG°, standard enthalpy ΔH°, and standard entropy ΔS° of the adsorption process were also calculated. Equilibrium modeling of the adsorption showed that the adsorption of Pb2+ ions was fitted to a Freundlich isotherm. (C) 1999 Academic Press.

Keywords: Mesoporous Silica, Titanium, Ti-MCM-41, Adsorption, Dynamics, Thermodynamics, Removal of Lead, Oxide-Water Interface, Amorphous Iron Oxyhydroxide, Metal-Ions, Removal, Complexation, Ionization, Carbon

Kraepiel, A.M.L., Keller, K. and Morel, F.M.M. (1999), A model for metal adsorption on montmorillonite. *Journal of Colloid and Interface Science*, **210** (1), 43-54.

Full Text: [J\J Col Int Sci210, 43.pdf](J/J%20Col%20Int%20Sci210,%2043.pdf)

Abstract: A consistent thermodynamic model is developed for metalsorption on expanding 2: 1 layer clays such as montmorillonite. The particle of clay, including lamellae and interlayers, is represented asb a porous solid bearing a permanent negative charge (resulting from isomorphic substitution) with an infinite plane interface (i.e., edges) with the solution. Cation exchange occurs inside the clay particle as the result of the negative potential of the clay. Surface complexation reactions take place at the interface whose surface charge and potential are pH dependent. The potential in the bulk of the clay and near the interface, as well as the surface potential-surface charge density relation, are calculated taking into account the effect of the permanent negative charge. The results are discussed and compared with the classic Gouy-Chapman theory. A subroutine (Clayeql) with the new potential-charge relationships is implemented in the thermodynamic equilibrium program Mineql +3.0 and is used to fit an extensive published experimental data set on adsorption of transition metals on montmorillonite. The model is shown not only to fit satisfactorily all the data, but also to explain specific features of adsorption on clays compared to oxides. In particular, the increase in the surface concentration of protons with decreasing ionic strength is successfully reproduced and the weaker dependence of metalsorption on pH compared to oxides is correctly fitted.

Parida, K.M. and Satapathy, P.K. (1999), Studies on Indian Ocean manganese nodules. XII. Physicochemical properties and catalytic activity of sodium hydroxide treated manganese nodules. *Journal of Colloid and Interface Science*, **210** (1), 130-133.

Full Text: [J\J Col Int Sci210, 130.pdf](J/J%20Col%20Int%20Sci210,%20130.pdf)

Abstract: The effects of alkali (sodium hydroxide) treatment on the physico-chemical properties and catalytic activity for H2O2 decomposition and CO oxidation of Indian Ocean manganese nodules have been studied. The surface area, surface oxygen, surface hydroxyl groups, etc. increase with alkali treatment up to 0.05 M and there after show a decreasing trend. The high catalytic activity of 0.05 M NaOH treated samples are correlated with the surface properties. (C) 1999 Academic Press.

Keywords: Manganese Nodules, Alkali Treatment, Textural Properties, Catalytic Activity, MnO2

Hiemstra, T. and VanRiemsdijk, W.H. (1999), Surface structural ion adsorption modeling of competitive. *Journal of Colloid and Interface Science*, **210** (1), 182-193.

Full Text: [J\J Col Int Sci210, 182.pdf](J/J%20Col%20Int%20Sci210,%20182.pdf)

Abstract: Spectroscopy has provided a progressive flow of information concerning the binding mechanism (s) of ions and their surface-complex structure. An important challenge in surface complexation models (SCM) is to connect the molecular microscopic reality to macroscopic adsorption phenomena. This is important because SCM alone provide insufficient insight in the binding mechanisms, and moreover, it is a priori not obvious that SCM, which describe the pH dependent adsorption correctly in simple systems, will predict the ion interaction under multicomponent conditions. This study elucidates the primary factor controlling the adsorption process by analysing the adsorption and competition of PO4, AsO4, and SeO3. We show that the structure of the surface-complex acting in the dominant electrostatic field can be ascertained as the primary controlling adsorption factor. The surface species of arsenate are identical with those of phosphate and the adsorption behavior is very similar. On the basis of the selenite adsorption, we show that the commonly used 2pK models are incapable to incorporate in the adsorption modeling the correctbidentate binding mechanism found by spectroscopy. The use of the bidentate mechanism leads to a proton-oxyanion ratio and corresponding pH dependency that are too large. The inappropriate intrinsic charge attribution to the primary surface groups and the condensation of the inner sphere surface complex to a point charge are responsible for this behavior of commonly used 2pK models. Both key factors are differently defined in the charge distributed multi site complexation (CD-MUSIC) model and are based in this model on a surface structural approach. The CD-MUSIC model can successfully describe the macroscopic adsorption phenomena using the surface speciation and binding mechanisms as found by spectroscopy. The model is also able to predict the anion competition well. The charge distribution in the interface is in agreement with the observed structure of surface complexes.

Riazi, M.R. and Khan, A.R. (1999), A thermodynamic model for gas adsorption isotherms. *Journal of Colloid and Interface Science*, **210** (2), 309-319.

Full Text: [J\J Col Int Sci210, 309.pdf](J/J%20Col%20Int%20Sci210,%20309.pdf)

Abstract: In this paper based on the principle of solution thermodynamics for gas-solid equilibrium, a relation is developed to express gas adsorption isotherms. An activity coefficient model based on weight fraction of sorbate in the solid phase has been derived that well describes the behavior of various gases on different types of adsorbents. The proposed model has been evaluated and compared with four other models commonly used for gas adsorption isotherms in the literature. For 12 different systems at various isotherms for the temperature range-128 to 100°C and the pressure range 0.02 to 1219 kPa for 689 data points, the proposed model predicts equilibrium pressure with an average deviation of 5.3%, which is about half of the error obtained from other methods. The proposed model clearly outperforms other available methods such as the vacancy solution theory, the ideal adsorption solution model, and other various modified forms of the Langmuir isotherm. Unique features of the proposed model are its simplicity, generality, and accuracy over the entire pressure and temperature ranges. (C) 1999 Academic Press.

Keywords: Gas Adsorption Isotherm, Thermodynamic Model, Solid Activity Coefficient, 13x Molecular-Sieves, Equilibrium Adsorption, Activated Carbon, Pollutants, Ethylene, Mixtures, Equation, Ethane

Hocker, T., Aranovich, G.L. and Donohue, M.D. (1999), Monolayer adsorption for the subcritical lattice gas and partially miscible binary mixtures. *Journal of Colloid and Interface Science*, **211** (1), 61-80.

Full Text: [J\J Col Int Sci211, 61.pdf](J/J%20Col%20Int%20Sci211,%2061.pdf)

Abstract: Lattice theories have been used extensively to predict and correlate liquid-liquid equilibria in mixtures. Lattice theories also have been used to predict the behavior of gases adsorbing onto solid surfaces. Here, we use a lattice model based on the ideas of Ono and Kondo to predict the phase behavior in adsorbed monolayers for systems that are below their bulk-phase critical points. For such an analysis, it is important that molecular behavior in the bulk and the adsorbed layer is based on consistent assumptions. Here, this is accomplished by treating the fluid in the bulk as well as in the adsorbed layer as a strictly regular solution. Interesting new adsorption isotherms and phase diagrams are generated that provide useful insights into adsorption of both lattice gases (i.e., “mixtures” of molecules and holes) and dense lattice liquids (i.e., “mixtures” of molecules without holes), illustrating the similarities between adsorption of gases and liquids.

Apak, R., Hizal, J. and Ustaer, C. (1999), Correlation between the limiting pH of metal ion solubility and total metal concentration. *Journal of Colloid and Interface Science*, **211** (2), 185-192.

Full Text: [J\J Col Int Sci211, 185.pdf](J/J%20Col%20Int%20Sci211,%20185.pdf)

Abstract: As an alternative to species distribution diagrams (pM vs pH curves in aqueous solution) drawn for a fixed total metal concentration, this work has developed simple linear models for correlating the limiting pH of metal ion solubility-in equilibrium with the least soluble amorphous metal hydroxide solid phase-to the total metal concentration. Thus adsorptive metal removal processes in complex systems can be better designed once the limiting pH of heavy metalsolubility (i.e., pH\*) in such a complex environment can be envisaged by simple linear equations. pH\* vs pM, (Mt = total metal concentration that can exist in aqueous solution in equilibrium with M (OH)2 (s)) linear curves for uranyl-hydroxide, uranyl-carbonate-hydroxide, and mercuric-chloride-hydroxide simple and mixed-ligand systems and cupric-carbonate-hydroxide complexes in equilibrium with mixed hydroxide solid phases may enable the experimental chemist to distinguish true adsorption (e.g., onto hydrous oxide sorbents) from bulk precipitation removal of the metal and to interpret some anomalous metal fixation data-usually attributed to pure adsorption in the literature-with precipitation if the pMt at the studied pH is lower than that tolerated by pH\* vs pMt curves. This easily predictable pH\* corresponding to a given pMt may aid the design of desorptive mobilization experiments for certain metals as well as their adsorptive removal with the purpose of simulating metal adsorption and desorption cycles in real complex environments with changing ground water pH. (C) 1999 Academic Press.

Keywords: Water Interface, Adsorption, Oxides, Goethite, Desorption, Equilibria, Stability, Sorption, Cadmium, Cations, pH, Solubility, Metal Hydroxide, Total Metal Concentration, Adsorption, Hydrolytic Precipitation, pH-pM Correlation

Angove, M.J., Wells, J.D. and Johnson, B.B. (1999), The influence of temperature on the adsorption of cadmium(II) and cobalt(II) on goethite. *Journal of Colloid and Interface Science*, **211** (2), 281-290.

Full Text: [J\J Col Int Sci211, 281.pdf](J/J%20Col%20Int%20Sci211,%20281.pdf)

Abstract: The adsorption of Cd(II) and Co(TI) onto goethite was measured at five temperatures between 10 and 70°C. For both cations the amount adsorbed at any given pH increased as the temperature was increased. Cd(II) adsorbed at a slightly lower pH at each temperature than Co(II). Adsorption isotherms at pH 7.00 for Cd(II) could be fitted closely by a simple Langmuir model, but a two-site Langmuir model was needed for Co(II). Potentiometric titrations of goethite suspensions in the presence and absence of added cation could be modeled closely by a constant-capacitance surface complexation model that assumed the adsorption reactions M2+ + SOH reversible arrow SOM+ + H+ and M2+ + SOH + H2O reversible arrow SOMOH + 2H+, where M represents Cd or Co. This model also fitted the experimental data from the adsorption edge and adsorption isotherm experiments. Thermodynamic parameters estimated from both Langmuir and surface complexation models showed that the adsorption of both metals was endothermic. Values obtained for the adsorption enthalpies from both modeling schemes were similar for both cations. Estimates of the adsorption entropies were model-dependent: Langmuir parameters yielded positive entropies, while some of the surface complexation parameters generated negative adsorption entropies. (C) 1999 Academic Press.

Keywords: Adsorption, Cadmium, Cobalt, Goethite, Langmuir, Surface Complexation, Water Interface, Organic-Acids, Model, Complexation, pH, Copper(II), Lead(II), Zinc(II), Sulfate

Monteiro, Jr., O.A.C. and Airoldi, C. (1999), Some thermodynamic data on copper-chitin and copper-chitosan biopolymer interactions. *Journal of Colloid and Interface Science*, **212** (2), 212-219.

Full Text: [J\J Col Int Sci212, 212.pdf](J/J%20Col%20Int%20Sci212,%20212.pdf)

Abstract: Chitin and chitosan are good removers of cations from aqueous solution and wastewater. The interactive effect of cation with both biopolymers in aqueous medium was studied by the batch method at 298±1 K. The results were fitted to the modified Langmuir equation. The same adsorption was followed by calorimetric titration. In this process, 50.0 mg of each polymer was suspended in 19.0 cm3 of bidistilled water at 298.15±0.02 K, maintained under mechanical turbine stirring. The titration was performed by adding increments of 10 µL of 0.10 mol dm-3 Cu(NO3)2 aqueous solution to the system. The resulting isotherm was also adjusted to a modified Langmuir equation. From the thermal effects K and Delta H values were determined, enabling the calculation of Delta G and Delta S for the interaction of copper cations with chitin and chitosan, giving the enthalpic values of -19.85±0.34 and -41.27±1.57 kJ mol-1, respectively. The spontaneity of this interaction is shown from Delta G values of -35.9±0.1 and -36.8±0.1 kJ mol-1, which are followed by Delta S values of +54 and of -15 J mol-1 K-1, respectively. The complexation is probably associated with the lack of order of the chitin polymeric chain or with the freedom of water molecules initially bonded to cations. The copper ion is coordinated to the pendant groups of the polymeric chain to form stable complexes. (C) 1999 Academic Press.

Keywords: Chitin, Chitosan, Calorimetry, Copper Interaction, Isothermal Microcalorimetry, Metal, Deacetylation, Sorption, Cations, Silica, Ions

Marmier, N., Delisée, A. and Fromage, F. (1999), Surface complexation modeling of Yb(III) and Cs(I) sorption on silica. *Journal of Colloid and Interface Science*, **212** (2), 228-233.

Full Text: [J\J Col Int Sci212, 228.pdf](J/J%20Col%20Int%20Sci212,%20228.pdf)

Abstract: Asurface complexation model is used to describe sorption ofytterbium and cesium on the silicasurface. Theconstant capacitance model gives thedescriptionof the solid-solution interface chosen forthiswork. The first step in the modeling consistsofextracting the surface acidityconstants. The result is: [equation]. Thesecond step consists of theextractionof surface complexation constants forbothytterbium and cesium. The sorption of the cationsisrepresented as follows: for theytterbium sorption, [equation] for thecesium sorption, [equation]. In the caseofcesium, the sorption of sodium is competitiveandhas to be considered: [equation] *Copyright1999 AcademicPress.*

Keywords: Sorption, Ytterbium, Cesium, Surface Complexation Model, Lanthanide

Wu, D.W., Aranovich, G.L. and Donohue, M.D. (1999), Adsorption of dimers at surfaces. *Journal of Colloid and Interface Science*, **212** (2), 301-309.

Full Text: [J\J Col Int Sci212, 301.pdf](J/J%20Col%20Int%20Sci212,%20301.pdf)

Abstract: A model for the adsorption of dimers at a surface is presented. The model is based on a generalization of the Ono-Kondo lattice theory, The densities of dimer molecules that are parallel to the surface, x (parallel to), and perpendicular to the surface, x (perpendicular to), are calculated. It is shown that symmetric dimer molecules adsorb preferentially parallel to the surface at all densities. The model also predicts that the Gibbs adsorption is negative for small interaction energies between dimers and the surface.

Keywords: Surfaces, Adsorption, Dimers, Ono-Kondo Lattice Theory, Polymers, Model

Tóth, J., Berger, F. and Dékány, I. (1999), Calculation of the BET compatible surface area from any type I isotherms measured below the critical temperature. *Journal of Colloid and Interface Science*, **212** (2), 402-410.

Full Text: [J\J Col Int Sci212, 402.pdf](J/J%20Col%20Int%20Sci212,%20402.pdf)

Abstract: It may occur in practice that the nitrogen isotherm should be measured at 77 K only in order to determine the Brunauer–Emmett–Teller (BET) specific surface area [*a*s(N2, 77)]. This fact has given cause for an elaborate method to calculate the value of*a*s(N2, 77) from Type I isotherms measured on any adsorbents at any temperature. Since Type I isotherms are measured most often in practice the proposed method makes it possible to calculate the value of*a*s(N2, 77) from isotherms of adsorptives which are the actual topics of the investigations. Thus, in these cases the determination of nitrogen isotherms at 77 K can be omitted. The proposed method is based on the Tóth (T) equation and on its modified and extended forms. In these equations are present the parameters χm, χo, and*t*with the following physical meanings: χmand χoare integral constants originating from the Gibbs equation integrated between definite limits of pressure and coverage and*t*is a parameter characterizing the heterogeneity of the adsorbents. The parameters χmand χoassure the thermodynamic consistence of these relationships. It is proven that the parameters (χm)1/tand (χo)1/tdepend only on the structure of adsorbents (micro-, mezoporous, or smooth surfaces). These parameters, calculated from Type I isotherms measured under the critical temperature of the adsorptives, are the bases of the calculation of the BET compatible surface areas.

Keywords: BET Method, Its Substitution, Omitting of Nitrogen Isotherms, Isotherms Type I, BET Compatible Surfaces, T Equation

Tóth, J., Berger, F. and Dékány, I. (1999), Separation of the first adsorbed layer from others and calculation of the BET compatible surface area from type II isotherms. *Journal of Colloid and Interface Science*, **212** (2), 411-418.

Full Text: [J\J Col Int Sci212, 411.pdf](J/J%20Col%20Int%20Sci212,%20411.pdf)

Abstract: In the previous paper it has been proven that a BET compatible specific surface area, *a*sc(N2, 77), can be calculated from any Type I isotherm measured below the critical temperature. In this paper it is proven that the same calculation can be performed from any Type II isotherms if the isotherm has a pure monolayer domain. In order to distinguish the mono- and multilayer adsorption the relative free energy of the surface as a function of the adsorbed amount, πr(*n*s), and the functions ψ(*p*r) and ψ(*n*s) are applied, both defined by the differential expression (*n*s/*p*r)(*dp*r/*dn*s). When the multilayer adsorption becomes the dominant process then the function πr(*n*s) has a point of inflexion and functions ψ(*p*r) and ψ(*n*s) have maximum values. It has been demonstrated that in most of the Type II isotherms the mono- and multilayer domains can be separated, so the monolayer component isotherm can be calculated by the T (Tóth) equation. Therefore, it is possible to calculate the BET compatible specific surface area discussed in detail in the previous paper. It has also been proven that there are Type II isotherms which describe only multilayer adsorption; i.e., the functions ψ(*p*r) and ψ(*n*s) do not have maximum values. In these cases the Harkins–Jura equation should be applied.

Keywords: Type II Isotherms, Mono- and Multilayer Domains, Separation of Those, T Equation, BET Compatible Surface Area, Harkins-Jura Equation

Tsung, E.F. and Tilton, R.D.. (1999), Measurement of catalytic reaction kinetics for adsorbed enzyme monolayers. *Journal of Colloid and Interface Science*, **213** (1), 208-217.

Full Text: [J\J Col Int Sci213, 208.pdf](J/J%20Col%20Int%20Sci213,%20208.pdf)

Abstract: We present a new assay based on total internal reflection fluorescence (TIRF) to quantify the catalytic activity of adsorbed enzyme monolayers on macroscopically flat surfaces. The need for such an assay derives from a general shortage of assay methods that are sufficiently sensitive to measure reaction kinetics for just a single monolayer of enzymes. The assay is based on the enzymatic conversion of a soluble, nonfluorescent fluorogenic substrate reagent to a soluble, highly fluorescent product. The reaction occurs at the solid–liquid interface where the enzymes are adsorbed. Fluorogenic substrates are introduced to the adsorbed layer by convective diffusion from solutions undergoing steady laminar slit flow. The exponentially decaying evanescent wave that is produced by total internal reflection serves as a “spectroscopic ruler” to resolve the spatial concentration profile of fluorescent products in solution near the interface. By measuring the steady-state fluorescence signal as a function of the Peclet number that characterizes mass transfer conditions in the experiment, it is possible to determine the enzymatic reaction rate. Here we present the development of the method and its application to a test system of β-galactosidase adsorbed to methylated silica surfaces. Compared to the enzymatic rate constants for this enzyme in free solution, adsorption decreased the Michaelis–Menten rate constant *k*cat by a factor of 10 and increased the equilibrium binding constant *K*m by a factor of 4.5. Thus the intrinsic activity of the enzyme, as represented by the ratio *k*cat/*K*m, decreased 45-fold due to adsorption.

Keywords: Enzyme Kinetics, Protein Adsorption, Total Internal Reflection Fluorescence, Fluorogenic Substrates

Weerasooriya, R. and Wickramarathna, H.U.S. (1999), Modeling anion adsorption on kaolinite. *Journal of Colloid and Interface Science*, **213** (2), 395-399.

Full Text: [J\J Col Int Sci213, 395.pdf](J/J%20Col%20Int%20Sci213,%20395.pdf)

Abstract: Anion adsorption onto kaolinite was quantified using the triple layer surface complexation model. Fluoride adsorption data were described by both anion exchange and H-bonded complexation mechanisms. The outer-sphere complexation mechanism was used to describe the weak adsorption of Cl-, Br-, and I- on kaolinite. The F-adsorption in the presence of Br-or I- was decreased over a range of pH 4-5 whereas Cl- showed a negligible effect. Competition for binding sites appeared to be an important factor in determining the adsorptive behavior of F-in Br-or I-mediated systems, (C) 1999 Academic Press.

Keywords: Kaolinite, Triple Layer Model, Chloride, Bromide, Fluoride, Iodide, Complexation Models, Surface, Interface, Oxide, Ions

Aranovich, G.L. and Donohue, M.D. (1999), Adsorption of chain molecules. *Journal of Colloid and Interface Science*, **213** (2), 457-464.

Full Text: [J\J Col Int Sci213, 457.pdf](J/J%20Col%20Int%20Sci213,%20457.pdf)

Abstract: We analyze the influence of chain length on the adsorption isotherm using the framework of lattice theory. Each molecule is represented as a chain of segments occupying separate sites in the lattice. Adsorption equilibria (particularly adsorption isotherms) are analyzed for one-component and two-component mixtures of chain molecules.

Elzinga, E.J. and Sparks, D.L. (1999), Nickel sorption mechanisms in a pyrophyllite-montmorillonite mixture. *Journal of Colloid and Interface Science*, **213** (2), 506-512.

Full Text: [J\J Col Int Sci213, 506.pdf](J/J%20Col%20Int%20Sci213,%20506.pdf)

Abstract: Nickel sorption on pyrophyllite, montmorillonite and a 1: 1 pyrophyllite-montmorillonite mixture was studied at pH 7.5 and a reaction time of 40 min. The main modes of Ni uptake under these reaction conditions are adsorption on montmorillonite and surface precipitation on pyrophyllite. For the clay mixture, where adsorption on the montmorillonite component and surface precipitation on the pyrophyllite component compete for Ni uptake, X-ray absorption fine structure spectroscopy (XAFS) was used to estimate the distribution of Ni over the mixture components. This was done by comparison to pyrophyllite-montmorillonite mixtures with known Ni distributions over the mixture components. Nickel uptake on singly reacted pyrophyllite was slightly higher than on singly reacted montmorillonite. This was consistent with the XAFS results for the clay mixture, which suggested that the pyrophyllite component sorbed slightly more Ni than the montmorillonite component. Our findings suggested that both adsorption and surface precipitation were important mechanisms in the overall Ni uptake in the clay mixture, and that neither sorption mechanism truly out-competed the other in the reaction time of 40 min employed. Therefore, both mechanisms should be considered when modeling Ni sorption in similar systems. (C) 1999 Academic Press.

Keywords: Metal Sorption, Sorption Kinetics, Xafs, Sorption In Sorbent Mixtures, Ray-Absorption Spectroscopy, Chromium(III) Sorption, Surface Complexes, Oxide Minerals, Kaolinite, Silica, Clays, Sites

Tsai, W.T., Chang, C.Y., Ho, C.Y. and Chen, L.Y. (1999), Simplified description of adsorption breakthrough curves of 1,1-dichloro-1-fluoroethane (HCFC-141b) on activated carbon with temperature effect. *Journal of Colloid and Interface Science*, **214** (2), 455-458.

Full Text: [J\J Col Int Sci214, 455.pdf](J/J%20Col%20Int%20Sci214,%20455.pdf)

Abstract: Recovery of HCFC-141b, used as a major alternative solvent and foam-blowing agent for CFCs in industrial applications, has received great attention due to its gradual phase out. This paper describes an investigation of the adsorption breakthrough of HCFC-141b vapor on a commercial activated carbon. A simple theoretical model developed by Yoon and Nelson was applied to investigate the breakthrough behavior of HCFC-141b on an activated carbon column, The values of parameters k’ (a rate constant) and tau (the time required for 50% adsorbate breakthrough) in the Yoon and Nelson model were determined at four different concentration levels (i.e., 399, 734, 1139, and 1954 ppmv) and five temperature ranges (i.e., 283, 293, 298, 303, and 313 K), respectively. These values were used to calculate the entire (0-100%) breakthrough curve (plot of percentage breakthrough versus time) regarding the adsorption of HCFC-141b on activated carbon columns. It was found that the calculated theoretical breakthrough curves are in high agreement with the corresponding experimental data. Also, the rate constant k’ can be reasonably represented by the empirical Arrhenius equation. The results obtained are applicable for the scale-up design of adsorption columns in the HCFC adsorption on activated carbon adsorbent. (C) 1999 Academic Press.

Keywords: Adsorption Breakthrough, HCFC-141b, Activated Carbon, Temperature Effect, Cartridge Service Life, Theoretical-Model, Kinetics

Inglezakis, V.J., Diamandis, N.A., Loizidou, M.D. and Grigoropoulou, H.P. (1999), Effect of pore clogging on kinetics of lead uptake by clinoptilolite. *Journal of Colloid and Interface Science*, **215** (1), 54-57.

Full Text: [J\J Col Int Sci215, 54.pdf](J/J%20Col%20Int%20Sci215,%2054.pdf)

Abstract: The kinetics of lead-sodium ion exchange using pretreated natural clinoptilolite are investigated, more specifically the influence of agitation (0, 210, and 650 rpm) on the limiting step of the overall process, for particle sizes of 0.63-0.8 and 0.8-1 mm at ambient temperature and initial lead solutions of 500 mg l-1 without pH adjustment. The isotopic exchange model is found to fit the ion exchange process. Particle diffusion is shown to be the controlling step for both particle sizes under agitation, while in the absence of agitation film diffusion is shown to control. The ion exchange process effective diffusion coefficients are calculated and found to depend strongly on particle size in the case of agitation at 210 rpm and only slightly on particle size at 650 rpm. Lead uptake rates are higher for smaller particles only at rigorous agitation, while at mild agitation the results are reversed. These facts are due to partial clogging of the pores of the mineral during the grinding process. This is verified through comparison of lead uptake rates for two samples of the same particle size, one of which is rigorously washed for a certain time before being exposed to the ion exchange. (C) 1999 Academic Press.

Keywords: Lead Uptake, Ion Exchange, Zeolites, Diffusion Coefficients, Pore Clogging, Ion-Exchange, Natural Zeolites, Removal, Montmorillonite, Cadmium

Schlegel, M.L., Manceau, A., Chateigner, D. and Charlet, L. (1999), Sorption of metal ions on clay minerals I. Polarized EXAFS evidence for the adsorption of Co on theedges of hectorite particles. *Journal of Colloid and Interface Science*, **215** (1), 140-158.

Full Text: [J\J Col Int Sci215, 140.pdf](J/J%20Col%20Int%20Sci215,%20140.pdf)

Abstract: Thelocal structural environment of Co sorbed on hectorite (amagnesian smectite) has beeninvestigated bypolarized EXAFS (P-EXAFS) spectroscopy onaself-supporting film of Co-sorbed hectorite.Thissorption sample was prepared by contactingCo andhectorite at pH 6.5 and athigh ionic strength (0.3 M NaNO3)to favor pH-dependentsorption reaction over cationexchange. Aself-supporting film was elaborated after120 h ofreacting time, when apparentquasi-equilibriumconditions were attained. The half-width athalfmaximum of the orientation distribution of c\*axis ofindividual clay platelets offthe film normal wasdetermined byquantitative texture analysis, and found tobe equalto 18.9°. Co K-edge P-EXAFS spectrawererecorded at angles between the incident beam andthefilm normal equal to 0°, 35°, 50°, and60°; the 90°spectrum was obtained byextrapolation. Spectral analysisledto the identification of the twonearestcationic subshells containing 1.6 ±0.4 Mg at 3.03 Åand 2.2 ±0.5 Si at 3.27 Å. Thesedistances are respectivelycharacteristic ofedge-sharing linkages between Mg andCo octahedraand of corner-sharing linkagesbetweenCo octahedra and Si tetrahedra, as inclaystructures. The angular dependence of the Co-Mgand Co-Sicontributions indicates thatCo-Mg pairs are orientedparallel tothe film plane, whereas Co-Si pairs arenot.These results are interpreted by the formation ofCoinner-sphere mononuclear surfacecomplexes located atthe edges ofhectorite platelets, in the continuityofthe (Mg, Li) octahedral sheet. (C) 1999 Academic Press, Inc.

Keywords: Co, Hectorite, Adsorption, EXAFS, Polarized EXAFS, Surface Complex

Strawn, D.G. and Sparks, D.L. (1999), The use of XAFS to distinguish between inner- and outer-sphere lead adsorption complexes on montmorillonite. *Journal of Colloid and Interface Science*, **216** (2), 257-269.

Full Text: [J\J Col Int Sci216, 257.pdf](J/J%20Col%20Int%20Sci216,%20257.pdf)

Abstract: Adsorptionmechanisms of Pb on montmorillonite were investigated byconducting equilibrium and X-rayabsorptionfine structure (XAFS) spectroscopystudies. Datafrom the batch equilibrium studiesindicatethat Pb could be adsorbing via twomechanisms, depending on ionic strength. At low ionicstrength (*I* = 0.006M) Pb adsorption ispH-independent: 97% of theavailable Pbwas removed from solution at pH 4.42 and 100%atpH 8.0. This behavior is consistent withanouter-sphere complexation mechanism. At high ionicstrength(*I* = 0.1 M) Pb adsorption ispH-dependent, suggesting inner-spherecomplexation as the adsorptionmechanism: 43% ofthe available Pb was removed from thesolutionat pH 4.11 and 98.9% at pH 7.83. X-rayabsorptionnear edge structure (XANES) and extendedX-rayabsorption fine structure (EXAFS)spectroscopy resultsreveal that in thesample equilibrated at *I* = 0.006 M, pH4.48-6.40the local atomic structure (LAS)surrounding theadsorbed Pb is similar to the LASsurroundingPb2+ (aq), confirming that the adsorptionmechanism isouter-sphere complexation. In thesystem equilibratedat *I* = 0.1 M, pH6.77 the XANES and EXAFS resultsshowthat the LAS surrounding the adsorbed Pb atomissimilar to the LAS surrounding referencecompounds inwhich Pb is forming covalentbonds (Pb4(OH)4+4 (aq) and a sample of γ-Al2O3 with Pb adsorbed viainner-sphere complexation).These similaritiesindicate that Pbis forming inner-sphere complexes onthemontmorillonite at this ionic strength and pH.Insamples equilibrated at *I* = 0.006 M, pH 6.77and *I* = 0.1M, pH 6.31 the XAFSresults suggest that Pb isforming bothinner- and outer-sphere adsorptioncomplexes.This observation could not be distinguished bymakingmacroscopic observations only. Thus, the results ofthis study revealimportant information on Pbsorptionbehavior on clays and also provides insightsintothe use of XAFS to determine sorption mechanisms. (C) 1999 Academic Press, Inc.

Keywords: Montmorillonite, Inner-Sphere Complexation, Outer-Sphere Complexation, Pb Adsorption, pH-Dependent Adsorption, XAFS

? Lee, J.F., Lee, C.K. and Juang, L.C. (1999), Size effects of exchange cation on the pore structure and surface fractality of montmorillonite. *Journal of Colloid and Interface Science*, **217** (1), 172-176.

Full Text: [1999\J Col Int Sci217, 172.pdf](1999/J%20Col%20Int%20Sci217,%20172.pdf)

Abstract: Ca-montmorillonites were exchanged with both metal cations (manganese and copper) and organic cations (tetramethylammonium (TMA) and hexadecyltrimethylammonium (HDTMA)) to study the cation size effects on the pore structure and surface roughness of montmorillonite based on the classical and fractal analysis of their nitrogen adsorption isotherms. The surface fractal dimension D was calculated from their nitrogen isotherms with the aid of the recently proposed Neimark equation. The decrease of BET surface area of montmorillonite induced by the larger size of exchange cation was interpreted with both the coverture of some surface roughness (surface screening effect) and the inhibition of nitrogen molecule into some pores (pore blocking effect), The pore blocking effect was examined with the changes of mean pore size. Meanwhile, the D value was used to examine whether or not the surface screening effect existed. It was concluded that the combination of classical and fractal analyses of nitrogen isotherms may facilitate our understanding of the evolution of pore and surface structures of clay exchanged with different cations. (C) 1999 Academic Press.

Keywords: Adsorption, Bet Surface Area, Ca-Montmorillonite, Chemistry, Montmorillonite, Noninteger Dimensions, Organic Contaminants, Pore Blocking Effect, Pore Structure, Porous Solids, Sorption, Surface Area, Surface Fractal Dimension, Surface Roughness, Surface Screening Effect

Leboda, R., Gun’ko, V.M., Marciniak, M., Malygin, A.A., Malkin, A.A., Grzegorczyk, W., Trznadel, B.J., Pakhlov, E.M. and Voronin, E.F. (1999), Structure of chemical vapor deposition titania/silica gel. *Journal of Colloid and Interface Science*, **218** (1), 23-39.

Full Text: [J\J Col Int Sci218, 23.pdf](J/J%20Col%20Int%20Sci218,%2023.pdf)

Abstract: The structure of porous silica gel/titania synthesized using chemical vapor deposition (CVD) of titania via repeated reactions of TiCl4 with the surface and subsequent hydrolysis of residual Ti-Cl bonds at different temperatures was investigated by means of low-temperature nitrogen adsorption-desorption, X-ray diffraction (XRD), IR spectroscopy, and theoretical methods. A globular model of porous solids with corpuscular structure was applied to estimate the porosity parameters of titania/silica gel adsorbents. The utilization of this model is useful, for example, to predict conditions for synthesis of titania/silica with a specified structure. Analysis of pore parameters and fractal dimension suggests that the porosity and fractality of samples decrease with increasing amount of TiO2 covering the silica gel surface in a nonuniform layer, which represents small particles embedded in pores and larger particles formed at the outer surface of silica globules. Theoretical simulation shows that the Si-O-Ti linkages between the cover and the substrate can be easily hydrolyzed, which is in agreement with the IR data corresponding to the absence of a band at 950 cm-1, (characteristic of Si-O-Ti bridges) independent of the concentration of CVD-titania. (C) 1999 Academic Press.

Keywords: Silica Gel, Chemical Vapor Deposition Titania, Porosity Parameters, Globular Model, Fractal Dimensions, Infrared, Non-Uniform Coverage, Theoretical Modeling, Adsorption-Isotherm Equation, Surface Fractal Dimension, Carbon-Black Particles, Polanyi-Dubinin Theory, Hydrothermal Modification, Microporous Carbon, Porous Structure, Fumed Silica, Adsorbents, Water

Datwani, S.S. and Stebe, K.J. (1999), The dynamic adsorption of charged amphiphiles: The evolution of the surface concentration, surface potential, and surface tension. *Journal of Colloid and Interface Science*, **219** (2), 282-297.

Full Text: [J\J Col Int Sci219, 282.pdf](J/J%20Col%20Int%20Sci219,%20282.pdf)

Abstract: In this work the evolution of the surface concentration, surface potential, and surface tension for adsorption of a charged amphiphile at an interface is studied numerically. While the results are of interest for any amphiphile, the simulations are performed for typical surfactant material parameters. The surface potential is related at each time step to the instantaneous surface charge density determined by the surfactant surface concentration using the Gouy-Chapman model. The sublayer concentration at each time step is a Boltzmann distribution in instantaneous equilibrium with the surface potential. At equilibrium, the surfactant is assumed to obey the Davies adsorption isotherm.

The model is integrated first for diffusion-controlled adsorption? in which the surfactant diffuses to the sublayer and adsorbs onto the interface in local equilibrium according to the adsorption isotherm. In this limit, since the equilibrium adsorption is strongly reduced by the repulsive electrostatic potential, the time required to deliver the surfactant by diffusion is also reduced. The greater the electrical repulsion, the faster the diffusion-controlled adsorption at a given surfactant concentration. Because less surfactant adsorbs, the surface tension reduces less at equilibrium. Counterions of greater valence than the surfactant are more effective at screening the surface potential. Equilibrium adsorption, surface tension reduction, and diffusion time scales increase. As the surfactant valence increases, so does the repulsion; the opposite trends in surface tension and diffusion time scales are predicted.

The model is also integrated including both diffusion and adsorption-desorption kinetic barriers. In experiment, adsorption-desorption kinetic barriers have been shown to control the mass transfer of non-ionic surfactants at elevated bulk concentration. The ability of the interface to deplete the bulk reduces with concentration. Therefore, diffusion time scales are reduced. In these regimes, adsorption-desorption kinetics can be rate determining. In simulation, the occurrence of the shift of the controlling mechanism from pure diffusion control at dilute concentration to mixed kinetic-diffusion control at elevated concentration is strongly influenced by ionic strength and surfactant valence. As the electrostatic adsorption increases, kinetic barriers are apparent at lower concentrations.

Finally, a simple time scale argument that has previously proven useful in predicting a priori the time required for diffusion-controlled absorption to an interface for nonionic surfactant ad-sorption is extended to include electrostatic effects. (C) 1999 Academic Press.

Keywords: Ionic Surfactants, Proteins, Electrostatics, Dynamic Surface Tension, Electric Double-Layer, Air-Water-Interface, Free-Falling Film, Ionic Surfactants, Fluid Interfaces, Air/Water Interface, Kinetics, Viscoelasticity, Monolayers, Systems

Mustafa, S., Naeem, A., Murtaza, S., Rehana, N. and Samad, H.Y. (1999), Comparative sorption properties of metal(III) phosphates. *Journal of Colloid and Interface Science*, **220** (1), 63-74.

Full Text: [J\J Col Int Sci220, 63.pdf](J/J%20Col%20Int%20Sci220,%2063.pdf)

Abstract: Sorption behavior of metal(III) phosphates toward Zn2+ was investigated using different concentrations, pHs, and temperatures. Ion exchange between protons from the surface and metal cations from solutions was found to be responsible for metal sorption by metal(III) phosphates. Dissociation constants of metal(III) phosphates and binding constants of the Zn2+ with metal(III) phosphates were determined using Henderson-Hasselbach and modified Langmuir equations, respectively. The sorption process in all the three metal phosphates was found tc, be endothermic in nature while the dissociation process was observed to be endothermic in AlPO4 and FePO4 and exothermic in CrPO4. (C) 1999 Academic Press.

Keywords: Ion Exchange, Sorption, Potentiometric Titration, AlPO4, CrPO4, FePO4, Cation-Exchange Properties, Iron(III) pHosphate, Titanium, Kinetics

Karthikeyan, K.G. and Elliott, H.A. (1999), Surface complexation modeling of copper sorption by hydrous oxides of iron and aluminum. *Journal of Colloid and Interface Science*, **220** (1), 88-95.

Full Text: [J\J Col Int Sci220, 88.pdf](J/J%20Col%20Int%20Sci220,%2088.pdf)

Abstract: Surface complexation models were used to simulate adsorption (ADS) and coprecipitation (CPT) of copper (Cu) by hydrous oxides of iron (HFO) and aluminum (HAO) over a range of pH and surface-loading conditions. The generalized two-layer model was satisfactory for two very different conditions: (1) low sorbate/sorbent ratios where metal-oxide interaction is adequately described as Cu2+ coordination to surface functional groups and (2) under HFO-CPT conditions which result in extremely high adsorption site density (0.425 mol of sites/mol of Fe). As the sorbate/sorbent ratio is progressively increased, the models must account for metal hydrolysis and surface precipitate formation, and Cu interaction with both hydrous oxides could be fitted over a wide range of surface loadings using a comprehensive surface precipitation model. Similar mass law constants for sorption reactions were used for generalized two-layer and surface precipitation modeling, ADS and CPT conditions, and pH-edge and isotherm data. Corroborating sorption and spectroscopic evidence, modeling indicated that Cu precipitated on HAO, unlike HFO, has a markedly lower K-sp than bulk precipitated Cu(OH)2(s). Results also suggest that enhanced Cu removal by CPT was not simply a manifestation of higher surface area. (C) 1999 Academic Press.

Keywords: Generalized Two-Layer Model, Surface Precipitation Model, Copper, Hydrous Oxides of Iron and Aluminum, Adsorption, Coprecipitation, Adsorption, Oxyhydroxide, Interface, Strategy, Coverage

Ryu, S.K., Kim, S.Y., Li, Z.J. and Jaroniec, M. (1999), Characterization of silver-containing pitch-based activated carbon fibers. *Journal of Colloid and Interface Science*, **220** (1), 157-162.

Full Text: [J\J Col Int Sci220, 157.pdf](J/J%20Col%20Int%20Sci220,%20157.pdf)

Abstract: Silver-containingpitch-based activated carbon fibers (ACFs) were prepared by activation with steam. Silver particles acted as catalyst by accelerating activation rate and increasing micropore size. Scanning electron microscopy (SEM) was used to investigate the surface morphology and behavior of silver particles in carbon fibers during activation. SEM images of the silver-containing fibers at about 70% burn-off were similar to those of nonactivated carbon fibers. Characterization of the ACFs studied was performed by using nitrogen adsorption isotherms, pore size distributions, silver content data, and adsorption capacities of iodine and Methylene blue. Nitrogen adsorption isotherms and specific surface areas for the silver-containing ACFs were similar to those measured on the pure ACFs, i.e., ACFs to which silver had not been added. Also, adsorption capacities of iodine and Methylene blue measured from liquid solutions were similar to those of the pure ACFs. However, the average micropore size of ACFs increased with increasing burn-off.

Keywords: Silver-Containing Activated Carbon Fibers, Nitrogen Adsorption, Iodine Adsorption, Methylene Blue Adsorption, Porosity

Manceau, A., Schlegel, M., Nagy, K.L. and Charlet, L. (1999), Evidence for the formation of trioctahedral clay upon sorption of Co2+ on quartz. *Journal of Colloid and Interface Science*, **220** (2), 181-197.

Full Text: [J\J Col Int Sci220, 181.pdf](J/J%20Col%20Int%20Sci220,%20181.pdf)

Abstract: The sorption mechanism of Co on quartz at room temperature has been investigated by an in-depth analysis of published extended X-ray absorption fine structure (EXAFS) spectroscopy and solution chemistry data. In particular, the 3.5-5 Angstrom mid-range atomic environment of Co has been determined with unprecedented precision by combining ad initio FEFF7.02 calculations and results obtained by polarized EXAFS on the mid-distance structure of sheet silicate minerals. The local atomic environment around sorbed Co atoms is identical to that of Co in trioctahedral clays and substantially different from that in the cobalt hydroxide Co (OH)2(s). Neoformation of a trioctahedral clay is consistent with calculated thermodynamic solubilities, which indicate that 2: 1 and 1: 1 Co-rich hydrous silicates, similar to kerolite and chrysotile, are less soluble than Co (OH)2(s). Consequently, precipitation of Co-rich clay is favored over that of Co (OH)2(s) at pH values below 9 and for a dissolved Si concentration equal to quartz solubility. New experimental data show that dissolved Si concentrations can approach, and even exceed, that of quartz solubility during the short times of sorption experiments. Based on the available data, it is not possible to conclude unequivocally if the Co layer silicate grew epitaxially on the quartz surface, topotactically in a surface amorphous layer, or independently of the quartz framework structure. The structural and chemical interpretation is supported by recent published studies in which sorption of a hydrolyzable cation leads to the neoformation of a mixed layer phase formed from the sorbate species and the sorbent metal. This surface-induced precipitation mechanism is a general phenomenon that may account for the formation of secondary clays as coatings on silicates.

Keywords: X-Ray-Absorption, Calcite-Water Interface, Fine-Structure, Exafs Spectroscopy, Polarized Exafs, Solid-Solution, Surface Complexes, Octahedral Sheets, Low-Temperatures, Aqueous-Solution, Quartz, Kerolite, Clay Minerals, Exafs, X-Ray Absorption Spectroscopy, Adsorption, Precipitation, Cobalt

Schlegel, M.L., Charlet, L. and Manceau, A. (1999), Sorption of metal ions on clay minerals-II. Mechanism of Co sorption on hectorite at high and low ionic strength and impact on the sorbent stability. *Journal of Colloid and Interface Science*, **220** (2), 392-405.

Full Text: [J\J Col Int Sci220, 392.pdf](J/J%20Col%20Int%20Sci220,%20392.pdf)

Abstract: The mechanism of Co uptake from aqueous solution onto hectorite (a magnesian smectite) and its impact on the stability of this clay mineral were investigated as a function of Co concentration (TotCo = 20 to 200 µM, 0.3 M NaNO3) and ionic strength (0.3 and 0.01 M NaNO3, TotCo = 100 µM) by combining kinetics measurements and Co K-edge extended X-ray absorption fine structure (EXAFS) spectroscopy. The morphology of the sorbent phase was characterized by atomic force microscopy (AFM) and consists of lath-type particles bounded by large basal planes and layer edges. At low ionic strength (0.01 M NaNO3), important Co uptake occurred within the first 5 min of reaction, consistent with Co adsorption on exchange sites of hectorite basal planes. Thereafter, the sorption rate dramatically decreased. In contrast, at high ionic strength (0.3 M NaNO3), Co uptake rate was much slower within the first 5 min and afterward higher than at 0.01 M NaNO3, consistent with Co adsorption on specific surface sites located on the edges of hectorite. Time-dependent isotherms for Co uptake at high ionic strength indicated the existence of several sorption mechanisms having distinct equilibration times. The dissolution of hectorite was monitored before and after Co addition. A congruent dissolution regime was observed prior to Co addition. Just after Co addition, an excess release of Mg relatively to congruent dissolution rates occurred at both high and low ionic strengths. At high ionic strength, this excess release nearly equaled the amount of sorbed Co. The dissolution rate of hectorite then decreased at longer Co sorption times. EXAFS spectra of hectorite reacted with Co at high and low ionic strengths and for reaction times longer than 6 h, exhibited similar features, suggesting that the local structural environments of Co atoms are similar. Spectral simulations revealed the occurrence of similar to 2 Mg and similar to 2 Si neighboring cations at interatomic distances characteristic of edge-sharing linkages between Co and Mg octahedra and corner-sharing linkages between Co octahedra and Si tetrahedra, respectively. This local structure is characteristic of inner sphere mononuclear surface complexes at layer edges of hectorite platelets. The occurrence of these complexes even at low ionic strength apparently conflicts with kinetics results, as exchangeable divalent cations are known to form outer sphere surface complexes. To clarify this issue, the amount of Co adsorbed on exchange sites was calculated from the solute Co concentration, assuming that cation exchange was always at equilibrium. These calculations showed that sorbed Co was transferred within 48 h from exchange sites to edge sorption sites.

Keywords: Absorption Fine-Structure, Dissolution Kinetics, Coordination Chemistry, Quartz Dissolution, Octahedral Sheets, Surface-Charge, pH-Dependence, Montmorillonite, Adsorption, Smectites, Co, Hectorite, Kinetics, Adsorption, Dissolution, Cation Exchange, EXAFS, Surface Complex

Zaki, A.B., El-Sheikh, M.Y., Evans, J. and El-Safty, S.A. (2000), Kinetics and mechanism of the sorption of some aromatic amines onto amberlite IRA-904 anion-exchange resin. *Journal of Colloid and Interface Science*, **221** (1), 58-63.

Full Text: [J\J Col Int Sci221, 58.pdf](J/J%20Col%20Int%20Sci221,%2058.pdf)

Abstract: The kinetics of the sorption of aromatic amines such as o-aminophenol (o-AP), o-phenylenediamine (o-PDA), and phenylenediamine (p-PDA) onto Amberlite anion-exchange resin in chloride form was investigated in batch experiments spectrophotometrically at different temperatures. The sorption rate is zero order in all amines sorbed, increasing directly in the order: p-PDA < o-PDA < o-AP, which corresponds to the sequence of the electrostatic contributions to the sorption interactions. The attainment of sorption equilibrium of aromatic amines is seen to be similar. The diffusion coefficients (D) have been calculated by using Fick’s equation from the second portions of the sorption/desorption curves; D values ranged from 0.7 to 2.8×10-9 cm2/s. These results, reflecting the diffusion mechanism, were ascribed to intraparticle diffusion. Arrhenius parameters for the diffusion process and the thermodynamic quantities for the process of equilibrium sorption have been estimated. The effect of a chemical oxidation reaction on intraparticle diffusion was investigated by measuring the intraparticle diffusion of amines during the redox reaction. (C) 2000 Academic Press.

Keywords: Anion Exchange, Aromatic Amines, Sorption, Diffusion, Kinetics

Hyun, S.P., Cho, Y.H., Kim, S.J. and Hahn, P.S. (2000), Cu(II) sorption mechanism on montmorillonite: An electron paramagnetic resonance study. *Journal of Colloid and Interface Science*, **222** (2), 254-261.

Full Text: [J\J Col Int Sci222, 254.pdf](J/J%20Col%20Int%20Sci222,%20254.pdf)

Abstract: Themechanism of Cu(II) sorption on montmorillonite wasstudied with electron paramagnetic resonance(EPR)spectroscopy. The major sorbed speciesweresuccessfully identified by EPR spectroscopy astheyshowed distinct signals due to theirstrength of bindingand local structure.The EPR results together withmacroscopicsorption data show that the sorptioninvolves at leastthree different mechanisms. Thedominantsorption mechanism changed with pH and Na+ content insolution. In the acidic pH range, thesorptionis independent of pH but is dependent on Na+ concentration.Like free copper ions, the sorbedCu(II) showsan isotropic absorption line. It isthought thatthe Cu(II) is ion-exchanged in theinterlayersite and is capable of free tumbling motiondespiteelectrostatic binding force. Inthe near neutral pHrange, the sorptionis strongly pH dependent and thesorbed Cu(II)shows no EPR signal. It is interpretedthat theCu(II) is sorbed by a surfacecomplexationmechanism to form an inner-sphere surface complex.TheEPR spectrum with a dipolarsplitting pattern meansthat the dimericCu(II) surface species is thedominantsorbed species in the basic pH region where the Cu-Cuinternucleardistance of the dimer is estimated tobe ~3.3 Å. (C) 2000 Academic Press, Inc.

Keywords: Sorption Mechanism, Montmorillonite, Copper(II), EPR, X-Ray-Absorption, Copper(II) Complexes, Na-Montmorillonite, Zn Sorption, Adsorption, Surface, Spectroscopy, Transition, Goethite, Aluminum

Leboda, R., Turov, V.V., Charmas, B., Skubiszewska-Zieba, J. and Gun’ko, V.M. (2000), Surface properties of mesoporous carbon-silica gel adsorbents. *Journal of Colloid and Interface Science*, **223** (1), 112-125.

Full Text: [J\J Col Int Sci223, 112.pdf](J/J%20Col%20Int%20Sci223,%20112.pdf)

Abstract: Carbon/silica (carbosil) samples prepared utilizing mesoporous silica gel (Si-60), modified by Methylene chloride pyrolysis were studied by nitrogen adsorption, quasi-isothermal thermogravimetry, p-nitrophenol adsorption from aqueous solution, and 1H NMR methods. The structural characteristics and other properties of carbosils depend markedly on the synthetic conditions and the amount of carbon deposited. The changes in the pore size distribution with increasing carbon concentration suggest grafting of carbon mainly in pores, leading to diminution of the mesopore radii. However, heating pure silica gel at the pyrolysis temperature of 550°C leads to an increase in the pore radii. The quasi-isothermal thermogravimetry and 1H NMR spectroscopy methods used to investigate the water layers on carbosils showed a significant capability of carbosils to adsorb water despite a relatively large content of the hydrophobic carbon deposit, which represents a nonuniform layer incompletely covering the oxide surface. (C) 2000 Academic Press.

Keywords: Mesoporous Silica Gel, Carbon/Silica Gel Adsorbents, 1H NMR, Water Adsorption, Nitrogen Adsorption, P-Nitrophenol Adsorption, Quasi-Isothermal Thermogravimetry, Surface Heterogeneity, Pore Size Distribution, Adsorption Energy Distribution, Polanyi-Dubinin Theory, Adsorption-Isotherm Equation, Fractal Dimension, Microporous Carbon, Mineral Adsorbents, 1H NMR Spectroscopy, Activated Carbons, Black Particles, Water, Carbonization

? Hiemstra, T. and Van Riemsdijk, W.H. (2000), Fluoride adsorption on goethite in relation to different types of surface sites. *Journal of Colloid and Interface Science*, **225** (2), 94-104.

Full Text: [2000\J Col Int Sci225, 94.pdf](2000/J%20Col%20Int%20Sci225,%2094.pdf)

Abstract: Metal (hydr)oxides have different types of surface groups. Fluoride ions have been used as a probe to assess the number of surface sites. We have studied the F- adsorption on goethite by measuring the F- and H+ interaction and F- adsorption isotherms. Fluoride ions exchange against singly coordinated surface hydroxyls at low F- concentrations. At higher concentrations also the doubly coordinated OH groups are involved. The replacement of a surface OH- by F- suggests that all F charge (-1) is located at the surface in contrast to oxyanions which have a charge distribution in the interface due to the binding structure in which the anion only partially coordinates with the surface. Analysis of our F- data with the CD-MUSIC approach shows that the formation of the fluoride surface complex is accompanied by a redistribution of charge. This is supposed to be due to a net switch in the H bonding as a result of the change of the type of surface complex from donating (FeOH, FeOH2) to proton accepting (FeF). The modeled redistribution of charge is approximately equivalent with the change of a donating H bond into an accepting H bond. At high F- concentrations precipitation of F-, as for instance FeF3(s), may occur. The rate of formation is catalyzed by the presence of high electrolyte concentrations. (C) 2000 Academic Press.

Keywords: Iron Oxide, Goethite, Fluoride, Proton, Hydroxyl, Adsorption, Coadsorption, H Bonds, CD-MUSIC, Singly Coordinated, Doubly Coordinated, Surface Group, Surface Site, Site Density, Solid-Solution Interface, Anion-Adsorption, Promoted Dissolution, Metal (Hydr)Oxides, Ion Adsorption, Oxide Surfaces, Iron-Oxides, Proton, Charge, pH

Tóth, J. (2000), Calculation of the BET-compatible surface area from any Type I isotherms measured above the critical temperature. *Journal of Colloid and Interface Science*, **225** (2), 378-383.

Full Text: [J\J Col Int Sci225, 378.pdf](J/J%20Col%20Int%20Sci225,%20378.pdf)

Abstract: In our previous papers [Tóth, J., *et al.*, J. Colloid Interface Sci 212, 402 (1999); 212, 411 (1999)] it has been proven that a BET-compatible specific surface area, a(c)(s)(N2, 77), can be calculated from any Type I monolayer isotherms and from the monolayer domain of Type II isotherms, both measured below the critical temperature. In this paper, the calculation of a(c)(s)(N2, 77) from Type I isotherms at temperatures above the critical temperature is discussed. These calculations are also based on the thermodynamical consistent form of the Tóth (T) equation. This relationship can be derived from the differential equation dn(s)/n(s) = [psi(p)] -1d p/p, when the function psi(p) is calculable from the measured isotherms and includes the change in the surface free energy. The basic problem of the calculation of a(c)(s)(N2, 77) is the determination of the upper limit of integration (pu) required to solve this differential equation. It is demonstrated that p(u) can be calculated from the equation ln(pu) =-alpha T-1 + beta. The constants alpha and beta are independent of the temperature of the isotherms but they an very sensitive to the structure of adsorbents and to the quality of adsorptives. This fact also makes it possible to characterize exactly the nanostructure of solids and the state of adsorptives. (C) 2000 Academic Press.

Keywords: BET-Compatible Surface Area, Calculation, Tóth Isotherm, Type I Isotherms, Above The Critical Temperature, Structure of Adsorbents, Gas-Solid Adsorption, Equations

Rappoli, B.J. and Rowley, D.A. (2000), The sorption kinetics of copper(II) on chemically modified controlled pore glass. *Journal of Colloid and Interface Science*, **226** (2), 218-221.

Full Text: [J\J Col Int Sci226, 218.pdf](J/J%20Col%20Int%20Sci226,%20218.pdf)

Abstract: Chemically bonded phases on controlled pore glass substrates have been prepared by the condensation of 3-(2-aminoethylamino)propyltrimethoxysilane in anhydrous or aqueous media. Sorption of copper(II) by the chemically bonded phase was measured via potentiometry and can be described by pseudo-second-order kinetics. Rate constants and equilibrium capacities have been calculated and were found to be dependent upon preparative conditions. (C) 2000 Academic Press.

Keywords: Kinetics, Sorption, Copper, Controlled Pore Glass, Trace-Metals, Silica, Adsorption, Removal, Agents, Ions, Peat

Pendleton, P. (2000), Temperature influence of benzene adsorption by a microporous silica. *Journal of Colloid and Interface Science*, **227** (1), 227-236.

Full Text: [J\J Col Int Sci227, 227.pdf](J/J%20Col%20Int%20Sci227,%20227.pdf)

Abstract: The theory for volume filling of micropores is used to describe benzene adsorption isotherms measured over a 25 K temperature range. The adsorption potential or molar work of adsorption for the isotherm at 298 K is derived and compared with Weibull, Gaussian, and gamma potential distribution functions. The Weibull function is fitted via a two-term Dubinin-Radushkevich (D-R) equation. The closest data fit occurs for the gamma distribution. The two-term D-R potentials are interpreted as indicating adsorption by primary micropores followed sequentially by secondary micropores, Analysis of the distribution of adsorption enthalpy for the porous solid compared with a nonporous standard suggests that the predominant pore width is 1.2 nm. The interpretation of the differential molar adsorption entropy at 298 K suggests that strongly localized adsorption occurs in the primary micropores and two-dimensional translational motion with rotation in the plane of the ring occurs in the secondary micropores. (C) 2000 Academic Press.

Keywords: Micropore, Silica, Adsorption Enthalpy, Adsorption Entropy, Gamma Distribution, Benzene Adsorption, Pore-Size Distribution, Polanyi-Dubinin Theory, Isotherm Equation, Fractal Dimension, Carbons, Thermodynamics, Adsorbents, Solids

Juang, R.S., Wu, F.C. and Tseng, R.L. (2000), Mechanism of adsorption of dyes and phenols from water using activated carbons prepared from plum kernels. *Journal of Colloid and Interface Science*, **227** (2), 437-444.

Full Text: [J\J Col Int Sci227, 437.pdf](J/J%20Col%20Int%20Sci227,%20437.pdf)

Abstract: The kinetics and mechanism of adsorption of two commercial dyes (BR22., AB25), phenol, and 3-chlorophenol from water on activated carbons were studied at 30°C. The activated carbons were prepared from plum kernels, and the activation temperature and time tested were in the ranges 750-900°C and 1-4 h, respectively. Three simplified kinetic models including a pseudo-first-order, a pseudo-second-order, and an intraparticle diffusion model were tested. It was shown that the adsorption of both phenols could be fitted to a pseudo-second-order rate law, and that of both dyes could be fitted to an intraparticle diffusion model. Kinetic parameters were calculated and correlated with the physical properties of the adsorbents. (C) 2000 Academic Press.

Keywords: Adsorption Mechanism, Dyes, phenols, Activated Carbons, Plum Kernels, Intraparticle Diffusion, Aqueous-Solutions, Fly-Ash, Kinetics, Removal, Equilibrium, Adsorbents, Cost, Dyestuffs, Sorbents

Gauden, P.A. and Terzyk, A.P. (2000), The normalization of the micropore-size distribution function in the Polanyi-Dubinin type of adsorption isotherm equations. *Journal of Colloid and Interface Science*, **227** (2), 482-494.

Full Text: [J\J Col Int Sci227, 482.pdf](J/J%20Col%20Int%20Sci227,%20482.pdf)

Abstract: The problem of the normalization of the micropore-size distribution (MSD) based on the gamma-type function is presented. Three cases of the integration range (widely known in the literature) of MSD, characterizing the geometric heterogeneity of a solid, are considered (val (= B, E0, and/or x)) i.e., from zero to infinity, from val(min) to infinity, and the finite range from valmin, up to valmax-due to the boundary setting of an adsorbate-adsorbent system. The physical meaning of the parameters of the gamma-type function (ρ and ν) is investigated for the mentioned intervals. The behavior and properties of this MSD function are analyzed and compared with the fractal MSD proposed by Pfeifer and Avnir. The general conclusion is that if adsorption proceeds by a micropore filling mechanism and the structural heterogeneity is described in the finite region (valmin, valmax), for all cases of the possible values of the parameters of the MSD functions, the generated isotherms belong to the first class of the IUPAC classification (i.e., Langmuir-type behavior is observed). For the other cases (val epsilon < 0, infinity) and val epsilon < Valmin, infinity)) some erroneous and ambiguous results are obtained. (C) 2000 Academic Press.

Keywords: Adsorption, Active Carbon, Fractal Dimension, Microporosity, Potential Theory, Pore Diameter, Pore-Size, Activated Carbon, Fractal Dimension, Characteristic Energy, Nitrogen Adsorption, Slit-Like, Surface, Solids, Adsorbents, Thermodynamics

Atun, G. and Hisarli, G. (2000), A study of surface properties of red mud by potentiometric method. *Journal of Colloid and Interface Science*, **228** (1), 40-45.

Full Text: [J\J Col Int Sci228, 40.pdf](J/J%20Col%20Int%20Sci228,%2040.pdf)

Abstract: A bauxite waste of alumina manifacture, i.e., red mud (RM), is an oxide-like adsorbent capable of removing radiocesium and strontium. The adsorption behavior of these radionuclides is dominated by the surface charge of the adsorbent and the number of available adsorption sites. In this study, the surface charge densities to), microscopic acidity constants (pK(S)), and site distributions of the RM in 10-3-1 M concentrations of NaCl, CsCl, and SrCl2 solutions were evaluated from potentiometric titration data. The reciprocal slopes of the pH-rr curves are higher than those predicted by double-layer theory. This suggests that surface charge and the counter charge are located in a region inside the surface because the porous and/or gel surface layer is permeable to these ions. Ionic strength dependency of sigma in CsCl solutions is similar to those found for other oxides. In SrCl2 and NaCl solutions, at any pH the surface charge decreases as the electrolyte concentration increases. This behavior of the RM may be attributed to the existence of differently charged oxide surface sites of variable affinity for electrolyte ions. Uptake of protons on these sites could be interpreted in terms of Hi adsorption and well described by the Freundlich equation. The empirical Freundlich parameters were used to characterize a site distribution function which provides information about the affinity ratio of the adsorption sites to H+ and supporting electrolyte cations. (C) 2000 Academic Press.

Keywords: Red Mud, Surface Charge, Potentiometric Titration, Adsorption, Site Distribution, Ionic Strength, Oxide-Water Interface, Electrical Double-Layer, Salt Concentration, Metal-Ions, Adsorption, Sorption, Montmorillonite, Equilibrium, Complexation, Ionization

Dahnert, K. and Huster, D. (2000), Thermodynamics of the laminar Donnan system. *Journal of Colloid and Interface Science*, **228** (2), 226-237.

Full Text: [J\J Col Int Sci228, 226.pdf](J/J%20Col%20Int%20Sci228,%20226.pdf)

Abstract: Thermodynamic quantities of a polyelectroyte immersed in salt solution are derived modeling the polyelectrolyte by a sequence of charged parallel flat plates. The starting point for the analysis is the derivation of the Gibbs free enthalpy in its canonic variables pressure (p) and temperature (T), i.e., as a thermodynamic potential. From this, further thermodynamic quantities such as Helmoltz free energy, entropy, internal energy, compressibility, isobar and isochor heat capacities, and expansive force are derived in analytical expressions by differentiation. All these formulas contain the parameter plate surface charge density (sigma) that provides a measure of the discontinuity of the polymer charge distribution that can be used to fit the theory to experimental data. Thermodynamic quantities are also known from the classical Donnan equilibrium that treats the polyelectroyte charge network as a charge continuum. A limiting process is used to perform the transition from the laminar Poisson-Boltzmann model to the continuous Donnan equilibrium. In general, the expressions of the Donnan system are recovered for plate charge density sigma --> 0, number of plates Z --> infinity, and sigma Z = constant. (C) 2000 Academic Press.

Keywords: Polyelectrolyte, Donnan Model, Pb Model, Thermodynamic Potential, Thermodynamic Quantities, DNA Double Helices, Polyelectrolyte Solutions, Electrostatic Properties, Condensation

Güçlü, K. and Apak, R. (2000), Modeling of copper(II), cadmium(II), and lead(II) adsorption on red mud from metal-EDTA mixture solutions. *Journal of Colloid and Interface Science*, **228** (2), 238-252.

Full Text: [J\J Col Int Sci228, 238.pdf](J/J%20Col%20Int%20Sci228,%20238.pdf)

Abstract: The adsorption of toxic heavy metal cations, i.e, Cu(II), Cd(II), and Pb(II), from metal-EDTA mixture solutions on a composite adsorbent having a heterogeneous surface, i.e., bauxite waste red mud, has been investigated and modeled with the aid of a modified surface complexation approach in respect to pH and complexant dependency of heavy metal adsorption. EDTA was selected as the modeling ligand in view of its wide usage as an anthropogenic chelating agent and abundance in natural waters. The adsorption experiments were conducted for metal salts (nitrates), metal-EDTA complexes alone, or in mixtures containing (metal + metal-EDTA). The adsorption equilibrium constants for the metal ions and metal-EDTA complexes were calculated. For all studied cases, the solid adsorbent phase concentrations of the adsorbed metal and metal-EDTA complexes were found by using the derived model equations with excellent compatibility of experimental and theoretically generated adsorption isotherms. The model was useful for metal and metal-EDTA mixture solutions either at their natural pH of equilibration with the sorbent, or after pH elevation with NaOH titration up to a certain pH. Thus adsorption of every single species (M2+ or MY2-) or of possible mixtures (M2+ + MY2-) at natural pH or after NaOH titration could be calculated by the use of simple quadratic model equations, once the initial concentrations of the corresponding species, i.e., [M2+](0) or [MY2-](0), were known. The compatibility of theoretical and experimental data pairs of adsorbed species concentrations was verified by means of nonlinear regression analysis. The findings of this study can be further developed so as to serve environmental risk assessment concerning the expansion of a heavy metal contaminant plume with groundwater movement in soil consisting of hydrated-oxide type minerals. (C) 2000 Academic Press.

Keywords: Adsorption Modeling, Red Mud, Bauxite Waste, Copper(II), Cadmium(II), Lead(II), Copper-EDTA, Cadmium-Edta, Lead-Edta, Metal-Edta Adsorption, Surface Complexation Modeling, Surface Complexation Model, Ion-Exchange Processes, Calcium-Montmorillonite, Oxide Surfaces, Organic-Matter, Forming Agents, Cobalt Ions, Sorption, Goethite, Dissolution

Seki, H., Suzuki, A. and Iburi, Y. (2000), Biosorption of heavy metal ions to a Marine Microalga, *Heterosigma akashiwo* (Hada) Hada. *Journal of Colloid and Interface Science*, **229** (1), 196-198.

Full Text: [J\J Col Int Sci229, 196.pdf](J/J%20Col%20Int%20Sci229,%20196.pdf)

Abstract: A fundamental study of the application of marine microalga to the aqueous-phase separation of toxic heavy metals was carried out. The biosorption characteristics of cadmium and lead ions were determined with marine microalga, *Heterosigma akashiwo* (Hada) Hada, which was inactivated by steam sterilization. A simple metal-binding model was used for the description of metal-binding data. The results showed that the biosorption of bivalent metal ions to *H. akashiwo* was due to monodentate binding to two different types of acidic sites: carboxylic- and phosphatic-type sites.

Keywords: Biosorption, Heavy Metal, Marine Microalga, *Heterosigma Akashiwo*

Krishna, B.S., Murty, D.S.R. and Prakash, B.S.J. (2000), Thermodynamics of chromium(VI) anionic species sorption onto surfactant-modified montmorillonite clay. *Journal of Colloid and Interface Science*, **229** (1), 230-236.

Full Text: [J\J Col Int Sci229, 230.pdf](J/J%20Col%20Int%20Sci229,%20230.pdf)

Abstract: Batch sorption experiments performed on Cr(VI) species sorption showed a significantly enhanced removal of inorganic hexavalent chromium anionic species from aqueous solution by montmorillonite clays modified with quaternary amine, hexadecyltrimethylammonium (HDTMA) bromide. Unmodified clay had no affinity for chromium(VI) species. The sorption of Cr(VI) species has been carried out as a function of pH, contact time, adsorbate concentration (4.14×10-5 to 8.62×10-3 M), and temperature (5-45°C), The surfactant-modified clay surface was stable when exposed to extremes in pH, The optimum pH for maximum sorption of Cr(VI) species was found to be at pH 1 and was constant between pH 2 and pH 6. The sorption data obtained was well described by DKR and Langmuir sorption isotherms, Sorption energy (E) for (i) surfactant sorption by montmorillonite clay and (ii) sorption of chromium(VI) species by surfactant modified clay have been computed from the DKR equation. Sorption energy evaluated for the sorption of both surfactant and Cr(VI) species showed that an ion-exchange mechanism was operative, The mechanism of retention appears to be replacement of counterion of the surfactant by Cr(VI) anionic species. Adsorbent capacity for the sorption of Cr(VI) species has been evaluated from the Langmuir sorption isotherm data. Thermodynamic parameters (ΔH°, ΔS° and ΔG°) for surfactant sorption on montmorillonite clay and Cr(VI) sorption by modified clay have been evaluated. The specific rate constant for sorption of Cr(VI) species on modified montmorillonite was rapid during the first 10 min and equilibrium was found to be attained within 30 min. The sorption of Cr(VI) species onto modified montmorillonite clay followed first-order rate kinetics. (C) 2000 Academic Press.

Keywords: Modified Clay, Chromium(VI) Sorption

? Pavan, P.C., Crepaldi, E.L. and Valim, J.B. (2000), Sorption of anionic surfactants on layered double hydroxides. *Journal of Colloid and Interface Science*, **229** (2), 346-352.

Full Text: [2000\J Col Int Sci229, 346.pdf](2000/J%20Col%20Int%20Sci229,%20346.pdf)

Abstract: In the present study we investigated the adsorption of sodium dodecyl- and octylsulfate, and sodium dodecyl- and octylbenzene-sulfonate, on a layered double hydroxide (LDH) under controlled conditions. The results were compared to those obtained for the adsorption of surfactants on mineral oxides and on LDHs, showing that the behavior of surfactant adsorption on LDHs can be approximately explained by the models proposed for surfactant adsorption on mineral oxides. The electrokinetic potential of the surfactant-adsorbed LDH particles in suspension was measured in order to monitor the variation of this potential as a function of the adsorption. The results showed a characteristic behavior of the surfactant-adsorbed LDH that can be correlated to a rearrangement of the adsorbed layer at concentrations above the CMC. Surfactant sorption was also studied, using SDS and the calcined LDH, showing the regeneration of the calcined material by intercalating the DS anions. Two processes can occur during the removal of surfactants from aqueous solutions by LDHs, depending on the starting material: (i) adsorption itself, when a noncalcined LDH intercalated with a nonexchangeable anion, such as carbonate, is used; and (ii) adsorption and intercalation, which occurs when a calcined LDH, like Mg-Al-CO3, is used. The potential application of this material for surfactant removal is one of the reasons for the need for a better understanding of the mechanisms involved. As we demonstrate here, LDHs are very efficient in removing surfactants from aqueous solutions. (C) 2000 Academic Press.

Keywords: Surfactant Adsorption, Surfactant Sorption, Zeta Potential, Layered Double Hydroxides, Hydrotalcite-Like Compound, Sodium Dodecyl-Sulfate, Physicochemical Properties, Thermal-Decomposition, Molecular Adsorption, Solution Interface, Aqueous-Solution, Oxide Catalysts, Exchange, Sorbent

Aubourg, R., Bee, A., Cassaignon, S., Monticone, V., Treiner, C. (2000), Adsorption isotherms of cetylpyridinium chloride with iron III salts at air/water and silica/water interfaces. *Journal of Colloid and Interface Science*, **230** (2), 298-305.

Full Text: [J\J Col Int Sci230, 298.pdf](J/J%20Col%20Int%20Sci230,%20298.pdf)

Abstract: The interaction of iron III salts and cetylpyridinium chloride (CPC) has been studied at the air/water and silica/water interfaces. The surface tension of cetylpyridinium chloride has been determined in aqueous solutions in the presence of iron III chloride and iron III nitrate at two constant pH values, namely, 3.5 and 1.2. It is shown that the surface tension of the cationic surfactant depends upon the ionic strength of the solution through the pH adjustment in the presence of the former salt but not in the presence of the latter. The effect of iron III nitrate on the surface tension of CPC is similar to that of potassium nitrate, indicating that the iron III various-hydrolyzed species do not interfere with the composition of the air/water interface. The competitive adsorption of iron III nitrate salt and the cationic surfactant at a silica/water interface was next investigated. The adsorption isotherms were determined at pH 3.5. It is shown that although the iron III ions, which were added to the silica dispersion in the presence of the cetylpyridinium ions, were strongly bound to the anionic surface sites, the surfactant ions are not salted out in the solution but remain in close vicinity of the silica surface. Conversely as the cationic surfactant is added first to the silica dispersion in the presence of the adsorbed iron III ions, the metal ions and the surfactant ions are both coadsorbed onto the silica surface. It is suggested that iron III hydrolyzed or free cations and the cationic surfactant molecules may not compete for the same adsorption sites onto the silica surface. (C) 2000 Academic Press.

Keywords: Surfactant Adsorption on Silica, Cetylpyridinium Chloride, Iron III Adsorption on Silica, Competitive Adsorption, Surface Tension Measurements, Adsorption Isotherms at Solid/Water Interfaces, Cationic Surfactants, Water Interface, Aqueous-Solutions, Particles, Ultrafiltration, Coadsorption, Chromate, Ions

Gun’ko, V.M., Villiéras, F., Leboda, R., Marciniak, M., Charmas, B. and Skubiszewska-Zięba, J. (2000), Characterization of titania/silica gel by means of low-pressure nitrogen adsorption. *Journal of Colloid and Interface Science*, **230** (2), 320-327.

Full Text: [J\J Col Int Sci230, 320.pdf](J/J%20Col%20Int%20Sci230,%20320.pdf)

Abstract: Adsorbents synthesized by grafting of titania onto mesoporous silica gel surfaces at different temperatures were studied by means of nitrogen adsorption-desorption and water desorption. The pore size distribution f(Rp) of titania/silica gel depends on the titania concentration (CTiO2), and the temperature of titania synthesis. Nonuniformity of TiO2 phase is maximal at a low CTiO2 value (3.2 wt.% anatase deposited at 473 K), and two peaks of the fractal dimension distribution f(D) are observed at such a concentration of titania, but at larger CTiO2 values, only one f(D) peak is seen. More ordered filling of pores and adsorption sites by nitrogen, reflecting in the shape of adsorption energy distributions f(E) at different pressures of adsorbate, is observed for adsorbent with titania (rutile + anatase) grafted on silica gel at a higher temperature (673 K). (C) 2000 Academic Press.

Keywords: Mesoporous Silica Gel, CVD-Titania/Silica Gel, Constrained Regularization Method, Pore Size Distribution, Fractal Dimension Distribution, Nitrogen Adsorption Energy Distribution, Water Desorption, Polanyi-Dubinin Theory, Carbon-Black Particles, Fractal Dimension, Microporous Carbon, Isotherm Equation, Porous Materials, Fumed Silica, Water, Silica/Titania, Heterogeneity

Gun’ko, V.M., Leboda, R., Skubiszewska-Zieba, J. and Rynkowski, J. (2000), Silica gel modified due to pyrolysis of acetylacetone and metal (Ti, Cr, Co, Ni, Zn, Zr) Acetylacetonates. *Journal of Colloid and Interface Science*, **231** (1), 13-25.

Full Text: [J\J Col Int Sci231, 13.pdf](J/J%20Col%20Int%20Sci231,%2013.pdf)

Abstract: Mesoporous silica gels modified due to pyrolysis of acetylacetone or acetylacetonates (AcAc) of zirconium [Zr(AcAc)4], titanium [titanyl TiO(AcAc)2], nickel [Ni(AcAc)2], zinc [Zn(AcAc)2], chromium [Cr(AcAc)3], and cobalt [Co(AcAc)2] were studied using nitrogen adsorption-desorption, TPD-DTG, TEM, XRD, and XRF methods. Grafted C/X phases consist of metal compounds (X denotes oxide, silicate, or metal crystallites) and pregraphite pyrocarbon, whose characteristics can be varied by changing the metal in M(AcAc)n. The structural parameters of C/X/SiO2, such as the specific surface area of micro-and mesopores, pore volume, pore size and fractal dimension distributions, and adsorptive ability, depend nonlinearly on the concentrations of the C/X deposit due to alterations in the topology of grafted matters with increased concentrations and a possible catalytic effect of the X phase on pyrolysis. (C) 2000 Academic Press.

Keywords: Mesoporous Silica Gel, Metal (Ti, Cr, Co, Ni, Zn, Zr) Acetylacetonate Pyrolysis, Carbon Deposit, Carbon-Metal Compound Deposit, Pore Size Distribution, Fractal Dimension Distribution, TEM, TPD-DTG, Water Desorption, Activation Energy Distribution, Arbon-Mineral Adsorbents, Adsorption-Isotherm Equation, Polanyi-Dubinin Theory, Surface-Properties, Polyfurfuryl Alcohol, 1H NMR Spectroscopy, Gas-Chromatography, Microporous Carbon, Fractal Dimension, Disperse Silica

Gunnarsson, M., Jakobsson, A.M., Ekberg, S., Albinsson, Y. and Ahlberg, E. (2000), Sorption studies of cobalt(II) on colloidal hematite using potentiometry and radioactive tracer technique. *Journal of Colloid and Interface Science*, **231** (2), 326-336.

Full Text: [J\J Col Int Sci231, 326.pdf](J/J%20Col%20Int%20Sci231,%20326.pdf)

Abstract: The sorption of Co(II) on colloidal hematite was studied as a function of pH, ionic strength, and Co(II) concentration. Two different techniques were used, yielding two different sets of information: (i) potentiometric titrations that provide information on the number of protons released as a function of pH owing to the sorption of Co(II) and (ii) measurement of the amount of cobalt sorbed on the surface as a function of pH using a radioactive tracer, Co-60. At low Co(II) concentrations (10-8 M), the sorption was found to be independent of ionic strength but there seems to be a weak ionic strength dependence at higher Co(II) concentrations (10-4 M). The adsorption edge moved to higher pH with increasing Co(II) concentration. For the high Co(II) concentration, the number of protons released per cobalt sorbed increased from zero to approximately 1.5. The basic charging properties of hematite were modeled with four different surface complexation models. The I-pg Basic Stern Model (BSM), with binding of electrolyte ions to the Stern plane, seems to be the most reasonable model if the ambition is to describe experimental data at different ionic strengths. The sorption of cobalt was modeled with the 1-pK BSM. By introducing a low concentration of high affinity surface sites for cobalt sorption it was possible to model the sorption in very wide cobalt concentrations, ranging from 10-8 M to 10-4 M. (C) 2000 Academic Press.

Keywords: Co(II), Hematite, Sorption, Protons Released, Surface Complexation Models, Potentiometry, Radioactive Tracer, Intrinsic Proton Affinity, Electrical Double-Layer, Reactive Surface Groups, Heterogeneous Surfaces, Solution Interfaces, Metal (Hydr)Oxides, Frumkin Isotherm, Adsorption, Particles, Oxides

Artola, A., Martin, M., Balaguer, M.D. and Rigola, M. (2000), Isotherm model analysis for the adsorption of Cd(II), Cu(II), Ni(II), and Zn(II) on anaerobically digested sludge. *Journal of Colloid and Interface Science*, **232** (1), 64-70.

Full Text: [J\J Col Int Sci232, 64.pdf](J/J%20Col%20Int%20Sci232,%2064.pdf)

Abstract: Adsorption of Cd(II), Cu(II), Ni(II), and Zn(II) from aqueous solutions on anaerobically digested sludge has been investigated. Experimental data has been fit to Langmuir, Freundlich, and Redlich-Peterson isotherms to obtain the characteristic parameters of each model. Based on the maximum adsorption capacity obtained from the Langmuir and the Redlich-Peterson isotherm the affinity of the studied metals for the sludge has been established as Cu(II) > Cd(II) > Zn(II)> Ni(II). Adsorption tests from multi-metal systems confirm the affinity order obtained in the individual metal tests. The adsorption capacity for Cu(II) measured in individual tests is not reduced by the presence of the other above referred metals. Desorption of Zn(II) and Cd(II) previously bound to the sludge in front of Cu(II) and HCl solutions is also reported. (C) 2000 Academic Press.

Keywords: Heavy Metals, Digested Sludge, Metal Affinity, Adsorption Isotherms, Multimetal System, Desorbing Agent, Heavy-Metal Binding, Aqueous-Solutions, Waste-Water, Biosorption, Biomass, Cadmium, Removal, Chromium(VI), Desorption, Surfaces

Chang, C.F., Chang, C.Y., Tsai, W.T. and Wu, S.C. (2000), Adsorption equilibrium of polyethylene glycol in the copper electroplating solution on activated carbon. *Journal of Colloid and Interface Science*, **232** (1), 207-209.

Full Text: [J\J Col Int Sci232, 107.pdf](J/J%20Col%20Int%20Sci232,%20107.pdf)

Abstract: Polyethylene glycol (PEG) used as a brightening and stabilization agent at the concentration of 30 mg dm-3 is a major organic additive in the copper electroplating solution. Activated carbon, Calgon Filtrasob 400, is used as the adsorbent to remove the PEG from the used electroplating solution in order to broaden the appeal of recycling it. The equilibrium of adsorption is attained within 14 days. The effect of the temperature on the amount of PEG adsorbed on the activated carbon is insignificant for the temperatures ranged from 288 to 313 K. The adsorption isotherm of PEG conforms to the Langmuir isotherm, qe = QLKLCe/(1 + KLCe), With a high correlation coefficient of 0.9979. The large values of the monolayer adsorption capacity, QL, of 303 mg g-1 and the equilibrium constant, KL, of 0.273 dm3 mg-1 show a great adsorption potential of PEG on the activated carbon. A high removal efficiency would be expected at such a low original concentration of PEG. From the results mentioned above, it is feasible to use activated carbon for removing PEG from the electroplating solution, thereby achieving the appeal of recycling. (C) 2000 Academic Press.

Keywords: Adsorption, Polyethylene Glycol, Activated Carbon, Electroplating Solution, Recycling

Kim, J.S. and Keane, M.A. (2000), Ion exchange of divalent cobalt and iron with Na-Y zeolite: Binary and ternary exchange equilibria. *Journal of Colloid and Interface Science*, **232** (1), 126-132.

Full Text: [J\J Col Int Sci232, 126.pdf](J/J%20Col%20Int%20Sci232,%20126.pdf)

Abstract: Divalent cobalt and iron removal from aqueous solutions by batch ion exchange with a synthetic Na-Y zeolite has been studied under competitive and noncompetitive conditions. The binary Co/Na and Fe/Na ion-exchange equilibrium isotherms, constructed at 291±2 K and a total solution positive charge concentration of 0.1 eq dm-3, exhibited sigmoidal shapes that are attributed to an exchange site heterogeneity. The solution pH and the ratio of sorbate to sorbent are identified for which minimal imbibition of metal hydroxide and maintenance of zeolite structural integrity are ensured. An increase in Fe and Co concentration over the range 0.005-0.05 mol dm-3 lowered the removal efficiency but the external Fe was preferred to the indigenous sodium over the entire concentration range; there was a switch in preference from Co to Na at [Co] in excess of 0.034 mol dm-3. Exchange data for Cu2+/Na+ and Ni2+/Na+ binary systems are included for comparative purposes, and ion exchange affinity and Na-Y exchange capacity are discussed in terms of metal ion hydration and ion location. The effect of exchange temperature has been considered where the maximal Fe exchange was temperature independent while Co exchange was promoted with increasing temperature. A Co/Fe/Na-Y ternary exchange isotherm was constructed from 20 pairs of experimental points and is treated quantitatively in terms of ternary and pseudo-binary separation factors. The preference of the zeolite for exchange with iron over cobalt under noncompetitive conditions also extended to solutions containing both metals. (C) 2000 Academic Press.

Keywords: Na-Y Zeolite, Ion Exchange, Iron, Cobalt, Binary Exchange, Ternary Exchange, Separation Factors, Water Treatment, Metal Co-Cation, Natural Zeolites, Transition-Metal, Heavy-Metals, Zn2+ Ions, Removal, Hydrolysis, Sorption, Cadmium, Acidity

Das, D.D., Mahapatra, R., Pradhan, J., Das, S.N. and Thakur, R.S. (2000), Removal of Cr(VI) from aqueous solution using activated cow dung carbon. *Journal of Colloid and Interface Science*, **232** (2), 235-240.

Full Text: [J\J Col Int Sci232, 235.pdf](J/J%20Col%20Int%20Sci232,%20235.pdf)

Abstract: Removal of hexavalent chromium from aqueous medium by using activated cow dung carbon was studied. Cow dung was carbonized and activated by treating with concentrated H2SO4 followed by heating for 24 h at 120 degreesC. The extent of adsorption was studied as a function of pH, contact time, amount of adsorbent, concentration of adsorbate, and temperature. At lower pH (<3.5), the prepared sorbent was capable of removing <similar to>90% Cr(VI) at 5 ppm concentration from aqueous synthetic solution. The dynamics of migration of the sorbate ions from the bulk onto the sorbent surface was studied and the results obtained under various experimental conditions were found to follow standard adsorption isotherms. The reaction kinetics was found to be of first order. (C) 2000 Academic Press.

Keywords: Chromium (VI) Adsorption, Activated Cow Dung Carbon, Adsorption Isotherm, Hexavalent Chromium, Adsorption, Coprecipitation, Cadmium, Metals, pH

Fainerman, V.B. and Miller, R. (2000), Phase transition processes in surfactant adsorption layers. *Journal of Colloid and Interface Science*, **232** (2), 254-259.

Full Text: [J\J Col Int Sci232, 254.pdf](J/J%20Col%20Int%20Sci232,%20254.pdf)

Abstract: Adsorption data in the form of surface tension vs hulk concentration isotherms having strong changes in the: slope have often been discussed in the literature in terms of phase transitions in the adsorption layer. It will be shown thermodynamically that these apparent kink points in the isotherms are unreal. A phase transition would cause a completely opposite change in the isotherm. Experimental surface tension data for sodium octanoate and dodecyl ammonium chloride obtained from the literature are reinterpreted on the basis of the Frumkin and reorientation isotherms. (C) 2000 Academic Press.

Keywords: Surfactant Adsorption Layers, Liquid Interfaces, Surface Reorientation, Phase Transition, Surface Thermodynamic Models, Hexane-Water Interface, Partial Molar Area, Adsorbed Film, Tension Equation, Air Interface, Monolayers, State, Fluoroalkanol, Isotherm

Chisholm-Brause, C.J., Berg, J.M., Matzner, R.A. and Morris, D.E. (2001), Uranium(VI) sorption complexes on montmorillonite as a function of solution chemistry. *Journal of Colloid and Interface Science*, **233** (1), 38-49.

Full Text: [J\J Col Int Sci233, 38.pdf](J/J%20Col%20Int%20Sci233,%2038.pdf)

Abstract: We have investigated the effect of changes in solution chemistry on the nature of uranyl sorption complexes on montmorillonite (SAz-1) at different surface coverages (1.43-53.6 µmol/g). Uranyl uptake onto SAz-1 between pH 3 and 7 was determined in both titration and batch-mode experiments. These pH values result in solutions that contain a range of monomeric and oligomeric aqueous uranyl species. Continuous-wave and time-resolved emission spectroscopies were used to investigate the nature of U(VI) sorbed to SAz-1. A discrete set of uranyl surface complexes has been identified over a wide range of pH values at these low to moderate coverages. For ail samples, two surface complexes are detected with spectral characteristics commensurate with an inner-sphere complex and an exchange-site complex; the relative abundance of these two species is similar over these pH values at low coverage (1.43-2.00 µmol/g). In addition, surface species having spectra consistent with polymeric hydroxide-like sorption complexes form at the moderate coverages (similar to 34-54 µmol/g), increasing in abundance as the capacity of the amphoteric surface sites is exceeded. Furthermore, a species with spectral characteristics anticipated for an outer-sphere surface complex is observed for wet paste samples at low pH (3.7-4.4) and both low (similar to2 µmol/g) and moderate (similar to 40 µmol/g) coverage. There are only subtle differences in the nature of sorption complexes formed at different pH values but similar coverages, despite markedly different uranyl speciation in solution. These results indicate that the speciation in the solution has minimal influence on the nature of the sorption complex under these experimental conditions. The primary control on the nature and abundance of the different uranyl sorption complexes appears to be the relative abundance and reactivity of the different sorption sites. (C) 2001 Academic Press.

Keywords: Uranium, Sorption, Clays, Montmorillonite, Emission Spectroscopy, Speciation, Surface Complexation, Ray-Absorption-Spectroscopy, Hematite Particles, Aqueous-Solutions, Binding-Sites, Metal-Ions, Adsorption, Uranyl, Speciation, Water, Model

Berka, M. and Bányai, I. (2001), Surface complexation modeling of K+, NO3-, SO42-, Ca2+, F-, Co2+, and Cr3+ ion adsorption on silica gel. *Journal of Colloid and Interface Science*, **233** (1), 131-135.

Full Text: [J\J Col Int Sci233, 131.pdf](J/J%20Col%20Int%20Sci233,%20131.pdf)

Abstract: Surface complex formation of K+, NO3-, SO42-, Ca2+, F-, Co2+, and Cr3+ ions was determined on the surface of silica gel. Experimental data obtained by acid-base titration of suspensions were interpreted in terms of the triple-layer model. The value of the deprotonation constant of surface OH could be determined precisely but the protonation constant was rather uncertain. The logarithms of ion pair formation constants for K+, NO3-, Ca2+, and SO42-adsorbed in the beta-plane are log K-ipM, K-X similar to 0, therefore these species can be considered inert ions in the investigated pH range. F-, Co2+, and Cr3+ ions were found to be strongly sorbed in the o-plane. In order to provide a good fit and to obtain parameters independent of their initial values, all possible equilibrium must be accounted for in the models. (C) 2001 Academic Press.

Keywords: Surface Complex Formation, Triple-Layer Model, Silica Gel, Oxide-Water Interface, Electrical Double-Layer, Alumina Electrolyte Interface, Solid-Solution Interface, Metal-Ions, Ionization, pH, Chromium(III), (Hydr)Oxides, Hydrolysis

Vlasova, N.N. (2001), Effect of 2,2’-bipyridine on the adsorption of Zn2+ ions onto silica surface. *Journal of Colloid and Interface Science*, **233** (2), 227-233.

Full Text: [J\J Col Int Sci233, 227.pdf](J/J%20Col%20Int%20Sci233,%20227.pdf)

Abstract: The influence of 2,2’-bipyridine (bipy) on adsorption of zink ions onto a highly dispersed silica surface has been studied. The enhanced adsorption of zink ions onto silica surface from the solution containing 2,2’-bipyridine is explained by ternary surface complex formation, {equivalent to SiOH\_Zn-m(bipy)(n)((2-m)+)}. The adsorbed Zn2+ and bipy concentrations were measured at the adsorption from solutions with different ratios of Zn: bipy. The equilibrium reaction constants of binary and ternary complexes have been calculated using the constant capacitance model. The potentiometric titration data were used in order to determine the H+/Zn2+ exchange stoichiometry. The composition of formed surface complexes has been confirmed with their UV absorption spectra. (C) 2001 Academic Press.

Keywords: Metal Ion Adsorption, Silica Surface, Zink Ion, 2,2’-Bipyridine, Ternary Surface Complex, Ternary Copper(II) Complexes, Metal-Ions, Gel

Hamieh, T., Rezzaki, M. and Schultz, J. (2001), Study of the second order transitions and acid–base properties of polymers adsorbed on oxides by using inverse gas chromatography at infinite dilution: I. Theory and methods. *Journal of Colloid and Interface Science*, **233** (2), 339-342.

Full Text: [J\J Col Int Sci233, 339.pdf](J/J%20Col%20Int%20Sci233,%20339.pdf)

Abstract: The study of phenomena transitions in polymers is of vital importance in material sciences and more particularly when polymers are adsorbed on oxides. Inverse gas chromatography (IGC) at infinite dilution proved to be an excellent technique to determine not only the glass transitions, but also β-transition and liquid–liquid transitions of polymers adsorbed on solid substrates. In this paper, we used the IGC technique to determine the second order transitions of the systems PMMA/SiO2 and PMMA/Al2O3, at various covered surface fractions and for various tacticities of the polymer (atactic, isotactic, and syndiotactic). In Part I, we developed the various theories, methods, and models used in the IGC technique in order to obtain physico-chemical properties when polymers are adsorbed on oxides.

Keywords: Adsorption, Inverse Gas Chromatography, Retention Volume, Surface Energy

Hamieh, T., Rezzaki, M. and Schultz, J. (2001), Study of the second order transitions and acid–base properties of polymers adsorbed on oxides by using inverse gas chromatography at infinite dilution: II. Experimental results. *Journal of Colloid and Interface Science*, **233** (2), 343-347.

Full Text: [J\J Col Int Sci233, 343.pdf](J/J%20Col%20Int%20Sci233,%20343.pdf)

Abstract: In Part I, we gave the details concerning inverse gas chromatography (IGC) at infinite dilution and the methods and models that will be used to characterize solid substrates. This technique proved to be an excellent technique to determine not only the glass transitions, but also β-transition and liquid–liquid transitions of polymers adsorbed on solid substrates. In this second part, we used the IGC technique to determine the second order transitions of the systems’ polymethyl methacrylate (PMMA)/SiO2 and PMMA/Al2O3, at various covered surface fractions and for various tacticities of the polymer. The maxima of the dispersive component of the surface energy γsd of our two systems, obtained by IGC at infinite dilution, indicated clearly the presence of transition temperatures (glass or local transitions). In general, we observed with PMMA three principal maxima that reflect the changes in motions leading to reorganization and rearrangement of the various groups or chain segments of the polymer. The change in the retention mechanism of the probes at the transition temperatures is attributed to an increased molecular mobility of the polymer segments, allowing for the penetration of the probes into the polymer layer. The study of the chemical physical properties of PMMA/SiO2 and PMMA/Al2O3 revealed an important difference in the acidic and basic behavior, in Lewis terms, of oxide covered by various concentrations of PMMA. This study also highlighted an important effect of the tacticity of the polymer on the acidic basic character of PMMA adsorbed on oxides.

Keywords: Glass and Liquid–Liquid Transitions, Adsorption, Specific Interactions, Acid–Baseconstants, Surface Energy, PMMA, Silica, Alumina

? Wu, C.H., Lo, S.L., Lin, C.F. and Kuo, C.Y. (2001), Modeling competitive adsorption of molybdate, sulfate, and selenate on γ-Al2O3 by the triple-layer model. *Journal of Colloid and Interface Science*, **233** (2), 259-264.

Full Text: [2001\J Col Int Sci233, 259.pdf](2001/J%20Col%20Int%20Sci233,%20259.pdf)

Abstract: Competitive adsorption of molybdate, sulfate, and selenate onto gamma -Al2O3 was investigated in the present study. Binary solute systems of MoO42- + SO42-, MoO42- + SeO42-, and MoO42- + SeO32- and a ternary solute system of MoO42- + SO42- + SeO42- were evaluated to determine their relative effects on competitive adsorption on the gamma -Al2O3 surface. Anionic competitive adsorption efficiency was pH dependent. The higher the pH, the lower the efficiency of MoO42- preventing SO42- and SeO42- adsorption; similar results were found in SeO42- depressing SO42- adsorption. This research found that more sites are occupied in mixed anionic adsorbate systems than when either ion is present alone. The results suggest that the gamma -Al2O3 surface is composed of many groups of binding sites. Because of the heterogeneity of adsorption sites, the triple-layer model (TLM) predicted the competitive effects qualitatively but not quantitatively. TLM gave reasonable descriptions of molybdate adsorption in the presence of sulfate and selenate, indicating that the model may be useful in predicting molybdate adsorption on gamma Al2O3. (C) 2001 Academic Press.

Keywords: Adsorption, Anion Competition, Arsenate, Competitive Adsorption, Complexation, Goethite, Groups, Heterogeneity, Kinetics, Molybdate, Oxide-Water Interface, Phosphate, Pressure-Jump Technique, Research, Selenate, Soils, Solute, Sulfate, Surface-Ionization, Triple-Layer Model

Sharma, Y.C. (2001), Effect of temperature on interfacial adsorption of Cr(VI) on wollastonite. *Journal of Colloid and Interface Science*, **233** (2), 265-270.

Full Text: [J\J Col Int Sci233, 265.pdf](J/J%20Col%20Int%20Sci233,%20265.pdf)

Abstract: An extensive study on the effect of temperature on interfacial adsorption of Cr(VI) on wollastonite has been carried out. Adsorption on the wollastonite surface increased from 69.5 to 91.7% by increasing the temperature from 30 to 50 degreesC under optimum conditions. Kinetic modeling of the process of adsorption of Cr(VI) was done and various parameters were determined. The process follows a first-order kinetic equation and the rate of uptake was found to be 2.40×10-2 min-1 at 30 degreesC, 2.5 pH, 0.5×10-4 M Cr(VI) concentration, and 0.01 M NaClO4 ionic strength. Kinetic and equilibrium modeling of the process of adsorption was undertaken and the equilibrium parameters were determined. The process of adsorption follows pore diffusion and the value of the rate constant of pore diffusion was found to be 5.00×10-3 mg g-1 min-1/2 at 30 degreesC and optimum conditions. The values of the coefficient of mass transfer, betaL, were determined at different temperatures. Thermodynamic studies of the removal process were performed. The study suggests that the process is a typical example of endothermic adsorption. (C) 2001 Academic Press.

Keywords: Cr(VI) Adsorption, Temperature Effect, Mass Transfer, Thermodynamic Studies, Activated Carbon, Industrial Effluents, Aqueous-Solution, Fly-Ash, Removal, Sorption, Sawdust, Adsorbability, Silica, Water

Pivovarov, S. (2001), Adsorption of cadmium onto hematite: Temperature dependence. *Journal of Colloid and Interface Science*, **234** (1), 1-8.

Full Text: [J\J Col Int Sci234, 1.pdf](J/J%20Col%20Int%20Sci234,%201.pdf)

Abstract: Cadmium adsorption by hematite has been investigated at 25-100 degreesC. The evaluation of experimental data was made, using the three-plain (drop Fe+...drop FeO-...counter plain) constant capacitance model. The structure of hematite surface and of cadmium complexes was also considered. The computer program for calculation of cadmium adsorption onto hematite at 25-100 degreesC in 0-1m NaNO3 is available. (C)2001 Academic Press.

Keywords: Cadmium, Adsorption, Temperature Dependence, Hematite, Surface Structure, Constant Capacitance Model, Solution Interface, Goethite, Model, Constants, Surfaces, pH

Notes: highly cited

? Goldberg, S. and Johnston, C.T. (2001), Mechanisms of arsenic adsorption on amorphous oxides evaluated using macroscopic measurements, vibrational spectroscopy, and surface complexation modeling. *Journal of Colloid and Interface Science*, **234** (1), 204-216.

Full Text: [2001\J Col Int Sci234, 204.pdf](2001/J%20Col%20Int%20Sci234,%20204.pdf)

Abstract: Arsenic adsorption on amorphous aluminum and iron oxides was investigated as a function of solution pH, solution ionic strength, and redox state. In this study in situ Raman and Fourier transform infrared (FTIR) spectroscopic methods were combined with sorption techniques, electrophoretic mobility measurements, and surface complexation modeling to study the interaction of As(III) and As(V) with amorphous oxide surfaces. The speciation of As(III) and As(V) in aqueous solution was examined using Raman and attenuated total reflectance (ATR)-FTIR methods as a function of solution pH. The position of the As–O stretching bands, for both As(III) and As(V), are strongly pH dependent. Assignment of the observed As–O bands and their shift in position with pH was confirmed using semiempirical molecular orbital calculations. Similar pH-dependent frequency shifts are observed in the vibrational bands of As species sorbed on amorphous Al and Fe oxides. The mechanisms of As sorption to these surfaces based on the spectroscopic, sorption, and electrophoretic mobility measurements are as follows: arsenate forms inner-sphere surface complexes on both amorphous Al and Fe oxide while arsenite forms both inner- and outer-sphere surface complexes on amorphous Fe oxide and outer-sphere surface complexes on amorphous Al oxide. These surface configurations were used to constrain the input parameters of the surface complexation models. Inclusion of microscopic and macroscopic experimental results is a powerful technique that maximizes chemical significance of the modeling approach.

Keywords: Adsorption, Alumina Electrolyte Interface, Amorphous Aluminum Oxide, Amorphous Iron Oxide, Aqueous-Solution, Arsenate, Arsenite, Chemistry, Electrical Double-Layer, Ferrihydrite, FTIR, FTIR Spectroscopy, Goethite, Hydroxide, Interaction, Iron-Oxide, Kinetics, Raman Spectroscopy, Sorption, Water Interface

Nevskaia, D.M. and Guerrero-Ruiz, A. (2001), Comparative study of the adsorption from aqueous solutions and the desorption of phenol and nonylphenol substrates on activated carbons. *Journal of Colloid and Interface Science*, **234** (2), 316-321.

Full Text: [J\J Col Int Sci234, 316.pdf](J/J%20Col%20Int%20Sci234,%20316.pdf)

Abstract: Adsorption of phenol and nonylphenol from aqueous solutions on microporous activated carbons has been studied. The phenol isotherm changes from L-shaped for surface oxygen group free carbon (I sample) to a two-stepped isotherm for oxidized carbon (IN sample, HNO3 treated) Furthermore, the adsorbed amounts diminish in about 25% on IN carbon. It is proposed that a change in the adsorption mechanism take place; i.e., weak interaction forces between the rr electrons in phenol and the pi electron in carbon are present on the original I carbon, while a donor-acceptor complex on the oxidized IN carbon is operating between basic surface oxygen groups and phenol aromatic rings. The shape of nonylphenol isotherms is two-stepped for both carbons. The introduction of acidic oxygen surface groups on the carbon enhances the specific nonylphenol adsorption by about 40%. This may be interpreted as being due to the fact that nonylphenol is hydrogen-bonded to the oxidized carbon surface by means of acidic groups. Thermal desorption experiments indicate that phenol is mainly physisorbed. Thermal desorption further confirms that nonylphenol is possibly bonded to oxygen surface groups by hydrogen bonds. (C) 2001 Academic Press.

Keywords: Activated Carbon, phenol, Nonylphenol, Adsorption, Desorption, Nonionic Surfactants, Thermal Regeneration, Nitric-Acid, Spectroscopy, Pollutants, Interface, Screen, N = 1-4

Cheung, C.W., Chan, C.K., Porter, J.F. and McKay, G. (2001), Film-pore diffusion control for the batch sorption of cadmium ions from effluent onto bone char. *Journal of Colloid and Interface Science*, **234** (2), 328-336.

Full Text: [J\J Col Int Sci234, 328.pdf](J/J%20Col%20Int%20Sci234,%20328.pdf)

Abstract: The sorption equilibrium and kinetics of cadmium ions from aqueous solution onto bone char have been studied. Equilibrium isotherms for the sorption system were correlated by Langmuir and bi-Langmuir equations. The application of the bi-Langmuir equation was developed because the mechanistic analysis in this research indicated that cadmium removal occurs ion exchange and physical adsorption onto different surface sites. The bi-Langmuir equation provides a better fit to the experimental data. In addition, the removal rates of cadmium ions based on the Langmuir models have been investigated. The effective diffusivity was calculated using the effects of initial metal ion concentration and bone char mass. Two mass-transport models based on film-pore diffusion control have been applied to analyze the concentration decay curves, The film and pore diffusion coefficients using an analytical equation are equal to 1.26×10-3 cm/s and 5.06×10-7 cm2/s, respectively. The pore diffusion coefficient obtained from the numerical method is 4.89×10-7 cm2/s. A sensitivity analysis showed that the film-pore diffusion model and constant effective diffusivity could be used to describe the mass-transport mechanism of the sorption system with a high degree of correlation. (C) 2001 Academic Press.

Keywords: Bone Char, Cadmium, Calcium Hydroxyapatite, Film-Pore Diffusion, Ion Exchange, Heterogeneous Surfaces, Adsorption Models, Metal Sorption, Kinetics, Removal, Exchange, Copper, Hydroxyapatites, Lignite, Water

Kekkonen, J., Lattu, H. and Stenius, P. (2001), Adsorption kinetics of complexes formed by oppositely charged polyelectrolytes. *Journal of Colloid and Interface Science*, **234** (2), 384-392.

Full Text: [J\J Cod Int Sci234, 384.pdf](J/J%20Cod%20Int%20Sci234,%20384.pdf)

Abstract: The objective of this study is to gain an understanding of the kinetics of adsorption of complexes formed in aqueous solution by oppositely charged polyelectrolytes. The properties of the complexes were characterized by means of dynamic light scattering and electrophoretic mobility and the reaction stoichiometry was studied by titration. The stoichiometry in the complexes depends on the polymer weight ratio w(p). Their point of zero charge (pzc) is shifted toward lower w(p) when simple cations of higher valence are added to the solution. The adsorption kinetics of the complexes on silica was studied by stagnation point reflectometry. The sign of charge of the complexes as well as the valence and concentration of simple cations governs the occurrence of adsorption in the electrolytes studied. Five different types of adsorption kinetics were found, (C) 2001 Academic Press.

Keywords: Polyelectrolyte Complexes, Adsorption Kinetics, Stagnation Point Flow, Cationic Polymers, Multilayer Films, Solid-Surfaces, Reflectometry, Flocculants, Deposition

Song, S., Lopez-Valdivieso, A. and Ojeda-Escamilla, M.C. (2001), Electrophoretic mobility study of the adsorption of alkyl xanthate ions on galena and sphalerite. *Journal of Colloid and Interface Science*, **237** (1), 70-75.

Full Text: [J\J Col Int Sci237, 70.pdf](J/J%20Col%20Int%20Sci237,%2070.pdf)

Abstract: The adsorption of ethyl and amyl xanthate ions on galena and sphalerite fines has been studied using electrophoretic lightscattering (ELS) measurements. It was performed on galena and sphalerite(< 2 μm) in aqueous solution at different potassium ethyl xanthate (PEX) and potassium amyl xanthate (PAX) concentrations. It has been observed that the presence of PEX or PAX caused the isoelectric points (IEP) of galena and sphalerite fines to shift and the electrophoretic mobility to reverse in sign, indicating that the xanthate ions chemisorbed on galena and sphalerite surfaces. This adsorption markedly broadened the electrophoretic mobility distribution of the mineral fines, suggesting that the populations of the particles have quite different adsorption densities of xanthate ions, and therefore the particle hydrophobicity was different. This phenomenon might be attributable to the effect of the hemimicelle adsorption of the xanthate ions on the minerals, the nonuniform distribution of active sites and their degree of activity, the effect of particle size and shape, etc. The nonuniform adsorption has been found to increase with increasing PEX or PAX concentration, reaching a maximum at a medium concentration followed by a decline. Also, experimental results have demonstrated that the nonuniform adsorption of the xanthate ions is much stronger on sphalerite than on galena, which may explain why sphalerite has a worse flotation response than galena when alkyl xanthates are used as collectors in flotation systems. (C) 2001 Academic Press.

Keywords: Adsorption Uniformity, Xanthate Ion, Electrophoretic Mobility, Sulfide Minerals, Thiol Collectors, Sulfide Minerals, Chemisorption, Flotation

Willett, L.J., Loyalka, S.K. and Tompson, R.V. (2001), Adsorption on heterogeneous regular surfaces. *Journal of Colloid and Interface Science*, **238** (2), 296-309.

Full Text: [J\J Col Int Sci238, 296.pdf](J/J%20Col%20Int%20Sci238,%20296.pdf)

Abstract: Quantifying the role of surface shape and physicochemical surface conditions on the interfacial reactivity of particles and substrates is fundamental to a multitude of natural and engineered surface adsorption phenomena. We consider continuum/jump regime adsorption at the gas or liquid interface of arbitrary regular solid surfaces with heterogeneous surface features. In particular, the 3-D boundary value problem (based on Laplace’s diffusion equation) is converted into a 2-D integral equation for the adsorbate concentration at the particle surface. This accommodates numerical descretization via the implementation of 2-D Gauss-Legendre quadratures on an arrangement of high-and low-adsorption patch trace sites constructed to completely cover the particle surface. A generalized computer program is developed to solve the resulting linear algebra problem for the unkown local adsorption current densities. We investigate the role of various distributions of high-and low-adsorption sites for a generalized class of spheres which includes the DNA-like shaped twisted spheres. The biological implications of the role of surface curvature on interfacial adsorption/reactivity at particle surfaces are also discussed. (C) 2001 Academic Press.

Keywords: Heterogeneous Surfaces, Catalysis, Chemoreception, Condensation/Evaporation, Continuum/Jump Regime Diffusion, Surface Adsorption/Absorption, Recombination

Liu, R.X., Liu, X.M., Tang, H.X. and Su, Y.B. (2001), Sorption behavior of dye compounds onto natural sediment of Qinghe River. *Journal of Colloid and Interface Science*, **239** (2), 475-482.

Full Text: [J\J Col Int Sci239, 475.pdf](J/J%20Col%20Int%20Sci239,%20475.pdf)

Abstract: The objective of this study is to assess the adsorption behavior of C.I. Basic Yellow X-5GL, C.I. Basic Red 13, C.I. Direct Blue 86, C.I. Vat Yellow 2, and C.I. Mordant Black 11 on natural sediment and to identify sediment characteristics that play a predominant role in the adsorption of the dyes. The potentiometric titration experiment is used to investigate acid-base properties of the sediment surface with a constant capacitance surface complexation model. The parameters controlling the sorption such as solution pH and ion strength, as well as the influence of organic carbon and Ca2+ ion on the adsorption, are evaluated. It is shown that the titration data can be successfully described by the surface protonation and deprotonation model with the least-squares FITEQL program 2.0. The sorption isotherm data are fitted to the Freundlich equation in a nonlinear form (1/n = 0.3-0.9) for all tested dyes. With increasing pH value, the sorption of C.I. Mordant Black 11 and C.I. Direct Blue 86 on the sediment decreases, while for C.I. Basic Yellow X-5GL and C.I. Basic Red 13, the extent of sorption slightly increases. In addition, ion strength also exhibits a considerably different effect on the sorption behavior of these dye compounds. The addition of Ca2+ can greatly reduce the sorption of C.I. Basic Red 13 on the sediment surface, while it enhances the sorption of C.I. Direct Blue 6. The removal of organic carbon decreases the sorption of C.I. Mordant Black 11 and C.I. Direct Blue 86. In contrast, the sorption of C.I. Basic Red 13 and C.I. Basic Yellow X-5GL is obviously enhanced after the removal of organic carbon. The differences in adsorption behavior are mainly attributed to the physicochemical properties of these dye compounds, (C) 2001 Academic Press.

Keywords: Natural Sediment, Acid-Base Properties, Sorption, Effect Factors, Dye Compounds, Distributed Reactivity Model, Soil Organic-Matter, Surface Complexation, Ionic-Strength, Waste-Water, Adsorption, Desorption, pH, Polarity, Kinetics

van Duijvenbode. R.C. and Koper, G.J.M. (2001), Effect of particle size on the sticking probability. *Journal of Colloid and Interface Science*, **239** (2), 581-583.

Full Text: [J\J Col Int Sci239, 581.pdf](J/J%20Col%20Int%20Sci239,%20581.pdf)

Abstract: In the literature the transport of particles toward an oppositely charged collector in stagnation point flow is described theoretically with the Smoluchowski-Levich solution of the convective-diffusion equation. Using optical reflectometry, the initial adsorption rate in the case of adsorption of negatively charged polystyrene latex particles onto a glass collector covered with positively charged poly(propylene imine) dendrimers was studied at low ionic strength and constant pH, For latex particle sizes varying from 10 to 100 nm, the experimentally obtained values for the initial adsorption rate are systematically lower than the theoretical predictions, The deviations are captured by a sticking probability or collision efficiency that increases linearly from 0.5 to 0.8 within the experimental window, This can be explained by the fact that with particle size the contact area between the incoming particles and the amorphous collector increases and with this the number of sites involved in binding. (C) 2001 Academic Press.

Keywords: Particle Deposition, Glass Surface, Convective Diffusion, Sticking Probability, Optical Reflectometry, Stagnant Flow, Poly(Propylene Imine) Dendrimers, Polymer Adsorption, Latex-Particles, Deposition, Kinetics, Glass, Interface, Flow, Reflectometry, Ellipsometry

Tripathy, S.S., Kanungo, S.B. and Mishra, S.K. (2001), The electrical double layer at hydrous manganese dioxide/electrolyte interface. *Journal of Colloid and Interface Science*, **241** (1), 112-119.

Full Text: [J\J Col Int Sci241, 112.pdf](J/J%20Col%20Int%20Sci241,%20112.pdf)

Abstract: The interfacial properties of two hydrous oxides of manganese, namely an amorphous variety and a poorly crystalline synthetic birnessite, in different electrolyte media, have been studied by using a batch potentiometric titration procedure with a 72-h equilibration period. The data obtained by this procedure are more relevant to a natural water system than those obtained by the rapid titration method as reported earlier [J. Colloid Interface Sci. 131, 103 (1989).]. Although the points of zero charge do not show any major variations, the surface dissociation and complexation (with Na+ in NaCl) constants differ with the method of titration. Both of the samples are characterized by their high surface charge (low Delta pK(a)) and surface potential, and as a result, complexation takes place possibly within the inner helmholtz plane. It is concluded that the triple-layer model is not applicable to this colloid system and that a basic Stern model would be more suitable in this case. (C) 2001 Academic Press.

Keywords: Interfacial Properties, Hydrous Manganese Dioxide, Electrical Double Layer, Electrolyte Solution, Surface-Chemistry, Adsorption, Dioxide, Oxides, Models

Yu, Y., Zhuang, Y.Y. and Wang, Z.H. (2001), Adsorption of water-soluble dye onto functionalized resin. *Journal of Colloid and Interface Science*, **242** (2), 288-293.

Full Text: [J\J Col Int Sci242, 288.pdf](J/J%20Col%20Int%20Sci242,%20288.pdf)

Abstract: The adsorption of water-soluble dye reactive Brilliant Blue KN-R onto the functionalized resin NKY has been dynamically and thermodynamically investigated. The adsorption rate constant is obtained from the first-order expression log(Q(e) - Q) = log Q(e) - k(ad)t/2.303. The adsorption is complex since the equilibrium data are well described by the Langmuir equation, the Freundlich equation, and the three-parameter equation. The first layer adsorption of KN-R onto NKY is physical, enhanced by a chemical effect, but multilayer adsorption is typically physical adsorption at normal temperature. The adsorption process is endothermic. The obtained standard free energy change and the inferred standard entropy change show that the adsorption of the dye onto NKY can occur spontaneously. Moreover, the effect of pH and temperature on the adsorption has been explored. The apparent activation energy E-a of the adsorption process has been calculated as well. (C) 2001 Academic Press.

Keywords: Adsorption, Functionalized Resin, Water-Soluble Dye, Dynamics, Thermodynamics, Batch, Aqueous-Solutions, Color Removal, Reactive Dyes, Sorption, Acid, Effluent, Behavior, Chitosan, Kinetics, Cost

Martinez, R.E. and Ferris, F.G. (2001), Chemical equilibrium modeling techniques for the analysis of high-resolution bacterial metal sorption data. *Journal of Colloid and Interface Science*, **243** (1), 73-80.

Full Text: [J\J Co Int Sc243, 73.pdf](J/J%20Co%20Int%20Sc243,%2073.pdf)

Abstract: An ion selective electrode was used to monitor binding of Cd2+ on two bacteria, Bacillus subtilis (Gram+) and Escherichia coli (Gram-), as a function of increasing pH. A competitive Langmuir sorption isotherm was used in conjunction with a linear programming method (LPM) or FITEQL to fit experimental data. Results obtained with simulated data showed that LPM is less sensitive than FITEQL to variations in sorption data. Application of the LPM to experimental data found three discrete metal binding sites on B. subtilis and E. coli with -log equilibrium constant (pK(S)) values of -0.80±0.20, 0.63±0.09, and 2.35±0.10, and -0.60±0.10, 0.25±0.19, and 1.93±0.17, respectively, at a constant ionic strength, I = 0.1 M (KNO3)The corresponding site densities were 0.09±0.01, 0.07±0.01, and 0.07±0.01, and 0.01±0.00(2), 0.02±0.01, and 0.04±0.01 µmol of Cd2+/mg of B. subtilis or E. coli. From FITEQL, pK(S) values of -1.18±0.15, 0.40±0.11, and 2.31±0.32 for B. subtilis and -1.46±0.34, 0.20±0.12, and 1.87±0.12 for E. coli were recovered with site densities of 0.10±0.07, 0.07±0.06, and 0.06±0.02, and 0.02±0.005, 0.02±000(4), and 0.04±0.04 µmol of Cd2+/Mg of B. subtilis or E. coli, respectively. Total site densities of 0.22±0.02 and 0.06 0.01 µmol/mg were obtained by LPM for B. subtilis and E. coli, whereas FITEQL yielded values of 0.23±0.02 and 0.08±0.07 µmol/mg. Both LPM and FITEQL produced feasible results, but LPM was less sensitive to error and did not require an a priori assumption of the number of binding sites. (C) 2001 Academic Press.

Keywords: Cadmium, Ion Selective Electrode, Bacterial Metal Sorption, High-Resolution Data Modeling, Biosorption, Adsorption, Ions, Complexation, Desorption, Surfaces, Binding, Cadmium, Cells, Acid

Acemioğlu, B. and Hakki Alma, M. (2001), Equilibrium studies on adsorption of Cu(II) from aqueous solution onto cellulose. *Journal of Colloid and Interface Science*, **243** (1), 81-84.

Full Text: [J\J Co Int Sc243, 81.pdf](J/J%20Co%20Int%20Sc243,%2081.pdf)

Abstract: Cellulose, a natural polymer, was used as an adsorbent for the adsorption of Cu(II) ions from the aqueous solutions of copper sulfate pentahydrate (CuSO4.5H2O) at different temperatures and a fixed pH. The amount adsorbed increased with increasing concentration of Cu(II) ions; however, it did not differ significantly with temperature. The equilibrium times of adsorptions of Cu(II) ions at various temperatures were the same. Kinetics studies showed that the adsorption process obeyed the first-order reversible kinetic model. It was also determined that adsorption isotherms followed both Freundlich and Langmuir models. Furthermore, the thermodynamic parameters, i.e., standard free energy (Δ*G*°), standard enthalpy (Δ*H*°), and standard entropy (Δ*S*°), of the adsorption process were calculated. The results obtained are discussed in detail.

Keywords: adsorption, Cellulose, Cu(II) Ions, Kinetics isotherms, Thermodynamic Parameters

? Wu, S.H. and Pendleton, P. (2001), Adsorption of anionic surfactant by activated carbon: Effect of surface chemistry, ionic strength, and hydrophobicity. *Journal of Colloid and Interface Science*, **243** (2), 306-315.

Full Text: [2001\J Co Int Sc243, 306.pdf](2001/J%20Co%20Int%20Sc243,%20306.pdf)

Abstract: This work investigates the interrelationship between the adsorbent surface chemistry and relative hydrophobic nature and the solution ionic strength and solution hydrophobicity during dilute anionic surfactant solution adsorption. The adsorbents were coconut- and coal-based, steam-activated carbons and wood-based, acid-activated carbons. The adsorptives were dodecanoic acid and octanoic acid dissolved in water or strong caustic solution. The activated carbons (ACs) were immersed in the strong caustic solution at different temperatures for various lengths of time prior to adsorption measurements. The oxygen content and surface functional group chemistry of each AC sample was analyzed using elemental analysis and X-ray photoelectron spectroscopy. The equilibrium solution concentration of each surfactant was determined using gas chromatography-flame ionization detection techniques. The amount of surfactant adsorbed by each AC indicates that an inverse linear relationship exists between the amount of surfactant adsorbed and the adsorbent oxygen content. Although the steam-activated carbons offer lower pore volumes than the acid-activated carbons, they exhibit the higher adsorption capacity. The high solution chemistry pH promotes adsorbent surface oxidation and anionic surfactant dissociation, leading to an interfacial repulsion force and decreased C-12- and C-8-acid adsorption. Overall, this study demonstrates that both the surface chemistry and the solution properties should be considered for an adsorption analysis since each has a significant influence on the adsorption process. (C) 2001 Academic Press.

Keywords: Activated Carbon, Oxygen Content, Surface Functional Groups, Anionic Surfactant Adsorption, Porous Carbons, Sodium Dodecyl-Sulfate, Aqueous-Solutions, Particle, Oxidation, Systems, Wood

? Ismadji, S. and Bhatia, S.K. (2002), The use of liquid phase adsorption isotherms for characterization of activated carbons. *Journal of Colloid and Interface Science*, **244** (2), 319-335.

Full Text: [2002\J Col Int Sci244, 319.pdf](2002/J%20Col%20Int%20Sci244,%20319.pdf)

Abstract: The characterization of three commercial activated carbons was carried out using the adsorption of various compounds in the aqueous phase. For this purpose the generalized adsorption isotherm was employed, and a modification of the Dubinin-Radushkevich pore filling model, incorporating repulsive contributions to the pore potential as well as bulk liquid phase nonideality, was used as the local isotherm. Eight different flavor compounds were used as adsorbates, and the isotherms were jointly fitted to yield a common pore size distribution for each carbon. The bulk liquid phase nonideality was incorporated through the UNIFAC activity coefficient model, and the repulsive contribution to the pore potential was incorporated through the Steele 10-4-3 potential model. The mean micropore network coordination number for each carbon was also determined from the fitted saturation capacity based on percolation theory. Good agreement between the model and the experimental data was observed. In addition, excellent agreement between the bimodal gamma pore size distribution and density functional theory-cum-regularization-based pore size distribution obtained by argon adsorption was also observed, supporting the validity of the model. The results show that liquid phase adsorption, using adsorptive molecules of different sizes, can be an effective means of characterizing the pore size distribution as well as connectivity. Alternately, if the carbon pore size distribution is independently known, the method can be used to “measure” critical molecular sizes. (C) 2001 Elsevier Science.

Keywords: Adsorption, Activated Carbon, Characterization, Network Connectivity, Pore-Size Distributions, Nitrogen Sorption Measurements, Network Connectivity, Porous Solids, Micropores, Simulation, Benzene

Merdy, P., Guillon, E., Aplincourt, M., Dumonceau, J. and Vezin, H. (2002), Copper sorption on a straw lignin: Experiments and EPR characterization. *Journal of Colloid and Interface Science*, **245** (1), 24-31.

Full Text: [J\J Col Int Sci245, 24.pdf](J/J%20Col%20Int%20Sci245,%2024.pdf)

Abstract: Spectroscopic and physicochemical data, X-ray photoelectron spectroscopy (XPS), solid-state C-13 cross-polarization magic-angle-spinning NMR, GC/MS, specific surface area, site density, and surface acidity constants have been recorded or determined for a lignocellulosic substrate (LS) extracted from straw. Its copper(II)-bound ability has also been studied. The LS solid that exhibits two types of binding sites, carboxylic and phenolic groups, has a great affinity, for copper(II), with a maximum of adsorption at around 4 mg g (1) as early as the pH reaches 6. The structural characterization of the Cu(II) surface complexes has been investigated using EPR spectroscopy. The CuO4 chromophore of the inner-sphere surface complexes is a slightly distorted square. A surface oxidation occurred simultaneously, which leads to semiquinonic radicals. Furthermore, our empirical approach, which used a correlation between thermodynamics data and EPR parameters, has led to a surface complexation constant log beta equal to 12.6. This indicates that copper(II) surface complexes are relatively stable. (C) 2002 Elsevier Science.

Keywords: Straw, Lignin, Sorption, Copper, EPR, Surface Complexation Model, Wheat Bran, Identification, Thioacidolysis, Stability, Products, Binding, Soils, Metal, Acid

Gemeay, A.H., El-Sherbiny, A.S. and Zaki, A.B. (2002), Adsorption and kinetic studies of the intercalation of some organic compounds onto Na+-montmorillonite. *Journal of Colloid and Interface Science*, **245** (1), 116-125.

Full Text: [J\J Col Int Sci245, 116.pdf](J/J%20Col%20Int%20Sci245,%20116.pdf)

Abstract: The adsorption and the kinetics of the intercalation of metanil yellow dye, p-aminodiphenylamine (p-NH2-DPA), and benzidine by colloidally dispersed Na+-montmorillonte (Na+-MMT) have been studied. The adsorption isotherm parameters confirmed the occurrence of chemical adsorption that is based on the cation-exchange process. The selectivity of these compounds toward Na+-MMT follows the order metanil yellow < p-NH2-DPA < benzidine, which reflects the stability sequence of the intercalates. The attainment of sorption equilibrium and the diffusion coefficient follows the order metanil yellow > p-NH2-DPA > benzidine. The rate of oxidation has been quantitatively measured using a stopped-flow spectrophotometer. The rate constant follows the order benzidine < p-NH2-DPA < metanil yellow. Addition of allyle acetate shows inhibiting effect on the reaction rate. The rate of cation exchange process between the radical cation of the organic molecule and the Na+ ion in the Na+-MMT has been monitored by using the stopped-low instrument with an electrical conductivity detection unit. The activation energy of the electron transfer reaction is less than that of cation exchange process and has the order metanil yellow < p-NH2-DPA < benzidine. X-ray diffraction, IR, and differential scanning colorimetry (DSC) measurements confirmed the intercalation process. (C) 2002 Elsevier Science.

Keywords: Intercalation, Aromatic Amines, Metanil Yellow, Adsorption, Diffusion Coefficient, Kinetics, Stopped-Flow, Thermodynamics, Aromatic-Amines, Fluorescence Properties, Ligand-Exchanger, Sorption, Clay, Atrazine, Sporopollenin, Complexes, Soil, Ion

Pendleton, P., Wu, S.H. and Badalyan, A. (2002), Activated carbon oxygen content influence on water and surfactant adsorption. *Journal of Colloid and Interface Science*, **246** (2), 235-240.

Full Text: [J\J Col Int Sci246, 235.pdf](J/J%20Col%20Int%20Sci246,%20235.pdf)

Abstract: This research investigates the adsorption properties of three activated carbons (AC) derived from coconut, coal, and wood origin. Each carbon demonstrates different levels of resistance to 2 M NaOH treatment. The coconut AC offers the greatest and wood AC the least resistance. The influence of base treatment is mapped in terms of its effects on specific surface area, micropore volume, water adsorption, and dodecanoic acid adsorption from both water and 2 M NaOH solution. A linear relationship exists between the number of water molecules adsorbed at the B-point of the water adsorption isotherm and the oxygen content determined from elemental analysis. Surfactant adsorption isotherms from water and 2 M NaOH indicate that the AC oxygen content effects a greater dependence on affinity for surfactant than specific surface area and micropore volume. We show a linear relationship between the plateau amount of surfactant adsorbed and the AC oxygen content in both water and NaOH phases. The higher the AC oxygen content, the lower the amount of surfactant adsorbed. In contrast, no obvious relationship could be drawn between the surfactant amount adsorbed and the surface area. (C) 2002 Elsevier Science (USA).

Keywords: Activated Carbon, Oxygen Content, Surface Area, Water Adsorption, Surfactant Adsorption, Anionic Surfactants, Hydrogen-Sulfide, Chemistry, Mechanism, Oxidation, Area

Seki, H. and Suzuki, A. (2002), Kinetic study of metal biosorption to a brown alga, *Kjellmaniella Crassiforia*. *Journal of Colloid and Interface Science*, **246** (2), 259-262.

Full Text: [J\J Col Int Sci246, 259.pdf](J/J%20Col%20Int%20Sci246,%20259.pdf)

Abstract: Akinetic study of cadmium and lead biosorption to a brownalga, *Kjellmaniella crassiforia*, wascarried out. The shrinking core model derived by M.Gopala Raoand A. K. Gupta (*Chem. Eng. J.* **24,** 181, (1982))was modified and adapted for description of therateprocess of cadmium and leadbiosorption to the alga.The biosorptionrate process was well described andaverageapparent diffusion coefficient of about 9×10-6 cm2 s-1 wasfound for both cadmium and lead ions. Thevalue was20 to 50 times higher than theapparentdiffusion coefficients of cadmium and lead ionsinstrong-acid resins like Dowex 50W-X8. (C) 2002 Academic Press, Inc.

Keywords: Kinetic, Biosorption, Diffusivity, Cadmium, Lead, BrownAlga

Sarkar, M., Das, M. and Datta, P.K. (2002), Solid-phase extraction for the decontamination of alkali metal, alkaline earth metal, and ammonium salts from heavy metal ions. *Journal of Colloid and Interface Science*, **246** (2), 263-269.

Full Text: [J\J Col Int Sci246, 263.pdf](J/J%20Col%20Int%20Sci246,%20263.pdf)

Abstract: Salicylaldoxime-immobilized silica gel was characterized and used as a potential sorbent for heavy metal ions, viz. Cu(II), Ni(II), Co(II), and Zn(II). The experimental conditions were optimized both in batch and column processes to achieve the maximum efficiency. Kinetic and thermodynamic parameters as well as isotherm constants were evaluated to test the feasibility of the process. The role of various metal ions and different anions were tested in order to monitor the process in case of real samples. The alkali metal, alkaline earth metal, and ammonium salts do not have any effect on the said process. This differential behavior can be effectively used for the decontamination of alkali metal, alkaline earth metal, and ammonium salts from Cu(II), Ni(II), Co(II), and Zn(II) ions via solid phase extraction following AAS measurement. The purification of the salts was confirmed by voltammetric experiment. (C) 2002 Elsevier Science (USA).

Keywords: Solid-Phase Extraction, Salicylaldoxime-Immobilized Silica Gel, Decontamination of Metal Salts, Atomic Absorption Spectrophotometry, Voltammetry Silica-Gel, Exchange Separation, Chelating Resin, Preconcentration, Sorption, Spectrometry, Adsorption, Cadmium, pHosphate, Seawater

He, W.J., Jiang, C.Y., Liu, F., Tai, Z.H., Liang, Y.Q., Guo, Z.J. and Zhu, L.G. (2002), Monolayer formation of alkyl chain-containing phosphoric acid amphiphiles at the air/water (pH 5.6) interface: Influence of temperature and cations. *Journal of Colloid and Interface Science*, **246** (2), 335-342.

Full Text: [J\J Col Int Sci246, 335.pdf](J/J%20Col%20Int%20Sci246,%20335.pdf)

Abstract: In the four studied nionoalkyl phosphoric acids (n-C12H25OPO (OH)2, MDP; n-C14H29OPO(OH)2, MTP; n-C16H33OPO(OH)2, MHP; and n-C18H37OPO(OH)2 MOP), only MOP can form an insoluble monolayer at the air/water interface (pH 5.6), suggesting that the longer alkyl chain (greater than or equal to C18) is essential for the formation of insoluble monolayers. On the contrary, all four corresponding dialkyl phosphoric acids ((n-C12H25O)2PO(OH), DDP; (n-C14H29O)2PO(OH), DTP; (n-C16H33O)2PO(OH), DHP; and (nC18H37O)2PO(OH) DOP) can form insoluble monolayers, with only the pi-A isotherm of DDP showing a phase transition plateau at 25degreesC. The enhancement of the subphase temperature not only increases the plateau pressure of the DDP monolayer, but also induces the emergence of a plateau for the DTP monolayer. In contrast to the weak influence of Na+ and K+ (1×10-4 M in the subphases, pH similar to 5.6) on the pi-A isotherm of DDP, Ca2+ Sr2+, and Ba2+ (1×10-4 M in the subphases, pH similar to 5.6) have an evident impact on the isotherms of DDP, and the different isotherm results indicate that DDP can recognize the three divalent cations at the air/water interface. In addition, the gaseous portion and phase transition plateaus of the isotherms of some DAPS on pure water and on subphases containing Ca2+, Sr2+, or Ba2+ were well simulated by Volmer’s equation of state and Vollhardt’s equation, except for a small difference for gas phases around critical points. The relationship between the plateau and the net molecule area is also discussed. (C) 2002 rixvier Science (USA).

Keywords: pHosphoric Acid, Pi-A Isotherm, Phase Transition, Simulation, Cation, Interfacial Recognition, Net Molecule Area, Volmer’s Equation of State, Vollhardt’s Equation, Cadmium-Sulfide, pHosphate, Crystallization

Borgo, C.A. andGushikem, Y. (2002), Zirconium phosphate dispersed on a cellulose fiber surface: Preparation, characterization, and selective adsorption of Li+, Na+, and K+ from aqueous solution. *Journal of Colloid and Interface Science*, **246** (2), 343-347.

Full Text: [J\J Col Int Sci246, 343.pdf](J/J%20Col%20Int%20Sci246,%20343.pdf)

Abstract: Highlydispersed zirconium phosphate was prepared by reactingCel/ZrO2 (ZrO2=6.7 wt %; 0.56 mmol g-1 of zirconium atom per gramof the material) withphosphoric acid.High power decoupling magic anglespinning(HPDEC-MAS) 31P NMR and X-ray photoelectron spectroscopydataindicated that HPO2-4 is the species present on the fiber surface.TheX-ray diffraction patterns showed thatzirconiumhydrogen phosphate particleswere amorphous and had anion-exchange capacity, determined by ammonia gasadsorption, of 0.30 mmol g-1. The ion-exchange capacities for Li+, Na+, and K+ ions were determined from ion-exchangeisothermsat 298 K and showed the followingvalues (in mmol g-1): Li+ = 0.01, Na+ = 0.23, and K+ = 0.30.The higher affinity of the surfacehydrogenphosphate particles for Na+ and K+ is due to itslamelar structure which permitseasierdiffusion of these two ions whose hydratedradiiare smaller than that of Li+. (C) 2002 Academic Press, Inc.

Keywords: Cellulose, Zirconium Oxide, Hybrid Cellulose-Zirconium Oxide, Ion-Exchange, Alkali Metal Ions

Mu, G.N. andTang, L.B. (2002), Adsorption of Cd(II) ion and its complex compounds from solution on the surface of charcoal treated with an oxidation-negative ionizing method. *Journal of Colloid and Interface Science*, **247** (2), 504-506.

Full Text: [J\J Col Int Sci247, 504.pdf](J/J%20Col%20Int%20Sci247,%20504.pdf)

Abstract: Theadsorption characteristics of Cd(II) from electrolyticsolution by activated charcoal have beeninvestigated.It was found that the amount ofadsorption ofCd(II) depends mainly on the pH value ofthesolution, the number of added inorganic ions, andoxygen-containing groups on thesurface. The activatedcharcoal was treatedwith the oxidation-negativeionizing(OA) method to produce moreoxygen-containinggroups on the surface. The adsorption amount ofCd(II) onthe treated activated charcoalincreased remarkably.It was alsofound that the more powerful the acidityof thesurface and the larger the adsorptionamountof Cd(II), so the charged groups on the surfaceofactivated charcoal are considered as themainadsorption-activated sites forinorganic ions. The adsorptioncharacteristics ofvarious complexes of Cd(II) on thesurface ofactivated charcoal have also beeninvestigated.Three types of adsorption configuration ofthecomplexes of Cd(II) on the surface ofactivatedcharcoal were suggested according to theexperimentalresults. (C) 2002 Academic Press, Inc.

Keywords: Cadmium Ion(II), ActivatedCharcoal, Adsorption, Complex, Method of Oxidation-Negative Ionizing

Valenzuela-Calahorro, C., Cuerda-Correa, E., Navarrete-Guijosa, A. and Gonzalez Pradas, E. (2002), Application of a single model to study the adsorption kinetics of prednisolone on six carbonaceous materials. *Journal of Colloid and Interface Science*, **248** (1), 33-40.

Full Text: [J\J Col Int Sci248, 33.pdf](J/J%20Col%20Int%20Sci248,%2033.pdf)

Abstract: The knowledge of the adsorption processes of nonelectrolytes from liquid solution on solid materials involves the study of their kinetic and equilibrium aspects as well as the understanding of their thermodynamic functions. However, in most published papers adsorption isotherms are analyzed by using the Giles classification and other proposed equations which are either empirical or based on kinetic or thermodynamic criteria. Our opinion is that both the kinetic and the equilibrium studies must be complementary and that, in general, equations describing the adsorption isotherms come from the kinetic laws governing the different partial processes which determine the global process. These kinetic laws may be derived from single models. In this paper a single model is proposed, which makes it possible to establish a kinetic law satisfactorily fitting a great number of *C* (concentration) vs *t* (time) isotherms. This model has been applied to study the adsorption process of prednisolone by six carbonaceous materials from ethanol solution, the specific adsorption rate, and the activation thermodynamic functions being calculated. The results obtained have also been used to analyze the influence of the intraparticle diffusion on the kinetics of the process.

Keywords: Adsorption, Kinetics, Carbonaceous Materials, Prednisolone

Liu, R.X., Guo, J.L. and Tang, H.X. (2002), Adsorption of fluoride, phosphate, and arsenate ions on a new type of ion exchange fiber. *Journal of Colloid and Interface Science*, **248** (2), 268-274.

Full Text: [J\J Col Int Sci248, 268.pdf](J/J%20Col%20Int%20Sci248,%20268.pdf)

Abstract: A new type of ion exchange fiber for the removal of fluoride, phosphate, and arsenate ions has been developed. A batch adsorption technique for investigating adsorption kinetic and equilibrium parameters and determining pH adsorption edges is applied, It is shown that the adsorption properties of the ion exchange fiber for fluoride, phosphate, and arsenate ions depend on the pH value and anion concentration. The adsorption of arsenate on the sorbent reaches a maximum of 97.9% in the pH value range of 3.5 to 7.0. The adsorption percentage of phosphate is more than 99% in the pH range of 3.0 to 5.5. The adsorption of fluoride on the ion exchange fiber is found to be 90.4% at pH 3.0. The Freundlich model can describe the adsorption equilibrium data of fluoride, arsenate, and phosphate anions. The sorption of the three anions on the ion exchange fiber is a rapid process, and the adsorption kinetic data can be simulated very well by the pseudo-second-order rate equation. The column performance is carried out to assess the applicability of the ion exchange fiber for the removal of fluoride, phosphate, and arsenate ions from synthetic wastewaters with satisfactory removal efficiency. The desorption experiment shows that fluoride ion sorbed by the fiber column can be quantitatively desorbed with 5 mL of 0.50 mol/L NaOH at elution rate of I mL/min, and 30 mL of NaOH is necessary for the quantitative recovery of phosphate and arsenate ions. (C) 2002 Elsevier Science (USA).

Keywords: Ion Exchange Fiber, Fluoride, pHosphate, Arsenate, Adsorption Properties, Desorption, Plasma-Mass Spectrometry, Aqueous-Solutions, Chelating Fiber, Waste-Water, Removal, Preconcentration, Arsenic(V), Adsorbent, Seawater, Elements

Seki, H. and Suzuki, A. (2002), Adsorption of heavy metal ions to floc-type biosorbents. *Journal of Colloid and Interface Science*, **249** (2), 295-300.

Full Text: [J\J Col Int Sci249, 295.pdf](J/J%20Col%20Int%20Sci249,%20295.pdf)

Abstract: Adsorptionof cadmium and lead ions to floc-type biosorbents wasreported in this work. Two types ofbiosorbentscontaining a marine microalga, *Heterosigmaakashiwo*(Hada) Hada, or a purple non-sulfurbacterium, *Rhodobactersphaeroides*, were prepared. Themicro-organismsinactivated by steam sterilizationwereimmobilized in casein floc and cross-linkedwithglutaraldehyde. In the present immobilizingmethod, weobtained the biosorbentscomprising as much as 67% ofmicro-organism on adry-weight basis. Simple metal-bindingmodelswere applied to explain the adsorptionmechanism ofbivalent metal ions to the biosorbents.Theresults showed that casein acted as boththeimmobilizing material and the adsorbentmaterial. Theadsorption of bivalentmetal ions to the biosorbents was duetobidentate binding to the acidic sites on caseinandmonodentate binding to the acidic sitesonmicro-organisms. The metal-bindingconstants and the bindingcapacities ofmicro-organisms were scarcely influencedbyimmobilization. *© 2002 Elsevier Science (USA).*

Park, S.J. and Jang, Y.S. (2002), Pore structure and surface properties of chemically modified activated carbons for adsorption mechanism and rate of Cr(VI). *Journal of Colloid and Interface Science*, **249** (2), 458-463.

Full Text: [J\J Col Int Sci249, 458.pdf](J/J%20Col%20Int%20Sci249,%20458.pdf)

Abstract: Effectsof hydrochloric acid and sodium hydroxide treatments ofactivated carbons (ACs) onchromium(VI) reductionwere studied. The surface propertiesweredetermined by pH, acid-base values, FT-IR, andX-ray photoelectron spectrometer (XPS). And theporousstructure of the activated carbonswas characterizedby adsorption of N2/77 K. The Cr(VI) adsorptionexperimentswere carried out to analyze the influenceofporous texture and surface properties changed bythechemical surface treatments of ACson adsorption ratewith carbon-solutioncontact time. From theexperimentalresults, it was observed that the extentofadsorption and reduction processes depends onbothmicroporous structure and functionalgroups. And theadsorption of Cr(VI) ionwas more effective in the case ofacidictreatment on activated carbons, resultingfromthe increases of acid value (or acidicfunctionalgroup) of activated carbon surfaces. However, basictreatment on activatedcarbons was not significantlyeffective onthe adsorption of Cr(VI) ion, probably duetothe effects of the decrease of specific surfaceareaand basic Cr(VI) in nature. *© 2002Elsevier Science(USA).*

Yamaguchi, N.U. and Okazaki, M. (2002), Micro volume changes due to Pb(II) and Cu(II) sorption on amorphous Fe(III) hydroxide. *Journal of Colloid and Interface Science*, **249** (2), 489-491.

Full Text: [J\J Col Int Sci249, 489.pdf](J/J%20Col%20Int%20Sci249,%20489.pdf)

Abstract: Microvolume changes due to Pb(II) and Cu(II) sorption onamorphous Fe(III) hydroxide (AFH) weredetermined bya dilatometer at pH 4.50. Volume changeisattributed to change in hydration statusofdissolved and/or suspended substances. Thevolume of thesystem increased due toPb(II) and Cu(II) sorption, suggestingthat water molecules hydrated around Pb(II)orCu(II) ions and AFH were released duringsorption.Volume increases due to Pb(II) andCu(II) sorption weresmaller than thosedue to bulk precipitation of PbandCu hydroxides. Precipitation of Pb(II) andCu(II)was not likely to occur at pH 4.50 in thepresence ofAFH. In conclusion, Pb(II) andCu(II) formed aninner-sphere complexon AFH at pH 4.50, keeping hydratedwater onthe adsorbed species. Adsorbed Cu(II)keptmore hydrated water than adsorbed Pb(II) on AFH. *©2002Elsevier Science (USA).*

Zorpas, A.A., Vassilis, I., Loizidou, M. and Grigoropoulou, H. (2002), Particle size effects on uptake of heavy metals from sewage sludge compost using natural zeolite clinoptilolite. *Journal of Colloid and Interface Science*, **250** (1), 1-4.

Full Text: [J\J Col Int Sci250, 1.pdf](J/J%20Col%20Int%20Sci250,%201.pdf)

Abstract: Landapplication of sewage sludge may be the least energyconsuming and the most cost-effectivemeans ofsludge disposal or utilization. However, themajor technical problem with land application ofsludgeconcerns the high concentrations ofheavy metals.These metals may beleached and enter the ecosystem, thefoodchain, and eventually the humanpopulation.This paper deals with the removal of heavy metalsfromsewage sludge compost using naturalzeoliteclinoptilolite, in respect tothe particle size. The finalresultsindicate that heavy metals can besufficientlyremoved by using 25% w/w of zeolite withparticle sizeof 3.3-4.0 mm. Pore cloggingand structural damage insmallerparticle sizes is probably the reason forlower uptakeof metals by the latter. *© 2002ElsevierScience (USA).*

Taylor, M.L., Morris, G.E., Self, P.G. and St. Smart, R.C. (2002), Kinetics of adsorption of high molecular weight anionic polyacrylamide onto kaolinite: The flocculation process. *Journal of Colloid and Interface Science*, **250** (1), 28-36.

Full Text: [J\J Col Int Sci250, 28.pdf](J/J%20Col%20Int%20Sci250,%2028.pdf)

Abstract: The adsorption kinetics of anionic polyacrylamide flocculant onto kaolinite clay are examined as a function of flocculant dosage and pH. Special attention has been given to the flocculation effect during the adsorption process and the resulting inhibition of further adsorption. At pH 8.5 the adsorption capacity of anionic polyacrylamide on kaolinite is low while at pH 4.5, the adsorption capacity increases. Flocculant adsorption has been shown to be related to the amount of available surface area, pH, flocculant dosage, and the resulting floc strength, which controls the rate of new surface area exposure and hence the continuation of further adsorption. At both pH 4.5 and pH 8.5, complete adsorption is achieved at low flocculant dosages and adsorption equilibrium is achieved at high flocculant dosages after 1 day. In contrast, at intermediate flocculant dosages adsorption equilibrium is not reached over a 7-day period, due to a continuously increasing surface area. *© 2002 Elsevier Science (USA).*

Jain, A.K., Suhas, and Bhatnagar, A. (2002), Methylphenols removal from water by low-cost adsorbents. *Journal of Colloid and Interface Science*, **251** (1), 39-45.

Full Text: [J\J Col Int Sci251, 39.pdf](J/J%20Col%20Int%20Sci251,%2039.pdf)

Abstract: A comparative study on the adsorption of methylphenols on adsorbents prepared from several industrial wastes has been carried out. The results show that extent of adsorption on carbonaceous adsorbent prepared from fertilizer industry waste has been found to be 37.3, 40.5, 65.9, and 88.5 mg/g for 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, and 2,4,6-trimethylphenol, rspectively. As compared to carbonaceous adsorbent, the other three adsorbents viz. blast furnace sludge, dust, and slag adsorb methylphenols to a much smaller extent. This has been accounted for due to the carbonaceous adsorbent having a larger porosity and consequently higher surface area. The adsorption of phenols on this carbonaceous adsorbent as a function of contact time, concentration, and temperature has been studied by the batch method. The adsorption has been found to be endothermic and data conform to the Langmuir equation. The analysis of data indicates that adsorption is a first-order process and pore diffusion-controlled. The efficiency of the carbonaceous adsorbent was assessed by comparing the results with those on a standard activated charcoal sample. It was found that the carbonaceous adsorbent is about 45% as efficient as standard activated charcoal and can therefore be employed for the removal of methylphenols from wastewaters. (C) 2002 Elsevier Science (USA).

Keywords: Adsorption, Industrial Wastes, Low Cost Adsorbents, Methylphenols, Activated Carbon, Aqueous-Solutions, Fertilizer Waste, Adsorption, Sorption, Lead(II), phenols, Peat

Gemeay, A.H. (2002), Adsorption characteristics and the kinetics of the cation exchange of Rhodamine-6G with Na+-montmorillonite. *Journal of Colloid and Interface Science*, **251** (2), 235-241.

Full Text: [J\J Col Int Sci251, 235.pdf](J/J%20Col%20Int%20Sci251,%20235.pdf)

Abstract: The adsorption and the kinetics of the cation exchange of Rhodamine-6G (Rh-6G) with Na+-montmorillonite (Na+-MMT) have been studied. The binding parameters of Rh-6G have been determined by applying Freundlich and D-R isotherms. The enthalpy and the entropy of adsorption have been determined. The isosteric heat of adsorption has also been determined and decreases with increasing the concentration of Rh-6G. Increasing the concentration of Rh-6G led to a decrease in the adsorption capacity, which attributed to the formation of Rh-6G aggregates. Kinetic measurements of the cation exchange were followed up using a stopped-flow electrical conductivity detection unit. The cation-exchange process exhibited first-order kinetics with respect to the dye concentration and inversely proportional to the clay concentration. The measurements were accomplished at different temperatures and the activation parameters were determined. Increasing the Na+-MMT concentration led to a decrease in the rate constant. The latter is also affected by changing the exchangeable cation. (C) 2002 Elsevier Science (USA).

Keywords: Rhodamine-6g, Montmorillonte, Adsorption, Thermodynamics, Stopped-Flow, Kinetics, Cation Exchange, Methylene-Blue, Basic-Dyes, Fluorescence Properties, Aqueous Suspensions, Polyurethane Foam, Laponite, Clay, Surfaces, 6g, Aggregation

Jakubov, T.S. and Mainwaring, D.E. (2002), Adsorption and deposition modified Dubinin–Radushkevich/Dubinin–Astakhov adsorption equations. *Journal of Colloid and Interface Science*, **252** (2), 263-268.

Full Text: [J\J Col Int Sci252, 263.pdf](J/J%20Col%20Int%20Sci252,%20263.pdf)

Abstract: The Dubinin–Radushkevich/Dubinin–Astakhov (DR/DA) adsorption equations have been modified with the aim to eliminate the thermodynamic incorrect behavior of these equations in the Henry region and in the vicinity of the equilibrium saturated vapor pressure. The expressions for heat and entropy of adsorption are obtained from the proposed modified DR/DA equations. These new equations, which do not include additional empirical parameters, have been evaluated on adsorption systems measured over a wide range of pressure and temperatures. The temperature dependence of the parameters has been analyzed.

Keywords: Adsorption Isotherm, Thermal Equation of Adsorption, Heat and Entropy of Adsorption

Hanna, K., Beurroies, I., Denoyel, R., Desplantier-Giscard, D., Galarneau, A. and Di Renzo, F. (2002), Sorption of hydrophobic molecules by organic/inorganic mesostructures. *Journal of Colloid and Interface Science*, **252** (2), 276-283.

Full Text: [J\J Col Int Sci252, 276.pdf](J/J%20Col%20Int%20Sci252,%20276.pdf)

Abstract: During the synthesis of micelle-templated silica an intermediate inorganic/organic mesostructure is obtained with an hexagonal arrangement of channels filled by surfactant molecules. The ability of such a mesostructure to solubilize organic molecules from an aqueous solution was investigated. To that end, silica/cationic surfactant mesostructures were prepared under various conditions and their stability toward surfactant release in water was first compared in order to select materials as stable as possible. Swelled mesostructures were also used. The sorption from solution of hydrophobic molecules was then studied. The affinity of the molecules for the mesostructures is directly related to their hydrophobic character as it is derived from their octanol/water partition coefficient. A cooperative effect between hydrophobic molecules and the cationic surfactant that stabilizes the surfactant inside the mesostructure was observed. Interaction energies between the solutes and the mesostructures were determined by microcalorimetry. They varied in accordance with the hydrophobic character of the molecule and, at low sorption amounts, they were of the same order of magnitude as the solubilization enthalpies in bulk micelles. When the sorption increases, the surfactant layer in the mesostructure is not allowed to swell as the free micelle does, and steric limitations in the headgroup area render sorption less favorable. (C) 2002 Elsevier Science (USA).

Keywords: Aqueous-Solution, Selective Adsorption, Surfactant, Silica, Removal, Chlorophenols, Carbofuran, phenols, MCM-41, Liquid

Nakanishi, A., Tamai, M., Kawasaki, N., Nakamura, T. and Tanada, S. (2002), Adsorption characteristics of bisphenol A onto carbonaceous materials produced from wood chips as organic waste. *Journal of Colloid and Interface Science*, **252** (2), 393-396.

Full Text: [J\J Col Int Sci252, 393.pdf](J/J%20Col%20Int%20Sci252,%20393.pdf)

Abstract: Many organic by-products have been discharged by humans, and the development of technology for recycling organic by-products has attracted much interest. In this paper, the techniques for producing carbonaceous adsorbents from an organic by-product an an application to remove endocrine disruptors are described. Wood chips as an organic by-product were carbonized at 873 to 1073 K. The iodine adsorption capacity of the obtained carbonaceous materials increased with increasing carbonization temperature. The amount of bisphenol A adsorbed on the carbonized materials produced from Sugi and Hinoki at a 1073 K carbonization temperature was higher than that of activated carbon. The Freundlich constant, I IN, of the carbonaceous materials produced from Sugi chips, Sugi sawdust, and Hinoki sawdust was similar to that of the activated carbon. This result indicated that the affinity between bisphenol A and the carbonaceous materials or the activated carbon was similar. Their Freundlich constant, K, was greater than that of the activated carbon. Hence, bisphenol A could be efficiently removed by the carbonaceous materials. (C) 2002 Elsevier Science (USA)

Keywords: Activated Carbon, Adsorbents, Adsorption, Affinity, Bisphenol A, By-Product, Carbonization, Sawdust, Wood Chips, Zero Emission

Kosmulski, M. (2002), The pH-dependent surface charging and the points of zero charge. *Journal of Colloid and Interface Science*, **253** (1), 77-87.

Full Text: [J\J Col Int Sci253, 77.pdf](J/J%20Col%20Int%20Sci253,%2077.pdf)

Abstract: The recently published points of zero charge of metal oxides and related materials are compiled to update the previous compilation (Kosmulski, M., “Chemical properties of materials surfaces.” Dekker, New York, 2001). The purity of materials is the most important factor responsible for discrepancies in the literature data. In contrast to the success of new spectroscopic methods in the studies of specific adsorption, the progress in studies of primary surface charging of oxides over recent years is less spectacular.

? Criscenti, L.J. and Sverjensky, D.A. (2002), A single-site model for divalent transition and heavy metal adsorption over a range of metal concentrations. *Journal of Colloid and Interface Science*, **253** (2), 329-352.

Full Text: [J\J Col Int Sci253, 329.pdf](J/J%20Col%20Int%20Sci253,%20329.pdf)

Abstract: Metal adsorption data over a range of surface coverages typically are characterized by curvilinear metal adsorption isotherms. These isotherms generally have a slope of 1 at low surface coverage and a shallower slope at higher surface coverages. The curvature of metal adsorption isotherms with increasing surface coverage is frequently interpreted in terms of sequential adsorption onto different types of surface sites, multinuclear surface complexation, or nonideality of metal adsorption. We demonstrate that the curvature of metal adsorption isotherms can also be attributed to changes in surface charge and potential that depend on the predominant type of metal surface complex. A single-site extended triple-layer model is used to reinterpret previously studied metal adsorption isotherms and pH edges for a wide variety of metals (Cd2+, Co2+, Cu2+, Pb2+, and Zn2+) and solids (goethite, hydrous ferric oxide, corundum, and magnetite) in different electrolyte solutions (NaNO3 and NaClO4). Only metal adsorption on ferrihydrite at very low surface coverages is not consistent with the single-site triple-layer model. This discrepancy might be explained if ferrihydrite is in fact not a single phase but a mixture of two or more phases. Metal surface coverages ranging from 10−4 to 10.2 mmol/m2 on the other minerals can be accounted for with a single-site extended triple-layer model if appropriate metal adsorption reactions are chosen. In addition, several examples suggest that, within the context of the model, surface complexation schemes can be established that describe metal adsorption over both a wide range of surface coverage and a wide range of ionic strength.

Keywords: Adsorption, Metal, Oxide, Triple-Layer Model, Isotherm

dos Anjos, F.S.C., Vieira, E.F.S. and Cestari, A.R. (2002), Interaction of indigo carmine dye with chitosan evaluated by adsorption and thermochemical data. *Journal of Colloid and Interface Science*, **253** (2), 243-246.

Full Text: [J\J Col Int Sci253, 243.pdf](J/J%20Col%20Int%20Sci253,%20243.pdf)

Abstract: Chitosan can use its protonated amine groups to adsorb strongly anionic species from diluted solutions. In this work, adsorption and thermochemical data on the interaction of the dye indigo carmine with chitosan in aqueous medium were found, in order to obtain new adsorption data on this relatively unexplored chitosan field. The studies were carried out by the batch method from 35 to 50degreesC. The adsorption results were well fitted to both Langmuir and Freundlich adsorption models. The increase in the temperature decreased the adsorption of the dye. The enthalpy of interaction, when a monolayer of the dye was formed on the chitosan surface, Delta(int)H, of -23.2 kJ mol-1 was encountered for all temperature ranges studied. The spontaneity of the interaction is indicated by the Delta(int)G values from -9.1 to -8.2 kJ mol-1. Other thermodynamic quantities were also calculated and are discussed. (C) 2002 Elsevier Science (USA).

Keywords: Chitosan, Adsorption of Dyes, Adsorption Modeling, Thermochemistry of Adsorption, Modified Silica-Gel, Divalent-Cations, Vant-Hoff, Chitin, Chemisorption, Deacetylation, Membranes

Hirata, M., Kawasaki, N., Nakamura, T., Matsumoto, K., Kabayama, M., Tamura, T. and Tanada, S. (2002), Adsorption of dyes onto carbonaceous materials produced from coffee grounds by microwave treatment. *Journal of Colloid and Interface Science*, **254** (1), 17-22.

Full Text: [J\J Col Int Sci254, 17.pdf](J/J%20Col%20Int%20Sci254,%2017.pdf)

Abstract: Organic wastes have been burned for reclamation. However, they have to be recycled and reused for industrial sustainable development. Carbonaceous materials were produced from coffee grounds by microwave treatment. There are many phenolic hydroxyl and carboxyl groups on the surface of carbonaceous materials. The base consumption of the carbonaceous materials was larger than that of the commercially activated carbon. The carbonaceous materials produced from coffee grounds were applied to the adsorbates for the removal of basic dyes (Methylene blue and gentian violet) in wastewater. This result indicated that the adsorption of dyes depended upon the surface polar groups on the carbonaceous materials. Moreover, the Freundlich constants of isotherms for the adsorption of Methylene blue and gentian violet onto the carbonaceous materials produced from coffee grounds were greater than those for adsorption onto activated carbon or ceramic activated carbon. The interaction was greatest between the surface or porosity of the carbonaceous materials and Methylene blue and gentian violet. The microwave treatment would be useful for the carbonization of organic wastes to save energy.

Lazarin, A.M., Landers, R., Kholin, Y.V. and Gushikem, Y. (2002), Determination of the constants of affinity of FeCl3, CuCl2, and ZnCl2 for a nitrogen-containing organosilane bonded on Al2O3-cellulose acetate hybrid material surface from ethanol solution. *Journal of Colloid and Interface Science*, **254** (1), 31-38.

Full Text: [J\J Col Int Sci254, 31.pdf](J/J%20Col%20Int%20Sci254,%2031.pdf)

Abstract: This work describes the preparation and characterization of a cellulose acetate fiber coated with Al2O3, resulting in the organic-inorganic hybrid Cel/Al2O3. Furthermore, the hybrid was modified by attaching organofunctional groups by reaction with the precursor reagents (RO)3Si(CH2)3L (L = NH2, NH(CH2)2NH2, NH(CH2)2NH(CH2)2NH2, and N2C3H3 (imidazole)), resulting in Cel/Al2O3/Si(CH2)3NH2 (1), Cel/Al2O3/Si(CH2)3NH(CH2)2NH2 (2), Cel/Al2O3/Si(CH2)3NH(CH2)2NH(CH2)2NH2 (3), and Cel/ Al2O3/Si(CH2)3N2C3H3 (4). The amounts of attached organofunctional groups were (in mmol per gram of the material) 1 = 1.90, 2 = 1.89, 3 = 1.66, and 4 = 1.35. The isotherms of adsorption of FeCl3, CuCl2, and ZnCl2 by Cel/Al2O3/Si(CH2)3L from ethanol solutions were obtained at 298 K. Accurate estimates of the specific sorption capacities and the heteregeneous stability constants of the immobilized metal complexes were determined with the aid of several computational procedures. It is shown that the sorptional capacities are much less than the concentrations of the attached organofunctional groups. As all sorption isotherms are fitted properly with the Langmuir isotherm equation, the effects of the energetic heterogeneity and the lateral interactions do not affect the chemisorption equilibria. The heterogeneous stability constants of the immobilized complexes are fairly high, which provides efficient removal of the metal ions from solutions by the hybrid materials. (C) 2002 Elsevier Science (USA)

Keywords: Adsorption, Adsorption Isotherms, Affinity Constants in Ethanol Solutions, Alkoxide, Aluminum-Chloride, Cellulose Acetate Fiber, Cellulose-Acetate, Enzyme, Immobilization, Membranes, Metal Halide, Metal Ions, NMR, Organofunctional Groups, Polymer, Silica-Gel Surface

Juang, R.S., Lin, S.H. and Tsao, K.H. (2002), Mechanism of sorption of phenols from aqueous solutions onto surfactant-modified montmorillonite. *Journal of Colloid and Interface Science*, **254** (2), 234-241.

Full Text: [J\J Col Int Sci254, 234.pdf](J/J%20Col%20Int%20Sci254,%20234.pdf)

Abstract: Equilibrium and kinetic studies on the sorption of phenol, m-nitrophenol (m-NP), and o-cresol from water onto montmorillonite modified with cetyltrimethylammounium bromide (CTAB) were conducted. Experiments were carried out as a function of solution pH, sorbate concentration, and temperature (25-55degreesC). It was shown that the sorption capacity decreased in the order phenol > o-cresol > m-NP. The Langmuir, dual-mode sorption, and Redlich-Peterson models were tested to fit the sorption isotherms of single-solute systems, whereas the Langmuir competitive model was used to describe bisolute sorption equilibria. Thermodynamic parameters (DeltaHdegrees and DeltaSdegrees) and the mean free energy (E) for the sorption of phenols were determined from the temperature dependence of the distribution constant and the Dubinin-Radushkevick equation, respectively. A simplified kinetic model was proposed to confirm the sorption mechanism. (C) 2002 Elsevier Science (USA).

Keywords: Montmorillonite, Ctab, Sorption Mechanism, Isotherms, Kinetics, phenol, M-Nitrophenol, O-Cresol, Organic Contaminants, Water, Clay, Adsorption, Bentonite, Removal, Organobentonites, Pollutants, Cations, Model

Ng, J.C.Y., Cheung, W.H. and McKay, G. (2002), Equilibrium studies of the sorption of Cu(II) ions onto chitosan. *Journal of Colloid and Interface Science*, **255** (1), 64-74.

Full Text: [J\J Col Int Sci255, 64.pdf](J/J%20Col%20Int%20Sci255,%2064.pdf)

Abstract: Chitosan is a polymer that can be obtained from the shells of seafood such as prawns, crabs, and lobsters. Chitosan has free amino groups, which can attract metal ions, and has been used as an adsorbent for the removal of metal ions from effluents. In this research, the sorption of copper ions from solution onto chitosan at two pHs has been investigated. DSC, TGA, surface area, SEM, and NMR studies have been used to report the pure physical states of chitosan and the chitosan-copper complex. The experimental isotherm data were analyzed using the Langmuir, Freundlich, and Redlich-Peterson equations. Correlation coefficients were determined for each isotherm analysis. Error functions have been used to determine the alternative single component parameters by nonlinear regression due to the inherent bias in using the correlation coefficient resulting from linearization. The error function method provided the best parameters for the isotherm equations in this system and is demonstrated for error comparison purposes. (C) 2002 Elsevier Science (USA).

Keywords: Chitosan, Chitin, Adsorption, Copper, Intraparticle Mass-Transport, Adsorption, Slurries

Jeribi, M., Almir-Assad, B., Langevin, D., Henaut, I. and Argillier, J.F. (2002), Adsorption kinetics of asphaltenes at liquid interfaces. *Journal of Colloid and Interface Science*, **256** (2), 268-272.

Full Text: [J\J Col Int Sci256, 268.pdf](J/J%20Col%20Int%20Sci256,%20268.pdf)

Abstract: When asphaltenes adsorb at liquid interfaces, after the rapid initial diffusion step toward the interface, a long reorganization and a progressive building of multilayers occur. The reorganization is faster at oil-water interfaces than at air-oil interfaces, but the multilayer formation takes similar times. In the case of oil-water interfaces, the time scales are similar for different oils, but the variation with asphaltene concentration is qualitatively different: adsorption becomes faster with increasing concentrations for oils that are good asphaltene solvents and slower in the case of poor solvents. The presence of surfactant changes significantly the adsorption process. (C) 2002 Elsevier Science (USA)

Keywords: Asphaltenes, Liquid Interfaces, Adsorption Kinetics, Crude Oil Emulsions, Crude-Oil-Emulsions, Dynamic Surface-Properties, Chemical Demulsifiers, Tension Measurements, Langmuir Surface, Stability, Destabilization, Aggregation, Solvents, Resins

? Huang, F.C., Lee, J.F., Lee, C.K., Tseng, W.N. and Juang, L.C. (2002), Effects of exchange titanium cations on the pore structure and adsorption characteristics of montmorillonite. *Journal of Colloid and Interface Science*, **256** (2), 360-366.

Full Text: [2002\J Col Int Sci256, 360.pdf](2002/J%20Col%20Int%20Sci256,%20360.pdf)

Abstract: Ca montmorillonite was exchanged with titanium cations to study the effects of ion exchange on the surface area, pore structure, and adsorption properties of montmorillonite. The revolution of both the surface area and pore structure of montmorillonite was characterized, based on classical and fractal analyses of the nitrogen adsorption isotherms as well as the XRD patterns. The adsorption isotherms of hexane and benzene were then measured to identify the effects of the exchange process on the adsorption characteristics of montmorillonite. It was found that the exchange process might induce an increase in the surface area, pore size, pore volume, and pore connectivity of montmorillonite. Accompanying this was an increase in the basal spacings between the tetrahedral sheets from 13 to 16 Angstrom. The effects of the alteration of both the surface area and pore structure on the adsorption characteristics of montmorillonite are discussed. (C) 2002 Elsevier Science (USA).

Keywords: Montmorillonite, Titanium, Surface Area, Pore Volume, Pore Connectivity, Pillared Clays, Percolation Analysis, Sorption, Connectivity, Texture

Lackovic, K., Angove, M.J., Wells, J.D. and Johnson, B.B. (2003), Modeling the adsorption of Cd(II) onto Muloorina illite and related clay minerals. *Journal of Colloid and Interface Science*, **257** (1), 31-40.

Full Text: [J\J Col Int Sci257, 31.pdf](J/J%20Col%20Int%20Sci257,%2031.pdf)

Abstract: Theadsorption of Cd(II) onto goethite, kaolinite, and illitewas measured as a function of pH(adsorptionedges) and concentration (adsorptionisotherms) at25 °C. As the pH was increased, adsorptionontogoethite occurred mainly in the pH range 5.5-8, whereasadsorption onto kaolinite occurred in twostages, separated by a plateau in the pH region 5.5to 7.Adsorption onto illiteincreased steadily as the pH wasincreased, with far less Cd(II) adsorbing ontoillitethan onto goethite or kaolinite per m2 of mineralsurface area. Potentiometric titrationsofsuspensions of each mineral, with and without Cd(II) present, were also completed. Results from all three types of experiments were modeled using an extended constant- capacitance surface complexation model. The reactions

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and

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best described Cd(II) adsorption onto goethite, while

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and

http://images.idealibrary.com/fjimg/production/jcis/2003/257/1/jcis.2002.0031/img5.gif

best described Cd(II) adsorption onto kaolinite. A combinationofthe first, second, and fourth of thesereactionsbest fitted the data for Cd(II) adsorptionontoillite. In each case the modelfitted all experimentaldata well. Theresults suggest that adsorption onto thevariablecharge (SOH) sites on illite morecloselyresembles adsorption onto goethite than ontokaolinite. *© 2003 Elsevier Science (USA)*

López, F., Medina, F., Prodanov, M. and Güell, C. (2003), Oxidation of activated carbon: Application to vinegar decolorization. *Journal of Colloid and Interface Science*, **257** (2), 173-178.

Full Text: [J\J Col Int Sci257, 173.pdf](J/J%20Col%20Int%20Sci257,%20173.pdf)

Abstract: This article reports studies on the feasibility of increasing the decoloring capacity of a granular activated carbon (GAC) by using oxidation with air at 350 °C to modify its surface activity and porosity. The GAC, obtained from olive stones, had a maximum decolorization capacity of 92% for doses of 20 g/l, while the maximum decolorization capacity of the modified granular activated carbon (MGAC) was about 96% at a dose of 10 g/l. The increase in decoloring capacity is thought to be due to an increase in mesopore area (from 129 to 340 m2/g) in the MGAC. The maximum decoloring values and the doses needed to attain them are very close to values obtained in previous studies using coconut shell powder-activated carbon (94 and 98% for red and white vinegar for a dose of 10 g/l, respectively).

Keywords: Vinegar, Decolorization, Activated Carbon, Adsorption, Oxidation

? Talbot, D., Bee, A. and Treiner, C. (2003), Adsolubilization of 4-nitrophenol at a kaolinite/water interface as a function of pH and surfactant surface coverage. *Journal of Colloid and Interface Science*, **258** (1), 20-26.

Full Text: [2003\J Col Int Sci258, 20.pdf](2003/J%20Col%20Int%20Sci258,%2020.pdf)

Abstract: The incorporation of a weak acid, 4-nitrophenol, into a kaolinite/water interface has been achieved by the addition of an adsorbing cationic surfactant, cetylpyridinium chloride. This so-called adsolubilization phenomenon has been studied as a function of surfactant concentration and of pH. In the absence of the surfactant 4-nitrophenol is hardly adsorbed onto the naked kaolinite particles in the whole pH range studied, from 3 to 10. At constant pH, the adsolubilization is at a maximum at a surfactant concentration corresponding to the onset of the saturation plateau. At still higher concentrations, the solute is. distributed between the surface and free aggregates. The influence of the pH on adsolubilization is very much dependent upon surfactant surface coverage. At low surfactant concentration the behavior of 4-nitrophenol is very similar to that observed with the same surfactant at a silica/water interface: the adsolubilization decreases with increasing pH as the result of the repulsive interaction between the deprotonated solute molecule and the negatively charged sites on kaolinite particles. At higher surfactant concentrations increasing the pH induces increased adsolubilization as a consequence of the favorable interaction which takes place between the deprotonated weak acid and the positively charged surface surfactant aggregates. Hence, depending upon the extent of surface coverage, increasing the pH may retain 4-nitrophenol at the kaolinite/water interface or reject it into the bulk micellar solution. (C) 2003 Elsevier Science (USA). All rights reserved.

Keywords: Adsolubilization, Adsorption Isotherms, Kaolinite/Water Interface, Cationic Surfactant, Cetylpyridinium Chloride, 4-Nitrophenol, Sodium Dodecyl-Sulfate, Cationic Surfactants, Naphthalene Derivatives, Titanium Dioxide/Water, Nonionic Surfactants, Aqueous-Solutions, Adsorption, Coadsorption, Silica, Alumina/Water

Notes: high cited

? Jiang, L.Q., Gao, L. and Sun, J. (2003), Production of aqueous colloidal dispersions of carbon nanotubes. *Journal of Colloid and Interface Science*, **260** (1), 89-94.

Full Text: [2003\J Col Int Sci260, 89.pdf](2003/J%20Col%20Int%20Sci260,%2089.pdf)

Abstract: Stable homogeneous dispersions of carbon nanotubes (CNTs) have been prepared by using sodium dodecyl sulfate (SDS) as dispersing agent. To our knowledge, it is the first report to quantitatively characterize colloidal stability of the dispersions by UV-vis spectrophometric measurements. When the sediment time reaches 500 h, the supernatant CNT concentration drops as much as 50% for the bare CNT suspension, compared to 15% with the addition of SDS. Furthermore, after 150 h, no precipitation is found for CNT/SDS dispersions, exhibiting an extreme stability. Zeta potential, auger electron microscopy, and FTIR analysis are employed to investigate the adsorption mechanism in detail. It has been concluded that the surfactant containing a single straight-chain hydrophobic segment and a terminal hydrophilic segment can modify the CNTs-suspending medium interface and prevent aggregation over long periods. The morphology of the CNT dispersions is observed with optical microscopy. An intermediate domain of homogeneously dispersed nanotubes exhibits an optimum at 0.5 wt% CNTs and 2.0 wt% SDS. (C) 2003 Elsevier Science (USA). All rights reserved.

Keywords: Carbon Nanotubes, SDS, Dispersion, Surface Chemistry, FTIR, Optical Microscopy, Field-Emission, Composites, C-60, Fibers, Water

El-Safty, S.A. (2003), Sorption and diffusion of phenols onto well-defined ordered nanoporous monolithic silicas. *Journal of Colloid and Interface Science*, **260** (1), 184-194.

Full Text: [J\J Col Int Sci260, 184.pdf](J/J%20Col%20Int%20Sci260,%20184.pdf)

Abstract: The sorption of phenol, and o-, m-, and p-aminophenol (o-, m-, and p-AP) onto highly ordered mesoporous silicas (HOM) with cubic Im3m (HOM-1), hexagonal H-1 (HOM-2), 3-D hexagonal p6(3)/mmc (HOM-3), cubic Ia3d (HOM-5), lamellar Loo (HOM-6), and solid phase S (HOM-8) materials has been investigated kinetically. Nanostructured silica molecular sieves have been prepared at 25 and 60 degreesC with lyotropic liquid-crystalline phases of the nonionic surfactant (Brij 76) that was used as a structure-directing agent. Such nanostructured silicas have been studied by Si-29 nuclear magnetic resonance (Si-29 NMR), powder X-ray diffraction (XRD), the Brunauer-Emmett-Teller (BET) method for nitrogen adsorption and surface area measurements, and transmission electron microscopy (TEM) techniques after synthesis and sorption. It was found that all materials exhibit well-defined long-range porous architectures without significant loss of the ordered texture during phenol sorption. The kinetics of phenol sorption has been studied spectrophotometrically at different temperatures (25-40 degreesC;±0.1 range). The sorption rate is zero order in all phenols sorbed, and increases directly in the pattern P > m-AP > o-AP > p-AP, which reflects the mobility of the phenol compounds on the particle pores. The isothermal sorption and the kinetic parameters were discussed and it was established that a diffusion-controlled process characterizes phenol sorption. Furthermore, the mechanism of phenol sorption was deduced to be predominantly particle diffusion. The diffusion coefficients were determined using Fick’s equation. The trend of diffusion of all phenolls onto nanoporous silica was HOM-8 > HOM-2 > HOM-6 > HOM-5 > HOW1 > HOM-3, reflecting the effect of the uniform pore size distribution and the internal surface area of the nanostructured silicas on the diffusion process. (C) 2003 Elsevier Science (USA). All rights reserved.

Keywords: Nanostructured Molecular Sieves, phenol Compounds, Surfactant, Sorption, Diffusion, Kinetics, Mesoporous Molecular-Sieves, Aromatic-Amines, Ligand-Exchanger, MCM-41, Mechanism, Adsorption, Kinetics, Water, Surface, Phases

Chang, C.Y., Tsai, W.T., Ing, C.H. and Chang, C.F. (2003), Adsorption of polyethylene glycol (PEG) from aqueous solution onto hydrophobic zeolite. *Journal of Colloid and Interface Science*, **260** (2), 273-279.

Full Text: [J\J Col Int Sci260, 273.pdf](J/J%20Col%20Int%20Sci260,%20273.pdf)

Abstract: In the present study, a hydrophobic zeolite was used as an adsorbent for the adsorption of polyethylene glycol (PEG) in water solution and electroplating solution at 25 °C. The adsorption capacities were determined through the adsorption isotherms in a thermostated shaker. The rate of adsorption, on the other hand, was investigated in a batch adsorber under controlled process parameters such as initial PEG concentration (30, 70, 110, 150, 200, and 300 mg dm-3), agitation speed (200, 800, and 1000 rpm), and adsorbent particle size (0.72, 1.44, and 2.03 mm). A batch kinetic model, according to a pseudo-second-order mechanism, has been tested to predict the rate constant of adsorption, equilibrium adsorption capacity, time of half-adsorption, and equilibrium concentration by the fitting of the experimental data. The results of the adsorption isotherm and kinetic studies show that the adsorption process can well be described with the Langmuir and Freundlich models and the pseudo-second-order equation, respectively. Comparing the values of adsorption parameters of PEG in water solution and electroplating solution, there are no significant differences. In addition, the effective diffusion coefficient of the PEG molecule in the microporous adsorbent has been estimated at about 3.20×10-8 cm2s-1 based on the restrictive diffusion model.

Keywords: Liquid-Phase Adsorption, Polyethylene Glycol, Hydrophobic Zeolite, Isotherm, Kinetic Modeling, Restrictive Diffusion

Atun, G., Hisarli, G., Sheldrick, W.S. and Muhler, M. (2003), Adsorptive removal of Methylene blue from colored effluents on fuller’s earth. *Journal of Colloid and Interface Science*, **261** (1), 32-39.

Full Text: [J\J Col Int Sci261, 32.pdf](J/J%20Col%20Int%20Sci261,%2032.pdf)

Abstract: The adsorption behavior of Methylene blue (MB) on four fuller’s earth (FE) samples of varying compositions was investigated using a spectrophotometric technique to obtain information on the color removal. The distribution coefficient (*K*D) increased with an increase in the initial concentration (*C*0) of the dye, attained a maximum value, and decreased again at higher initial concentrations. Dye solutions became colorless for a *C*0 value corresponding to maximum *K*D. A progressively increased flocculation behavior in the clay suspensions was observed and the maximum value of *K*D corresponds to optimum flocculation of the clay. The *K*D values were found to decrease exponentially after of the solution again became colored while the amount adsorbed increased with an increase in the initial concentration of MB. Only adsorption data obtained for this region could be defined by adsorption isotherm equations. The shifts of the *C*0 values corresponding to *K*Dmax toward higher concentrations were correlated with the composition of FE samples by using XRF, XRD patterns, and SEM images. The influence of temperature on MB adsorption was also studied and thermodynamic parameters were calculated.

Keywords: Acridine-Orange, Adsorption Isotherm, Basic-Dyes, Clay-Minerals, Distribution Coefficient, Dye Adsorption, Fuller’s Earth, Metachromasy, Methylene Blue, Monovalent Organic Cations, Montmorillonite, Palygorskite, Sepiolite, Sorption, Thionine

Inglezakis, V.J., Loizidou, M.D. and Grigoropoulou, H.P. (2003), Ion exchange of Pb2+, Cu2+, Fe3+, and Cr3+ on natural clinoptilolite: Selectivity determination and influence of acidity on metal uptake. *Journal of Colloid and Interface Science*, **261** (1), 49-54.

Full Text: [J\J Col Int Sci261, 49.pdf](J/J%20Col%20Int%20Sci261,%2049.pdf)

Abstract: In the present study ion exchange of Pb2+, Cu2+, Fe3+, and Cr3+ on natural Greek clinoptilolite was examined in terms of selectivity toward the above heavy metals in single- and multicomponent solutions in batch systems. Also examined. are the influence of clinoptilolite on solution acidity and the effect of acidity on the ion exchange process. Clinoptilolite increases solution acidity due to the exchange of H+ cations with the cations initially present in its structure. H+ cations should be considered as competitive ones in ion exchange processes, and consequently ion exchange of metals is favored at high acidity values. Cu2+ and Cr3+ are the most sensitive cations with respect to acidity. Selectivity determination demonstrates that the selectivity at total concentration 0.01 N and acidity 2 in both single- and multicomponent solutions is following the order Pb2+ > Fe3+ > Cr3+ greater than or equal to Cu2+. This order is set since the first days of equilibration. However, Cu2+ shows remarkable changes in selectivity and generally its uptake and selectivity are increasing with time. On the other hand selectivity in single metal solutions where acidity is not adjusted is following the order Pb2+ > Cr3+ > Fe3+ congruent to Cu2+. (C) 2003 Elsevier Science (USA). All rights reserved.

Keywords: Clinoptilolite, Heavy Metals, Selectivity, Acidity, Ion Exchange, Heavy-Metals, Waste-Water, Removal, Zeolites

Okada, K., Yamamoto, N., Kameshima, Y. and Yasumori, A. (2003), Adsorption properties of activated carbon from waste newspaper prepared by chemical and physical activation. *Journal of Colloid and Interface Science*, **262** (1), 194-199.

Full Text: [J\J Col Int Sci262, 194.pdf](J/J%20Col%20Int%20Sci262,%20194.pdf)

Abstract: Adsorption properties of activated carbons prepared from waste newspaper by chemical and physical activation were investigated using water vapor, ammonia, methane, and Methylene blue (MB) as adsorbents. The water vapor adsorption isotherms show type V behavior and the maximum vapor adsorption of the chemically and physically activated products is about 1050 and 450 ml/g, respectively. The higher water vapor adsorption of the chemically activated products is attributed to the higher specific surface area (*S*BET) and greater hydrophilic activity (arising from the surface oxygen-containing functional groups) than in the physically activated products. The adsorption of ammonia and methane was measured by temperature-programmed desorption (TPD). NH3 adsorption is found to be higher in the chemically activated product than in the physically activated product while methane adsorption is slightly higher in the physically activated products even though these have lower *S*BET values. In the MB adsorption, the chemically activated products show higher adsorption (390 mg/g) than the physically activated product. These results are suggested to be related to the surface characteristics.

Keywords: Activated Carbon, Waste Newspaper, Adsorption Properties, Temperature-Programmed Desorption

Ho, Y.S. (2003), Comment on “Adsorption of fluoride, phosphate, and arsenate ions on a new type of ion exchange fiber, “ by RX Liu, J.L. Guo, and HX Tang. *Journal of Colloid and Interface Science*, **262** (1), 307-308.

Full Text: [J\J Col Int Sci262, 307.pdf](J/J%20Col%20Int%20Sci262,%20307.pdf) [J\J Col Int Sci-Ho.pdf](J/J%20Col%20Int%20Sci-Ho.pdf)

Keywords: Fungus *Aspergillus-Niger*, Sphagnum Moss Peat, Aqueous-Solution, Sorption Kinetics, Batch System, Metal-Ions, Removal, Dye, Equilibrium, Lead

Majdan, M., Pikus, S., Kowalska-Ternes, M., Gładysz-Płaska, A., Staszczuk, P., Fuks L. and Skrzypek, H. (2003), Equilibrium study of selected divalent *d*-electron metals adsorption on A-type zeolite. *Journal of Colloid and Interface Science*, **262** (2), 321-330.

Full Text: [J\J Col Int Sci262, 321.pdf](J/J%20Col%20Int%20Sci262,%20321.pdf)

Abstract: The objective of the presented study was to investigate the adsorption of Cu, Co, Mn, Zn, Cd and Mn on A-type zeolite. The isotherms for adsorption of metals from their nitrates were registered. The following adsorption constants *K* of metals were found: 162, 890, 124, 260, 69, 025, 16, 035, 10, 254, and 151 [M-1] for Cu, Co, Mn, Zn, Cd, and Ni, respectively, for the concentration range 10-4–10-3 M. On the other hand, the investigation of pH influence on the distribution constants of metals showed that the adsorption of metals proceeds essentially through an ion-exchange process, surface hydrolysis, and surface complexation. The supplementary results from DRIFT, scanning electron microscopy, and X-ray diffraction methods confirmed the presumption about the possible connection between the electronic structure of divalent ions and their adsorption behavior, showing that ions with *d*5 and *d*10 configurations such as Mn2+, Zn2+, Cd2+, with much weaker hydrolytic properties than Cu2+ and Ni2+, strongly interact with the zeolite framework and therefore their affinity to the zeolite phase is much stronger when compared with that of the Ni2+ ion, but at the same time not as strong as the affinity of the Cu2+ ion, the latter forming a new phase during the interaction with zeolite framework. For Zn2+, during inspection of the correlation between the proton concentration H/Al and zinc concentration Zn/Al on the zeolite surface, the formation of the surface complex S---OZn(OH) was proposed. A correlation between the heterogeneity of proton concentrations H/Al on Me–zeolite surfaces and the hydrolysis constants p*Kh* of Me2+ ions was found.

Keywords: Zeolite A, Adsorption, *d*-Electron Metals, Ligand Field, Surface Hydrolysis, T–O–T Vibration

Markai, S., Andrès, Y., Montavon, G. and Grambow, B. (2003), Study of the interaction between europium(III) and Bacillus subtilis: fixation sites, biosorption modeling and reversibility. *Journal of Colloid and Interface Science*, **262** (2), 351-361.

Full Text: [J\J Col Int Sci262, 351.pdf](J/J%20Col%20Int%20Sci262,%20351.pdf)

Abstract: In order to elucidate the underlying mechanisms involved in the biosorption of metal ions, potentiometric titrations, complexation studies, and time-resolved laser-induced fluorescence spectroscopy (TRLFS) measurements were used to characterize the interaction between Eu(III) and *Bacillus subtilis*. The reversibility of the interaction between Eu(III) and *Bacillus subtilis* was studied by a cation-exchange technique using the Chelex resin. For complexation studies in the presence of 0.15 mol/l of NaCl, the metal ion, the biomass, concentrations and the pH were varied. The adsorption data were quantified by a surface complexation model without electrostatic term. The data on the Eu(III)/*B.subtilis* system at pH 5 were satisfactorily described by one site at which Eu(III) was bound through one carboxylic function of the bacteria. With increasing pH, another site should be considered, involving a phosphate-bound environment. This was partially confirmed by time-resolved laser-induced fluorescence spectroscopy. In addition to this, it was evidenced that the site availability was dependent on the nature of the cation, i.e., a proton or Eu(III). Finally, it was shown that, at pH 5, the Eu(III)/*Bacillus subtilis* equilibrium was reversible.

Keywords: Complexation, Distribution, Reversibility, Bioavailability, Europium, *Bacillus Subtilis*, Cation exchange Resin, TRLFS

Meziani, M.J., Benalla, H., Zajac, J., Partyka, S. and Jones, D.J. (2003), Adsorption of a cationic gemini surfactant from aqueous solution onto aluminosilicate powders of the MCM-41 type: Effect of pore size and co-adsorption of phenol. *Journal of Colloid and Interface Science*, **262** (2), 362-371.

Full Text: [J\J Col Int Sci262, 362.pdf](J/J%20Col%20Int%20Sci262,%20362.pdf)

Abstract: The adsorption of cationic gemini dodecanediyl-α, ω-bis(dodecyldimethylammonium) bromide (i.e., C12C12C12) from aqueous solution onto aluminosilicate powders of the MCM-41 type (referred to as SiAl32*dx*, where *x* is the mean pore diameter in Å) has been studied at 298 K under the conditions of free pH of the aqueous phase. Macroporous silica gel XO15M was used for comparative purposes. The discussion was based on the interpretation of experimental adsorption isotherms and differential enthalpies of displacement obtained on various solid samples. For the hydrogen-exchanged SiAl32*d28* sample (i.e., H+–SiAl32*d28*), the adsorption of bromide counterions Br- at the solid–solution interface, the isotherm of the pH evolution in the equilibrated supernatant liquid, and the electrophoretic mobility of the solid particles coated with the adsorbed C12C12C12 were additionally measured. The uptake of phenol (pHOH) by a surfactant–solid system from a 1.5 mmol kg-1 pHOH solution and the related thermal effect of displacement onto SiAl32*d50* were quantified with the use of the solution depletion technique combined with UV spectrophotometry and the titration calorimetry technique. Titration calorimetry was also used to determine the molar enthalpy change accompanying micellization of C12C12C12 in pure deionized water and in a 1.5 mmol kg-1 pHOH solution at 298 K. The adsorption of C12C12C12 occurs simultaneously on the external surface and on the pore walls and it is a strongly co-operative phenomenon. Surfactant aggregates forming at adsorption saturation are thought to be composed of the adsorbed surfactant units having their cationic head groups mostly oriented outward with respect to the solid surface. Therefore, they can provide co-adsorption sites for polarisable phenol molecules. On average, there is one phenol molecule retained for one gemini cation adsorbed. Transfer of phenol from the aqueous phase to either the bulk micelles or to the interfacial aggregates is enthalpically favourable.

Keywords: Adsorption of Gemini Surfactants, Titration Microcalorimetry, Dodecanediyl-α, ω-bis(Dodecyldimethylammonium Bromide), Mesoporous MCM-41 Aluminosilicates, phenol Co-Adsorption

Gil, A., Korili, S.A. and Cherkashinin, G.Yu. (2003), Extension of the Dubinin–Astakhov equation for evaluating the micropore size distribution of a modified carbon molecular sieve. *Journal of Colloid and Interface Science*, **262** (2), 603-607.

Full Text: [J\J Col Int Sci262, 603.pdf](J/J%20Col%20Int%20Sci262,%20603.pdf)

Abstract: A new method for the characterization of the pore size distribution of microporous solids is applied on data obtained for activated carbon molecular sieve samples. In this method, based on the Dubinin–Astakhov equation, a simple numerical algorithm is used for the reconstruction of the micropore size distribution from the integral equation that represents the experimental nitrogen adsorption isotherm. The results are compared with the ones obtained on the basis of the well-known Horvath–Kawazoe method. The samples used in this study come from a carbon molecular sieve that has been treated with solutions of concentrated HNO3 at various temperatures and with solutions of H2O2 of various concentrations.

Keywords: Dubinin–Astakhov Equation, Micropore Size Distribution, Modified Carbon Molecular Sieve, Nitrogen Adsorption, Regularization Method

Tsai, W.T., Lai, C.W. and Hsien, K.J. (2003), Effect of particle size of activated clay on the adsorption of paraquat from aqueous solution. *Journal of Colloid and Interface Science*, **263** (1), 29-34.

Full Text: [J\J Col Int Sci263, 29.pdf](J/J%20Col%20Int%20Sci263,%2029.pdf)

Abstract: This paper describes the effect of particle size on the process of paraquat adsorption from aqueous solution onto an activated clay surface at 25 °C and initial pH 11.0. Measurements of the pore properties of the clay adsorbents with three different particle sizes (0.053–0.074 mm, 0.037–0.053 mm, and < 0.037 mm) were carried out. The rates and isotherms of adsorption have been also investigated by batch methods under the controlled conditions. From the experimental results obtained, the adsorption process can be well described with the pseudo-second order model and Freundlich model for adsorption kinetics and adsorption isotherm, respectively. In addition, the effect of the particle size of the clay adsorbent on the adsorption kinetics was found to be of considerable significance; namely, the rate constant (*k*) of paraquat adsorption by the clay adsorbent decreased with increasing particle size. It was concluded that the pore properties (i.e., surface area and total pore volume) and particle size of the clay adsorbent played a significant role in determining adsorption capacity and adsorption rate, respectively.

Lopes, E.C.N., dos Anjos, F.S.C., Vieira, E.F.S. and Cestari, A.R. (2003), An alternative Avrami equation to evaluate kinetic parameters of the interaction of Hg(II) with thin chitosan membranes. *Journal of Colloid and Interface Science*, **263** (2), 542-547.

Full Text: [J\J Col Int Sci263, 542.pdf](J/J%20Col%20Int%20Sci263,%20542.pdf)

Abstract: In this work, thin chitosan membranes were utilized as an adsorbent for the removal of Hg(II) from aqueous solutions. A rise of temperature accelerates the mass transfer of Hg(II) to the membranes, surfaces. The kinetic data did not present a good fitting to the traditional Lagergren adsorption kinetic equations. An alternative Avrami kinetic equation was employed and successfully fitted to the kinetic adsorption quantities. From this new equation, two regions presenting distinct kinectic parameters were found, and the use of the parameter *n* was also relationed to the determination of the kinetic order. Variations of the adsorption kinetic rate in relation to the time, the initial Hg(II) concentration, and the temperature were also calculated and are discussed.

Keywords: Chitosan Membranes, Hg(II) Adsorption, Adsorption Modeling, Kinetics, Avrami Adsorption Model

Zhang, X. and Bai, R.B. (2003), Mechanisms and kinetics of humic acid adsorption onto chitosan-coated granules. *Journal of Colloid and Interface Science*, **264** (1), 30-38.

Full Text: [J\J Col Int Sci264, 30.pdf](J/J%20Col%20Int%20Sci264,%2030.pdf)

Abstract: Chitosan, a naturally abundant biopolymer, has widely been studied for metal adsorption from various aqueous solutions, but the extension of chitosan as an adsorbent to remove humic substances from water has seldom been explored. In this study, chitosan was coated on the surface of polyethyleneterephthalate (PET) granules through a dip and phase inversion process and was examined for humic acid removal in a series of batch adsorption experiments. Scanning electron microscopic (SEM) images showed that the PET granules were uniformly covered with a layer of chitosan and the chitosan layer possessed numerous open pores on the surface. Zeta potential study indicated that the chitosan-coated granules had positive zeta potentials at pH < 6.6 and negative zeta potentials at pH > 6.6. Adsorption of humic acid onto the chitosan-coated granules was found to be strongly pH-dependent. Significant amounts of humic acid were adsorbed under acidic and neutral pH conditions, but the adsorption capacity was reduced remarkably with increasing solution pH values. The adsorption isothermal data under various initial humic acid concentrations (at the same solution pH value) can be adequately modeled by the Langmuir and Freundlich models. X-ray photoelectron spectroscopy (XPS) revealed that the amino groups of the chitosan layer were protonated due to humic acid adsorption, suggesting the formation of organic complex between the protonated amino groups and humic acid. Kinetic study indicated that the adsorption process was transport-limited at low solution pH values, but became both transport- and attachment-limited at high solution pH values. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Chitosan Coating, Humic Acid Adsorption, Surface Interaction, Mechanisms, Kinetics, Ray pHotoelectron-Spectroscopy, Surface Interactions, Substances, pH

Genç, H., Tjell, J.C., McConchie, D. and Schuiling, O. (2003), Adsorption of arsenate from water using neutralized red mud. *Journal of Colloid and Interface Science*, **264** (2), 327-334.

Full Text: [J\J Col Int Sci264, 327.pdf](J/J%20Col%20Int%20Sci264,%20327.pdf)

Abstract: The potential for using seawater-neutralized red mud (Bauxsol), a waste from aluminum manufacturing, as an adsorbent for removing As(V) (arsenate) from water is studied. Herein, adsorption characteristics are investigated and it is shown that adsorption follows the Langmuir model, with the adsorption constants indicating the feasibility of the process. Furthermore, the adsorption is found to increase with decreasing pH (i.e., ligand-like adsorption), higher adsorbent dosages, and lower initial arsenate concentrations. The effects of ions are also tested and it is shown that the adsorption of arsenate decreases in the presence of HCO-3, while Cl- has little effect, and Ca2+ increases the adsorption. Water quality assessment after treatment with Bauxsol indicates that none of the trace elements tested are released from the adsorbent. A TCLP leaching test also reveals that the used adsorbent is not toxic. It is foreseen that Bauxsol may be developed into an efficient low-cost adsorbent for (pre-) treating arsenate contaminated waters.

Keywords: Arsenate Removal, Seawater-Neutralized Red Mud, Adsorption, TCLP Test

Nagaoka, H. and Imae, T. (2003), Analytical investigation of two-step adsorption kinetics on surfaces. *Journal of Colloid and Interface Science*, **264** (2), 335-342.

Full Text: [J\J Col Int Sci264, 335.pdf](J/J%20Col%20Int%20Sci264,%20335.pdf)

Abstract: Analytical equations of two-step adsorption kinetics on surface have been derived. Moreover, computer simulations have been carried out to interpret various experimental adsorption kinetics previously reported. In the first case, molecules are further adsorbed from a solution onto a layer consisting of previously adsorbed molecules. This model was applied to the adsorption kinetics of hexadecyltrimethylammonium chloride (C16TAC) on a self-assembled monolayer (SAM) of 3-mercaptopropionic acid (T. Imae, H. Torii, J. Phys. Chem. B 104 (2000) 9218). The second case is that some of the initially adsorbed molecules are released from the adlayer with further time course. The adsorption of C16TAC on 1-dodecanethiol SAM (T. Imae, T. Takeshita, K. Yahagi, Stud. Surf. Sci. Catal. 132 (2001) 477) agrees with this mechanism. The strict mathematical developments presented in this work are demanded to specify the physical meaning of observed non-Langmuir adsorption kinetics, consisting of the two exponential terms.

Keywords: Two-Step Adsorption Kinetics, Langmuir Adsorption Kinetics, Hexadecyltrimethylammonium Chloride, 3-Mercaptopropionic Acid, 1-Dodecanethiol, Self-Assembled Monolaye

Notes: highly cited

Gupta, V.K., Ali, I., Suhas, and Mohan D. (2003), Equilibrium uptake and sorption dynamics for the removal of a basic dye (basic red) using low-cost adsorbents. *Journal of Colloid and Interface Science*, **265** (2), 257-264.

Full Text: [J\J Col Int Sci265, 257.pdf](J/J%20Col%20Int%20Sci265,%20257.pdf)

Abstract: Waste carbon slurries (generated in fertilizer plants) and blast furnace slag (generated in steel plants) have been converted into low-cost potential adsorbents. The adsorbents have been characterized and tried for the removal of the dye basic red from wastewater. Studies were performed at different pH to find the pH at which maximum adsorption occurs. Equilibrium isotherms were determined to assess the maximum adsorption capacity of the adsorbents. Adsorption capacities are compared for activated carbon developed from fertilizer waste and activated slag developed from blast furnace waste. The adsorption data are correlated with Freundlich and Langmuir isotherms in each system. The kinetics of adsorption depends on the adsorbate concentration and the physical and chemical characteristics of the adsorbent. Studies were conducted to delineate the effect of pH, temperature, initial absorbate concentration, particle size of the adsorbent, and solid-to-liquid ratio. The adsorption of basic red was found to be endothermic and first-order in nature.

Keywords: Adsorption, Activated Carbon, Blast Furnace Slag, Carbonaceous Material, Solid Waste Utilization, Dye Removal, Wastewater Treatment

Sarkar, M., Acharya, P.K. and Bhattacharya, B. (2003), Modeling the adsorption kinetics of some priority organic pollutants in water from diffusion and activation energy parameters. *Journal of Colloid and Interface Science*, **266** (1), 28-32.

Full Text: [J\J Col Int Sci266, 28.pdf](J/J%20Col%20Int%20Sci266,%2028.pdf)

Abstract: The kinetic aspects of adsorption of some priority organic pollutants, viz., phenol (hydroxybenzene), o-hydroxyphenol (1,2-dihydroxybenzene), m-hydroxyphenol (1,3-dihydroxybenzene), and 4-nitrophenol (1-hydroxy-4-nitrobenzene), on fly ash have been studied. The process is found to be of complex nature consisting of both surface adsorption and pore diffusion, the extent being estimated from the diffusion coefficient value. Activation parameter data for the ultimate adsorption as well as the pore diffusion are also evaluated. The data indicate that in the studied solute concentration range, external transport mainly governs the rate-limiting process. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: phenol, Adsorption, Fly Ash, Kinetics, Diffusion, Activation Energy, Waste-Water, Removal, phenol, Soil, Equilibrium, Adsorbents, Sorption, Recovery, Carbon, Color

Alvim-Ferraz, M.C.M. and Gaspar, C.M.T.B. (2003), Impregnated active carbons to control atmospheric emissions: 2. Influence of the raw material on the porous texture. *Journal of Colloid and Interface Science*, **266** (1), 160-167.

Full Text: [J\J Col Int Sci266, 160.pdf](J/J%20Col%20Int%20Sci266,%20160.pdf)

Abstract: The preparation of impregnated active carbons was optimized, in order to use them as catalysts for the deep oxidation of volatile organic compounds on atmospheric emissions. When impregnation is performed on the raw material or after activation, the influence of raw material on the texture and on the catalyst dispersion is already well studied. This paper aims to analyze the influence of raw material when the impregnation step is performed after the carbonization of different carbon precursors, as yet knowledge is very scarce. Olive stones, pinewood sawdust, nut shells, and almond shells were used as raw materials. In order to evaluate the influence of impregnation methodology of CoO, Co3O4, and CrO3 on the catalyst dispersion in the porous carbon texture, the impregnation step was made after activation and between carbonization and activation. On the first sequence, for all the raw materials, the impregnated oxides must be deposited on the internal surface, blocking part of the initial porous texture. When the impregnation step is conducted after carbonization, metal species act as catalysts during the activation step. The textures developed strongly depend either on the raw material or on the chemical state and distribution of the catalyst in the carbonized material. Olive stones and sawdust carbons stay with a microporous texture with very narrow pores where catalysts are not deposited. In nut shell and almond shell carbons, metal species are dispersed in the largest micropores and in a well-developed mesoporous texture. (C) 2003 Elsevier Inc. All rights reserved

Keywords: Adsorption, Carbon Support, Catalysts, Co3O4, CoO, CrO3, Impregnation, Oxidation Catalysis, Pore Volume, Preparation, Sawdust, Surface Area

Atkin, R., Craig, V.S.J., Wanless, E.J. and Biggs, S. (2003), The influence of chain length and electrolyte on the adsorption kinetics of cationic surfactants at the silica-aqueous solution interface. *Journal of Colloid and Interface Science*, **266** (2), 236-244.

Full Text: [J\J Col Int Sci266, 236.pdf](J/J%20Col%20Int%20Sci266,%20236.pdf)

Abstract: The equilibrium and kinetic aspects of the adsorption of alkyltrimethylammonium surfactants at the silica-aqueous solution interface have been investigated using optical reflectometry. The effect of added electrolyte, the length of the hydrocarbon chain, and of the counter- and co-ions has been elucidated. Increasing the length of the surfactant hydrocarbon chain results in the adsorption isotherm being displaced to lower concentrations. The adsorption kinetics indicate that above the cmc micelles are adsorbing directly to the surface and that as the chain length increases the hydrophobicity of the surfactant has a greater influence on the adsoption kinetics. While the addition of 10 mM KBr increases the CTAB maximal surface excess, there is no corresponding increase for the addition of 10 mM KCl to the CTAC system. This is attributed to the decreased binding efficiency of the chloride ion relative to the bromide ion. Variations in the co-ion species (Li, Na, K) have little effect on the adsorption rate and surface excess of CTAC up to a bulk electrolyte concentration of 10 mM. However, the rate of adsorption is increased in the presence of electrolyte. Slow secondary adsorption is seen over a range of concentrations for CTAC in the absence of electrolyte and importantly in the presence of LiCl; the origin of this slow adsorption is attributed to a structural barrier to adsorption. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Optical Reflectometry, Surfactant, Adsorption, Kinetics, Silica, Structural Arrangements, Gemini Surfactants, Water Interface, Surfaces, Micelles, Mechanism, Diffusion, Charge

Pendleton, P. and Wu, S.H. (2003), Kinetics of dodecanoic acid adsorption from caustic solution by activated carbon. *Journal of Colloid and Interface Science*, **266** (2), 245-250.

Full Text: [J\J Col Int Sci266, 245.pdf](J/J%20Col%20Int%20Sci266,%20245.pdf)

Abstract: This study examines the influences of adsorbent porosity and surface chemistry and of carbon dosage on dodecanoic acid adsorption kinetics from aqueous and 2 M NaOH solutions as batch adsorption processes. Both adsorbents are steam-activated carbons prepared from either coconut or coal precursors. Prior to use the adsorbents were washed in deionized water or 2 M NaOH. Mass transfer coefficients and effective overall diffusion coefficients indicate a minor contribution from adsorbent porosity. In contrast, high surface oxygen content impedes transport to and into the adsorbent structure. Carbon dosage shows a proportional increase in transport coefficients with increasing mass; these coefficients are constant when normalized per unit mass. Neither water nor NaOH treatment of the adsorbents has a significant influence on dodecanoic acid adsorption kinetics. Molecular and Knudsen diffusion coefficients are defined to demonstrate that the overall effective diffusion coefficient values and the diffusion process are controlled by surface diffusion. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption Kinetics, Oxygen Content, Dodecanoic Acid Adsorption, Porous Materials, Caustic Solution, External Mass-Transfer, Surface-Diffusion Model, Sodium Dodecyl-Sulfate, Anionic Surfactant, Aqueous-Solutions, Ionic-Strength, Sorption, Chemistry, 2-Methylisoborneol, Temperature

Terzyk, A.P., Chatłas, J., Gauden, P.A., Rychlicki, G. and Kowalczyk, P. (2003), Developing the solution analogue of the Toth adsorption isotherm equation. *Journal of Colloid and Interface Science*, **266** (2), 473-476.

Full Text: [J\J Col Int Sci266, 473.pdf](J/J%20Col%20Int%20Sci266,%20473.pdf)

Abstract: The well-known Toth adsorption isotherm equation developed formerly for adsorption of vapors is converted into its solution analogue. It is shown that this equation can be successfully applied to the description of adsorption data of organics on activated carbons.

Keywords: Activated Carbon, Adsorption from Solution, Toth Equation

Li, W.J. and Tao, Z.Y. (2003), Comparative study on Np(V) sorption on oxides of aluminum and silicon: effects of humic substance and carbonate in solution. *Journal of Colloid and Interface Science*, **267** (1), 25-31.

Full Text: [J\J Col Int Sci267, 25.pdf](J/J%20Col%20Int%20Sci267,%2025.pdf)

Abstract: The sorption of Np(V) (total concentration 10-5 mol/L) onto alumina and silica was studied by a batch technique under ambient aerobic conditions at 25 °C. The effects of pH, ionic strength, humic substance (HS), and added carbonate in aqueous solutions on the sorption of Np(V) onto alumina and silica were investigated. The sorption isotherms of Np(V) on alumina and the relationships between the equilibrium concentrations after sorption onto silica and the initial concentration before sorption in the absence and presence of HS and added carbonate in solutions were determined. It was found that as compared with the sorption of Np(V) onto alumina, the sorption by silica on the basis of mass is tremendously less, negative sorption of Np(V) onto silica occurs, the relative rate of sorption onto silica is quicker the sensitivity of sorption onto silica to ionic strength is higher, the pH dependence of sorption onto silica is less, and consequently the characteristics of Np(V) sorption onto alumina and silica are distinctly different. The effect of addition of HS or carbonate in solution was studied. Little effect of addition of HS (20 mg/L) on sorption onto alumina and silica were found. The addition of carbonate (0.001 mol/L) increased Np(V) sorption onto silica at pH values below 10 and decreased it at pH values above 10.

Doğan, M. and Alkan, M. (2003), Removal of methyl violet from aqueous solution by perlite. *Journal of Colloid and Interface Science*, **267** (1), 32-41.

Full Text: [J\J Col Int Sci267, 32.pdf](J/J%20Col%20Int%20Sci267,%2032.pdf)

Abstract: The use of perlite for the removal of methyl violet from aqueous solutions at different concentration, pH, and temperature has been investigated. Adsorption equilibrium is reached within 1 h. The capacity of perlite samples for the adsorption of methyl violet was found to increase with increasing pH and temperature and decrease with expansion and increasing acid-activation. The adsorption isotherms are described by means of the Langmuir and Freundlich isotherms. The adsorption isotherm was measured experimentally at different conditions and the experimental data were correlated reasonably well by the adsorption isotherm of Langmuir. The order of heat of adsorption corresponds to a physical reaction. It is concluded that the methyl violet is physically adsorbed onto the perlite. The removal efficiency (*P*) and dimensionless separation factor (*R*) have shown that perlite can be used for removal of methyl violet from aqueous solutions, but unexpanded perlite is more effective.

Keywords: Adsorption Isotherms, Methyl Violet, Perlite, Dye

Yang, T. and Lua, A.C. (2003), Characteristics of activated carbons prepared from pistachio-nut shells by physical activation. *Journal of Colloid and Interface Science*, **267** (2), 408-417.

Full Text: [J\J Col Int Sci267, 408.pdf](J/J%20Col%20Int%20Sci267,%20408.pdf)

Abstract: Activated carbons were prepared from pistachio-nut shells, which are one type of lignocellulosic material, by a two-step physical method. The effects of the preparation variables on the activated carbon pore structure were studied, followed by the optimization of these operating parameters. It was found that the activation temperature and dwell time are the important parameters that affect the characteristics of the activated carbons obtained. The effects of CO2 flow rate and heating rate during activation were also studied. Under the experimental conditions used, the optimum conditions to prepare activated carbons with high surface area and pore volume were identified. The microstructure of the activated carbons prepared was examined by scanning electron microscopy while the Fourier transform infrared spectra showed the changes in the surface functional groups produced during the different preparation stages. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Activation, Characterization, Pistachio-Nut Shell, Adsorption, Rockrose

Subramaniam, K., Vithayaveroj, V., Yiacoumi, S. and Tsouris, C. (2003), Copper uptake by silica and iron oxide under high surface coverage conditions: surface charge and sorption equilibrium modeling. *Journal of Colloid and Interface Science*, **268** (1), 12-22.

Full Text: [J\J Col Int Sci268, 12.pdf](J/J%20Col%20Int%20Sci268,%2012.pdf)

Abstract: A sorption modeling approach based on surface complexation concepts was applied to predict copper uptake and its effects on the surface electrostatic potential of ferric oxide and silica colloids. Equilibrium modeling of copper uptake by ferric oxide using the traditional surface complexation model (SCM) was reasonably successful with some discrepancies especially in the acidic pH ranges and high colloid concentration cases. Good predictions of the ferric oxide charge reversals during uptake were obtained from the modeling. Based on the SCM predictions, copper removal from solution is due to the outer-sphere complexation of the first hydrolysis product, resulting in the surface-metal complex SO-CuOH+. The SCM was found to be insufficient to describe copper uptake by silica particles. To address discrepancies between experimental data and SCM predictions, the SCM was modified to include attributes of the surface polymer model (SPM), which incorporates sorption of the dimeric copper species Cu2(OH)22+. The continuum model (CM) was also studied as a second modification to the SCM to include formation of surface precipitates. Both the SPM and the CM were successful in modeling copper uptake and ζpotential variations as a function of pH at various solution conditions and colloid concentrations. From the SPM and CM predictions, it was concluded that for systems with high surface loadings, copper removal from solution occurs due to the formation of both monomeric and dimeric surface complexes, as well as through precipitation mechanisms.

Liu, Q. and Liu, Y.Q. (2003), Distribution of Pb(II) species in aqueous solutions. *Journal of Colloid and Interface Science*, **268** (1), 266-269.

Full Text: [J\J Col Int Sci268, 266.pdf](J/J%20Col%20Int%20Sci268,%20266.pdf)

Abstract: Turbidity and zeta potential measurements were made on solid precipitates formed after raising the pH of a 10-3 mol/l lead nitrate aqueous solutions containing 10-2 mol/l KCl with KOH. Distribution diagrams of Pb(II) species in aqueous solutions at a total Pb(II) concentration of 10-3 mol/l and 10-2 mol/l KCl was constructed to explain the results. Several solubility products for solid Pb(OH)2 were found from the literature and used to construct the diagrams. It was observed that distribution diagrams constructed using a solubility product of 1.43×10-20 explained the experimental results better than those with other reported solubility products.

Keywords: Lead Nitrate, Lead Hydroxide, Turbidity, Zeta Potential, Distribution Diagram

? Terzyk, A.P. (2003), Further insights into the role of carbon surface functionalities in the mechanism of phenol adsorption. *Journal of Colloid and Interface Science*, **268** (2), 301-329.

Full Text: [2003\J Col Int Sci268, 301.pdf](2003/J%20Col%20Int%20Sci268,%20301.pdf)

Abstract: The presented study describes the temperature as well as pH dependence of phenol adsorption (and adsorption kinetics) on four carbons with different chemical compositions of the surface layer but almost identical porosity. In the first part, it is shown, applying the most sophisticated method of carbon porosity characterization (i.e., the method of Do and co-workers-ND method), that the porosity does not change much after the chemical modification of carbons. Then it is shown that the ND method leads to the same results as the DFT (density functional theory) does. Next, the TPD results for D43/1 carbons (initial, modified with HNO3, fuming H2SO4, and with NH3) are described. The TPD results for carbon modified with fuming sulphuric acid has not been reported yet by others. The deconvolution of peaks is performed. The obtained results, together with those already published, lead to the chemical structures of surface functionalities for all studied carbons. The thermogravimetric analysis of phenol adsorption shows that the amount of chemically bonded molecules is small. Then it is shown that the adsorption at the acidic pH (1.5) level is lower for all studied carbons than that at the neutral one. The description of the isotherms applying adsorbability, quasi-Freundlich and DA models, together with enthalpy measurements, lead to the mechanism of phenol adsorption at both pH values. The mechanism is, furthermore, confirmed by some empirical correlations. The analysis of the average hysteresis on adsorption-desorption isotherms as well as the comparison of phenol adsorption in oxic and anoxic conditions leads to the mechanism of irreversible phenol adsorption. It is suggested that the irreversibility is caused by two effects: the creation of strong complexes between phenol and surface carbonyl and lactones as well as by the polymerization. The last effect is due to the ability of carbon to adsorb the oxygen from solution and form superoxo ions. Finally, the kinetics is considered. The analytical solution of Fick’s law of diffusion for adsorption in cylindrical particles is applied, the diffusion coefficients are calculated. It is shown that phenol diffusion is mixed between a surface process and a pore one. The obtained energy of diffusion is correlated with the values of the physicochemical parameters of studied carbons. As a final point, it is concluded that the mechanism of phenol adsorption is not only determined by so called “pi-pi interactions” and “donor-acceptor complex formation” but also by (strongly depending on temperature) the “solvent effect” balancing the influence of the two mentioned factors on this mechanism. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: 4-Hydroxyacetanilide Paracetamol, Activated Carbon, Adsorption, Adsorption From Solution, Adsorption Kinetics, Analysis, Aqueous-Solutions, Biologically-Active Compounds, Carbon, Characterization, Chemical Modification, Comparison, Correlations, Cylindrical Adsorbent Particles, Deconvolution, DFT, Diffusion, Electron-Spin-Resonance, Enthalpy, First, Isotherms, Kinetics, Law, Lead, Mechanism, Models, Modification, ND Method, Neutral pH, NH3, Paracetamol In-Vitro, Particles, pH, Phenol, Polymerization, Pore-Size Distribution, Porosity, Rights, Small, Solution, Sulphuric Acid, Temperature, Temperature-Dependence, Theory, Volume Compressibilities

Kanungo, S.B., Tripathy, S.S. and Rajeev, (2004), Adsorption of Co, Ni, Cu, and Zn on hydrous manganese dioxide from complex electrolyte solutions resembling sea water in major ion content. *Journal of Colloid and Interface Science*, **269** (1), 1-10.

Full Text: [J\J Col Int Sci269, 1.pdf](J/J%20Col%20Int%20Sci269,%201.pdf)

Abstract: Adsorption of Co, Ni, Cu. and Zn onto a poorly crystalline hydrous manganese dioxide (delta-MnO2) has been studied in complex electrolyte solutions such as (a) 0.5 M NaCl + 0.054 M MgCl2, (b) 0.5 M NaCl + 0.028 M Na2SO4, and (c) artificial sea water prepared according to the standard literature method. These three solutions allow us to identify the specific effect of major cations, major anions, and the mixture of major cations and anions (including carbonate and bicarbonate) that is present in real sea water. The adsorption isotherm in major ion sea water at pH 7.25 indicates that while Co and Zn exhibit increases in adsorption with increase in concentration, Ni shows relatively poor adsorption, reaching a plateau at 0.075 mM concentration. The three trace metals (Co, Ni, and Zn) show Langmuirian behavior for adsorption at low concentration. It is generally observed that the fractional adsorption vs pH curve shifts to higher pH either in the presence of 0.054 M MgCl2 or in sea water. In the presence of 0.028 M Na2SO4 the fractional adsorption vs pH curve remains almost unchanged with respect to a 0.5 M NaCl solution. The competitive adsorption of one trace metal in the presence of other three in major ion sea water indicates that this phenomenon is more predominant with Ni and Zn than with Co and Cu. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Metal Ions, Delta-MnO2, Complex Electrolyte, Interfacial Properties, Amorphous Feooh, Beta-Feooh, Oxides, Iron, Cations, Behavior, Sorption, Cd, Seawater

Kanungo, S.B., Tripathy, S.S., Mishra, S.K., Sahoo, B. and Rajeev, (2004), Adsorption of Co2+, Ni2+, Cu2+, and Zn2+ onto amorphous hydrous manganese dioxide from simple (1–1) electrolyte solutions. *Journal of Colloid and Interface Science*, **269** (1), 11-21.

Full Text: [J\J Col Int Sci269, 11.pdf](J/J%20Col%20Int%20Sci269,%2011.pdf)

Abstract: The adsorption of Co2+, Ni2+, Cu2+, and Zn2+ onto amorphous hydrous manganese dioxide (δ-MnO2) has been studied using two methods, viz., isotherms at constant pH in the presence of buffer solution and pH variation in the absence of buffer solution from a fixed metal ion concentration. While the adsorption isotherm experiments were carried out in 0.5 M NaCl only, pH variation or batch titration experiments were carried out in 0.5 M NaCl, 0.01 M NaCl, and 0.01 M KNO3 solutions. The complex nature of adsorption isotherms at constant pH values indicates that adsorption of all the cations is non-Langmuirian (Freundlich) and takes place on the highly heterogeneous oxide surface with different binding energies. The proton stoichiometry derived from isotherms at two close pH values varies between 0.3 and 0.8. The variation of fractional adsorption with pH indicates that the background electrolyte solution influences the adsorption of cations through either metal-like or ligand-like complexes with Cl−, the former showing a low adsorption tendency. The proton stoichiometry values derived from the Kurbatov-type plot varies not only with the electrolyte solution but also with the adsorbate/adsorbent ratio. The variation of fractional adsorption with pH can be modeled either with the formation of the SOM+ type or with a combination of SOM+ and SOMOH type complexes, depending upon the cation and electrolyte medium. The equilibrium constants obtained from Kurbatov-type plots are found to be most suitable in these model calculations. Adsorption calculated on the basis of ternary surface metal–chlorocomplex formation exhibits very low values.

Keywords: Adsorption; Metal Ions; δ-MnO2; Simple Electrolyte Medium

Gündoğan, R., Acemioğlu, B. and Alma, M.H. (2004), Copper(II) adsorption from aqueous solution by herbaceous peat. *Journal of Colloid and Interface Science*, **269** (2), 303-309.

Full Text: [J\J Col Int Sci269, 303.pdf](J/J%20Col%20Int%20Sci269,%20303.pdf)

Abstract: In this research, the herbaceous peat collected from Gavurgolu peatlands, one of the biggest Turkish peatlands, was utilized as an adsorbent for the removal of copper(II) ions from aqueous solution. Adsorption experiments were conducted under various conditions, i.e., initial concentration, temperature, and pH. While the amount of Cu(II) adsorbed on the peat increased with increasing concentration of Cu(II) ions, it was not markedly affected by temperature and pH. Percentage removal was higher at lower concentration. For example, the maximum percentage removal of Cu(II) ions for initial concentration of 3×10-4 M was 97.04% at 21ºC and pH 5.5. The adsorption capacity (Q0) of the peat was 4.84 mg g.1 from Langmuir adsorption isotherm for the concentration range of 3×10-4 - 6×10-4 M at 21.C and pH 5.5. The equilibrium time of adsorption of Cu(II) ions was 150 min and independent of concentration and temperature. The amount of Cu(II) adsorbed at equilibrium time did not considerably change with temperature and pH. It was also determined that adsorption isotherm followed both Freundlich and Langmuir. Uptake mechanism of Cu(II) ions by the peat occurs via cation exchange (especially by means of Ca2+ and Mg2+) as well as copper/peat complexation. Adsorption kinetic was consistent with the pseudo-second-order model. 2003 Elsevier Inc. All rights reserved.

Keywords: Adsorption Isotherm, Kinetics, Mechanism, Herbaceous Peat, Buffering Property of Peat, Cu(II) Ions

Gürses, A., Karaca, S., Doğar, Ç., Bayrak, R., Açıkyıldız, M. and Yalçın, M. (2004), Determination of adsorptive properties of clay/water system: Methylene blue sorption. *Journal of Colloid and Interface Science*, **269** (2), 310-314.

Full Text: [J\J Col Int Sci269, 310.pdf](J/J%20Col%20Int%20Sci269,%20310.pdf)

Abstract: In this study, adsorption of Methylene blue onto clay was investigated. The effect of adsorption time and temperature on the adsorption process was studied. To reveal the adsorptive characteristics of the clay studied, porosity and BET surface area measurements were made. It was observed that the adsorption capacity decreases with increasing temperature, and adsorption equilibrium was attained within 1 h. It was found that the data fit well to Langmuir, Halsey, Henderson, and Harkins-Jura models but experimental data deviate significantly from BET and Freundlich models at especially high concentrations. Furthermore, isosteric adsorption enthalpy and entropy are calculated as -7.99 kJ mol-1 and 25.41 J K-1 mol-1, respectively. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Adsorption Isotherms; Clay, Adsorption, Methylene Blue, Aqueous-Solutions, Surface-Area, Basic-Dyes, Removal, Mechanism, Effluents, Thionine, Kinetics, Carbons, Clays

Singh, K. and Mohan, S. (2004), Adsorption behavior of selected monosaccharides onto an alumina interface. *Journal of Colloid and Interface Science*, **270** (1), 21-28.

Full Text: [J\J Col Int Sci270, 21.pdf](J/J%20Col%20Int%20Sci270,%2021.pdf)

Abstract: The adsorption of glucose and fructose from their aqueous solutions onto an alumina interface has been carried out spectrophotometrically at room temperature. The adsorption isotherms are characterized as typical L-type and an adsorption mechanism on the basis of dipolar interactions has been suggested. In addition to this, a partial role of metal–saccharide interactions as found in organometallic complexes (OMCs) for the observed adsorption cannot be ruled out. Various kinetic and thermodynamic parameters of the adsorption process have been evaluated. The effects of variation in experimental conditions of the system have also been investigated. The adsorption exhibited a typical response to the pH effect and maximum adsorption was found near the isoelectric point of alumina (pH 9.0). The anionic addition to the suspension affects the adsorbed amount and Cl-, SO42-, and PO43- affect the adsorption quantitatively. The addition of similar concentration of cations was found to reduce the adsorbed amount. The presence of cationic and anionic detergents was found to influence both the adsorbed amount and the adsorption rate. The temperature was found to have an inverse effect on adsorption. Adsorptive kinetic parameters have revealed that fructose tends to be a better adsorbate than glucose. This is found to be consistent with the chelation behaviour of monosaccharides as found in the OMC of monosaccharides. The thermodynamics of the adsorption model indicates its spontaneous and exothermic nature. The negative values of entropy are an indication of the probability of a favorable nature of adsorption.

Keywords: Adsorption Kinetics, Alumina–Monosaccharide Model, L-Type Isotherms, Separation of Carbohydrates, Chromatographic Method

Trivedi, P., Dyer, J.A., Sparks, D.L. and Pandya, K. (2004), Mechanistic and thermodynamic interpretations of zinc sorption onto ferrihydrite. *Journal of Colloid and Interface Science*, **270** (1), 77-85.

Full Text: [J\J Col Int Sci270, 77.pdf](J/J%20Col%20Int%20Sci270,%2077.pdf)

Abstract: Elucidating the reaction mechanisms and estimating the associated transport and thermodynamic parameters are important for an accurate description of the fate of toxic metal pollutants, such as Zn(II), in soils and aquatic ecosystems rich in iron oxides. Consequently, sorption of Zn(II) ions onto ferrihydrite was investigated with macroscopic and spectroscopic studies as a function of pH (4.0–8.0), ionic strength (10-3–10-1 M NaNO3), aqueous Zn(II) concentration (10-8–10-2 M), and temperature (4–25 °C). Present findings suggest that, for a given set of pH and temperature conditions, Zn sorption onto ferrihydrite can best be described by one average reaction mechanism below the saturation limits. Thermodynamic analyses reveal that the Zn(II) ions sorb onto the ferrihydrite surfaces via strong endothermic chemical reactions. Consistently, X-ray absorption spectroscopic (XAS) analyses confirm that, at pH < 6.5, for all Zn loadings, Zn(II) ions form corner-sharing, mononuclear, bidentate inner-sphere complexes with ferrihydrite, where *R*Zn–O ≈1.97 Å and *R*Zn–Fe ≈ 3.48 Å. For pH ≥ 6.5, similar sorption complexes were observed at lower sorption densities. Then again, for pH ≥ 6.5 and at higher sorption densities, Zn(II) ions may begin to form zinc-hydroxide-like polynuclear sorption complexes on the surfaces of the ferrihydrite, where *R*Zn–Zn ≈ 3.53 Å. Surprisingly, small changes in temperature had a significant impact on the affinity of zinc for the ferrihydrite surface; equilibrium sorption capacity decreased by 3–4 orders of magnitude as temperature fell from 25 to 4 °C for all pH. Zinc sorption onto ferrihydrite, therefore, is governed by pH as well as by temperature and sorbate/sorbent ratio.

Keywords: Zn(II), Ferrihydrite, Sorption, Thermodynamics, XAS

Lackovic, K., Wells, J.D., Johnson, B.B. and Angove, M.J. (2004), Modeling the adsorption of Cd(II) onto kaolinite and Muloorina illite in the presence of citric acid. *Journal of Colloid and Interface Science*, **270** (1), 86-93.

Full Text: [J\J Col Int Sci270, 86.pdf](J/J%20Col%20Int%20Sci270,%2086.pdf)

Abstract: The adsorption of cadmium onto kaolinite and Muloorina illite in the presence of citric acid has been measured as a function of pH and cadmium concentration at 25 °C. When citric acid is present in the systems cadmium adsorption is slightly enhanced below pH 5, but significantly suppressed between pH 5 and 8, for both substrates. At higher citric acid concentrations very little cadmium adsorbs onto kaolinite from pH 5 to 8. Above pH 8 adsorption of Cd(II) onto illite is enhanced in the presence of citric acid, especially at lower concentrations, but this does not occur for kaolinite. Adsorption and potentiometric titration data were fitted by simple extended constant-capacitance surface complexation models for the two substrates. Enhancement of adsorption at lower pH values was ascribed to the ternary reaction

Image

involving outer-sphere complexation with permanently charged X- sites on the “silica” faces of both clay minerals. The models suggested that suppression of adsorption in the intermediate pH range was due to the formation of a strong CdL- solution complex which adsorbed neither on the permanently charged sites nor on the surface hydroxyl groups at the edges of the clay crystals. At higher pH values the dominant solution complex, CdLOH2-, apparently adsorbed as an outer-sphere complex at surface hydroxyl groups on illite,

SOH+2Cd2++L3-right arrow over left arrow[SOCd+- -CdOHL2-]-+2H+,

but not on kaolinite. This difference in behavior results from the presence of =FeOH groups on the illite surface which can form surface complexes with CdLOH2-, while Keywords: Adsorption, Cd(II), Citric acid, Illite, Kaolinite, Clays, Surface complexation, Inner-sphere, Outer-sphere, Modeling

the =AlOH groups on the kaolinite surface cannot.

Netpradit, S., Thiravetyan, P. and Towprayoon, S. (2004), Adsorption of three azo reactive dyes by metal hydroxide sludge: Effect of temperature, pH, and electrolytes. *Journal of Colloid and Interface Science*, **270** (2), 255-261.

Full Text: [J\J Col Int Sci270, 255.pdf](J/J%20Col%20Int%20Sci270,%20255.pdf)

Abstract: Adsorption of azo reactive dyes by metal hydroxide sludge were investigated using CI Reactive Red 2 (RR-2), CI Reactive Red 120, (RR-120), and CI Reactive Red 141 (RR-141). The adsorption isotherms, including the Langmuir constants (*Q*° and *b*) and the Freundlich constant (*Kf*), for RR-2 decreased with increasing temperature, but this was reversed for RR-120 and RR-141. This behavior implied an exothermic process for RR-2 but an endothermic process for RR-120 and RR-141. The enthalpy value of adsorption for RR-2, RR-120, and RR-141 was -5.56, 2.77, and 6.41 kJ/mol, respectively, indicating that the adsorption of the less charged dyes (RR-2) was mainly physical, but that of the more charged dyes (RR-120 and RR-141) was chemical. The optimum system pH of 8.6±0.3 was maintained even when the solution pH was varied from 3 to 10. Higher concentration or more valence of anions of electrolytes in dye solution caused decreasing dye adsorption efficiency of metal hydroxide sludge. A higher dosage of sludge is required for real textile wastewater (>1% w/v) than for the synthetic dye solution (0.2% w/v). The leachates of heavy metals from metal hydroxide sludge to the environment are very low, which are within the standard limit of industrial effluent and leachable substances.

Keywords: Adsorption, Azo Reactive Dyes, Metal Hydroxide, Textile Wastewater

Ferreira, S.L.C., Andrade, H.M.C. and dos Santos, H.C. (2004), Characterization and determination of the thermodynamic and kinetic properties of the adsorption of the molybdenum(VI)-calmagite complex onto active carbon. *Journal of Colloid and Interface Science*, **270** (2), 276-280.

Full Text: [J\J Col Int Sci270, 276.pdf](J/J%20Col%20Int%20Sci270,%20276.pdf)

Abstract: The extraction of the Mo(VI)-calmagite complex by adsorption onto active carbon is investigated in the present paper. Thermodynamic and kinetic properties and different adsorption isotherms were determined. The adsorption studies have shown that both the empirical Freundlich and the classical Langmuir isotherms successfully fit the experimental results. The overall adsorption process was exothermic and spontaneous in the temperature range from 283 to 323 K; namely, DeltaH(0) and DeltaS(0) values were found to be -8.15 kJ mol-1 and -3.86 J mol-1 K, respectively. The high activation energy demanded for desorption of the Mo(VI)-calmagite complex surface indicated that the overall process was controlled by the slow desorption, while a fast and low activated adsorption of the complex onto active carbon surface was fairly favored. These features indicate that active carbon may be very useful for preconcentration of molybdenum from diluted solutions. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Atomic-Absorption-Spectrometry, Polyurethane Foam, General Treatment, Aqueous-Solution, Acidic Solution, Trace Amount, Preconcentration, Molybdenum, Sorption, Isotherm

Li, H.T., Xu, M.C., Shi, Z.Q. and He, B.L. (2004), Isotherm analysis of phenol adsorption on polymeric adsorbents from nonaqueous solution. *Journal of Colloid and Interface Science*, **271** (1), 47-54.

Full Text: [J\J Col Int Sci271, 47.pdf](J/J%20Col%20Int%20Sci271,%2047.pdf)

Abstract: Macroporous poly(methyl methacrylate-co-divinylbenzene) (PMMA), interpenetrating polymer adsorbent based on poly(styrene-co-divinylbenzene) (PS) and poly(methyl methacrylate-co-divinylbenzene) (PMMA/PS), and macroporous cross-linked poly(N-p-vinylbenzyl acetylamide) (PVBA) were prepared for the adsorption of phenol from cyclohexane. The sorption isotherms of phenol on the three polymeric adsorbents were measured and fitted to Langmuir and Freundlich isotherms. It is shown that the Langmuir isotherm, which is based on a homogeneous surface model, is unsuitable to describe the sorption of phenol on the adsorbents from nonaqueous solution and the Freundlich equation fits the tested three adsorption systems well. The isosteric enthalpy was quantitatively correlated with the fractional loading for the sorption of phenol onto the three polymeric adsorbents. The surface energetic heterogeneity patterns of the adsorbents were described with functions of isosteric enthalpy. The results showed that the tested three polymeric adsorbents exhibited different surface energetic heterogeneity patterns. The initial isosteric enthalpy of phenol sorption on polymeric adsorbent has to do with the surface chemical composition and is free from the pore structure of the polymeric adsorbent matrix. Forming hydrogen bonds between phenol molecules and adsorbent is the main driving force of phenol sorption onto PVBA and PMMA adsorbent from nonaqueous solution. When phenol is adsorbed on PMMA/PS. pi-pi interaction resulting from the stacking of the benzene rings of the adsorbed phenol molecules and the pendant benzene ring of adsorbent is involved. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Sorption, Isotherm, Isosteric Enthalpy, Polymeric Adsorbent, phenol, Aqueous-Solution, Resin, Heterogeneity, Equilibrium, Organics, Sorption, Removal, Water

Peng, Z.G., Hidajat, K. and Uddin, M.S. (2004), Adsorption of bovine serum albumin on nanosized magnetic particles. *Journal of Colloid and Interface Science*, **271** (2), 277-283.

Full Text: [J\J Col Int Sci271, 277.pdf](J/J%20Col%20Int%20Sci271,%20277.pdf)

Abstract: Adsorption of bovine serum albumin (BSA) on nanosized magnetic particles (Fe3O4) was carried out in the presence of carbodiimide. The equilibrium and kinetics of the adsorption process were studied. Nanosized magnetic particles (Fe3O4) were prepared by the chemical precipitation method using Fe2+, Fe3+ salts, and ammonium hydroxide under a nitrogen atmosphere. Characterizations of magnetic particles were carried out using transmission electron microscopy (TEM) and a vibrating sample magnetometer (VSM). Fourier-transform infrared spectroscopy (FTIR) and X-ray photoelectron spectroscopy (XPS) were used to confirm the attachment of BSA on magnetic particles. Effects of pH and salt concentrations were investigated on the adsorption process. The experimental results show that the adsorption of BSA on magnetic particles was affected greatly by the pH, while the effect of salt concentrations was insignificant at a low concentration range. The adsorption equilibrium isotherm was fitted well by the Langmuir model. The maximum adsorption of BSA on magnetic particles occurred at the isoelectric point of BSA. Adsorption kinetics was analyzed by a linear driving force mass-transfer model. BSA was desorbed from magnetic particles under alkaline conditions, which was confirmed by SDS–PAGE electrophoresis and FTIR results.

Keywords: Nanosized Magnetic Particles, Bovine Serum Albumin, Zeta Potential, Adsorption, Desorption

Choy, K.K.H., Ko, D.C.K., Cheung, C.W., Porter, J.F. and McKay, G. (2004), Film and intraparticle mass transfer during the adsorption of metal ions onto bone char. *Journal of Colloid and Interface Science*, **271** (2), 284-295.

Full Text: [J\J Col Int Sci271, 284.pdf](J/J%20Col%20Int%20Sci271,%20284.pdf)

Abstract: The sorption of three metal ions, namely, copper, cadmium, and zinc, onto bone char has been studied in terms of equilibrium and rate studies. Equilibrium studies have been analyzed using the Langmuir isotherm equation and the maximum sorption capacities for the metals were 0.477, 0.709, and 0.505 mmol g-1 bone char for cadmium, copper, and zinc ions, respectively. The kinetic experimental data were used to analyze the effect of external film boundary layer and intraparticle mass transfer resistance on the sorption process and its significance. Four methods of determining the external film transport coefficient were developed and tested; three utilized experimental data to obtain the coefficient and the fourth method was completely empirical. The three experimentally based models give very similar results and consequently similar values of the deviation error values, whereas the error values for the empirical correlation were greater than these three values. The results also demonstrated that the methods for determining the film coefficient could be integrated into more complex diffusion-transport models such as film–intraparticle diffusion processes.

Keywords: Bone Char, Copper, Cadmium, Zinc, Sorption, External Mass Transfer, Intraparticle Diffusion

Huang, X. (2004), Intersection of isotherms for phosphate adsorption on hematite. *Journal of Colloid and Interface Science*, **271** (2), 296-307.

Full Text: [J\J Col Int Sci271, 296.pdf](J/J%20Col%20Int%20Sci271,%20296.pdf)

Abstract: Adsorption isotherms for phosphate on hematite were prepared at pH 3.39, 4.16, 5.10, 5.63, and 6.71 in this study. It was found that the adsorption isotherms at pH 5.63 and 6.71 intersected those at pH 4.16 and 5.10. Using surface complexation theory, this study demonstrates that the intersection of adsorption isotherms results from (1) phosphate being adsorbed mainly as protonated complexes at pH 4.16 and 5.10 but as nonprotonated complexes at pH 5.63 and 6.71; (2) the electric potential (*ψ*) at the surface of hematite changing with pH at a rate less than 29.5 mV per pH unit (-*dψ*/*d*pH ≈ 8.9 mV/pH). Fundamentally, however, it seems that the dominance of an imperfect (001) crystal face in the hematite sample is responsible for a low value of -*dψ*/*d*pH and the intersection of adsorption isotherms. The adsorption behavior may be regarded as characteristic behavior of protonation of adsorbed phosphate on an oxide with a small value of -*dψ*/*d*pH.

Keywords: pHosphate, Adsorption, Hematite, Protonation, pH Dependence, Isotherm Intersection

Genç-Fuhrman, H., Tjell, J.C. and McConchie, D. (2004), Increasing the arsenate adsorption capacity of neutralized red mud (Bauxsol). *Journal of Colloid and Interface Science*, **271** (2), 313-320.

Full Text: [J\J Col Int Sci271, 313.pdf](J/J%20Col%20Int%20Sci271,%20313.pdf)

Abstract: The possibility of increasing the arsenate adsorption capacity of seawater-neutralized red mud (Bauxsol) through acid treatment, combined acid and heat treatment, and the addition of ferric sulfate (Fe2(SO4)3.7H2O) or aluminum sulfate (Al2(SO4)3.18H2O) is investigated. The results show that acid treatment alone, as well as in combination with heat treatment increases the removal efficiency, with the combination providing the best removal. Adding ferric sulfate or aluminum sulfate, however, suppress the removal. The results also show that activated Bauxsol (AB) produced using combined acid and heat treatment can remove roughly 100% arsenate (at pH 4.5) with or without competing anions (i.e., phosphate, bicarbonate, and sulfate) when the initial arsenate concentration is ≤ 2 mg l-1. Furthermore, it is found that the adsorption process using AB is not accompanied by the release of unwanted contaminants, and TCLP results indicate that the spent AB is not hazardous. It is believed that the AB produced here has good potential as an alternative adsorbent to conventional methods for removing arsenate from water.

Keywords: Bauxsol, Red Mud, Acid Treatment, Acid and Heat Treatment, Arsenate Adsorption, Competitive Anions, TCLP

Gupta, V.K. and Ali, I. (2004), Removal of lead and chromium from wastewater using bagasse fly ash: A sugar industry waste. *Journal of Colloid and Interface Science*, **271** (2), 321-328.

Full Text: [J\J Col Int Sci271, 321.pdf](J/J%20Col%20Int%20Sci271,%20321.pdf)

Abstract: An inexpensive and effective adsorbent was developed from bagasse fly ash, obtained from a sugar industry, for the dynamic uptake of lead and chromium. Lead and chromium are sorbed by the developed adsorbent up to 96-98%. The removal of these two metal ions up to 95-96% was achieved by column experiments at a flow rate of 0.5 ml min-1. The adsorption was found to be exothermic in nature. The adsorbent was successfully tried for the removal of lead and chromium from wastewater in our laboratory. The developed system for the removal of two ions is very useful, economic, rapid, and reproducible. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Chromium, Lead, Bagasse Fly Ash, Column Studies, Earth Elements, Adsorption, Cadmium, Equilibrium, Copper, Oxides, Moss

Mohamed, M.M. (2004), Acid dye removal: Comparison of surfactant-modified mesoporous FSM-16 with activated carbon derived from rice husk. *Journal of Colloid and Interface Science*, **272** (1), 28-34.

Full Text: [J\J Col Int Sci272, 28.pdf](J/J%20Col%20Int%20Sci272,%2028.pdf)

Abstract: Cetyltrimethylammonium bromide (CTAB)-modified mesoporous molecular sieve FSM-16, prepared by a hydrothermal process (373 K, 3 days), was tested as an adsorbent for acid dye (acid yellow, AY, and acid blue, AB) removal in comparison with as-prepared FSM-16 and activated carbon (AC) derived from rice husk (50 vol% H3PO4, 773 K, 2.5 h). The adsorption isotherms, sorption kinetics, and pH effects upon acid dyes sorption on the adsorbents were thoroughly investigated. The structures of different adsorbents were characterized by XRD, FTIR spectroscopy, N2 adsorption measurements, and thermogravimetric (TG) analysis. It was found that the ultimate capacity of the adsorbents varied in the order FSM-16 > modified FSM-16 > AC and followed first-order rate kinetics. The adsorption isotherm of acid dyes on FSM-16 is of type IV, according to the IUPAC classification, drastically different from that of CTAB/FSM-16, which showed a type I isotherm. The latter sample had better adsorption performance at low concentration of acid dyes than the former. As compared to activated carbon of microporous character, the CTAB/FSM-16 sample achieved higher performance at low concentrations. This was due to the successful narrowing of the pore opening of FSM-16 using CTAB with maintenance of a considerable portion of the pore volume. Powder XRD and N2 adsorption studies of the CTAB/FSM-16 material indicated that the textural properties of the support were preserved during the hydrothermal synthesis and that the channels remained accessible, despite a significant reduction in surface area (ca. 26%). TG studies, on the other hand, confirmed that the modified material presented a higher hydrophobicity than that of the CTAB-free FSM-16 sample.

Keywords: CTAB-modified FSM-16, Activated Carbon, Acid Dyes, Removal, Isotherms, Kinetics, pH, Texturing, TG

Chang, C.F., Chang, C.Y. and Höll, W. (2004), Investigating the adsorption of 2-mercaptothiazoline on activated carbon from aqueous systems. *Journal of Colloid and Interface Science*, **272** (1), 52-58.

Full Text: [J\J Col Int Sci272, 52.pdf](J/J%20Col%20Int%20Sci272,%2052.pdf)

Abstract: 2-Mercaptothiazoline (2-MT) is widely used as an organic corrosive as well as a diffusion inhibitor due to its high ability to form metal-chelate Schiff base complexes. This study investigated the elimination of 2-MT from aqueous systems with adsorption process to reach the goal of sustainable use of water resources. The Freundlich and Langmuir adsorption isotherms were adopted to examine the adsorption behavior of two types of 2-MT (i.e., 2-MT molecule and 2-MT complex) on activated carbon (AC) Chemviron Filtrasorb 400 (F 400) in three different solutions. The results of adsorption isotherm data showed that the adsorption ability of 2-MT molecule is much higher than that of 2-MT complex, whose ability may be reduced due to the electrostatic repulsion. The good applicability of Langmuir adsorption isotherm to experimental data indicated that the adsorption of 2-MT complexes on F 400 might be limited to a monolayer. Higher ionic strength and lower pH value of the solutions promoted the uptake of 2-MT onto F 400 from the solutions. In addition, not only 2-MT molecule and complex but also Cu(II) can be adsorbed on the surface of F 400, which was demonstrated by energy dispersive analysis of X-ray (EDAX). Effects of the two major interactions, chemical and physical interactions, on the adsorption of 2-MT on F 400 were compared as well in this study. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: 2-Mercaptothiazoline, Adsorption Isotherms, Metal Complex, Physical Interaction, Chemical Interaction

? Terzyk, A.P. (2004), The effect of carbon surface chemical composition on the adsorption of acetanilide. *Journal of Colloid and Interface Science*, **272** (1), 59-75.

Full Text: [2004\J Col Int Sci272, 59.pdf](2004/J%20Col%20Int%20Sci272,%2059.pdf)

Abstract: The study of acetanilide adsorption-desorption performed at three temperatures (300, 310, and 320 K) and at two pH levels (7.0 and 1.5) on the series of D43/1 carbons (initial and modified with HNO3, fuming H2SO4, and gaseous NH3) is reported. Sorption data are additionally supplemented with the results of thermal analysis and calorimetric and kinetic measurements. It is shown that, generally, acetanilide adsorption at the neutral pH level is reversible (only on the more acidic carbons and at the lowest temperature does hysteresis occur due to the formation of hydrogen bonds with surface OH groups), and it decreases for the chemically modified carbons. In contrast, at the acidic pH level acetanilide adsorption is irreversible. A mechanism of irreversibility is proposed and it is shown that hysteresis is caused by the chemical reaction between the nucleophile (carbon) and the protonized acetanilide molecules. For all studied carbons, at the acidic pH level, adsorption increases and this is caused by the weakly basic character of acetanilide molecule. Adsorption results are described applying adsorbability and Dubinin-Astakhov, quasi-Freundlich and solution analogue of the Toth adsorption isotherm equations. Using the kinetic data, the effective diffusion coefficients and the energy of diffusion are calculated. It is shown that the diffusion is mainly a surface process, and the contribution of the pore diffusion increases with the rise in temperature. By applying different correlations between the parameters obtained from the theoretical description of experimental data and those characterizing the chemical composition of the studied carbons, the role of the latter in the adsorption and kinetics of acetanilide adsorption is determined. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: 4-Hydroxyacetanilide Paracetamol, Acetanilide, Activated Carbon, Adsorption, Adsorption From Solution, Adsorption Isotherm, Analysis, Aqueous-Solutions, Biologically-Active Compounds, Carbon, Correlations, Cylindrical Adsorbent Particles, Diffusion, Diffusion-Coefficient, Experimental, Hydrogen, Isotherm, Isotherm Equations, Kinetic, Kinetics, Mechanism, Neutral Ph, NH3, Organic-Compounds, Paracetamol In-Vitro, pH, Phenol Adsorption, Pore Diffusion, Rights, Solution, Sorption, Temperature, Temperature-Dependence

Ho, Y.S. (2004), Comment on “An alternative Avrami equation to evaluate kinetic parameters of the interaction of Hg(II) with thin chitosan membranes,” by E.C.N. Lopes, F.S.C. dos Anjos, E.F.S. Vieira, and A.R. Cestari. *Journal of Colloid and Interface Science*, **272** (1), 249-250.

Full Text: [J\J Col Int Sci272, 249.pdf](J/J%20Col%20Int%20Sci272,%20249.pdf) [J\J Col Int Sci-Ho1.pdf](J/J%20Col%20Int%20Sci-Ho1.pdf)

Abstract: A history of using and applying Ho’s pseudo-second-order kinetic expression for adsorption systems is presented. A reference section in a paper is important to researchers interested in the paper’s statement and in following the study or finding useful information from the paper. This section is as important as the core of a paper. This comment offers information on citing the original idea of pseudo-second-order kinetic expression. (C) 2004 Elsevier Inc. All rights reserved.

Keywords: Aqueous-Solutions, Bagasse Pith, Sorption, Removal, Adsorption, Mercury(II), Waste, Ions, Lead, Equilibrium

Weng, C.H. (2004), Modeling Pb(II) adsorption onto sandy loam soil. *Journal of Colloid and Interface Science*, **272** (2), 262-270.

Full Text: [J\J Col Int Sci272, 262.pdf](J/J%20Col%20Int%20Sci272,%20262.pdf)

Abstract: The adsorption of Pb(II) onto hydrous sandy loam soil was investigated with batch equilibrium adsorption experiments. Results show that the amount of Pb(II) adsorbed increases with increasing pH and surface loading. It was demonstrated that the surface acidity of the soil could be determined using electrophoretic mobility measurements. The surface acidity constants, p*Ka*1int and p*Ka*2int, were 1.57 and 3.43, respectively. A surface complex formation model (SCFM) was employed to describe the adsorption. The intrinsic stability constants, p*Kis*, for the surface reaction between the Pb species and the ionized soil surface hydroxyl groups were determined from SCFM fitting. The adsorption free energy of Pb2+ and Pb(OH)+ ions ranges from -5.74 to -6.48 kcal/mol and from -9.68 to -10.00 kcal/mol, respectively, for surface loadings between 1.21×10-5 and 2.41×10-4 mol/g. The adsorption binding calculation indicated that the specific chemical interaction is the major mechanism responsible for the adsorption process.

Keywords: Adsorption, Energy, Lead, Surface Complexation, Soil, Surface Acidity

Cestari, A.R., Vieira, E.F.S., Lopes, E.C.N. and da Silva, R.G. (2004), Kinetics and equilibrium parameters of Hg(II) adsorption on silica–dithizone. *Journal of Colloid and Interface Science*, **272** (2), 271-276.

Full Text: [J\J Col Int Sci272, 271.pdf](J/J%20Col%20Int%20Sci272,%20271.pdf)

Abstract: Sílica–dithizone (Sil-dtz) was synthesized and used to adsorb Hg(II) in solution at pH 6.0. Increasing the temperature accelerates the mass transfer of Hg(II) to the silica surface. The kinetic data were evaluated using the traditional pseudo-first-order Lagergren equation and an alternative Avrami kinetic equation. From the latter equation, two regions presenting distinct kinetic parameters were found, at 25 and 35 °C, and the use of the parameter *n* was also related to the determination of distinct kinetic orders. Variations of the adsorption kinetic rate in relation to the time and the temperature were also calculated and are discussed. The adsorption isotherms data were well fitted to the Freundlich model. Interestingly, good adsorption data correlation of the Langmuir model and experimental values was observed only at 45 and 50 °C, suggesting, for this temperature range, the formation of complexes with the proportion Hg: dithizone 1: 1 on the silica surface.

Keywords: Silica Gel, Silica–Dithizone, Hg(II) Adsorption, Kinetics, Adsorption Models

Pendleton, P. and Wu, S.H. (2004), Kinetics of dodecanoic acid adsorption from caustic solution by activated carbon (vol 266, pg 245, 2003). *Journal of Colloid and Interface Science*, **272** (2), 504.

Full Text: [J\J Col Int Sci272, 504.pdf](J/J%20Col%20Int%20Sci272,%20504.pdf)

Ikhsan, J., Johnson, B.B., Wells, J.D. and Angove, M.J. (2004), Adsorption of aspartic acid on kaolinite. *Journal of Colloid and Interface Science*, **273** (1), 1-5.

Full Text: [J\J Col Int Sci273, 1.pdf](J/J%20Col%20Int%20Sci273,%201.pdf)

Abstract: The interaction of aspartic acid with kaolinite was studied by potentiometric titrations and by adsorption measurements both at constant aspartate concentration (but varying pH) and at a constant pH of 5.5. The temperature was 25 °C, and the ionic medium 5 mM KNO3. Aspartic acid dissociation constants estimated from titrations agreed with those from the literature. The adsorption of aspartic acid to kaolinite was weak and varied only slightly with pH; 10–18% of 100 μM aspartic acid adsorbed to kaolinite at 100 m2 L-1 between pH 3 and 10. Data from the titrations and adsorption experiments were fitted closely by an extended constant-capacitance surface complexation model, in which monodentate outer-sphere complexes formed between deprotonated aspartic acid molecules and protonated sites on the variable-charge edges of the kaolinite crystals. There appeared to be no adsorption to the permanently charged crystal faces.

Keywords: Aspartic Acid, Amino Acid, Dissociation Constants, Adsorption, Kaolinite, Surface, Complexation, Modeling, ECCM

Rengaraj, S., Kim, Y., Joo, C.K. and Yi, J. (2004), Removal of copper from aqueous solution by aminated and protonated mesoporous aluminas: Kinetics and equilibrium. *Journal of Colloid and Interface Science*, **273** (1), 14-21.

Full Text: [J\J Col Int Sci273, 14.pdf](J/J%20Col%20Int%20Sci273,%2014.pdf)

Abstract: A novel adsorbent, aminated and protonated mesoporous alumina, was prepared and employed for the removal of copper from aqueous solution at concentrations between 5 and 30 mg/l, in batch equilibrium experiments, in order to determine its adsorption properties. The removal of copper by the adsorbents increases with increasing adsorbent dosages. The adsorption mechanism is assumed to be an ion exchange between copper and the hydrogen ions present on the surface of the mesoporous alumina. The adsorbent was characterized by XRD, TEM, SEM, and BET methods. The sorption data have been analyzed and fitted to linearized adsorption isotherm of the Freundlich, Langmuir, and Redlich–Peterson models. The batch sorption kinetics have been tested for first-order, pseudo-first-order, and pseudo-second-order kinetic reaction models. The rate constants of adsorption for all these kinetic models have been calculated. Results also showed that the intraparticle diffusion of Cu(II) on the mesoporous catalyst was the main rate-limiting step.

Keywords: Copper(II), Sorption, Mesoporous Alumina, Equilibrium, Kinetics

El-Sayed, Y. and Bandosz, T.J. (2004), Adsorption of valeric acid from aqueous solution onto activated carbons: Role of surface basic sites. *Journal of Colloid and Interface Science*, **273** (1), 64-72.

Full Text: [J\J Col Int Sci273, 64.pdf](J/J%20Col%20Int%20Sci273,%2064.pdf)

Abstract: Adsorption of valeric acid was studied on two activated carbons of different origins, wood and bituminous coal. The effect of oxidation on the adsorption uptake was investigated. Both initial samples were oxidized with nitric acid, which caused the introduction of a significant number of oxygen-containing groups onto the carbon surface. Boehm titration, potentiometric titration, thermal analysis, and sorption of nitrogen were used for detailed surface characterization. Valeric acid adsorption from aqueous solution was measured at 333 K. The calculated isotherms showed a good fitting to the Freundlich equation. The capacity coefficients revealed a direct correlation with the number of basic groups present on the surface. The amount of valeric acid adsorbed at its low concentration is dependent on the number of basic groups, whereas at high concentration the amount adsorbed depends on the volume of micropores smaller than 10 Å, where the adsorption potential is the strongest.

Keywords: Activated Carbons, Valeric Acid Adsorption, Freundlich Isotherm, Porosity, Surface Chemistry

Wang, C.C., Juang, L.C., Hsu, T.C., Lee, C.K., Lee, J.F. and Huang, F.C. (2004), Adsorption of basic dyes onto montmorillonite. *Journal of Colloid and Interface Science*, **273** (1), 80-86.

Full Text: [J\J Col Int Sci273, 80.pdf](J/J%20Col%20Int%20Sci273,%2080.pdf)

Abstract: Ca-montmorillonite (Ca-Mont) was exchanged with titanium cations and the adsorption equilibrium and kinetics of Basic Green 5 (BG5) and Basic Violet 10 (BV10) on these montmorillonites were measured to examine the ion-exchange effects on the basic dyes adsorption. The relationship between the dye adsorption and the alteration of pore structures of montmorillonite induced by ion-exchange processes was discussed. Moreover, the changes in the surface and pore structure of montmorillonites during adsorption were characterized based on classical and fractal analyses of the nitrogen adsorption isotherms as well as the XRD patterns. The decrease in BET surface area of montmorillonites after adsorption of dyes was interpreted in terms of both the coverage of some surface roughness (surface screening effect) and the inhibition of the movement of nitrogen molecule into some pores (pore blocking effect). The surface fractal dimension *D* was used to examine whether or not the surface screening effect exists and the pore blocking effect was examined with the changes of mean pore size before and after adsorbing basic dyes.

Keywords: Montmorillonite, Dye, Titanium, Surface Area, Pore Structure

Li, Y.S., Liu, C.C. and Chiou, C.S. (2004), Adsorption of Cr(III) from wastewater by wine processing waste sludge. *Journal of Colloid and Interface Science*, **273** (1), 95-101.

Full Text: [J\J Col Int Sci273, 95.pdf](J/J%20Col%20Int%20Sci273,%2095.pdf)

Abstract: Wine processing waste sludge has been shown to be an effective adsorbent for the adsorption of Cr(III) from aqueous solution. The sludge has been characterized by scanning electron microscopy (SEM) and energy dispersive X-rays (EDX). The effect of pH, initial concentration of Cr(III), sludge particle size, and temperature on the adsorption studied. The equilibrium data could be described well by the Langmuir and Freundlich isotherm equations. A separation factor was used to judge the favorable adsorption. The calculated thermodynamic parameters, Δ*H*0 and Δ*S*0, are 1.95 kJ/mol and 27.16 J/mol K, respectively. The Δ*G*0 values range from -5.98 to -6.79 J/mol, which shows the physical adsorption properties of the sludge. Adsorption dynamics had been successfully studied by the Lagergren model and an intraparticle diffusion model.

Keywords: Sludge, Adsorption, Chromium

Yang, X.N. (2004), Thermodynamic modeling of solute adsorption equilibrium from near-critical carbon dioxide. *Journal of Colloid and Interface Science*, **273** (2), 362-368.

Full Text: [J\J Col Int Sci273, 362.pdf](J/J%20Col%20Int%20Sci273,%20362.pdf)

Abstract: Modeling of adsorption equilibrium for supercritical fluid mixtures, with as few parameters as possible, is important in applications of the technology of supercritical fluid adsorption. In this paper, a correlative model has been developed to represent the adsorption equilibria of solutes from the near-critical CO2 fluid. A two-dimensional van der Waals equation of state and the three-dimensional *P*–*R* equation of state were used to describe the adsorbed and bulk phases, respectively. This model contains five parameters for adsorption equilibrium isotherms at finite concentrations and two parameters for adsorption equilibrium constants at infinite dilution. All the parameters are independent of temperature and pressure. By applying the model to the experimental data from the literature, it was shown that this model is capable of describing the adsorption behavior of solutes from supercritical carbon dioxide over relatively wide temperature and pressure ranges. In addition, the adsorption behavior of supercritical fluid mixtures was investigated at finite and infinite dilution conditions.

Keywords: Modeling, Adsorption, Two-Dimensional EOS, Supercritical Carbon Dioxide

Acemioğlu, B. (2004), Adsorption of Congo red from aqueous solution onto calcium-rich fly ash. *Journal of Colloid and Interface Science*, **274** (2), 371-379.

Full Text: [J\J Col Int Sci274, 371.pdf](J/J%20Col%20Int%20Sci274,%20371.pdf)

Abstract: The adsorption of Congo red from solution was carried out using calcium-rich fly ash with different contact times, concentrations, temperatures, and pHs. While the amount of dye adsorbed per unit weight of fly ash increases with increasing concentration and temperature, it decreases slightly with increasing pH. The adsorption was between 93 and 98% under the conditions studied. Kinetic studies showed that the adsorption process obeyed the pseudo-second-order kinetic model. It was also determined that the adsorption isotherm followed Freundlich and Dubinin–Radushkevich models. From thermodynamic studies, it was seen that the adsorption was spontaneous and endothermic. Desorption studies suggested that desorption was 29.18% in the presence of 0.1 N HCl and was 47.21% in the presence of CH3COOH (50% v/v). This indicated that most of the dye was held by fly ash via chemisorption as well as ion exchange. Furthermore, FTIR study also shows that a chemisorption process occurs between CR and fly ash, probably indicating dye/fly ash complexing.

Keywords: Adsorption, Kinetics, Adsorption Isotherm, Adsorption Thermodynamics, Desorption, Dye, Congo Red, FTIR Spectra

Uzun, İ. and Güzel, F. (2004), Kinetics and thermodynamics of the adsorption of some dyestuffs and *p*-nitrophenol by chitosan and MCM-chitosan from aqueous solution. *Journal of Colloid and Interface Science*, **274** (2), 398-412.

Full Text: [J\J Col Int Sci274, 398.pdf](J/J%20Col%20Int%20Sci274,%20398.pdf)

Abstract: The effect of initial concentration, temperature, and shaking rate on the adsorption of three dyestuffs [orange II (O-II), crystal violet (CV), and reactive blue 5 (RB5)] and an ideal adsorbate, *p*-nitrophenol (PNP), by chitosan (Sigma C-3646) and the effect of temperature on the adsorption of O-II and CV by monocarboxymethylated chitosan (MCM-chitosan) were investigated. Kinetic data obtained for the adsorption of each dyestuff and PNP by chitosan and of O-II and CV by MCM-chitosan at different temperatures were applied to the Lagergren equation, and adsorption rate constants (*k*ads) at these temperatures were determined. These rate constants related to the adsorption of O-II and RB5 by chitosan and of O-II by MCM-chitosan were applied to the Arrhenius equation, and activation energies (*Ea*) were determined. In addition, the isotherms for adsorption, at different temperatures, of each dyestuff and PNP by chitosan and of O-II and CV by MCM-chitosan were also determined. These isothermal data were applied to linear forms of isotherm equations that they fit, and isotherm constants were calculated. Because the isotherm curves obtained for the adsorption of O-II and CV by chitosan and of CV by MCM-chitosan fit the Langmuir adsorption isotherm, *b* constants were applied to thermodynamic equations, and thermodynamic parameters (Δ*G*, Δ*H*, and Δ*S*) were calculated. Lastly, chitosan and MCM-chitosan were compared with respect to the ability to take up the dyestuffs and PNP.

Keywords: Chitosan, Mcm-Chitosan, Dyestuff Adsorption from Aqueous Solution, Adsorption Kinetics and Thermodynamics, Specific Surface Area

Stack, A.G., Rosso, K.M., Smith, D.M.A. and Eggleston, C.M. (2004), Reaction of hydroquinone with hematite: II. Calculated electron-transfer rates and comparison to the reductive dissolution rate. *Journal of Colloid and Interface Science*, **274** (2), 442-450.

Full Text: [J\J Col Int Sci274, 442.pdf](J/J%20Col%20Int%20Sci274,%20442.pdf)

Abstract: The rate of reaction of hematite with quinones and the quinone moieties of larger molecules may be an important factor in limiting the rate of reductive dissolution of hematite, especially by iron-reducing bacteria. It is possible that the rate of reductive dissolution of hematite in the presence of excess hydroquinone at pH 2.5 may be limited by the electron-transfer rate. Here, a reductive dissolution rate was measured and compared to electron-transfer rates calculated using Marcus theory. An experimental rate constant was measured at 9.5×10−6 s−1 and the reaction order with respect to the hematite concentration was found to be 1.1. Both the dissolution rate and the reaction order of hematite concentration compare well with previous measurements. Of the Marcus theory calculations, the inner-sphere part of the reorganization energy and the electronic coupling matrix element for hydroquinone self-exchange electron transfer are calculated using ab initio methods. The second order self-exchange rate constant was calculated to be 1.3×107 M−1s−1, which compares well with experimental measurements. Using previously published data calculated for hexaquairon(III)/(II), the calculated electron-transfer rate for the cross reaction with hydroquinone also compares well to experimental measurements. A hypothetical reductive dissolution rate is calculated using the first-order electron-transfer rate constant and the concentration of total adsorbed quinone. Three different models of the hematite surface are used as well as multiple estimates for the reduction potential, the surface charge, and the adsorption density of hydroquinone. No calculated dissolution rate is less than five orders of magnitude faster than the experimentally measured one.

Keywords: Hydroquinone, Hematite, α-Fe2O3, Biological Electron Transfer, Marcus Theory

Fainerman, V.B., Zholob, S.A., Leser, M., Michel, M. and Miller, R. (2004), Competitive adsorption from mixed nonionic surfactant/protein solutions. *Journal of Colloid and Interface Science*, **274** (2), 496-501.

Full Text: [J\J Col Int Sci274, 496.pdf](J/J%20Col%20Int%20Sci274,%20496.pdf)

Abstract: A thermodynamic model is derived which is suitable to describe adsorption from a mixed protein/surfactant solution. The comparison with experimental data for HSA mixed with the nonionic surfactant decyl dimethyl phosphine oxide shows good agreement. Some model calculations are discussed in terms of the competitive character of the process of adsorption from mixed protein/surfactant solutions. The behavior of globular (HSA) and flexible (β-casein) proteins appears to be quite different due to the possibility of changing the molar area of adsorbed protein molecules.

Keywords: Thermodynamic Model, Mixed Protein/Surfactant Adsorption, β-Casein, Nonionic Surfactants

? Lua, A.C. and Yang, T. (2004), Effect of activation temperature on the textural and chemical properties of potassium hydroxide activated carbon prepared from pistachio-nut shell. *Journal of Colloid and Interface Science*, **274** (2), 594-601.

Full Text: [2004\J Col Int Sci274, 594.pdf](2004/J%20Col%20Int%20Sci274,%20594.pdf)

Abstract: The effect of activation temperature on the textural and chemical properties of activated carbons prepared from pistachio-nut shells by potassium hydroxide activation was studied. Relatively high activation temperature was required to develop high porosities. However, too high an activation temperature resulted in the burn-off of the carbon structures and the widening of micropores to meso- and macropores. The microstructures and microcrystallinities of the carbons prepared were examined using a scanning electron microscope and a powder X-ray diffraction analyzer, respectively, while the Fourier transform infrared spectra indicated the changes in the surface functional groups that were formed during the different preparation stages. (C) 2003 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorbent, Adsorption, Characterization, Chemical Activation, Coal, Coconut Shell, High-Surface-Area, Pistachio-Nut Shell, Pyrolysis, Rockrose

Tóth, J. (2004), Thermodynamical model and prediction of gas/solid adsorption isotherms. *Journal of Colloid and Interface Science*, **275** (1), 2-8.

Full Text: [J\J Col Int Sci275, 2.pdf](J/J%20Col%20Int%20Sci275,%202.pdf)

Abstract: A thermodynamic model of gas/solid adsorption has been constructed from two elements. One of those is the original Gibbs equation. The second is functions ψ (Θ) or ψ(*P*) calculable from measured isotherms. The model provides the possibility of calculating the relative change in free energy of the surface, and based on the model, implicit isotherm equations of general validity and in integral form can be derived. The prediction of isotherms can be made based on characteristic adsorption functions (CAFs). The CAFs concentrate in one function all measured isotherms having the same change in relative free energy of the surface. From CAFs any isotherm can be predicted if one measured point is known or one required datum of the isotherm can be defined. The maximum average deviation between the measured adsorbed amounts and those calculated from the CAFs is ±10%. The CAFs are very sensitive to the internal structure of adsorbents (micro-, meso-, and macropores and nanostructures). It is the goal of future investigations to determine the exact connections related to the CAFs and to the structure of adsorbents.

Keywords: Integral Isotherm Equations, Gibbs Equation and Measured Isotherms, Free Energy of the Surface, Characteristic Adsorption Function, Prediction of Isotherms, Sensitivity of Characteristic Adsorption Functions to the Structure of Adsorbents

Abe, I., Iwasaki, S., Tokimoto, T., Kawasaki, N., Nakamura, T. and Tanada, S. (2004), Adsorption of fluoride ions onto carbonaceous materials. *Journal of Colloid and Interface Science*, **275** (1), 35-39.

Full Text: [J\J Col Int Sci275, 35.pdf](J/J%20Col%20Int%20Sci275,%2035.pdf)

Abstract: The characteristics of fluoride ion adsorption onto carbonaceous materials were derived as adsorption isotherms at different temperatures and in different pH solutions. The fluoride ion was adsorbed into pores in carbonaceous materials produced from wood; the larger the specific surface area, the more fluoride ions adsorbed. Bone char was the most effective adsorbent. The composition of bone char includes calcium phosphate, calcium carbonate, and so on. This suggests that the phosphate ion in bone char was exchanged with a fluoride ion. Moreover, the mechanism of fluoride ion adsorption onto bone char is clearly chemical in nature because the amount of fluoride ion adsorbed onto bone char increased with increasing temperature and decreasing pH. The amount of fluoride ion adsorbed onto bone char was also shown to depend on the concentration of sodium chloride in solution because of the “salting-out” effect. The adsorption of fluoride ion onto bone char is endothermic. Bone char can be utilized to remove fluoride ions from drinking water.

Keywords: Adsorption, Fluoride Ion, Salting Out, Bone Char, Carbonaceous Materials

Kawasaki, N., Kinoshita, H., Oue, T., Nakamura, T. and Tanada, S. (2004), Study on adsorption kinetic of aromatic hydrocarbons onto activated carbon in gaseous flow method. *Journal of Colloid and Interface Science*, **275** (1), 35-39.

Full Text: [J\J Col Int Sci275, 40.pdf](J/J%20Col%20Int%20Sci275,%2040.pdf)

Abstract: The adsorption behavior of benzene, toluene, *o*-xylene, *m*-xylene, and *p*-xylene onto activated carbon was investigated using the flow method. The removal efficiency of aromatic hydrocarbons in the gaseous phase was estimated based on the adsorption kinetic constants and the saturated amount of aromatic hydrocarbons adsorbed on the activated carbon. The saturated amount of benzene and toluene adsorbed was greater than that of xylene adsorbed because the molecular sizes of benzene and toluene are smaller than that of xylene. The adsorption kinetic constant increased in the order of xylene, toluene, and benzene. Those of the three xylene isomers were similar. These results indicated that the adsorption rate of benzene by the activated carbon was the fastest and the kinetic constant depended upon the different between the boiling point and the melting point and the molecular size of the aromatic hydrocarbons.

Keywords: Flow Method, Aromatic Hydrocarbons, Activated Carbon, Kinetic Constant, Amount Adsorbed

Juang, R.S. and Chung, J.Y. (2004), Equilibrium sorption of heavy metals and phosphate from single- and binary-sorbate solutions on goethite. *Journal of Colloid and Interface Science*, **275** (1), 53-60.

Full Text: [J\J Col Int Sci275, 53.pdf](J/J%20Col%20Int%20Sci275,%2053.pdf)

Abstract: The amounts of Cu(II), Zn(II), and phosphate sorbed from single- and binary-sorbate systems on goethite (α-FeOOH) were measured. Experiments were carried out as a function of equilibrium pH (2–7), sorbate concentration (0.21–1.57 mM), and temperature (15–35 °C). The aqueous phase contained 0.1 M NaNO3 to maintain ionic strength constant. A convenient method was used to obtain sorption isotherms of single Cu(II), Zn(II), and phosphate at a fixed equilibrium pH, which could be well described by the Langmuir equation. Thermodynamic parameters for the sorption of single Cu(II) and phosphate including the free energies, isosteric enthalpies, and entropies were determined. In contrast to the single-sorbate systems, the sorption of metals was inhibited in the binary Cu(II)–Zn(II) system, whereas the sorption of both sorbates was enhanced in the binary Cu(II)–phosphate system under the conditions studied. The validity of the Langmuir competitive model for the prediction of the sorption isotherms in a binary Cu(II)–Zn(II) system was also discussed.

Keywords: Sorption Isotherms, Cu(II), Zn(II), pHosphate, Goethite, Langmuir Equation, Thermodynamic Parameters

Jong, T. and Parry, D.L. (2004), Adsorption of Pb(II), Cu(II), Cd(II), Zn(II), Ni(II), Fe(II), and As(V) on bacterially produced metal sulfides. *Journal of Colloid and Interface Science*, **275** (1), 61-71.

Full Text: [J\J Col Int Sci275, 61.pdf](J/J%20Col%20Int%20Sci275,%2061.pdf)

Abstract: The adsorption of Pb(II), Cu(II), Cd(II), Zn(II), Ni(II), Fe(II) and As(V) onto bacterially produced metal sulfide (BPMS) material was investigated using a batch equilibrium method. It was found that the sulfide material had adsorptive properties comparable with those of other adsorbents with respect to the specific uptake of a range of metals and, the levels to which dissolved metal concentrations in solution can be reduced. The percentage of adsorption increased with increasing pH and adsorbent dose, but decreased with increasing initial dissolved metal concentration. The pH of the solution was the most important parameter controlling adsorption of Cd(II), Cu(II), Fe(II), Ni(II), Pb(II), Zn(II), and As(V) by BPMS. The adsorption data were successfully modeled using the Langmuir adsorption isotherm. Desorption experiments showed that the reversibility of adsorption was low, suggesting high-affinity adsorption governed by chemisorption. The mechanism of adsorption for the divalent metals was thought to be the formation of strong, inner-sphere complexes involving surface hydroxyl groups. However, the mechanism for the adsorption of As(V) by BPMS appears to be distinct from that of surface hydroxyl exchange. These results have important implications to the management of metal sulfide sludge produced by bacterial sulfate reduction.

Keywords: Microbially Produced Adsorbent, Sulfate Reduction, Metal Removal, Metal Sulfides, Adsorption, Sulfate Reducing Bacteria

Tsai, W.T., Chang, C.Y., Ing, C.H. and Chang, C.F. (2004), Adsorption of acid dyes from aqueous solution on activated bleaching earth. *Journal of Colloid and Interface Science*, **275** (1), 72-78.

Full Text: [J\J Col Int Sci275, 72.pdf](J/J%20Col%20Int%20Sci275,%2072.pdf)

Abstract: In the present study, activated bleaching earth was used as clay adsorbent for an investigation of the adsorbability and adsorption kinetics of acid dyes (i.e., acid orange 51, acid blue 9, and acid orange 10) with three different molecular sizes from aqueous solution at 25 °C in a batch adsorber. The rate of adsorption has been investigated under the most important process parameters (i.e., initial dye concentration). A simple pseudo-second-order model has been tested to predict the adsorption rate constant, equilibrium adsorbate concentration, and equilibrium adsorption capacity by the fittings of the experimental data. The results showed that the adsorbability of the acid acids by activated bleaching earth follows the order: acid orange 51 > acid blue 9 > acid orange 10, parallel to the molecular weights and molecular sizes of the acid dyes. The adsorption removals (below 3%) of acid blue 9 and acid orange 10 onto the clay adsorbent are far lower than that (~24%) of acid orange 51. Further, the adsorption kinetic of acid orange 51 can be well described by the pseudo-second-order reaction model. Based on the isotherm data obtained from the fittings of the adsorption kinetics, the Langmuir model appears to fit the adsorption better than the Freundlich model. The external coefficients of mass transfer of the acid orange 51 molecule across the boundary layer of adsorbent particle have also been estimated at the order of 10-4–10-5 cm s-1 based on the film–pore model and pseudo-second-order reaction model.

Keywords: Liquid-Phase Adsorption, Acid Dye, Activated Bleaching Earth, Isotherm, Kinetic Modeling, Mass Transfer Coefficient

Notes: highly cited

Sheng, P.X., Ting, Y.P., Chen, J.P. and Hong, L. (2004), Sorption of lead, copper, cadmium, zinc, and nickel by marine algal biomass: Characterization of biosorptive capacity and investigation of mechanisms. *Journal of Colloid and Interface Science*, **275** (1), 131-141.

Full Text: [J\J Col Int Sci275, 131.pdf](J/J%20Col%20Int%20Sci275,%20131.pdf)

Abstract: The marine algae *Sargassum* sp., *Padina* sp., *Ulva* sp., and *Gracillaria* sp., harvested locally, were investigated for their biosorption performance in the removal of lead, copper, cadmium, zinc, and nickel from dilute aqueous solutions. It was found that the biosorption capacities were significantly affected by solution pH, with higher pH favoring higher metal-ion removal. Kinetic and isotherm experiments were carried out at the optimal pH: at pH 5.0 for lead and copper, and at pH 5.5 for cadmium, zinc, and nickel. The metal removal rates were rapid, with 90% of the total adsorption taking place within 60 min. *Sargassum* sp. and *Padina* sp. showed the highest potential for the sorption of the metal ions, with the maximum uptake capacities ranging from 0.61 to 1.16 mmol/g for *Sargassum* sp. and 0.63 to 1.25 mmol/g for *Padina* sp. The general affinity sequence for *Padina* sp. was Pb>Cu>Cd>Zn>Ni, while that for *Sargassum* sp. was Pb>Zn>Cd>Cu>Ni. XPS and FTIR analysis of *Sargassum* sp. and *Padina* sp. revealed the chelating character of the ion coordination to carboxyl groups. It was confirmed that carboxyl, ether, alcoholic, and amino groups are responsible for the binding of the metal ions.

Keywords: Biosorption, Heavy Metal, Marine Algae, XPS, FTIR

Mustafa, S., Hamid, A. and Naeem, A. (2004), Temperature effect on xanthate sorption by chalcopyrite. *Journal of Colloid and Interface Science*, **275** (2), 368-375.

Full Text: [J\J Col Int Sci275, 368.pdf](J/J%20Col%20Int%20Sci275,%20368.pdf)

Abstract: Xanthate ions sorption on copper ore (chalcopyrite) is studied as a function of temperature (273–293 K) in the pH range (8–11). The sorption of xanthate ions at all the pH values is observed to increase with the increase in temperature. The changes in pH, dissolution studies of the ore, SO42- concentration determinations, and FTIR studies were employed to probe the mechanism of the process of adsorption. The results are found to fit successfully to the linear form of the Freundlich equation. The isosteric heats of adsorption (Δ*Hi*) are also calculated and show that the adsorption of xanthate on copper ore under the given experimental condition is endothermic in nature. The values of Δ*Hi* found are in conformity with the ion exchange sorption of xanthate by the chalcopyrite.

Keywords: Chalcopyrite, Potassium Ethyl Xanthate, Adsorption, Ion Exchange, Cuprous Xanthate

Ustinov, E.A., Staudt, R., Do, D.D., Herbst, A. and Harting, P. (2004), Multicomponent adsorption on activated carbons under supercritical conditions. *Journal of Colloid and Interface Science*, **275** (2), 376-385.

Full Text: [J\J Col Int Sci275, 376.pdf](J/J%20Col%20Int%20Sci275,%20376.pdf)

Abstract: Adsorption of binary mixtures onto activated carbon Norit R1 for the system nitrogen–methane–carbon dioxide was investigated over the pressure range up to 15 MPa. A new model is proposed to describe the experimental data. It is based on the assumption that an activated carbon can be characterized by the distribution function of elements of adsorption volume (EAV) over the solid–fluid potential. This function may be evaluated from pure component isotherms using the equality of the chemical potentials in the adsorbed phase and in the bulk phase for each EAV. In the case of mixture adsorption a simple combining rule is proposed, which allows determining the adsorbed phase density and its composition in the EAV at given pressure and compositions of the bulk phase. The adsorbed concentration of each adsorbate is the integral of its density over the set of EAV. The comparison with experimental data on binary mixtures has shown that the approach works reasonably well. In the case of high-pressure binary mixture adsorption, when only total amount adsorbed was measured, the proposed model allows reliably determining partial amounts of the adsorbed components.

Keywords: Adsorption, Mixture, Activated Carbon, High Pressure, Equilibria, Distribution of Adsorption Volume

Gupta, V.K., Singh, P. and Rahman, N. (2004), Adsorption behavior of Hg(II), Pb(II), and Cd(II) from aqueous solution on Duolite C-433: A synthetic resin. *Journal of Colloid and Interface Science*, **275** (2), 398-402.

Full Text: [J\J Col Int Sci275, 398.pdf](J/J%20Col%20Int%20Sci275,%20398.pdf)

Abstract: The adsorption behavior of Hg(II), Pb(II), and Cd(II) on Duolite C-433 synthetic resin has been determined at different temperatures by batch process. The various thermodynamic parameters, such as equilibrium constant (*K*0), free energy (Δ*G*0), entropy (Δ*S*0), and enthalpy (Δ*H*0), have been calculated in order to predict the nature of sorption.

Keywords: Duolite C-433, Adsorption Behavior, Hg(II), Pb(II), Cd(II), Thermodynamics

Tsai, W.T., Hsien, K.J. and Yang, J.M. (2004), Silica adsorbent prepared from spent diatomaceous earth and its application to removal of dye from aqueous solution. *Journal of Colloid and Interface Science*, **275** (2), 428-433.

Full Text: [J\J Col Int Sci275, 428.pdf](J/J%20Col%20Int%20Sci275,%20428.pdf)

Abstract: The objective of this work is to study the activation regeneration of spent diatomaceous earth (SDE) for the preparation of silica adsorbents using thermal regeneration and acid/alkaline activation methods. Under the experimental conditions investigated, it was found that the alkaline activation method carried out by sodium hydroxide under controlled conditions is significantly superior to other heat and activation methods. The porosities of solids thus obtained are over 0.2, indicating that they are basically mesoporous. The optimal porous material thus prepared was used as a mineral adsorbent for Methylene blue at 25 °C. The adsorption equilibrium revealed that the silica adsorbent can take up over 50 mg/g at relatively low concentrations in aqueous medium from the fittings of Langmuir and Freundlich isotherms with high correlations. On the other hand, the adsorption kinetic of Methylene blue under various adsorbent dosages can be well described with a pseudo-second-order reaction model.

Keywords: Spent Diatomaceous Earth, Activation Regeneration, Pore Property, Adsorption, Methylene Blue, Activated Bleaching Earth, Acid Activation, Paraquat, Clay, Adsorption, Sorption, Kinetics, Waste

Inglezakis, V.J., Loizidou, M.M. and Grigoropoulou, H.P. (2004), Ion exchange studies on natural and modified zeolites and the concept of exchange site accessibility. *Journal of Colloid and Interface Science*, **275** (2), 570-576.

Full Text: [J\J Col Int Sci275, 570.pdf](J/J%20Col%20Int%20Sci275,%20570.pdf)

Abstract: In the present study natural and Na-rich form of clinoptilolite are examined, in respect to ion exchange of Pb2+, Cu2+, Cr3+, and Fe3+. Equilibrium and kinetic studies performed, under the same normality (0.01 N). Equilibrium studies demonstrate that Na+ enrichment of clinoptilolite is beneficial in respect to metal uptake for all metals, except Cr3+, which is shown to have the same equilibrium behavior in both materials. Kinetic study shows that diffusion coefficients are in the range of 0.16 to 9×10-9 cm2 s, and are not always improved in Na-rich form of clinoptilolite. The effect of temperature on diffusion coefficients is also examined, and Arrhenius activation energy is determined to be in the range of 3.02 to 13.9 kcal, mol, for all metals and materials, except Cu2+, which have extremely low activation energy in the natural sample, equal to 0.04 kcal, mol. (C) 2004 Elsevier Inc. All rights reserved.

Keywords: Activation Energy, Clinoptilolite, Clinoptilolite, Diffusion Coefficients, Distribution Coefficients, Equilibria, Heavy Metals, Ion Exchange, Lead, Pretreatment, Removal, Sodium, Sorption, Strontium, Thermodynamics, Waste-Water, Zeolites

Özcan, A.S. and Özcan, A. (2004), Adsorption of acid dyes from aqueous solutions onto acid-activated bentonite. *Journal of Colloid and Interface Science*, **276** (1), 39-46.

Full Text: [J\J Col Int Sci276, 39.pdf](J/J%20Col%20Int%20Sci276,%2039.pdf)

Abstract: The adsorption of two dyes, namely, Acid Red 57 (AR57) and Acid Blue 294 (AB294), onto acid-activated bentonite in aqueous solution was studied in a batch system with respect to contact time, pH, and temperature. Acidic pH was favorable for the adsorption of these dyes. The surface characterization of acid-activated bentonite was performed using the FTIR technique. The pseudo-first-order and pseudo-second-order kinetic models and the intraparticle diffusion model were used to describe the kinetic data and the rate constants were evaluated. The dynamic data fitted the pseudo-second-order kinetic model well and also followed the intraparticle diffusion model up to 90 min, but diffusion is not the only rate controlling step. The Langmuir and Freundlich adsorption models were applied to describe the equilibrium isotherms and the isotherm constants were determined. The Freundlich model agrees very well with experimental data. The activation energies of adsorption were also evaluated for the adsorption of AR57 and AB294 onto activated bentonite.

Keywords: Adsorption, Acid Dyes, Kinetics, Clays, Activated Bentonite

Notes: highly cited

Azizian, S. (2004), Kinetic models of sorption: A theoretical analysis. *Journal of Colloid and Interface Science*, **276** (1), 47-52.

Full Text: [J\J Col Int Sci276, 47.pdf](J/J%20Col%20Int%20Sci276,%2047.pdf)

Abstract: The kinetics of sorption from a solution onto an adsorbent has been explored theoretically. The general analytical solution was obtained for two cases. It has been shown that at high initial concentration of solute (sorbate) the general equation converts to a pseudo-first-order model and at lower initial concentration of solute it converts to a pseudo-second-order model. In other words, the sorption process obeys pseudo-first-order kinetics at high initial concentration of solute, while it obeys pseudo-second-order kinetics model at lower initial concentration of solute. The theoretical results (derived equations) show that the observed rate constants of pseudo-first-order and pseudo-second-order models are combinations of adsorption and desorption rate constants and also initial concentration of solute. The obtained theoretical equations are used to correlate experimental data for sorption kinetics of some solutes on various sorbents. The predictions of the theory are in excellent agreement with the experimental data.

Keywords: Kinetics, Adsorption, Desorption, Sorption Models

? Rengaraj, S., Kim, Y., Joo, C.K. and Yi, J. (2004), Response to “Comment on ‘Removal of copper from aqueous solution by aminated and protonated mesoporous aluminas: Kinetics and equilibrium’”. *Journal of Colloid and Interface Science*, **276** (1), 255.

Full Text: [2004\J Col Int Sci276, 255-0.pdf](2004/J%20Col%20Int%20Sci276,%20255-0.pdf)

Ho, Y.S. (2004), Comment on “Removal of copper from aqueous solution by aminated and protonated mesoporous aluminas: Kinetics and equilibrium,” by S. Rengaraj, Y. Kim, C.K. Joo, and J. Yi. *Journal of Colloid and Interface Science*, **276** (1), 255-258.

Full Text: [J\J Col Int Sci276, 255.pdf](J/J%20Col%20Int%20Sci276,%20255.pdf) [J\J Col Int Sci-Ho-1.pdf](J/J%20Col%20Int%20Sci-Ho-1.pdf)

Abstract: This study presents a literature review concerning the precision of over 80 publications which originally cited Ho’s pseudo- second-order kinetic expression for solute sorption on various sorbents. This model applies to a range of solid-liquid systems such as metal ions, dyestuffs, herbicides, oil, and organic substances in aqueous systems onto various sorbents. A reference section in a paper plays a key role to researchers who are interested in the paper’s statement and following study or finding useful information from the paper. This section is as important as the core of a paper; however, it is easily ignored by the author. This comment offers information citing the original presentation of a pseudo-second-order kinetic expression. It is also suggested that an author not only must be creative but also must be careful while writing in order to publish more valuable and papers more worthy of reading. (C) 2004 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Kinetics, Pseudo-Second Order, Citation, Fungus Aspergillus-Niger, Heavy-Metal Adsorption, Sugarcane Bagasse Pith, Activated Date Pits, Sphagnum Moss Peat, Waste-Water, Arsenic Removal, Tree Fern, Sorption Kinetics, Dye Sorption

Wu, Q., Zhou, L., Zhou, Y.P. and Wu, J.Q. (2004), Prediction of the adsorption equilibrium of mixtures composed of supercritical gases. *Journal of Colloid and Interface Science*, **276** (2), 277-283.

Full Text: [J\J Col Int Sci276, 277.pdf](J/J%20Col%20Int%20Sci276,%20277.pdf)

Abstract: A new model was proposed to predict the adsorption equilibrium of mixtures composed of supercritical gases. The adsorbed phase was visualized as a two-dimensional nonideal compressed gas. Pore size distribution was used to describe the energetic heterogeneity of the surface, and the two-dimensional virial equation was used as the local adsorption isotherm. The new model obtained is thermodynamically rigorous because it reduces to Henry’s law as pressure approaches zero. The prediction performance of the new model was verified and compared with other models using the experimental data of a ternary mixture of CH4/N2/H2 and two binary mixtures of CH4/C2H4 and CH4/N2. Better performance was shown for all systems tested.

Keywords: Adsorption, Multicomponent, Supercritical, Prediction

Bradl, H.B. (2004), Adsorption of heavy metal ions on soils and soils constituents. *Journal of Colloid and Interface Science*, **277** (1), 1-18.

Full Text: [J\J Col Int Sci277, 1.pdf](J/J%20Col%20Int%20Sci277,%201.pdf)

Abstract: The article focuses on adsorption of heavy metal ions on soils and soils constituents such as clay minerals, metal (hydr)oxides, and soil organic matter. Empirical and mechanistic model approaches for heavy metal adsorption and parameter determination in such models have been reviewed. Sorption mechanisms in soils, the influence of surface functional groups and surface complexation as well as parameters influencing adsorption are discussed. The individual adsorption behavior of Cd, Cr, Pb, Cu, Mn, Zn and Co on soils and soil constituents is reviewed.

Keywords: Adsorption, Soil, Heavy Metals, Clay Minerals, Metal (Hydr)Oxides, Soil Organic Matter, Cd, Cr, Pb, Cu, Mn, Zn, Co

de Farias, R.F., do Nascimento, A.A.S. and Bezerra, C.W.B. (2004), Adsorption of Co(II), Ni(II), Cu(II), and Zn(II) on hexagonal templated zirconia obtained thorough a sol–gel process: the effects of nanostructure on adsorption features. *Journal of Colloid and Interface Science*, **277** (1), 19-22.

Full Text: [J\J Col Int Sci277, 19.pdf](J/J%20Col%20Int%20Sci277,%2019.pdf)

Abstract: Using zirconium tetrabutoxide, diaminedecane, and diamineoctane as precursors, a templated hexagonal zirconia matrix is synthesized and characterized by X-ray diffractometry and scanning electron microscopy. The adsorption capacity of such a matrix toward Co(II), Ni(II), Cu(II), and Zn(II) from aqueous solutions is studied. The adsorption affinity of the synthesized hexagonal templated zirconia toward the cations is Cu(II)>Zn(II)>>Ni(II)>Co(II). It is also verified that the adsorption of the cations follows a Langmuir and not a Freundlich isotherm. All obtained isotherms are of type I, according to the IUPAC classification. The observed adsorption affinity sequence can be explained by taking into account the velocity constant for the substitution of water molecules into the cation coordination spheres, as well as the Irving–Williams series.

Keywords: Adsorption, Sol–Gel, Transition Metals

Chang, C.F., Chang, C.Y., Chen, K.H., Tsai, W.T., Shie, J.L. and Chen, Y.H. (2004), Adsorption of naphthalene on zeolite from aqueous solution. *Journal of Colloid and Interface Science*, **277** (1), 29-34.

Full Text: [J\J Col Int Sci277, 29.pdf](J/J%20Col%20Int%20Sci277,%2029.pdf)

Abstract: Polynuclear aromatic hydrocarbons (PAHs), which are environmental hormones and carcinogens, are viewed as the priority pollutants to deal with by many countries. Most PAHs are hydrophobic with high boiling and melting points and high electrochemical stability, but with low water solubility. Compared with other PAH species, naphthalene has less toxicity and is easily found in the environment. Thus, naphthalene is usually adopted as a model compound to examine the environmental and health aspects of PAHs. This study attempted to use an adsorption process to remove naphthalene from a water environment. The adsorption equilibrium of naphthalene on zeolite from water–butanol solution, which is a surfactant-enriched scrubbing liquid, was successfully evaluated by Langmuir, Freundlich, and linear isotherms. Among the tested kinetics models in this study (e.g., pseudo-first-order, pseudo-second-order, and Elovich rate equations), the pseudo-second-order equation successfully predicted the adsorption.

Keywords: Naphthalene, Zeolite, Adsorption Isotherms, Adsorption Kinetics, Pseudo-First-Order Process, Pseudo-Second-Order Process, Elovich Rate Equation

Prado, A.G.S., Torres, J.D., Faria, E.A. and Dias, S.C.L. (2004), Comparative adsorption studies of indigo carmine dye on chitin and chitosan. *Journal of Colloid and Interface Science*, **277** (1), 43-47.

Full Text: [J\J Col Int Sci277, 43.pdf](J/J%20Col%20Int%20Sci277,%2043.pdf)

Abstract: The adsorption of indigo carmine dye onto chitin and chitosan from aqueous solutions was followed in a batch system. The ability of these materials to adsorb indigo carmine dye from aqueous solution was followed through a series of adsorption isotherms adjusted to a modified Langmuir equation. The maximum number of moles adsorbed was 1.24±0.16×10−5 and 1.54±0.03×10−4 mol g−1 for chitin and chitosan, respectively. The same interactions were calorimetrically followed and the thermodynamic data showed exothermic enthalpic values of −40.12±3.52 and −29.25±1.93 kJ mol−1 for chitin and chitosan, respectively. Gibbs free energies for the two adsorption processes of indigo carmine dye presented a positive value for chitin and a negative one for chitosan, reflecting that dye/surface interactions are thermodynamic favorable for chitosan and nonspontaneous for chitin at 298.15 K. The interaction processes were accompanied by an increase of entropy value for chitosan (90±6 J mol−1 K−1) and a decrease for chitin (−145±13 J mol−1 K−1). Thus, dye/chitosan interaction showed favorable enthalpic and entropic processes, reflecting thermodynamic stability of the formed complex, while dye/chitin interaction showed an exothermic enthalpic value and a highly nonfavorable entropic effect, resulting in a nonspontaneous thermodynamic system.

Keywords: Chitin, Chitosan, Adsorption, Calorimetry

Čapková, P., Malý, P., Pospíšil, M., Klika, Z., Weissmannová, H. and Weiss, Z. (2004), Effect of surface and interlayer structure on the fluorescence of rhodamine B–montmorillonite: Modeling and experiment. *Journal of Colloid and Interface Science*, **277** (1), 128-137.

Full Text: [J\J Col Int Sci277, 128.pdf](J/J%20Col%20Int%20Sci277,%20128.pdf)

Abstract: The surface and interlayer structure of rhodamine B (RhB)–montmorillonite for various guest concentrations has been studied using a combination of X-ray powder diffraction and molecular modeling (molecular mechanics and molecular dynamics) in the *Cerius*2 modeling environment. The joint effect of surface and interlayer structure on the fluorescence spectrum has been observed and discussed in relation to the position and orientation of RhB+ cations with respect to the silicate layer. Structural analysis showed that the surface and interlayer structures are different as to the arrangement of RhB+ cations, and both of them strongly depend on the guest concentration in the intercalation solution and on the method of preparation. The repeated intercalation of montmorillonite by rhodamine B used in the present work allowed obtaining RhB–montmorillonite in the maximum degree of ion exchange for every sample.

Keywords: Surface Structure, Interlayer Structure, Rhodamine B–Montmorillonite, Molecular Modeling, Fluorescence of Rhodamine B

Rengaraj, S., Kim, Y., Joo, C.K. and Yi, J. (2004), Response to Comment on “Removal of copper from aqueous solution by aminated and protonated mesoporous aluminas: Kinetics and equilibrium”. *Journal of Colloid and Interface Science*, **277** (1), 255.

Full Text: [J\J Col Int Sci277, 255.pdf](J/J%20Col%20Int%20Sci277,%20255.pdf)

Karaca, S., Gürses, A., Ejder, M. and Açıkyıldız, M. (2004), Kinetic modeling of liquid-phase adsorption of phosphate on dolomite. *Journal of Colloid and Interface Science*, **277** (2), 257-263.

Full Text: [J\J Col Int Sci277, 257.pdf](J/J%20Col%20Int%20Sci277,%20257.pdf)

Abstract: The adsorption of phosphate from aqueous solution on dolomite was investigated at 20 and 40 °C in terms of pseudo-second-order mechanism for chemical adsorption as well as an intraparticle diffusion mechanism process. Adsorption was changed with increased contact time, initial phosphate concentration, temperature, solution pH. A pseudo-second-order model and intraparticle diffusion model have been developed to predict the rate constants of adsorption and equilibrium capacities.The activation energy of adsorption can be evaluated using the pseudo-second-order rate constants. The adsorption of phosphate onto dolomite are an exothermically activated process. A relatively low activation energy and a model highly fitting to intraparticle diffusion suggest that the adsorption of phosphate by dolomite may involve not only physical but also chemisorption. This was likely due to its combined control of chemisorption and intraparticle diffusion. However, for phosphate/dolomite system chemical reaction is important and significant in the rate-controlling step, and for the adsorption of phosphate onto dolomite the pseudo-second-order chemical reaction kinetics provides the best correlation of the experimental data.

Keywords: Dolomite, pHosphate, Kinetics, Adsorption

Pardo-Botello, R., Fernández-González, C., Pinilla-Gil, E., Cuerda-Correa, E.M. and Gómez-Serrano, V. (2004), Adsorption kinetics of zinc in multicomponent ionic systems. *Journal of Colloid and Interface Science*, **277** (2), 292-298.

Full Text: [J\J Col Int Sci277, 292.pdf](J/J%20Col%20Int%20Sci277,%20292.pdf)

Abstract: Using commercial activated carbon as an adsorbent, the kinetics of adsorption of zinc from multicomponent ionic systems having cadmium and mercury has been studied and reported. The variables investigated have been the chemical nature, ionic strength, and pH of the adsorptive (Zn2+) solution. The adsorption of Zn2+ is speeded up by the presence of Cd2+ and Hg2+ ions provided that the concentration of these two ions is high as compared to the concentration of Zn2+. When the ionic strength of the solution in relative terms is high (i.e., >3×10−4 M), however, the adsorption of Zn2+ decelerates. Also, the adsorption process is greatly accelerated at pH 12, whereas at pH 2 it does not occur at all.

Keywords: Activated Carbon, Zn2+ Adsorption, Multicomponent Ionic Systems

Feng, Q.G., Lin, Q.Y., Gong, F.Z., Sugita, S. and Shoya, M. (2004), Adsorption of lead and mercury by rice husk ash. *Journal of Colloid and Interface Science*, **278** (1), 1-8.

Full Text: [J\J Col Int Sci278, 1.pdf](J/J%20Col%20Int%20Sci278,%201.pdf)

Abstract: An attempt at the use of rice husk ash, an agricultural waste, as an adsorbent for the adsorption of lead and mercury from aqueous water is studied. Studies are carried out as a function of contact times, ionic strength, particle size, and pH. Rice husk ash is found to be a suitable adsorbent for the adsorption of lead and mercury ions. The Bangham equation can be used to express the mechanism for adsorption of lead and mercury ions by rice husk ash. Its adsorption capability and adsorption rate are considerably higher and faster for lead ions than for mercury ions. The finer the rice husk ash particles used, the higher the pH of the solution and the lower the concentration of the supporting electrolyte, potassium nitrate solution, the more lead and mercury ions absorbed on rice husk ash. Equilibrium data obtained have been found to fit both the Langmuir and Freundlich adsorption isotherms.

Keywords: Rice Husk Ash, Adsorption, Lead, Mercury, Equilibrium Isotherms

Khelifa, A., Benchehida, L. and Derriche, Z. (2004), Adsorption of carbon dioxide by X zeolites exchanged with Ni2+ and Cr3+: Isotherms and isosteric heat. *Journal of Colloid and Interface Science*, **278** (1), 9-17.

Full Text: [J\J Col Int Sci278, 9.pdf](J/J%20Col%20Int%20Sci278,%209.pdf)

Abstract: The adsorption of CO2, at intervals of 30 K from 303 K was carried out on M*n*+X zeolites (M*n*+=Ni2+ or Cr3+) exchanged at different degrees. The structural regularity of the zeolite lattice of NaX and the existence of well-defined cavities within which the adsorbate molecules are lodged suggest that it should be possible to use various isotherm equations. Several models were thus used to describe the experimental isotherms. The best fit of adsorption isotherm data is obtained with the Sips model. The Volmer model also describes satisfactorily the isotherms of CO2 adsorption by NaX, Ni(*x*)X, and Cr(*x*)X. Analysis of the isosteric heat reveals a character energetically heterogeneous for NaX and Ni(*x*)X samples exchanged at a higher degree of Ni2+ exchange and at low coverage. Specific interaction is also obtained between the adsorbate molecules and Cr(*x*)X exchanged at a lower degree. From these considerations, hypotheses will be advanced to describe the behavior of the adsorbed phase within zeolitic cavities.

Keywords: NaX Zeolite, Ionic Exchange, CO2 Adsorption, Theoretical Model, Isosteric Heat

Chang, M.Y. and Juang, R.S. (2004), Adsorption of tannic acid, humic acid, and dyes from water using the composite of chitosan and activated clay. *Journal of Colloid and Interface Science*, **278** (1), 18-25.

Full Text: [J\J Col Int Sci278, 18.pdf](J/J%20Col%20Int%20Sci278,%2018.pdf)

Abstract: Chitosan is a well-known excellent adsorbent for a number of organics and metal ions, but its mechanical properties and specific gravity should be enhanced for practical operation. In this study, activated clay was added in chitosan slurry to prepare composite beads. The adsorption isotherms and kinetics of two organic acids (tannic acid, humic acid) and two dyes (Methylene blue, reactive dye RR222) using composite beads, activated clay, and chitosan beads were compared. With composite beads as an adsorbent, all the isotherms were better fitted by the Freundlich equation. The adsorption capacities with composite beads were generally comparable to those with chitosan beads but much larger than those with activated clay. The pseudo-first-order and pseudo-second-order equations were then screened to describe the adsorption processes. It was shown that the adsorption of larger molecules such as tannic acid (MW, 1700 g mol−1), humic acid, and RR222 from water onto composite beads was better described by the pseudo-first-order kinetic model. The rate parameters of the intraparticle diffusion model for adsorption onto such adsorbents were also evaluated and compared to identify the adsorption mechanisms.

Keywords: Chitosan, Activated Clay, Composite Bead, Adsorption, Tannic Acid, Humic Acid, Dyes

Erciyes, N., Gürten, A.A. Abdullah, M.I. and Ayar, A. (2004), Adsorption of indole and 2-methylindole on ligand-exchange matrix. *Journal of Colloid and Interface Science*, **278** (1), 91-95.

Full Text: [J\J Col Int Sci278, 91.pdf](J/J%20Col%20Int%20Sci278,%2091.pdf)

Abstract: The adsorption of indole and its 2-methyl derivative from aqueous solutions onto cobalt(II)-carboxylated diaminoethane sporopollenin (CDAE-sporopollenin) was studied using a fixed-bed column at 25±0.1 °C. Minicolumn adsorption studies showed that the breakthrough and the total adsorption capacities of CDAE-sporopollenin in the concentration range we have studied increased with increasing external ligand concentration. The characteristics of the adsorption process were investigated using Scatchard plot analysis, where the equilibrium binding data for indole on ligand exchanger gave rise to a linear plot. However, for 2-methylindole, divergence from the Scatchard plot was evident, consistent with the participation of secondary equilibrium effects in the adsorption process. The adsorption behaviors of ligands on CDAE-sporopollenin were expressed by both the Langmuir and Freundlich isotherms. The adsorption isotherm data for these ligands on the resin can be satisfactorily fitted to the Freundlich isotherm within the concentration range studied. However, in the case of 2-methylindole, the experimental data did not fit the Langmuir model, especially when a high ligand concentration range is used; this is probably due to the nonspecific interactions between the ligand exchange matrix and the methyl group present. Ligand adsorption constants and correlation coefficients for the ligands were calculated from the Langmuir and Freundlich isotherms.

Keywords: Indole, 2-Methylindole, Sporopollenin, Adsorption Isotherm, Breakthrough Curve, Scatchard Analysis

González-García, C.M., González-Martín, M.L., Denoyel, R., Gallardo-Moreno, A.M., Labajos-Broncano, L. and Bruque, J.M. (2004), Ionic surfactant adsorption onto activated carbons. *Journal of Colloid and Interface Science*, **278** (2), 257-264.

Full Text: [J\J Col Int Sci278, 257.pdf](J/J%20Col%20Int%20Sci278,%20257.pdf)

Abstract: The adsorption of sodium dodecyl sulfate onto a set of activated carbons from aqueous solutions has been studied in the low concentration range. The adsorption isotherms are reasonably well fitted by a double Langmuir equation but the calorimetry of adsorption enthalpies shows a rather wide distribution of energies. This distribution is related to direct adsorbate–adsorbent interactions in pores of different size, without noticeable contributions from the chemical nature of the surface. The adsorbate–adsorbent interaction free energy through water is evaluated using the model proposed by van Oss and co-workers for the interfacial free energy. The obtained results indicate that the calculated free energy is in good agreement with that found from application of the double Langmuir equation to the adsorption isotherms.

Keywords: Activated Carbons, Ionic Surfactant, Adsorption, Interfacial Free Energy, Langmuir Equation

Zhang, G.K., Yang, X., Liu, Y., Jia, Y.Y., Yu, G.W. and Ouyang, S.X. (2004), Copper(II) adsorption on Ca-rectorite, and effect of static magnetic field on the adsorption. *Journal of Colloid and Interface Science*, **278** (2), 265-269.

Full Text: [J\J Col Int Sci278, 265.pdf](J/J%20Col%20Int%20Sci278,%20265.pdf)

Abstract: Rectorite is a kind of rare clay mineral. In this work, the sorption of Cu(II) on Ca-rectorite and the effects of static magnetic fields on the sorption have been studied. The results from this study indicated that (1) apparent equilibrium for the sorption of copper onto Ca-rectorite is attained within the first hour; (2) magnetic treatment enhances the ζ potential of Ca-rectorite suspensions in the absence of Cu and reduces that of the suspension in the presence of Cu; (3) magnetic treatment promotes the sorption of Cu onto Ca-rectorite, especially at low Cu concentrations; (4) the effects of static magnetic fields decrease the pH of Ca-rectorite suspensions whether they contain copper or not. The effect mechanisms of static magnetic field on the sorption of Cu onto Ca-rectorite were discussed.

Keywords: Ca-Rectorite, Copper, Magnetic Field, ζ Potential, Adsorption

Dutta, P.K., Ray, A.K., Sharma, V.K. and Millero, F.J. (2004), Adsorption of arsenate and arsenite on titanium dioxide suspensions. *Journal of Colloid and Interface Science*, **278** (2), 270-275.

Full Text: [J\J Col Int Sci278, 270.pdf](J/J%20Col%20Int%20Sci278,%20270.pdf)

Abstract: Adsorption of arsenate (As(V)) and arsenite (As(III)) to two commercially available titanium dioxide (TiO2) suspensions, Hombikat UV100 and Degussa P25, was investigated as a function of pH and initial concentration of adsorbate ions. The BET surface area and zeta potential values of TiO2 were also measured to understand the difference in adsorption behavior of two suspensions. Both As(V) and As(III) adsorb more onto Hombikat UV100 particles than Degussa P25 particles. Adsorption of As(V) onto TiO2 suspensions was more than As(III) at pH 4 while the adsorption capacity of As(III) was more at pH 9. The electrostatic factors between surface charge of TiO2 particles and arsenic species were used to explain adsorption behavior of As(V) and As(III) at different pH. The Langmuir and Freundlich isotherm equations were used to interpret the nature of adsorption of arsenic onto TiO2 suspensions. The usefulness of adsorption data in removing arsenic in water is briefly discussed.

Keywords: Arsenate, Arsenite, Titanium Dioxide, Adsorption, Point of Zero Charge, Isotherms

Park, S.J. and Kim, Y.M. (2004), Influence of anodic treatment on heavy metal ion removal by activated carbon fibers. *Journal of Colloid and Interface Science*, **278** (2), 276-281.

Full Text: [J\J Col Int Sci278, 276.pdf](J/J%20Col%20Int%20Sci278,%20276.pdf)

Abstract: In this work, the effect of electrochemical oxidation treatment on activated carbon fibers (ACFs) was studied in the context of Cr(VI), Cu(II), and Ni(II) adsorption behavior. Ten weight percent phosphoric acid (A-ACFs) and ammonia (B-ACFs) were used for acidic and basic electrolytes, respectively. Surface properties of ACFs were determined by X-ray photoelectron spectroscopy (XPS). The specific surface area and the pore structure were evaluated from nitrogen adsorption data at 77 K. As a result, the electrochemical oxidation treatment led to an increase in the amount of oxygen-containing functional groups. Also, the adsorption capacity of the electrochemically oxidized ACFs was improved in the order B-ACFs>A-ACFs>untreated-ACFs, in spite of a decrease in specific surface area which resulted from pore blocking by functional groups and pore destruction by acidic electrolyte. It was clearly found that the heavy metal ions were largely influenced by the functional groups on the ACF surfaces.

Keywords: Activated Carbon Fibers, Electrochemical Oxidation, Adsorption, Surface Properties, Textural Properties

Burns, C.A., Boily, J.F., Crawford, R.J. and Harding, I.H. (2004), Cd(II) binding by particulate low-rank coals in aqueous media: Sorption characteristics and NICA–Donnan models. *Journal of Colloid and Interface Science*, **278** (2), 291-298.

Full Text: [J\J Col Int Sci278, 291.pdf](J/J%20Col%20Int%20Sci278,%20291.pdf)

Abstract: An experimental investigation of Cd(II) sorption onto two Australian coals was carried out in 0.1 M NaNO3 at 298.2 K. The initial concentration of Cd(II) was varied from 0.133 to 2.000 mmol/g in a series of batch adsorption experiments with an initial coal concentration of 3.75 g/L of Loy Yang (brown) or of Collie (sub-bituminous) coals in the p[H+] range 2–8. Adsorption edges were typical of metal ion adsorption onto negatively charged organic substrates, starting at p[H+]≈3 and increasing with increasing pH. The largest measured Cd(II) uptake capacities from these experiments were of 1.2 mmol/g for Loy Yang and 0.7 mmol/g for Collie coals. This difference is ascribed to the larger concentrations of carboxyl groups in Loy Yang coal (2.78 mmol/g) compared to Collie coal (1.34 mmol/g). An adsorption isotherm for Loy Yang coal at p[H+] 6 was collected up to a surface loading of 1.7 mmol/g of adsorbed Cd(II). These experiments also revealed a release of about 1.5–1.6 protons per adsorbed Cd(II). Zeta potentials of Loy Yang coal suspensions were not affected by Cd(II) adsorption, suggesting that the coal particles efficiently neutralize the charge of Cd(II). Collie coal, on the other hand, exhibited a zeta potential increase that may indicate a modification of the surface potentials of the coal particles. Cd(II) uptake data obtained from both batch experiments and proton balance data have been combined with p[H+] stat data for the same experimentally covered Cd(II)/coal ratios to model adsorption using the NICA–Donnan model. The modeling results suggest that both coals possess identical affinities and reaction stoichiometries. Loy Yang coal, however, possessed a narrower distribution of affinities.

? Tamura, H. (2004), Theorization on ion-exchange equilibria: activity of species in 2-D phases. *Journal of Colloid and Interface Science*, **279** (1), 1-22.

Full Text: [J\J Col Int Sci279, 1.pdf](J/J%20Col%20Int%20Sci279,%201.pdf)

Abstract: Ion-exchange reactions are naturally occurring at soil and sediment/water interphases, determining soil fertility and water quality. These ion-exchange reactions with inorganic and organic exchangers are applied to chemical analysis, recovery of useful ions from low-grade ores (potentially from sea water), water purification including the preparation of “ultrapure” water, production of foods and medicines, therapy, and other uses. It is important to theorize about or to model ion-exchange reactions for quantitative explanations of ion-exchange phenomena and for efficient operation of ion-exchange processes. This paper describes the modeling of ion-exchange equilibria for hydroxyl sites on metal oxides and carboxyl sites in resins with monovalent cations (alkali metal ions), a monovalent anion (nitrate ion), and divalent heavy metal ions. The procedure of modeling is as follows: the stoichiometry and material balance equations of the respective ion-exchange reactions were established based on findings here and by others. The equilibrium conditions were given by the Frumkin equation, where the mass-action relation is modified with lateral interactions between species at the interphase. The model equations were fitted to the measured data and model parameter values were determined by nonlinear regression analysis. The formation of bonds between ions and exchanger sites was evaluated by the equilibrium constant and the suppression of bond formation by electrostatic, geometric, and other lateral interactions was evaluated by the interaction constant. It was established that the properties of ions are determined by the valence, size, and hydration state of the ions. Monovalent ions (anions and cations) react with oxide surface hydroxyl and resin carboxyl sites as hydrated ions and form loose ion-site pairs by a weak electrostatic bond (nonspecific adsorption). However, the lateral interactions are large because of a large polarization of the ion-site pairs. When the monovalent cations are dehydrated to react with carboxyl sites in narrow resin nanopores, the bond formation is difficult because energy for dehydration is necessary. The suppressive lateral interactions here are small because of a small polarization of the dehydrated ion-site pairs that are in direct contact. Divalent heavy metal ions react with oxide hydroxyl sites by replacing their hydrated water molecules and form ion-site pairs in direct strong contact (specific adsorption). The bond formation becomes easier with increasing charge density of the ions evaluated by the charge/radius ratio, agreeing with the order of these ions to form hydroxo complexes in solution. The suppressive lateral interaction is, however, small for ions with large charge densities, because a strong contact bond reduces the polarization of ion-site pairs by neutralization. The properties of exchangers are functions of the molecular and pore environments around the functional groups. The acid–base nature of oxide surface-hydroxyl groups is determined by the electronegativity of surrounding lattice metal ions, and that of resin carboxyl groups by the electron-repelling effect of adjacent methyl groups. Pores in oxides have diameters sufficient to accommodate hydrated ions, and the suppression is large because of repulsion from ions adsorbed on opposite pore walls (across-pore interaction). Pores in resins differentiate ions that can access or not access sites on the internal surfaces of the pores. Narrow nanopores with diameters less than those of the hydrated ions require ions to dehydrate before they can enter. The ion-exchange reactivity here is small, as described above for dehydrated monovalent ions. In wide nanopores where hydrated ions can enter, bond formation is easier, but suppression is greater because of a larger polarization of hydrated ion-site pairs and also of the across-pore interaction. Macropores have diameters much larger than those of the hydrated ions and the bond formation is the same as that in wide nanopores, but the suppression is smaller because of the absence of the across-pore interaction. Finally, this paper attempts a formulation of activity coefficients of exchanging sites and adsorbed ion-site pairs and compares the proposed activity coefficients of interphase species with that of solution species given by the Debye–Hückel equation.

Keywords: Metal Oxide, Weak Acid Cation-Exchange Resin, Surface Hydroxyl Group, Carboxyl Group, Ion, Ion-Exchange Reaction, Frumkin Equation

Tan, Y.Q. and O’Haver, J.H. (2004), Use of the BET adsorption isotherm equation to examine styrene adsolubilization by nonionic surfactants at the water–silica interface. *Journal of Colloid and Interface Science*, **279** (2), 289-295.

Full Text: [J\J Col Int Sci279, 289.pdf](J/J%20Col%20Int%20Sci279,%20289.pdf)

Abstract: A modified BET adsorption isotherm equation was used to explain adsolubilization at the water–silica interface, producing a method for understanding adsolubilization that is independent of admicelle structure. The two constants *k*1 and *k*2 provide a measure of the surfactant–solute and solute–solute interactions, respectively. As predicted, *k*1 changed with various factors including surfactant structure, the presence and quantity of added lipophilic linker and hexane. On the other hand, *k*2 was fairly constant for all examined systems having the same solute. Commonly used partition coefficients can be easily related to the model and adsolubilization isotherms may be reproduced by the developed equation. Inferences about solute distribution at the interface and its location within the admicelle may be extracted from the results. The model is useful in explaining trends in adsolubilization and in predicting adsolubilization behavior for similar systems.

Keywords: Nonionic Surfactant, Adsolubilization, Styrene, BET, Model, Lipophilic Linker

Nagayasu, T., Yoshioka, C., Imamura, K. and Nakanishi, K. (2004), Effects of carboxyl groups on the adsorption behavior of low-molecular-weight substances on a stainless steel surface. *Journal of Colloid and Interface Science*, **279** (2), 296-306.

Full Text: [J\J Col Int Sci279, 296.pdf](J/J%20Col%20Int%20Sci279,%20296.pdf)

Abstract: The adsorption isotherms of various carboxylic acids and several amines on a stainless steel surface were taken as a function of pH and the ionic strength of the solution at 30 °C. In particular, the effect of the number of carboxyl groups on the adsorption behavior was investigated. Monocarboxylic acids such as benzoic acid and *n*-butyric acid were reversibly adsorbed on the stainless steel particles and showed a Langmuir-type adsorption isotherm, i.e., *Q*=*Kq*m*C*/(1+*KC*), where *Q* and *C* are, respectively, the amount of adsorbate adsorbed and the equilibrium concentration in the bulk solution, *q*m, the maximum adsorbed amount, and *K* is the adsorption equilibrium constant. Carboxylic acids having plural carboxyl groups had much higher affinity to the surface and were adsorbed in both reversible and irreversible modes. The adsorption isotherms for the carboxylic acids having plural carboxyl groups could be expressed by a modified Langmuir-type adsorption isotherm, i.e., *Q*=*q*irrev+*Kq*rev*C*/(1+*KC*), where *q*irrev and *q*rev are, respectively, the maximum amounts adsorbed irreversibly and reversibly. The *K* and *q*irrev values increased with an increase in the number of carboxyl groups except for isophthalic acid and terephthalic acid. On the basis of the pH dependencies of *K*, *q*m, *q*irrev, and *q*rev as well as the surface properties of the stainless steel, both reversible and irreversible adsorptions were considered to occur through the electrostatic interaction between negatively charged carboxyl groups and the positively charged sites on the surface. The dependency of the *q*irrev value on ionic strength was discussed on the basis of the differences in their adsorbed state with the interaction forces to the surface and repulsive forces among the adsorbed molecules. The adsorption of amine components was quite weak. The RA-IR and molecular dynamics calculation were done to investigate the adsorption states of phthalic acid, trimellitic acid, and mellitic acid.

Keywords: Stainless Steel, Adsorption, Adsorption Equilibrium, Carboxylic Acid, Amine, FTIR

Sekar, M., Sakthi, V. and Rengaraj, S. (2004), Kinetics and equilibrium adsorption study of lead(II) onto activated carbon prepared from coconut shell. *Journal of Colloid and Interface Science*, **279** (2), 307-313.

Full Text: [J\J Col Int Sci279, 307.pdf](J/J%20Col%20Int%20Sci279,%20307.pdf)

Abstract: Removal of lead from aqueous solutions by adsorption onto coconut-shell carbon was investigated. Batch adsorption experiments were performed to find out the effective lead removal at different metal ion concentrations. Adsorption of Pb2+ ion was strongly affected by pH. The coconut-shell carbon (CSC) exhibited the highest lead adsorption capacity at pH 4.5. Isotherms for the adsorption of lead on CSC were developed and the equilibrium data fitted well to the Langmuir, Freundlich, and Tempkin isotherm models. At pH 4.5, the maximum lead adsorption capacity of CSC estimated with the Langmuir model was 26.50 mg g−1 adsorbent. Energy of activation (*E*a) and thermodynamic parameters such as Δ*G*, Δ*H*, and Δ*S* were evaluated by applying the Arrhenius and van’t Hoff equations. The thermodynamics of Pb(II) on CSC indicates the spontaneous and endothermic nature of adsorption. Quantitative desorption of Pb(II) from CSC was found to be 75% which facilitates the sorption of metal by ion exchange.

Keywords: Coconut-Shell Carbon, Lead, Adsorption, Isotherms, Kinetics, Thermodynamics and Desorption

Onyango, M.S., Kojima, Y., Aoyi, O., Bernardo, E.C. and Matsuda, H. (2004), Adsorption equilibrium modeling and solution chemistry dependence of fluoride removal from water by trivalent-cation-exchanged zeolite F-9. *Journal of Colloid and Interface Science*, **279** (2), 341-350.

Full Text: [J\J Col Int Sci279, 341.pdf](J/J%20Col%20Int%20Sci279,%20341.pdf)

Abstract: Fluoride in drinking water above permissible levels is responsible for human dental and skeletal fluorosis. In this study, therefore, the large internal surface area of zeolite was utilized to create active sites for fluoride sorption by exchanging Na+-bound zeolite with Al3+ or La3+ ions. Fluoride removal from water using Al3+- and La3+-exchanged zeolite F-9 particles was subsequently investigated to evaluate the fluoride sorption characteristics of the sorbents. Equilibrium isotherms such as the two-site Langmuir (L), Freundlich (F), Langmuir–Freundlich (LF), Redlich–Peterson (RP), Tóth (T), and Dubinin–Radushkevitch (DR) were successfully used to model the experimental data. Modeling results showed that the isotherm parameters weakly depended on the solution temperature. From the DR isotherm parameters, it was considered that the uptake of fluoride by Al3+-exchanged zeolite proceeded by an ion-exchange mechanism (*E*=11.32−12.13 kJ/mol), while fluoride–La3+-exchanged zeolite interaction proceeded by physical adsorption (*E*=7.41−7.72 kJ/mol). Factors from the solution chemistry that affected fluoride removal from water were the solution pH and bicarbonate content. The latter factor buffered the system pH at higher values and thus diminished the affinity of the active sites for fluoride. Natural groundwater samples from two Kenyan tube wells were tested and results are discussed in relation to solution chemistry. In overall, Al3+-exchanged zeolite was found to be superior to La3+-exchanged zeolite in fluoride uptake within the tested concentration range.

Keywords: Fluoride, Equilibrium Modeling, Solution Chemistry, Al3+- or La3+-Exchanged Zeolite

Tancredi, N., Medero, N., Möller, F., Píriz, J., Plada, C., and Cordero, T. (2004), phenol adsorption onto powdered and granular activated carbon, prepared from *Eucalyptus* wood. *Journal of Colloid and Interface Science*, **279** (2), 357-363.

Full Text:[J\J Col Int Sci279, 357.pdf](J/J%20Col%20Int%20Sci279,%20357.pdf)

Abstract: *Eucalyptus grandis* sawdust, a major waste from the growing Uruguayan wood industry, was used in previous work to prepare powdered activated carbon (PAC). In the present work, granular activated carbon (GAC) was prepared by mixing PAC, carboxymethyl cellulose as a binder, and kaolin as reinforcer. Ultimate analysis and surface characterization of GAC and PAC were performed. phenol adsorption was used as a way to compare the characteristics of different PAC and GAC preparations. Kinetics and isotherms of the different GAC and PAC were performed in a shaking bath at 100 rpm and 298 K. phenol concentrations were determined by UV spectroscopy. Some kinetics parameters were calculated; from kinetics results, external resistance to mass transfer from the bulk liquid can be neglected as the controlling step. Isotherms were fitted to Langmuir and Freundlich models, and corresponding parameters were determined. Maximum phenol uptakes for all carbons were determined and correlated with carbon characteristics. Thermogravimertic analysis (TGA) determinations were performed in order to study adsorption characteristics and conditions for GAC regeneration after its use. The results showed that phenol is preferentially physisorbed on the carbon of the granules, though some chemisorption was detected. No adsorption was detected in the kaolin–carboxymethyl cellulose mixture.

Keywords: Activated Carbon, Granulation, phenol, Isotherm, Adsorption Kinetics

Covelo, E.F., Andrade, M.L. and Vega, F.A. (2004), Heavy metal adsorption by humic umbrisols: Selectivity sequences and competitive sorption kinetics. *Journal of Colloid and Interface Science*, **280** (1), 1-8.

Full Text: [J\J Col Int Sci280, 1.pdf](J/J%20Col%20Int%20Sci280,%201.pdf)

Abstract: This work examines sorption kinetics of Cd, Cr, Cu, Ni, Pb, and Zn adsorbed simultaneously by four humic umbrisols, as well as the influence of the soil components on the adsorption rate. Starting from the value of *K*d, the metals most adsorbed by the soils are Cu, Cr, and Pb. The soils that adsorb the largest amounts of metals have also the highest organic matter, oxide, and clay content. In general, the most common selectivity sequence of adsorption is Pb > Cr > Cu > Cd ≈ Ni ≈ Zn. Sorption kinetics is rapid for Cr, Cu, and Pb in all the soils studied and competes favorably for the adsorption sites with Cd, Ni, and Zn. Various rate equations (zero-order, first-order, second-order, Elovich, and power function) were applied to the kinetic data to obtain the corresponding rate coefficients. A second-order reaction best represents the kinetic data for Cr in most of the soils.

Keywords: Adsorption, Kinetic, Heavy Metals, Soil

Thomas, T.N., Land, T.A., Johnson, M. and Casey, W.H. (2004), Molecular properties of adsorbates that affect the growth kinetics of archerite (KDP). *Journal of Colloid and Interface Science*, **280** (1), 18-26.

Full Text: [J\J Col Int Sci280, 18.pdf](J/J%20Col%20Int%20Sci280,%2018.pdf)

Abstract: We explore the molecular properties of adsorbates that dramatically affect growth kinetics and morphology of the 100 face of archerite, also known as potassium dihydrogen phosphate (KH2PO4 or KDP). Aqueous complexes of Al(III), Fe(III), and Cr(III) are known to affect KDP growth, albeit the actual step-pinning complex(es) is unknown. Using in situ atomic force microscopy (AFM), we measured changes in the growth rates of the 100 face of KDP with supersaturation in the presence of trace amounts of [Co(NH3)6]3+, [Fe(CN)6]3−, *η*1-[Co(NH3)5HPO4]+, *η*2-[Co(NH3)4HPO4]+, *η*2-[Co(NH3)4P2O7H2]+, and [Rh(H2PO4)2(H2O)4]+. Unlike in experiments using trivalent-metals, these complexes do not change stoichiometry or structure on the timescale of step motion, so that the actual molecular interactions that affect growth can be studied. Step velocity and morphology on the 100 face are unaffected by outer-sphere coordination complexes of either charge. Surprisingly, inner-sphere phosphatoammine complexes do not affect growth rates regardless of how the phosphate group is coordinated to the metal. However, doping the growth solution with [Rh(H2PO4)2(H2O)4]+ results in profound step pinning, matching the behavior of KDP surfaces grown in the presence of Rh(III) after an equilibration period. Not only is an inner-sphere phosphate group needed to dock a trivalent metal to the step edge, but compatible hydrogen bonding of the remainder of the inner-sphere ligands with the bulk lattice is also essential.

Keywords: KDP, Crystal Growth, Phosphates, AFM, Adsorbates

Wang, C.C., Juang, L.C., Lee, C.K., Hsu, T.C., Lee, J.F. and Chao, H.P. (2004), Effects of exchanged surfactant cations on the pore structure and adsorption characteristics of montmorillonite. *Journal of Colloid and Interface Science*, **280** (1), 27-35.

Full Text: [J\J Col Int Sci280, 27.pdf](J/J%20Col%20Int%20Sci280,%2027.pdf)

Abstract: Ca-montmorillonite (Ca-Mont) was exchanged with two quaternary amines, tetramethylammonium (TMA) chloride and hexadecyltrimethylammonium (HDTMA) bromide, to study the surfactant ion exchange effect on the pore structure, surface characteristics, and adsorption properties of montmorillonite. The revolution of both the surface area and pore structure of montmorillonite was characterized based on classical and fractal analyses of the nitrogen isotherms as well as the XRD patterns. The change of surface characteristics was identified from FTIR patterns and zeta-potential plots. The adsorption isotherms of acid dye, Amido Naphthol Red G (AR1), were then measured to identify the effects of the ion-exchange process on the adsorption properties of montmorillonite. It was found that the exchange processes might induce an increase or decrease in the surface area, pore size, pore volume, and surface fractal dimension *D* of montmorillonite, depending on the size, the molecular arrangement, and the degree of hydration of the exchanged ion in the clay. On the other hand, it was also found that the hydrophobic bonding by conglomeration of large C16 alkyl groups associated with HDTMA could cause positive charge development on the surface of montmorillonite, which was not observed for TMA-modified montmorillonite (TMM). The effects of the alteration of the surface characteristics of montmorillonites on their adsorption selectivity for acid dye were discussed.

Keywords: Montmorillonite, Acid Dye, Surfactant Cations, Ion Exchange, Hydrophobic Bonding

Deng, S. and Bai, R. (2004), Adsorption and desorption of humic acid on aminated polyacrylonitrile fibers. *Journal of Colloid and Interface Science*, **280** (1), 36-43.

Full Text: [J\J Col Int Sci280, 36.pdf](J/J%20Col%20Int%20Sci280,%2036.pdf)

Abstract: Aminated polyacrylonitrile fibers (APANFs) were prepared by surface modification and were used as an adsorbent to remove humic acid from aqueous solutions. The APANFs were found to be very effective in removing humic acid at the pH range from 2 to 10. The adsorption isotherm obeyed both the Langmuir and Freundlich models, and the adsorption kinetics followed an initial diffusion-controlled and then an attachment-controlled adsorption pattern. X-ray photoelectron spectroscopy (XPS) and Fourier transform infrared (FTIR) spectroscopy revealed that chemical bonds were formed between the nitrogen atoms in the amine groups on the fibers and humic acid molecules adsorbed, suggesting that, besides electrostatic interaction, surface complexation also played an important role in humic acid adsorption on the APANFs. The humic acid adsorbed on the APANFs can be effectively desorbed in a 0.1 M NaOH solution, and the regenerated APANFs can be reused in the subsequent adsorption cycles without significant loss of the adsorption capacities.

Keywords: Polyacrylonitrile Fibers, Surface Modification, Adsorption, Humic Acid Removal

Özcan, A.S., Erdem, B. and Özcan, A. (2004), Adsorption of Acid Blue 193 from aqueous solutions onto Na–bentonite and DTMA–bentonite. *Journal of Colloid and Interface Science*, **280** (1), 44-54.

Full Text: [J\J Col Int Sci280, 44.pdf](J/J%20Col%20Int%20Sci280,%2044.pdf)

Abstract: Dodecyltrimethylammonium bromide-modified bentonite (DTMA–bentonite) was prepared and tested as an adsorbent for an acid dye (Acid Blue 193, AB193) removal from aqueous solution in comparison with Na–bentonite. The effect of various experimental parameters was investigated using a batch adsorption technique. In this manner, the adsorption isotherms, adsorption kinetics, and temperature and pH effects upon Acid Blue 193 adsorption on Na–bentonite and DTMA–bentonite were thoroughly examined. Results show that a pH value of 1.5 is favorable for the adsorption of Acid Blue 193. The isothermal data could be well described by the Freundlich equation. The dynamical data fit well with the pseudo-second-order kinetic model. The adsorption capacity of DTMA–bentonite (740.5 mg g−1) was found to be around 11 times higher than that of Na–bentonite (67.1 mg g−1) at 20 °C. Thermodynamic parameters such as activation energy (*E*a) and change in the free energy (Δ*G*0), the enthalpy (Δ*H*0), and the entropy (Δ*S*0) were also evaluated. The overall adsorption process was exothermic but it is only spontaneous at 20°C. The results indicate that Na–bentonite and DTMA–bentonite could be employed as low-cost alternatives to activated carbon in wastewater treatment for the removal of color which comes from textile dyes.

Keywords: Adsorption, Acid dye, Kinetics, Bentonite, Thermodynamics, Surfactant, C

Adam, F. and Chua, J.H. (2004), The adsorption of palmytic acid on rice husk ash chemically modified with Al(III) ion using the sol–gel technique. *Journal of Colloid and Interface Science*, **280** (1), 55-61.

Full Text: [J\J Col Int Sci280, 55.pdf](J/J%20Col%20Int%20Sci280,%2055.pdf)

Abstract: Silica-incorporated aluminum (RHA-Al) was synthesized from rice husk ash (RHA) using the sol–gel technique. RHA-Al was calcined at 500 °C for 5 h to yield RHA-Al(C). The ratio of silica to alumina was found to be 4:1. The BET analysis of RHA-Al(C) showed an increase in total pore volume and specific surface area compared to RHA-Al. SEM and XRD showed that RHA-Al and RHA-Al(C) were composed of microcrystals and the surface of both samples had a porous structure. Adsorption studies of palmytic acid on RHA-Al and RHA-Al(C) at 30, 40, and 50 °C conformed to the Langmuir isotherm. The equilibrium parameter, R, revealed that both are good adsorbents for palmytic acid. The Gibbs free energy of adsorption, ΔG0ads, was determined to be between −21.0 and −26.0 kJ mol−1. ΔH0ads, and ΔS0ads for RHA-Al were found to be 26.2 kJ mol−1 and 158 J mol−1, respectively. Corresponding values for RHA-Al(C) were 31.7 kJ mol−1 and 178 J mol−1. The adsorption of fatty acid on RHA-Al and RHA-Al(C) was an endothermic process, which occurred spontaneously. An FTIR study on the adsorbed material was used to determine the possible adsorbed complex on the surface of the adsorbent.

Keywords: Adsorption, Rice Husk Ash, Modified Silica, Sol–Gel Technique, Fatty Acid, Langmuir Isotherm, Free Energy of Adsorption, Enthalpy of Adsorption, Entropy of Adsorption

Lenoble, V., Chabroullet, C., al Shukry, R., Serpaud, B., Deluchat, V. and Bollinger, J.C. (2004), Dynamic arsenic removal on a MnO2-loaded resin. *Journal of Colloid and Interface Science*, **280** (1), 62-67.

Full Text: [J\J Col Int Sci280, 62.pdf](J/J%20Col%20Int%20Sci280,%2062.pdf)

Abstract: Previous batch studies on a polystyrene matrix loaded with manganese dioxide, synthesized from an anionic commercial resin in chloride form, have proven the efficiency of this sorbent in As(V) and As(III) removal. This solid is now tested with column experiments to predict its behavior in a treatment process. An artificial water, with a composition in major ions similar to that of granitic water, often contaminated with arsenic, was prepared. This artificial water was used to simulate arsenic removal processes under near-natural conditions and with a stable composition. Furthermore, the hydride generation AAS analytical method was optimized to measure low arsenic concentrations (1 to 20 μg/L).

Keywords: Arsenic Removal, Artificial Water, MnO2-Loaded Resin

Kaynak, G., Ersoz, M. and Kara, H. (2004), Investigation of the properties of oil at the bleaching unit of an oil refinery. *Journal of Colloid and Interface Science*, **280** (1), 131-138.

Full Text: [J\J Col Int Sci280, 131.pdf](J/J%20Col%20Int%20Sci280,%20131.pdf)

Abstract: Color removal from neutralized Sunflower oil was studied with different kinds of commercial bleaching earths. The effect of changes in time (25 and 35 min), temperature (80-125 degreesC), and bleaching earth dosage (0.1-0.9% by weight) on color, chlorophyll and carotene concentrations, and oxidation degree were investigated. To obtain adsorption Curves from coloring compounds adsorbed onto activated bleaching earths, the Langmuir and Freundlich equations was used, the constant parameters and correlation coefficient R were calculated for each type of bleaching earth, and color changes were explained by both adsorption isotherms. It was observed that an increase in bleaching earth dosage decreases color. Its effect oil oxidation state, however, is complex and related to both primary and secondary oxidation products. In addition, ail increase in temperature seems to decrease chlorophyll and carotene adsorptions. Generally, time beyond equilibrium is considered useless for the removal of unwanted components. This Study also confirms this claim and reveals that the pet-oxide value does not indicate the oxidation state of the oil completely. (C) 2004 Elsevier Inc. All rights reserved.

Keywords: Bleaching Adsorption, Freundlich Equation, Chlorophylls, Carotenes, Relative Absorbance, Activated Bleaching Earth, Removal, Montmorillonite, Sorption, Peat

Ma, Y.L., Xu, Z.R., Guo, T. and You, P. (2004), Adsorption of Methylene blue on Cu(II)-exchanged montmorillonite. *Journal of Colloid and Interface Science*, **280** (2), 283-288.

Full Text: [J\J Col Int Sci280, 283.pdf](J/J%20Col%20Int%20Sci280,%20283.pdf)

Abstract: Cu2+-exchanged montmorillonite (CEM) was prepared using the method of ion exchange reaction. The goal was to determine the adsorption of Methylene blue (MB) onto montmorillonite and CEM. The results showed that treatment with Cu2+ slightly reduced the adsorption of montmorillonite. Temperature, pH value, and ionic strength in the medium had greater or smaller effects on interaction between MB and the clay. The data obtained from MB adsorption onto the tested adsorbents followed the Langmuir and BET equations. Also, the adsorption processes were endothermic and spontaneous in nature.

Keywords: Montmorillonite, Copper, Methylene Blue, Adsorption

Akçay, M. (2004), Characterization and determination of the thermodynamic and kinetic properties of *p*-CP adsorption onto organophilic bentonite from aqueous solution. *Journal of Colloid and Interface Science*, **280** (2), 299-304.

Full Text: [J\J Col Int Sci280, 299.pdf](J/J%20Col%20Int%20Sci280,%20299.pdf)

Abstract: The characterization of tetraethylammonium bentonite and the adsorption of *p*-chlorophenol (*p*-CP) onto organophilic bentonite (tetraethylammonium bentonite) was studied as a function of the solution concentration and temperature. The observed adsorption rates were found to fit first-order kinetics. The rate constants were calculated for temperatures ranging between 15.0 and 35.0 °C at constant concentration. The adsorption energy *E* and adsorption capacity *q*m for the phenolic compound adsorbing on organophilic bentonite were estimated using the Dubinin–Radushkevic equation. Thermodynamic parameters (Δ*g*a, Δ*h*a, Δ*s*a) were calculated by a new approximation from the isotherms of *p*-CP adsorption on organophilic bentonite. These isotherms were modeled according to Freundlich and Dubinin–Radushkevic adsorption isotherms. The amount of adsorption of *p*-chlorophenol on organophilic bentonite was found to be dependent on the relative energies of adsorbent–adsorbate, adsorbate–solvent, and adsorbate–adsorbate interactions.

Keywords: phenolic Compounds, Adsorption, Thermodynamics, Kinetics, Organophilic Clays

Erdem, E., Karapinar, N. and Donat, R. (2004), The removal of heavy metal cations by natural zeolites. *Journal of Colloid and Interface Science*, **280** (2), 309-314.

Full Text: [J\J Col Int Sci280, 309.pdf](J/J%20Col%20Int%20Sci280,%20309.pdf)

Abstract: In this study, the adsorption behavior of natural (clinoptilolite) zeolites with respect to Co2+, Cu2+, Zn2+, and Mn2+ has been studied in order to consider its application to purity metal finishing wastewaters. The batch method has been employed, using metal concentrations in solution ranging from 100 to 400 mg/l. The percentage adsorption and distribution coefficients (*K*d) were determined for the adsorption system as a function of sorbate concentration. In the ion exchange evaluation part of the study, it is determined that in every concentration range, adsorption ratios of clinoptilolite metal cations match to Langmuir, Freundlich, and Dubinin–Kaganer–Radushkevich (DKR) adsorption isotherm data, adding to that every cation exchange capacity metals has been calculated. It was found that the adsorption phenomena depend on charge density and hydrated ion diameter. According to the equilibrium studies, the selectivity sequence can be given as Co2+ > Cu2+ > Zn2+ > Mn2+. These results show that natural zeolites hold great potential to remove cationic heavy metal species from industrial wastewater.

Keywords: Adsorption, Wastewaters, Heavy Metals, Natural Zeolites, Clinoptilolite

Allen, S.J., McKay, G. and Porter, J.F. (2004), Adsorption isotherm models for basic dye adsorption by peat in single and binary component systems. *Journal of Colloid and Interface Science*, **280** (2), 322-333.

Full Text: [J\J Col Int Sci280, 322.pdf](J/J%20Col%20Int%20Sci280,%20322.pdf)

Abstract: Colored effluents from textile industries are a problem in many rivers and waterways. Prediction of dye adsorption capacities is important in design considerations. The sorption of three basic dyes, namely Basic blue 3, Basic yellow 21, and Basic red 22, onto peat is reported. Equilibrium sorption isotherms have been measured for the three single-component systems. Equilibrium was achieved after 21 days. The experimental isotherm data were analyzed using Langmuir, Freundlich, Redlich–Peterson, Tempkin, and Toth isotherm equations. A detailed error analysis has been undertaken to investigate the effect of using different error criteria for the determination of the single-component isotherm parameters and hence obtain the best isotherm and isotherm parameters which describe the adsorption process. The linear transform model provided the highest *R*2 regression coefficient with the Redlich–Peterson model. The Redlich–Peterson model also yielded the best fit to experimental data for all three dyes using the nonlinear error functions. An extended Langmuir model has been used to predict the isotherm data for the binary systems using the single component data. The correlation between theoretical and experimental data had only limited success due to competitive and interactive effects between the dyes and the dye–surface interactions.

Keywords: Adsorption, Isotherm, Langmuir, Freundlich, Redlich–Peterson, Toth, Tempkin, Extended Langmuir, Error analysis

Chen, J.P. and Wu, S. (2004), Simultaneous adsorption of copper ions and humic acid onto an activated carbon. *Journal of Colloid and Interface Science*, **280** (2), 334-342.

Full Text: [J\J Col Int Sci280, 334.pdf](J/J%20Col%20Int%20Sci280,%20334.pdf)

Abstract: In this study, simultaneous adsorption of copper ions and humic acid (HA) from Aldrich onto an activated carbon is investigated. It is found that the HA adsorption in the absence of copper decreases as the pH is increased. It leads to a reduction of 34.7% in the specific surface area of carbon. There exists a critical concentration (CC) of HA for copper adsorption. At HA concentrations < CC, a decrease in copper adsorption is observed; however, the HA improves the adsorption at HA concentrations > CC. An increase in ionic strength can enhance the copper uptake; however, zinc and/or cobalt ions have an insignificant influence on copper adsorption. The adsorption is significantly increased by citric acid, whereas addition of EDTA slightly decreases the uptake. An intraparticle diffusion model is successfully used to describe the copper adsorption kinetics.

Keywords: Activated Carbon, Adsorption, Surface Properties, Humic Acid, Copper Ions

Covelo, E.F., Álvarez, N., Andrade Couce, M.L., Vega, F.A. and Marcet, P. (2004), Zn adsorption by different fractions of Galician soils. *Journal of Colloid and Interface Science*, **280** (2), 343-349.

Full Text: [J\J Col Int Sci280, 343.pdf](J/J%20Col%20Int%20Sci280,%20343.pdf)

Abstract: To evaluate the contribution of organic matter, oxides, and clay fraction to Zn adsorption in six soils from Galicia (Spain), after soil characterization, adsorption isotherms were obtained by adding nine solutions containing between 20 and 500 mg L−1 concentrations of Zn(NO3)2. Distribution coefficients were obtained from the data of adsorption isotherms. Zn adsorption isotherms corresponding to untreated soil and to the organic matter removed samples and organic matter and oxides removed samples were compared with curves pattern and adjusted to Langmuir and Freundlich empirical models. Untreated soils described L-curves whereas when soils were deprived of any component, the curves described were S-type. Distribution coefficients allowed knowing the Zn adsorption capacity of the untreated soil, and of the organic matter, oxides, and clay fraction. Soil organic matter is the main component that affects Zn adsorption as long as soil pH is near neutrality. At acid pH, the oxides are the main component that affects Zn adsorption, although to a much smaller extent than the organic matter near neutral conditions. So soil pH is the main soil factor that determines Zn adsorption, before any other soil property.

Keywords: Soil, Zinc, Adsorption, pH, Organic Matter, Oxides, Isotherms, Clays

Namasivayam, C. and Sangeetha, D. (2004), Equilibrium and kinetic studies of adsorption of phosphate onto ZnCl2 activated coir pith carbon. *Journal of Colloid and Interface Science*, **280** (2), 359-365.

Full Text: [J\J Col Int Sci280, 359.pdf](J/J%20Col%20Int%20Sci280,%20359.pdf)

Abstract: pHosphate removal from aqueous solution was investigated using ZnCl2-activated carbon developed from coir pith, an agricultural solid waste. Studies were conducted to delineate the effect of contact time, adsorbent dose, phosphate concentration, pH, and temperature. The adsorption equilibrium data followed both Langmuir and Freundlich isotherms. Langmuir adsorption capacity was found to be 5.1 mg/g. Adsorption followed second-order kinetics. The removal was maximum in the pH range 3–10. pH effect and desorption studies showed that adsorption occurred by both ion exchange and chemisorption mechanisms. Adsorption was found to be spontaneous and endothermic. Effect of foreign ions on adsorption shows that perchlorate, sulfate, and selenite decreased the percent removal of phosphate.

Keywords: Adsorption, ZnCl2-Activated Coir Pith Carbon, pHosphate, Isotherms, pH Effect, Desorption, Temperature Effect

Cestari, A.R., Vieira, E.F.S., dos Santos, A.G.P., Mota, J.A. and de Almeida, V.P. (2004), Adsorption of anionic dyes on chitosan beads. 1. The influence of the chemical structures of dyes and temperature on the adsorption kinetics. *Journal of Colloid and Interface Science*, **280** (2), 380-386.

Full Text: [J\J Col Int Sci280, 380.pdf](J/J%20Col%20Int%20Sci280,%20380.pdf)

Abstract: In this work, chitosan beads were synthesized in acidic medium and cross-linked in 1% glutaraldehyde solution. The characterization of the materials using TG/DTG, XRD, and BET surface areas showed that the beads did not modify their characteristics after the cross-linking reaction. The cross-linked beads were utilized as adsorbents for the removal of the yellow-, blue-, and red-anionic reactive dyes from aqueous solutions at pH 2.0. Adsorption of the yellow-dye increased from 25 to 50 °C. However, adsorption of the blue-dye decreased from 25 to 50 °C. Interestingly, the adsorption of the red-dye decreased from 25 to 35 °C and increased from 45 to 50 °C. The kinetic data were evaluated using an Avrami kinetic model, where the parameter *n* was related to the determination of changes in the adsorption mechanisms. Adsorption data of the dyes in relation to the contact time, the chemical structures of the dyes, and temperature were presented and were discussed.

Keywords: Chitosan Beads, Reactive Dyes, Adsorption Kinetics, Avrami Kinetic Model

Hisarli, G. (2005), The effects of acid and alkali modification on the adsorption performance of fuller’s earth for basic dye. *Journal of Colloid and Interface Science*, **281** (1), 18-26.

Full Text: [2005\J Col Int Sci281, 18.pdf](2005/J%20Col%20Int%20Sci281,%2018.pdf)

Abstract: The objective of this work was to prepare modified adsorbents from fuller’s earth (FE) by acid and alkali treatment for enhancement cationic dye adsorption. Toluidine blue (TB) was selected as adsorbate for evaluating the adsorption performance of fuller’s earth samples, which was affected significantly by acid and alkali modification. The adsorption of TB was studied by visible spectra. The absorption band of the monomer at low loading of TB in FE suspension with respect to its maximum in aqueous solution is red-shifted, which is related to accessibility of dye interlamellar space in the presence of positively charged surface sites. Since all surfaces are negatively charged under experimental conditions, this effect has not been observed in acid- and alkali-treated FE suspensions. It was seen that the adsorption capacity of alkali-treated surface (FEAl) for TB was higher than these of acid-treated adsorbent (FEAc) and FE. Scanning electron micrographs (SEM) and X-ray diffraction (XRD) and fluorescence (XRF) spectra were applied to analyze the structure of the raw and modified FE samples. Absence of any identifiable amount of a crystalline compound in the solid reaction products after acid treatment was confirmed by XRD and SEM, whereas the crystalline form of FEAl was preserved. Experimental data for high-concentration regions were well described by Freundlich and Langmuir adsorption equations. The thermodynamic parameters were estimated for FE, FEAc, and FEAl by using temperature dependence of adsorption equilibrium constants.

Keywords: Toluidine Blue, Fuller’s Earth, Acid Treatment, Alkali Treatment, Adsorption

Akçay, G., Akçay, M. and Yurdakoç, K. (2005), Removal of 2,4-dichlorophenoxyacetic acid from aqueous solutions by partially characterized organophilic sepiolite: Thermodynamic and kinetic calculations. *Journal of Colloid and Interface Science*, **281** (1), 27-32.

Full Text: [2005\J Col Int Sci281, 27.pdf](2005/J%20Col%20Int%20Sci281,%2027.pdf)

Abstract: The adsorption of 2,4-dichlorophenoxyacetic acid (2,4-D) on organophilic sepiolite (dodecylammonium sepiolite, DAS) was studied as a function of solution concentration and temperature. The observed adsorption rates were found to be equal to the first-order kinetics. The rate constants were calculated for temperatures ranging between 25 and 40 °C at constant concentration. The adsorption energies, E, and adsorption capacity, qm, for 2,4-D adsorption on organophilic sepiolite was estimated using the Dubinin–Radushkevic equation. Thermodynamic parameters (Δga, Δha, Δsa) were determined by a new approximation from the isotherm of 2,4-D adsorption on DAS. Also, ΔS0 and ΔH0 values were calculated from the van’t Hoff equation. These isotherms were modeled according to the Freundlich and Dubinin–Radushkevic adsorption equations. The amount of adsorption of this herbicide on organophilic sepiolite was found to be dependent on the relative energies of adsorbent–adsorbate, adsorbate–solvent, and adsorbate–adsorbate interaction.

Keywords: Herbicides, Removal, Adsorption, Thermodynamics, Kinetics, Organophilic Sepiolite

Bilgiç, C. (2005), Investigation of the factors affecting organic cation adsorption on some silicate minerals. *Journal of Colloid and Interface Science*, **281** (1), 33-38.

Full Text: [2005\J Col Int Sci281, 33.pdf](2005/J%20Col%20Int%20Sci281,%2033.pdf)

Abstract: In this study, the effects of some factors on the adsorption of a basic dye (Methylene blue) on bentonite and sepiolite samples were studied. These factors are cation (Na+ and Ca2+) saturation of the samples and pH and ionic strength of the dye solution. The adsorption data were found to conform to the Langmuir equation within the concentration range studied and Langmuir constants were determined for each of the samples. The adsorption capacities of the samples were found to increase with cation saturation. Changes in the pH of the dye solution had no significant influence on the adsorption capacity and adsorption capacities were found to decrease with increasing ionic strength. The maximum sorption capacity of Methylene blue exceeded the cation exchange capacity of bentonite and sepiolite.

Keywords: Bentonite, Cation Saturation, Ionic Strength, Methylene Blue Adsorption, pH, Sepiolite

Fan, M., Boonfueng, T., Xu, Y., Axe, L. and Tyson, T.A. (2005), Modeling Pb sorption to microporous amorphous oxides as discrete particles and coatings. *Journal of Colloid and Interface Science*, **281** (1), 39-48.

Full Text: [2005\J Col Int Sci281, 39.pdf](2005/J%20Col%20Int%20Sci281,%2039.pdf)

Abstract: Hydrous amorphous Al (HAO), Fe (HFO), and Mn (HMO) oxides are ubiquitous in the subsurface as both discrete particles and coatings and exhibit a high affinity for heavy metal contaminants. To assess risks associated with heavy metals, such as Pb, to the surrounding environment and manage remedial activities requires accurate mechanistic models with well-defined transport parameters that represent sorption processes. Experiments were conducted to evaluate Pb sorption to microporous Al, Fe, and Mn oxides, as well as to montmorillonite and HAO-coated montmorillonite. Intraparticle diffusion, a natural attenuating process, was observed to be the rate-limiting mechanism in the sorption process, where best-fit surface diffusivities ranged from 10−18 to 10−15 cm2 s−1. Specifically, diffusivities of Pb sorption to discrete aluminum oxide, aluminum oxide-coated montmorillonite, and montmorillonite indicated substrate surface characteristics influence metal mobility where diffusivity increased as affinity decreased. Furthermore, the diffusivity for aluminum oxide-coated montmorillonite was consistent with the concentrations of the individual minerals present and their associated particle size distributions. These results suggest that diffusivities for other coated systems can be predicted, and that oxide coatings and montmorillonite are effective sinks for heavy metal ions.

Keywords: Lead, Sorption, Intraparticle Diffusion, Hydrous Aluminum Oxide, Hydrous Iron Oxide, Hydrous Manganese Oxide, Oxide Coating, Montmorillonite

Bhatnagar, A. and Jain, A.K. (2005), A comparative adsorption study with different industrial wastes as adsorbents for the removal of cationic dyes from water. *Journal of Colloid and Interface Science*, **281** (1), 49-55.

Full Text: [2005\J Col Int Sci281, 49.pdf](2005/J%20Col%20Int%20Sci281,%2049.pdf)

Abstract: Four adsorbents have been prepared from industrial wastes obtained from the steel and fertilizer industries and investigated for their utility to remove cationic dyes. Studies have shown that the adsorbents prepared from blast furnace sludge, dust, and slag have poor porosity and low surface area, resulting in very low efficiency for the adsorption of dyes. On the other hand, carbonaceous adsorbent prepared from carbon slurry waste obtained from the fertilizer industry was found to show good porosity and appreciable surface area and consequently adsorbs dyes to an appreciable extent. The adsorption of two cationic dyes, viz., rhodamine B and Bismark Brown R on carbonaceous adsorbent conforms to Langmuir equation, is a first-order process and pore diffusion controlled. As the adsorption of dyes investigated was appreciable on carbonaceous adsorbent, its efficiency was evaluated by comparing the results with those obtained on a standard activated charcoal sample. It was found that prepared carbonaceous adsorbent exhibits dye removal efficiency that is about 80–90% of that observed with standard activated charcoal samples. Thus, it can be fruitfully used for the removal of dyes and is a suitable alternative to standard activated charcoal in view of its cheaper cost.

Keywords: Rhodamine B, Bismark Brown R, Wastewater, Industrial Solid Wastes, Adsorbents

Tokimoto, T., Kawasaki, N., Nakamura, T., Akutagawa, J. and Tanada, S. (2005), Removal of lead ions in drinking water by coffee grounds as vegetable biomass. *Journal of Colloid and Interface Science*, **281** (1), 56-61.

Full Text: [2005\J Col Int Sci281, 56.pdf](2005/J%20Col%20Int%20Sci281,%2056.pdf)

Abstract: In an attempt to reuse food waste for useful purposes, we investigated the possibility of using coffee grounds to remove lead ions from drinking water. We studied the lead ion adsorption characteristics of coffee beans and grounds by measuring their fat and protein content, adsorption isotherms for lead ions, and adsorption rates for lead ions. The number of lead ions adsorbed by coffee grounds did not depend on the kind of coffee beans or the temperature at which adsorption tests were performed. The rate of lead ion adsorption by coffee grounds was directly proportional to the amount of coffee grounds added to the solution. When coffee grounds were degreased or boiled, the number of lead ions decreased. When proteins contained in coffee grounds were denatured, the lead ion adsorption was considerably reduced. The lead ion adsorption capacity of coffee grounds decreased with increased concentration of perchloric acid used for treating them and disappeared with 10% perchloric acid. The experiments demonstrated that proteins contained in coffee beans depend upon the adsorption of lead ion. The present study gave an affirmative answer to the possibility of using coffee grounds, an abundant food waste, for removing lead ions from drinking water.

Keywords: Lead Ion, Adsorption, Coffee Grounds, Vegetable Biomass

Oguz, E. (2005), Thermodynamic and kinetic investigations of PO43− adsorption on blast furnace slag. *Journal of Colloid and Interface Science*, **281** (1), 62-67.

Full Text: [2005\J Col Int Sci281, 62.pdf](2005/J%20Col%20Int%20Sci281,%2062.pdf)

Abstract: The kinetics of adsorption of PO43− by blast furnace slag were found to be fast, reaching equilibrium in 20 min and following a pseudo-second-order rate equation. The adsorption behavior of PO43− on blast furnace slag has been studied as a function of the solution agitation speed, pH, and temperature. Results have been analyzed by Freundlich, Langmuir, BET, and Dubinin–Radushkevich (D–R) adsorption isotherms. The mean energy of adsorption, 10.31 kJ mol−1, was calculated from the D–R adsorption isotherm. The rate constants were calculated for 293, 298, 303, and 308 K using a pseudo-second-order rate equation and the activation energy (*E*a) was derived using the Arrhenius equation. Thermodynamic parameters such as Δ*H*0, Δ*S*0, and Δ*G*0 were calculated from the slope and intercept of linear plot of ln*K*D against 1/*T*. The Δ*H*0 and Δ*G*0 values of PO43− adsorption on the blast furnace slag show endothermic heat of adsorption. But there is a negative free energy value, indicating that the process of PO3−4 adsorption is favored at high temperatures.

Keywords: Activation, Adsorption, Adsorption Isotherm, Adsorption Isotherms, Aluminum, Aqueous-Solutions, Biological Phosphorus Removal, Blast Furnace Slag, Equilibrium, Ions, Iron, Isotherm, Isotherms, Kinetic, Kinetics, Kinetics of Adsorption, Phosphate, Phosphate Adsorption, Pseudo Second Order, Silicate, Sorption, Variables, Waste-Water-Treatment

Inglezakis, V.J. (2005), The concept of “capacity” in zeolite ion-exchange systems. *Journal of Colloid and Interface Science*, **281** (1), 68-79.

Full Text: [2005\J Col Int Sci281, 68.pdf](2005/J%20Col%20Int%20Sci281,%2068.pdf)

Abstract: In the present paper a study is conducted in order to distinguish the several types of capacity used in the literature on zeolite ion-exchange systems, to verify the use of each capacity type, and to analyze the several experimental methods used for capacity determination. Although the study is focused on zeolite clinoptilolite as a characteristic paradigm, its theoretical approaches and experimental findings and methods could also apply to other zeolites.

Keywords: Zeolites, Capacity, Ion Exchange, Clinoptilolite

Seki, H., Suzuki, A. and Maruyama, H. (2005), Biosorption of chromium(VI) and arsenic(V) onto methylated yeast biomass. *Journal of Colloid and Interface Science*, **281** (2), 261-266.

Full Text: [2005\J Col Int Sci281, 261.pdf](2005/J%20Col%20Int%20Sci281,%20261.pdf)

Abstract: Yeast biomass was methylated in a 0.1 M HCl methyl alcohol solution at room temperature and the methylated yeast (MeYE) was applied to the adsorptive separation of Cr(VI) and As(V) anions from aqueous solutions. At near-neutral pH, while Cr(VI) and As(V) anions were scarcely adsorbed onto unmethylated yeast biomass, the amounts adsorbed increased with increasing methylation degree. The amount of Cr(VI) adsorbed onto MeYE was almost constant at pH 4–6 and decreased with increasing pH above pH 6. The amount of As(V) adsorbed onto MeYE was rather lower than that of Cr(VI) and it had a peak at about pH 7. A metal-binding model was used to describe the adsorption characteristics of Cr(VI) and As(V) on MeYE. The results showed that MeYE has two different types of adsorption sites. The saturated amount of Cr(VI) and As(V) adsorbed onto MeYE having methylation degree 0.94 was 0.55 mmol g−1.

Keywords: Biosorption, Chromium, Arsenic, Methylated Yeast Biomass

Kan, A.T., Fu, G.M. and Tomson, M.B. (2005), Adsorption and precipitation of an aminoalkylphosphonate onto calcite. *Journal of Colloid and Interface Science*, **281** (2), 275-284.

Full Text: [2005\J Col Int Sci281, 275.pdf](2005/J%20Col%20Int%20Sci281,%20275.pdf)

Abstract: The mechanism of nitrilotris(Methylene phosphonic acid) (H6NTMP)/calcite reaction was studied with a large number of batch experiments where phosphonic acid was neutralized with 0 to 5 equivalents of NaOH per phosphonic acid and the concentration ranged from about 10 nmol/L to 1 mol/L. It is proposed that the phosphonate/calcite reactions are characterized in three steps. At low phosphonate concentration (<1 μmol/L NTMP concentration), the phosphonate/calcite reaction can be characterized as a Langmuir isotherm. At saturation, only 7% of the calcite surface is covered with phosphonate; presumably these are the kinks, step edges, or other imperfect sites. At higher phosphonate concentrations, the attachment is characterized by calcium phosphonate crystal growth to a maximum of four to five surface layer thick, with solid phase stoichiometry of Ca2.5HNTMP and a constant solubility product of 10−24.11. After multiple layers of phosphonate are formed on the calcite surface, the solution is no longer at equilibrium with calcite. Further phosphonate retention is probably due to mixed calcium phosphonate solid phase formation at lower pH and depleted solution phase Ca conditions. The proposed mechanism is consistent with phosphate/calcite reaction and can be used to explain the fate of phosphonate in brines from oil producing wells and the results are compared with two oil wells.

Keywords: Phosphonates, Calcite, Adsorption, Precipitation, Scale inhibition

? Guo, J., Xu, W.S., Chen, Y.L. and Lua, A.C. (2005), Adsorption of NH3 onto activated carbon prepared from palm shells impregnated with H2SO4. *Journal of Colloid and Interface Science*, **281** (2), 285-290.

Full Text: [2005\J Col Int Sci281, 285.pdf](2005/J%20Col%20Int%20Sci281,%20285.pdf)

Abstract: Adsorption of ammonia (NH3) onto activated carbons prepared from palm shells impregnated with sulfuric acid (H2SO4) was investigated. The effects of activation temperature and acid concentration oil pore surface area development were studied. The relatively large micropore surface areas of the palm-shell activated carbons prepared by H2SO4 activation suggest their potential applications in gas adsorption. Adsorption experiments at a fixed temperature showed that the amounts of NH3 adsorbed onto the chemically activated carbons, unlike those prepared by CO2 thermal activation, were not solely dependent on the specific pore surface areas of the adsorbents. Further adsorption tests for a wide range of temperatures suggested combined physisorption and chemisorption of NH3. Desorption tests at the same temperature as adsorption and at an elevated temperature were carried out to confirm the occurrence of chemisorption due to the interaction between NH3 and some oxygen functional groups via hydrogen bonding. The surface functional groups on the adsorbent surface were detected by Fourier transform infrared spectroscopy. The amounts of NH3 adsorbed by chemisorption were correlated with the contents of elemental oxygen present in the adsorbents. Mechanisms for chemical activation and adsorption processes are proposed based on the observed phenomena. (C) 2004 Published by Elsevier Inc.

Keywords: Activated Carbon, Activation, Activation Temperature, Adsorbent, Adsorbents, Adsorption, Ammonia, Carbon, Carbons, Chemical Activation, Chemisorption, Co2, Desorption, Development, Elevated Temperature, Fourier Transform Infrared, Fourier Transform Infrared Spectroscopy, Gases, H2SO4, H2SO4 Activation, Infrared, NH3, NH3 Adsorption, Oxygen Functional Groups, Palm Shell, Pore, Reaction Mechanism, Surface Area, Temperature, Thermal Activation

Shen, D.Z., Huang, M.H., Wang, F. and Yang, M.S. (2005), Impedance analysis of an electrode-separated piezoelectric sensor as a surface-monitoring technique for gelatin adsorption on quartz surface. *Journal of Colloid and Interface Science*, **281** (2), 398-409.

Full Text: [2005\J Col Int Sci281, 398.pdf](2005/J%20Col%20Int%20Sci281,%20398.pdf)

Abstract: The early events pertaining to gelatin adsorption and desorption onto quartz surfaces were studied, employing an electrode-separated piezoelectric sensor (ESPS). The adsorption of gelatin on a quartz crystal surface corresponds to a mass increase, which can be monitored in real time by the changes in the impedance parameters of the ESPS. It was shown that the adsorption of gelatin on a quartz surface is partly irreversible with respect to the dilution of the bulk phase. The observed adsorption kinetics is compatible with a mechanism that involves adsorption, desorption, and transformation from a reversible adsorption state to irreversible one. A progressive approach method was established to simulate the adsorption process. The adsorption densities and kinetic parameters in the early adsorption process were obtained from the responses of the ESPS in the adsorption process. The influence of pH and ionic strength was tested. A comparison with the Langmuir adsorption model was made.

Keywords: Adsorption Kinetics, Gelatin, Piezoelectric Sensor, Electrode-Separated

Dal Bosco, S.M., Jimenez, R.S. and Carvalho, W.A. (2005), Removal of toxic metals from wastewater by Brazilian natural scolecite. *Journal of Colloid and Interface Science*, **281** (2), 424-431.

Full Text: [2005\J Col Int Sci281, 424.pdf](2005/J%20Col%20Int%20Sci281,%20424.pdf)

Abstract: The cation-exchange capacity of Brazilian natural zeolite, identified as scolecite, was studied with the aim of evaluating its applications in wastewater control. We investigated the process of sorption of chromium(III), nickel(II), cadmium(II), and manganese(II) in synthetic aqueous effluents, including sorption isotherms of single-metal solutions at 298, 313, and 333 K, by batch experiments, and the influence of pH on the process. The results have demonstrated that removal of metals from specific metal solutions is best described by a Freundlich isotherm, in which the values obtained for the *K*f constants were in the following order: Cr > Mn > Cd > Ni. A Lagergren pseudo-second-order was the model that best described the sorption mechanism. The retention of metals was shown to be a function of the pH; the maximum binding capacity occurring at pH values around 6.0. Thermodynamic data indicate the spontaneity of the endothermic cation-exchange process. The values of Δ*G*0 suggest the following selectivity series at 298 K: Ni > Cr > Cd > Mn. The desorption process reaches equilibrium during the first 60 min of binding, suggesting that the mechanism involves specific sites located in the external surface of the scolecite.

Keywords: Natural Zeolites, Cation Exchange, Scolecite, Toxic Metals, Sorption Isotherm, Wastewater, Metal Removal, Brazilian Zeolites

Yang, J.K. and Lee, S.M. (2005), EDTA effect on the removal of Cu(II) onto TiO2. *Journal of Colloid and Interface Science*, **282** (1), 5-10.

Full Text: [2005\J Col Int Sci282, 5.pdf](2005/J%20Col%20Int%20Sci282,%205.pdf)

Abstract: The adsorption of Cu(II) and Cu(II)–EDTA onto TiO2 with variations in the pH, concentration, and molar ratio of Cu(II) to EDTA has been studied. The adsorption of Cu(II) and Cu(II)–EDTA onto TiO2 showed typical cationic- and anionic-type behavior, respectively. The removal of Cu(II) in an EDTA-excess system was less than that in an equimolar Cu(II)/EDTA system due to the competitive adsorption of EDTA and Cu(II)–EDTA onto the TiO2. The removal of Cu(II) was favorable at low pH for both the equimolar and EDTA-excess systems, while significant Cu(II) removal was observed over the entire pH range in a copper-excess system. For model predictions, the MINTEQA2 program employing an inner-sphere complexation and a diffuse layer model was used; the surface complexes used included Ti-(OH2)O-Cu+, Ti-(OH)EDTAH2−2, and Ti-(OH)EDTA-Cu2−.

Keywords: Adsorption, Copper, Cu(II)–EDTA, EDTA, Surface Complexation, TiO2

Xu, Y. and Axe, L. (2005), Synthesis and characterization of iron oxide-coated silica and its effect on metal adsorption. *Journal of Colloid and Interface Science*, **282** (1), 11-19.

Full Text: [2005\J Col Int Sci282, 11.pdf](2005/J%20Col%20Int%20Sci282,%2011.pdf)

Abstract: To accurately model metal mobility and bioavailability in soils and sediments, systematic adsorption studies are needed in considering heterogeneous, well characterized minerals. Two important surfaces are iron oxide and silica, which are ubiquitous and associated with one another in the environment playing important roles in metal distribution. This study focuses on the synthesis and characterization of such a system, iron oxide-coated silica. A three-level fractional factorial study was used to determine the optimum conditions for producing goethite-coated silica. The amount of coating achieved was between 0.59 and 21.36 mg Fe g−1 solid. The most significant factor in coating using either adsorption or precipitation was the particle size of silica, where Fe increased from an average of 0.85 to 9.6 mg Fe g−1 solid as silica size decreased from 1.5 to 0.2 mm. Other factors investigated, including coating temperature, initial iron concentration, and contact time, were of less importance. The iron oxide coatings were observed to be non-uniform, concentrated in rough concave areas. FTIR revealed a band shift as well as a new band indicating changes in the chemical environment of FeO and SiO bonds; these results along with abrasion studies suggest that the interaction between the oxide coating and silica surface potentially involves chemical forces. Because the nano-sized iron oxide coatings increased surface area, introduced small pores, and changed the surface charge distribution of silica, the coated system demonstrates a greater affinity for Ni compared to that of uncoated silica.

Keywords: Iron Oxide-Coated Sand, Nickel, Adsorption, Coating Synthesis and Characterization

Demirbas, A., Pehlivan, E., Gode, F., Altun, T. and Arslan, G. (2005), Adsorption of Cu(II), Zn(II), Ni(II), Pb(II), and Cd(II) from aqueous solution on Amberlite IR-120 synthetic resin. *Journal of Colloid and Interface Science*, **282** (1), 20-25.

Full Text: [2005\J Col Int Sci282, 20.pdf](2005/J%20Col%20Int%20Sci282,%2020.pdf)

Abstract: The adsorption of copper(II), zinc(II), nickel(II), lead(II), and cadmium(II) on Amberlite IR-120 synthetic sulfonated resin has been studied at different pH and temperatures by batch process. The effects of parameters such as amount of resin, resin contact time, pH, and temperature on the ion exchange separation have been investigated. For the determination of the adsorption behavior of the resin, the adsorption isotherms of metal ions have also been studied. The concentrations of metal ions have been measured by batch techniques and with AAS analysis. Adsorption analysis results obtained at various concentrations showed that the adsorption pattern on the resin followed Freundlich isotherms. Here we report the method that is applied for the sorption/separation of some toxic metals from their solutions.

Keywords: Cu(II), Zn(II), Ni(II), Pb(II), Cd(II), Amberlite IR-120, Adsorption Behavior, Freundlich Isotherm

Yuan, R.H., Guan, R.B., Shen, W.Z. and Zheng, J.T. (2005), pHotocatalytic degradation of Methylene blue by a combination of TiO2 and activated carbon fibers. *Journal of Colloid and Interface Science*, **282** (1), 87-91.

Full Text: [2005\J Col Int Sci282, 87.pdf](2005/J%20Col%20Int%20Sci282,%2087.pdf)

Abstract: pHotocatalytic degradation of Methylene blue (MB) in aqueous solution was investigated using TiO2 immobilized on activated carbon fibers (ACFs). The TiO2 and ACF combination (TiO2/ACF) was prepared by using epoxy as the precursor of the link between TiO2 and ACFs, followed by calcination at 460 °C in a N2 atmosphere. The TiO2/ACF composite prepared was easier to handle than the original TiO2 powder in suspension. More significantly, the TiO2/ACF composite can be used repeatedly without a decline in photodegradation ability. After six cycles, the amount of MB removal for the TiO2/ACF composite was still slightly higher than that for fresh P25 TiO2 in suspension. Through measurement of chemical oxygen demand in the solution and the concentration of ammonium generated during degradation of MB, it was confirmed that MB molecules are mineralized instead of adsorbed by ACFs.

Keywords: Titanium Dioxide, Activated Carbon Fibers, pHotodegradation, Methylene Blue

Gauden, P.A. (2005), Does the Dubinin–Serpinsky theory adequately describe water adsorption on adsorbents with high-energy centers? *Journal of Colloid and Interface Science*, **282** (2), 249-260.

Full Text: [2005\J Col Int Sci282, 249.pdf](2005/J%20Col%20Int%20Sci282,%20249.pdf)

Abstract: The paper is an attempt to explain the mechanism of water adsorption on carbonaceous adsorbents with high-energy centers (surface or cation-exchange groups). The equations formulated previously by Dubinin et al. and Barton et al. are analyzed. Thus, four types of empirical factors defining the decrease in adsorption site concentration are taken into account. The isotherms of water adsorption measured on two microporous activated carbons containing various densities of hydrophilic sites are described by the above-mentioned theoretical isotherm equations. It is shown that none of these models provides an adequate description of the experimental data, especially at low relative pressures. This leads to the conclusion that with regard to the Dubinin and Serpinsky theory, the chemisorption of water at very high-energy adsorption sites needs to be taken into account. In view of the above, a new theoretical relationship is proposed which includes a correct description of the decreasing number of active sites. As a consequence, a good correlation between the new theoretical model and experimental data is observed over the whole range of relative pressures.

Keywords: Carbon, Water Adsorption, Chemisorption, Microporosity, Hydrophilic Centers, Primary Adsorption Sites, Dubinin–Serpinsky Theory

Heidmann, I., Christl, I., Leu, C. and Kretzschmar, R. (2005), Competitive sorption of protons and metal cations onto kaolinite: Experiments and modeling. *Journal of Colloid and Interface Science*, **282** (2), 270-282.

Full Text: [2005\J Col Int Sci282, 270.pdf](2005/J%20Col%20Int%20Sci282,%20270.pdf)

Abstract: Competitive sorption of protons, Cu, and Pb onto kaolinite (KGa-2) was investigated over wide concentration ranges and quantitatively described using three different models based on surface complexation and cation exchange reactions. In all models, two types of binding sites were assumed for kaolinite: edge sites (SOH0.5−) with pH-dependent charge and face sites (X−) with permanent negative charge. In a first step, proton sorption was measured by potentiometric acid–base titrations of kaolinite dispersed in 0.01, 0.03, and 0.1 M NaNO3 electrolyte solutions. The acid–base titration data were fitted to obtain site densities and protonation constants for the edge and face sites, respectively. In a second step, the sorption of Cu and Pb onto kaolinite was investigated at fixed pH values by metal titration using ion-selective electrodes for Cu2+ and Pb2+, respectively, and by independent batch sorption experiments. Our metal sorption data cover a range of pH 4–8 for Cu and pH 4–6 for Pb, three different ionic strengths (0.01, 0.03, and 0.1 M NaNO3), and up to eight orders of magnitude in free metal ion activity. An additional experiment was conducted to explore the sorption competition between Cu and Pb. In all three models, sorption of protons and metal cations to the edge sites of kaolinite was described with a 1-p*K* basic Stern (BS) approach. The three models differed only in the description of cation sorption to the face sites. In the first model (BS/GT), we used a Gaines–Thomas (GT) cation exchange equation for the face sites. This model yielded a satisfactory description of Cu sorption, but failed to describe Pb sorption isotherms at pH 4, 5, and 6. In the second model (BS/BS), we replaced the Gaines–Thomas equation by a basic Stern surface complexation formulation, thereby introducing electrostatic terms for sorption to face sites and allowing for free binding sites X−. This did not improve the fits of Cu or Pb sorption to kaolinite, however. In the third model (BS/BSext), we extended the BS/BS-model by introducing additional monodentate sorption complexes at face sites (X-Cu+ and X-PbNO3). This model described both Cu and Pb sorption very well over the entire range in metal concentrations and pH. It also correctly predicted the competitive effect of Pb on sorption of Cu. Model calculations with all three models suggested that Cu and Pb were sorbed mainly to face sites at low pH, while sorption to edge sites dominated at high pH values.

Keywords: Adsorption, Kaolinite, Copper, Lead, Surface Complexation, Cation Exchange, Modeling, Titration, Ion-Selective Electrodes

Erdem, E., Çölgeçen, G. and Donat, R. (2005), The removal of textile dyes by diatomite earth. *Journal of Colloid and Interface Science*, **282** (2), 314-319.

Full Text: [2005\J Col Int Sci282, 314.pdf](2005/J%20Col%20Int%20Sci282,%20314.pdf)

Abstract: The adsorption of some textile dyes by diatomite was investigated using Sıf Blau BRF (SB), Everzol Brill Red 3BS (EBR), and Int Yellow 5GF (IY). Adsorption of these textile dyes onto diatomite earth samples was studied by batch adsorption techniques at 30 °C. The adsorption behavior of textile dyes on diatomite samples was investigated using a UV–vis spectrophotometric technique. The effect of particle size of diatomite, diatomite concentration, the effect of initial dye concentrations, and shaking time on adsorption was investigated. Adsorption coverage over the surface of diatomite was studied using two well-known isotherm models: Langmuir’s and Freundlich’s. These results suggest that the dye uptake process mediated by diatomite has a potential for large-scale treatment of textile mill discharges. According to the equilibrium studies, the selectivity sequence can be given as IY > SB > EBR. Values of the removal efficiency of the dyes ranged from 28.60 to 99.23%. These results show that natural diatomite holds great potential to remove textile dyes from wastewater.

Keywords: Adsorption, Textile dyes, Diatomite, Clay, Isotherm

Benhammou, A., Yaacoubi, A., Nibou, L. and Tanouti, B. (2005), Adsorption of metal ions onto Moroccan stevensite: Kinetic and isotherm studies. *Journal of Colloid and Interface Science*, **282** (2), 320-326.

Full Text: [2005\J Col Int Sci282, 320.pdf](2005/J%20Col%20Int%20Sci282,%20320.pdf)

Abstract: The aim of this paper is to study the adsorption of the heavy metals (Cd(II), Cu(II), Mn(II), Pb(II), and Zn(II)) from aqueous solutions by a natural Moroccan stevensite called locally rhassoul. We carried out, first, a mineralogical and physicochemical characterization of stevensite. The surface area is 134 m2/g and the cation exchange capacity (CEC) is 76.5 meq/100 g. The chemical formula of stevensite is Si3.78Al0.22Mg2.92Fe0.09Na0.08K0.08O10(OH)24H2O. Adsorption tests of Cd(II), Cu(II), Mn(II), Pb(II), and Zn(II) in batch reactors were carried out at ambient temperature and at constant pH. Two simplified models including pseudo-first-order and pseudo-second- order were used to test the adsorption kinetics. The equilibrium time and adsorption rate of adsorption were determined. The increasing order of the adsorption rates follows the sequence Mn(II) > Pb(II) > Zn(II) > Cu(II) > Cd(II). The Dubinin–Radushkevich (D–R), Langmuir, and Redlich–Peterson (R–P) models were adopted to describe the adsorption isotherms. The maximal adsorption capacities at pH 4.0 determined from the D–R and Langmuir models vary in the following order: Cu(II) > Mn(II) > Cd(II) > Zn(II) > Pb(II). The equilibrium data fitted well with the three-parameter Redlich–Peterson model. The values of mean energy of adsorption show mainly an ion-exchange mechanism. Also, the influence of solution pH on the adsorption onto stevensite was studied in the pH range 1.5–7.0.

Keywords: Adsorption, Heavy Metals, Isotherm, Kinetic, Stevensite

Kalies, G., Rockmann, R. and Denoyel, R. (2005), Calculation of immersion enthalpy data from adsorption isotherms. *Journal of Colloid and Interface Science*, **282** (2), 327-334.

Full Text: [2005\J Col Int Sci282, 327.pdf](2005/J%20Col%20Int%20Sci282,%20327.pdf)

Abstract: The thermodynamic equations for the calculation of binary and ternary immersion data in excess formalism are presented. Immersion enthalpies and entropies of the n-hexane/n-octane, n-octane/n-tetradecane and n-hexane/n-tetradecane binary mixtures as well as the n-hexane/n-octane/n-tetradecane ternary mixture on activated carbon are calculated from the temperature dependence of adsorption isotherms. In order to evaluate the quality of the calculations, the calculated immersion enthalpies of the binary mixtures on activated carbon are compared with those that were measured calorimetrically. It is shown that phenomenological thermodynamics can be used successfully to predict calorimetric data on the basis of adsorption excess isotherms.

Keywords: Excess Formalism, Thermodynamic Calculation, Calorimetric Quantities, Binary and Ternary Liquid Mixtures, Activated Carbon

? Horváth-Szabó, G., Masliyah, J.H., Elliott, J.A.W., Yarranton, H.W. and Czarnecki, J. (2005), Adsorption isotherms of associating asphaltenes at oil/water interfaces based on the dependence of interfacial tension on solvent activity. *Journal of Colloid and Interface Science*, **283** (1), 5-17.

Full Text: [2005\J Col Int Sci283, 5.pdf](2005/J%20Col%20Int%20Sci283,%205.pdf)

Abstract: In the Gibbs adsorption equation, the application of solvent activity for the calculation of the surface/interfacial excess is proposed for nonideal or associating or pseudocomponents such as asphaltenes. For the aforementioned systems, only the mass-based phenomenological interfacial excess can be determined based on interfacial tension versus activity data. The use of the mole fraction is compared to the use of the activity when the adsorbed amount of associating asphaltenes is calculated at a water/toluene interface. Langmuir-type isotherms describe the adsorption of asphaltenes at toluene/water interfaces. Asphaltenes were treated to remove the resins and natural surfactants using cyclic precipitation and dissolution of asphaltenes at a fixed aliphatic/aromatic ratio. Different fractions of asphaltenes were obtained by changing the aliphatic/aromatic ratio of the precipitating solvent. The limiting molar masses of asphaltenes measured by vapor pressure osmometry are different for fractions precipitated at different heptane to toluene ratios. The mass-based adsorbed amounts at the water/toluene interface, at a 0.1 asphaltene-to-toluene mass-ratio, varied in the range of 0.8–2.8 mg/m2, depending on the molar mass of asphaltenes.

Keywords: Adsorption from Nonideal Mixtures, Adsorption of Associating Components, Interfacial Excess, Activity in Gibbs Adsorption Equation, Molar Mass of Asphaltenes, Fractionation of Asphaltenes, Interfacial Tension of Asphaltenes, Molecular Area of Asphaltenes, Association of Asphaltenes

van Beinum, W., Hofmann, A., Meeussen, J.C.L. and Kretzschmar, R. (2005), Sorption kinetics of strontium in porous hydrous ferric oxide aggregates: I. The Donnan diffusion model. *Journal of Colloid and Interface Science*, **283** (1), 18-28.

Full Text: [2005\J Col Int Sci283, 18.pdf](2005/J%20Col%20Int%20Sci283,%2018.pdf)

Abstract: Sorption of ions by hydrous ferric oxide (HFO) often shows a fast initial sorption reaction followed by a much slower sorption process. The second step is diffusion-controlled and can continue for days or months before equilibrium is reached. In this paper, we demonstrate that the diffusion rate may be explained by electrostatic interactions. The internal and external surfaces of HFO are generally positively charged and therefore repel cations. This can result in extremely low cation concentrations in pores, and therefore a significant reduction in pore diffusion rate. The theory is demonstrated here for sorption of Sr2+ in HFO aggregates. The ion concentrations in the pore space are calculated using a Donnan model and diffusion is calculated from the Donnan concentration and potential gradients. This diffusion model is compared with nonelectrostatic pore diffusion, which does not take electrostatic interactions into account. The Donnan model predicts very low concentrations of Sr2+ in the pores and diffusion rates that are up to 8000 times lower than predicted with a nonelectrostatic model.

Keywords: Ferrihydrite, HFO, Iron Oxide, Diffusion In Pores, Micro-Mesoporous Aggregates, Donnan Diffusion Model, Nernst–Planck Diffusion, CD-MUSIC, Sorption Kinetics

Hofmann, A., van Beinum, W., Meeussen, J.C.L. and Kretzschmar, R. (2005), Sorption kinetics of strontium in porous hydrous ferric oxide aggregates. II. Comparison of experimental results and model predictions. *Journal of Colloid and Interface Science*, **283** (1), 29-40.

Full Text: [2005\J Col Int Sci283, 29.pdf](2005/J%20Col%20Int%20Sci283,%2029.pdf)

Abstract: In a previous paper, we introduced the Donnan diffusion model to describe cation diffusion into microporous solids with variably charged surfaces, such as hydrous ferric oxides (HFO). Here, we present experiments investigating slow diffusion and sorption of strontium by HFO aggregates with well-characterized porosity. Adsorption of protons and strontium at the HFO surface was evaluated by acid–base titration and batch adsorption experiments with dispersed HFO. The experimental data were fitted with a 1-pK basic Stern model including surface ion pair formation of Na+ and NO3- and charge distribution for Sr surface complexes. Sorption–diffusion experiments were conducted in flow-through columns at controlled flow rates and at two different pH values, pH 4 and 7. Wet HFO aggregates, which were synthesized using a freezing and thawing method, were packed into chromatographic columns, pre-equilibrated to reach a constant pH, and then Sr breakthrough curves for adsorption and desorption of Sr were recorded. Strong retardation of Sr indicated that diffusion was sufficiently fast in a fraction of pores, so that sorption sites in these pores were rapidly accessible. Based on the analysis of NaNO3 breakthrough curves, this rapidly accessible pore fraction was estimated to be 37% of the total aggregate pore volume at pH 4.0 and 72% at pH 7.0, respectively. Taking this into account, the Donnan diffusion model gave a good description of the experimental Sr breakthrough curves. Cation exclusion was correctly predicted at pH 4.0. At pH 7, the strong tailing of Sr breakthrough curves due to Sr diffusion into the smallest pores was very well simulated. The Donnan diffusion model proved adequate for pore sizes between approximately 2 and 5 nm, depending on pH and ionic strength. This category of pores was dominant in the HFO aggregates used in this work.

Keywords: Strontium, Ferrihydrite, HFO, Surface Complexation, Cd-Music, Micro–Mesoporous Aggregate, Sorption Kinetics, Donnan Diffusion Model

Wu, F.C., Tseng, R.L. and Juang, R.S. (2005), Comparisons of porous and adsorption properties of carbons activated by steam and KOH. *Journal of Colloid and Interface Science*, **283** (1), 49-56.

Full Text: [2005\J Col Int Sci283, 49.pdf](2005/J%20Col%20Int%20Sci283,%2049.pdf)

Abstract: In this work, fir woods and pistachio shells were used as source materials to prepare porous carbons, which were activated by physical (steam) and chemical (KOH) methods. Pore properties of these activated carbons including the BET surface area, pore volume, pore size distribution, and pore diameter were first characterized by a *t*-plot method based on N2 adsorption isotherms. Highly porous activated carbons with BET surface area up to 1009–1096 m2/g were obtained. The steam and KOH activation methods produced carbons with mesopore content in the range 9–15 and 33–49%, respectively. The adsorption equilibria and kinetics of tannic acid, Methylene blue, 4-chlorophenol, and phenol from water on such carbons at 30 °C were then investigated to check their chemical characteristics. The Freundlich equation gave a better fit to all adsorption isotherms than the Langmuir equation. On the other hand, the intraparticle diffusion model could best follow all adsorption processes. In comparison with KOH-activated carbons, it was shown that the rate of external surface adsorption with steam-activated carbons was significantly higher but the rate of intraparticle diffusion was much lower.

Keywords: Activated Carbons, Steam Activation, KOH Activation, Porous Properties, Adsorption Equilibrium, Kinetics

Goyne, K.W., Chorover, J., Kubicki, J.D., Zimmerman, A.R. and Brantley, S.L. (2005), Sorption of the antibiotic ofloxacin to mesoporous and nonporous alumina and silica. *Journal of Colloid and Interface Science*, **283** (1), 160-170.

Full Text: [2005\J Col Int Sci283, 160.pdf](2005/J%20Col%20Int%20Sci283,%20160.pdf)

Abstract: Mesoporous and nonporous SiO2 and Al2O3 adsorbents were reacted with the fluoroquinolone carboxylic acid ofloxacin over a range of pH values (2–10) and initial concentrations (0.03–8 mM) to investigate the effects of adsorbent type and intraparticle mesopores on adsorption/desorption. Maximum ofloxacin adsorption to SiO2 surfaces occurs slightly below the pKa2 (pH 8.28) of the antibiotic and sorption diminishes rapidly at pH > pKa2. For Al2O3, maximum sorption is observed at pH values slightly higher than the adsorbent’s point of zero net charge (p.z.n.c.) and less than midway between the pKa values of ofloxacin. The effects of pH on adsorption and ATR–FTIR spectra suggest that the zwitterionic compound adsorbs to SiO2 solids through the protonated N4 in the piperazinyl group and, possibly, a cation bridge; whereas the antibiotic sorbs to Al2O3 solids through the ketone and carboxylate functional groups via a ligand exchange mechanism. Sorption edge and isotherm experiments show that ofloxacin exhibits a higher affinity for mesoporous SiO2 and nonporous Al2O3, relative to their counterparts. It is hypothesized that decreased ofloxacin sorption to mesoporous Al2O3 occurs due to electrostatic repulsion within pore confines. In contrast, it appears that the environment within SiO2 mesopores promotes sorption by inducing formation of ofloxacin–Ca complexes, thus increasing electrostatic attraction to SiO2 surfaces.

Keywords: Ofloxacin, Fluoroquinolone Carboxylic Acid, Mesoporosity, Sorption Edge, Adsorption/Desorption Isotherms, ATR–FTIR Spectroscopy, Molecular Modeling, Mineral-Organic Interactions

Ho, Y.S. (2005), Comment on “Adsorption of naphthalene on zeolite from aqueous solution” by C.F. Chang, C.Y. Chang, K.H. Chen, W.T. Tsai, J.L. Shie, Y.H. Chen. *Journal of Colloid and Interface Science*, **283** (1), 274-277.

Full Text: [2005\J Col Int Sci283, 274.pdf](2005/J%20Col%20Int%20Sci283,%20274.pdf) [J\J Col Int Sci-Ho3.pdf](J/J%20Col%20Int%20Sci-Ho3.pdf) [J\J Col Int Sci-Ho2.pdf](J/J%20Col%20Int%20Sci-Ho2.pdf)

Abstract: A paper contributes not only by its originality and creativity, but also by its continuity and development toward subsequent research. Referencing and quotation accuracy are an important part of a scientific article. This study presents a literature review concerning the precision of 50 first authors’ publications, which originally cited Ho’s pseudo-second-order kinetic expression paper in kinetics model for solute sorption on various sorbents. This model applies to a range of solid–liquid systems such as metal ions, dyestuffs, herbicides, oil, and organic substances in aqueous systems onto various sorbents. In addition, citations of Lagergren and Elovich rate equations are also discussed. This comment offers information for citing the original idea of Ho’s pseudo-second-order kinetic expression and Lagergren’s pseudo-first-order kinetic equation. It is also suggested that the cited paper should be accurately quoted.

Keywords: Sorption, Kinetics, Pseudo-Second-Order, Pseudo-First-Order, Citation, Fungus Aspergillus-Niger, Heavy-Metal Adsorption, Sphagnum Moss Peat, Activated Carbon, Kinetic-Models, Sorption Kinetics, Congo-Red, Tree Fern, Pseudo-Isotherms, Arsenic Removal

Mustafa, S., Murtaza, S., Naeem, A. and Farina, K. (2005), Sorption of divalent metal ions on CrPO4. *Journal of Colloid and Interface Science*, **283** (2), 287-293.

Full Text: [2005\J Col Int Sci283, 287.pdf](2005/J%20Col%20Int%20Sci283,%20287.pdf)

Abstract: The divalent metal ion sorption (Cu2+, Cd2+, Ni2+, and Pb2+) on chromium phosphate (CrPO4) was studied as a function of pH, temperature, and concentration of metal ions. The sorption of metal ions is observed to increase with the increase in pH, temperature, and concentration of metal ions in solution. The mechanism of sorption is found to be the exchange of the hydrolyzed metal cations with the protons from solid at high temperature. The sorption at low temperature is found to be accompanied by the precipitation of the corresponding metal phosphates such as Pb3(PO4)2.

Keywords: Ion Exchange, Sorption, Metal pHosphates, CrPO4, Metal Ions

Mishra, S.K. and Panda, D. (2005), Studies on the adsorption of Brij-35 and CTAB at the coal–water interface. *Journal of Colloid and Interface Science*, **283** (2), 294-299.

Full Text: [2005\J Col Int Sci283, 294.pdf](2005/J%20Col%20Int%20Sci283,%20294.pdf)

Abstract: The adsorption behavior of polyoxyethylene (23) lauryl ether (Brij-35) and cetyl trimethyl ammonium bromide (CTAB) on coal sample has been studied. The adsorption process is found to be sensitive to pH, temperature, electrolyte concentration, and the amount of surface active agent. An attempt has been made to explain the adsorption behavior of the surfactants using the Langmuir equation. The extent of adsorption of Brij-35 on coal is found to be the highest at pH 2, which decreases with increase in pH and remains constant in the neutral and alkaline pH regions. But, the adsorption of CTAB exhibits the opposite behavior of that of Brij-35. Adsorption of any of the surfactant at the coal/water interface sharply decreases the apparent viscosity of 55 wt% coal–water slurry (CWS) at a shear rate of 100 s−1. Electrostatic adsorption of the surfactants on the coal surface decreases the surface charge and renders the coal surface hydrophobic which is manifested in the form of high apparent viscosity of the coal–water slurry under the test conditions.

Keywords: Adsorption, Brij-35, CTAB, Coal, Rheology, Apparent Viscosity

? Kim, D.J. and Yie, J.E. (2005), Role of copper chloride on the surface of activated carbon in adsorption of methyl mercaptan. *Journal of Colloid and Interface Science*, **283** (2), 311-315.

Full Text: [2005\J Col Int Sci283, 311.pdf](2005/J%20Col%20Int%20Sci283,%20311.pdf)

Abstract: In this paper, adsorption characteristics of methyl mercaptan on virgin activated carbon and copper chloride impregnated activated carbons were studied by using a dynamic adsorption method in a fixed bed. The activated carbons were characterized by nitrogen adsorption, XRD, TGA and solubility tests. The impregnation of copper chloride on the activated carbon significantly enhanced the adsorption capacity of methyl mercaptan, despite a notable decrease in microporosity. It is likely that copper chloride may act as adsorption site for methyl mercaptan. Copper chloride on the activated carbon in a range of 3–20 wt% Cu content was present mostly in the amorphous form of CuCl2, according to the results of the solubility, XRD and TGA tests. Starting at 10 wt% in Cu loading, the adsorption capacity for methyl mercaptan decreases gradually. It is likely that a decrease in the degree of copper chloride dispersion and an accessibility of small pores may lead to the decrease in the adsorption capacity of the activated carbon for methyl mercaptan.

Keywords: Methyl Mercaptan, Copper Chloride, Activated Carbon, Pore Structure, Adsorption

Al-Qunaibit, M.H., Mekhemer, W.K. and Zaghloul, A.A. (2005), The adsorption of Cu(II) ions on bentonite: A kinetic study. *Journal of Colloid and Interface Science*, **283** (2), 316-321.

Full Text: [2005\J Col Int Sci283, 316.pdf](2005/J%20Col%20Int%20Sci283,%20316.pdf)

Abstract: The kinetics of sorption of Cu2+ on a Saudi clay mineral (bentonite) was investigated at 20±0.5°C using different weights of the clay (0.5, 1.0, 1.5, and 2 g). Each weight represents a certain sample size. The order of the process appeared to be 1 with respect to the Cu2+, and 1 1/2with respect to the clay surface area. The rate was found to depend on internal diffusion.,which produced a decrease in the specific rate of sorption as a function of time. Sorption characteristics were described using two site Langmuir isotherms. The desorption experiments proved that Cu2+ ions are chemisorbed on the bentonite surface. The maximum adsorption obtained was 909 mg Cu2+/g clay. This value is of great significance, as it is much higher than any reported one.

Keywords: Bentonite, Sorption, Kinetics, Desorption, Cu2+ Ions

? López-León, T., Carvalho, E.L.S., Seijo, B., Ortega-Vinuesa, J.L. and Bastos-González, D. (2005), Physicochemical characterization of chitosan nanoparticles: Electrokinetic and stability behavior. *Journal of Colloid and Interface Science*, **283** (2), 344-351.

Full Text: [2005\J Col Int Sci283, 344-351.pdf](2005/J%20Col%20Int%20Sci283,%20344-351.pdf)

Abstract: Some physical properties of nanogel particles formed by chitosan ionically cross-linked by tripolyphosphate (TPP) have been studied. Electrokinetic properties and colloidal stability were analyzed as a function of pH and ionic strength of the medium. Chitosan particles showed volume phase transitions (swelling/shrinking processes) when the physicochemical conditions of the medium were changed. Experimental data were mainly obtained by electrophoretic mobility measurements and by photon correlation spectroscopy and static light scattering techniques. Chitosan chains possess glucosamine groups that can be deprotonated if the pH increases. Therefore, modification of pH from acid to basic values caused a deswelling process based on a reduction of the intramolecular electric repulsions inside the particle mesh. Electrophoretic mobility data helped to corroborate the above electrical mechanism as responsible for the size changes. Additionally, at those pH values around the isoelectric point of the chitosan–TPP particles, the system became colloidally unstable. Ionic strength variations also induced important structural changes. In this case, the presence of KCl at low and moderate concentrations provoked swelling, which rapidly turned on particle disintegration due to the weakness of chitosan–TPP ionic interactions. These last results were in good agreement with the predictions of gel swelling theory by salt in partially ionized networks.

Keywords: Electrophoretic Mobility, Colloidal Stability, Gel Phase Transitions, Chitosan Nanoparticles

Chang, Y.C. and Chen, D.H. (2005), Preparation and adsorption properties of monodisperse chitosan-bound Fe3O4 magnetic nanoparticles for removal of Cu(II) ions. *Journal of Colloid and Interface Science*, **283** (2), 446-451.

Full Text: [2005\J Col Int Sci283, 446.pdf](2005/J%20Col%20Int%20Sci283,%20446.pdf)

Abstract: Monodisperse chitosan-bound Fe3O4 nanoparticles were developed as a novel magnetic nano-adsorbent for the removal of heavy metal ions. Chitosan was first carboxymethylated and then covalently bound on the surface of Fe3O4 nanoparticles via carbodiimide activation. Transmission electron microscopy micrographs showed that the chitosan-bound Fe3O4 nanoparticles were monodisperse and had a mean diameter of 13.5 nm. X-ray diffraction patterns indicated that the magnetic nanoparticles were pure Fe3O4 with a spinel structure, and the binding of chitosan did not result in a phase change. The binding of chitosan was also demonstrated by the measurement of zeta potential, and the weight percentage of chitosan bound to Fe3O4 nanoparticles was estimated to be about 4.92 wt%. The chitosan-bound Fe3O4 nanoparticles were shown to be quite efficient for the removal of Cu(II) ions at pH>2. In particular, the adsorption rate was so fast that the equilibrium was achieved within 1 min due to the absence of internal diffusion resistance. The adsorption data obeyed the Langmuir equation with a maximum adsorption capacity of 21.5 mg g−1 and a Langmuir adsorption equilibrium constant of 0.0165 L mg−1. The pH and temperature effects revealed that the adsorption capacity increased significantly with increasing pH at pH 2–5, and the adsorption process was exothermic in nature with an enthalpy change of −6.14 kJ mol−1 at 300–330 K.

Keywords: Chitosan, Magnetic, Nanoparticles, Adsorbent, Cu(II)

Kumar, K.V., Ramamurthi, V. and Sivanesan, S. (2005), Modeling the mechanism involved during the sorption of Methylene blue onto fly ash. *Journal of Colloid and Interface Science*, **284** (1), 14-21.

Full Text: [2005\J Col Int Sci284, 14.pdf](2005/J%20Col%20Int%20Sci284,%2014.pdf)

Abstract: Batch sorption experiments were carried out to remove Methylene blue from its aqueous solutions using fly ash as an adsorbent. Operating variables studied were initial dye concentration, fly ash mass, pH, and contact time. Maximum color removal was observed at a basic pH of 8. Equilibrium data were represented well by a Langmuir isotherm equation with a monolayer sorption capacity of 5.718 mg/g. Sorption data were fitted to both Lagergren first-order and pseudo-second-order kinetic models and the data were found to follow pseudo-second-order kinetics. Rate constants at different initial concentrations were estimated. The process mechanism was found to be complex, consisting of both surface adsorption and pore diffusion. The effective diffusion parameter Di values were estimated at different initial concentrations and the average value was determined to be 2.063×10-9 cm2/s. Analysis of sorption data using a Boyd plot confirms the particle diffusion as the rate-limiting step for the dye concentration ranges studied in the present investigation (20 to 60 mg/L).

Keywords: Adsorption, Malachite Green, Adsorption Kinetics, Equilibrium, Mechanisms

Xu, R.K., Xiao, S.C., Zhao, A.Z. and Ji, G.L. (2005), Effect of Cr(VI) anions on adsorption and desorption behavior of Cu(II) in the colloidal systems of two authentic variable charge soils. *Journal of Colloid and Interface Science*, **284** (1), 22-29.

Full Text: [2005\J Col Int Sci284, 22.pdf](2005/J%20Col%20Int%20Sci284,%2022.pdf)

Abstract: Heavy metals in wastes exist as multiple pollutants. The study of the interactions between multiple pollutants and soils should be of significance in practice. In the present study, the effect of chromate on adsorption and desorption behavior of Cu(II) in two variable charge soils was investigated, with the emphasis on the adsorption and desorption equilibria of Cu(II). The results showed that chromate can affect adsorption and desorption of Cu(II) in the colloidal systems of two variable charge soils. The extent of the effect was related to the initial concentrations of chromate and Cu(II), the system pH, and the nature of the soils. The presence of chromate led to an increase in the adsorption of Cu(II). For example, in the presence of 0.5, 0.8, 1.0, and 1.5 mmol L−1 of chromate, for the rhodic ferralsol the adsorption of Cu(II) increased by 15.3, 18.0, 19.0, and 20.2%, respectively. For the hyperrhodic ferrasol, the corresponding figures were 11.9, 17.0, 20.3, and 26.1%, respectively. The presence of chromate also caused an increase in the desorption of Cu(II). For instance, in the presence of 0.5, 1.0, and 1.5 mmol L−1 of chromate, the desorption for the rhodic ferralsol increased by 16.9, 27.5, and 34.1%, respectively. For the hyperrhodic ferralsol, the corresponding figures were 18.1, 35.6, and 51.4%, respectively. The increments of the adsorption and desorption increased with the increase in equilibrium concentration of Cu(II) in the solution. For instance, when the equilibrium concentrations were 0.5, 1.0, 1.5, and 2.0 mmol L−1, the increments for the rhodic ferralsol were 2.5, 3.2, 3.3, and 3.0 mmol kg−1, respectively. For the hyperrhodic ferralsol, the corresponding figures were 2.9, 3.5, 4.0, and 4.2 mmol kg−1, respectively. The effect of chromate for the hyperrhodic ferralsol was greater than that for the rhodic ferralsol. This is caused by the difference in the content of iron oxides for the two soils. The increments of the adsorption and the desorption of Cu(II) increased with the rise in pH, reaching a maximum value, and then decreased. It can be assumed that the increment of the adsorption was caused by the change in surface charge of the soils induced by the adsorption of chromate and the cooperative adsorption of chromate adsorbed and Cu(II). The increase of electrostatically adsorbed Cu(II) was responsible for the increase in the desorption of Cu(II).

Keywords: Chromate, Cu(II), Adsorption, Desorption, Variable Charge Soil

Tripathy, S.S. and Kanun, S.B. (2005), Adsorption of Co2+, Ni2+, Cu2+ and Zn2+ from 0.5 M NaCl and major ion sea water on a mixture of δ-MnO2 and amorphous FeOOH. *Journal of Colloid and Interface Science*, **284** (1), 30-38.

Full Text: [2005\J Col Int Sci284, 30.pdf](2005/J%20Col%20Int%20Sci284,%2030.pdf)

Abstract: The pHpzc values of several mechanical mixtures of amorphous hydrous oxides of iron (amorphous FeOOH) and manganese (δ-MnO2) have been determined using the solid addition method. While the pHpzc of δ-MnO2 remains almost unchanged, the corresponding value for amorphous FeOOH tends to increase with increased proportion of δ-MnO2 in the mixtures. The adsorption behavior of Co2+, Ni2+, Cu2+, and Zn2+ with respect to pH on a mechanical mixture of 70% δ-MnO2 and 30% amorphous FeOOH from 0.5 M NaCl and major ion sea water has been studied. Since δ-MnO2 is much more active adsorbent than amorphous FeOOH at pH below 6.5, the adsorption data on mixture have not only been normalized with respect to the mass of δ-MnO2 in the mixture, but also compared with adsorption data on δ-MnO2 alone. It is interesting to note that though each trace metal behaves in a different way from the other especially with respect to the nature of electrolyte medium, it is generally observed that the adsorption on the mixed oxide system is higher than that on δ-MnO2 alone under similar condition. It is also observed that adsorption in major ion sea water at a particular pH value is lower than in 0.5 M NaCl solution.

Keywords: Adsorption, Metal Ions, Mixture of δ-MnO2 and Amorphous FeOOH, Sea Water

Senthilkumaar, S., Varadarajan, P.R., Porkodi, K. and Subbhuraam, C.V. (2005), Adsorption of Methylene blue onto jute fiber carbon: Kinetics and equilibrium studies. *Journal of Colloid and Interface Science*, **284** (1), 78-82.

Full Text: [2005\J Col Int Sci284, 78.pdf](2005/J%20Col%20Int%20Sci284,%2078.pdf)

Abstract: Jute fiber obtained from the stem of a plant was used to prepare activated carbon using phosphoric acid. Feasibility of employing this jute fiber activated carbon (JFC) for the removal of Methylene blue (MB) from aqueous solution was investigated. The adsorption of MB on JFC has found to dependent on contact time, MB concentration and pH. Experimental result follows Langmuir isotherm model and the capacity was found to be 225.64 mg/g. The optimum pH for the MB removal was found to be 5–10. The kinetic data obtained at different concentrations have been analyzed using a pseudo-first-order, pseudo-second-order equation, intraparticle diffusion and Elovich equation. Among the kinetic models studied, the intraparticle diffusion was the best applicable model to describe the adsorption of MB onto JFC.

Keywords: Activated Carbon, Methylene Blue, Adsorption Isotherm, Equilibrium Studies, Kinetic Models

Ayranci, E., Hoda, N. and Bayram, E. (2005), Adsorption of benzoic acid onto high specific area activated carbon cloth. *Journal of Colloid and Interface Science*, **284** (1), 83-88.

Full Text: [2005\J Col Int Sci284, 83.pdf](2005/J%20Col%20Int%20Sci284,%2083.pdf)

Abstract: The adsorption of benzoic acid from aqueous solution onto high area carbon cloth at different pH values has been studied. Over a period of 125 min the adsorption process was found to follow a first-order kinetics and the rate constants were determined for the adsorption of benzoic acid at pH 2.0, 3.7, 5.3, 9.1, and 11.0. The extents of adsorption and the percentage coverage of carbon cloth surfaces were calculated at 125 min of adsorption. Adsorption isotherms at pH values of 2.0, 3.7, and 11.0 were derived at 25 °C. Isotherm data were treated according to Langmuir and Freundlich equations and the parameters of these equations were evaluated by regression analysis. The fit of experimental isotherm data to both equations was good. It was found that both the adsorption rate and the extent of adsorption at 125 min were the highest at pH 3.7 and decreased at higher or lower pH values. The types of interactions governing in the adsorption processes are discussed considering the surface charge and the dissociation of benzoic acid at different pH values.

Keywords: Adsorption, Benzoic Acid, Carbon Cloth, Surface Charge

Gupta, V.K., Mittal, A. and Gajbe, V. (2005), Adsorption and desorption studies of a water soluble dye, Quinoline Yellow, using waste materials. *Journal of Colloid and Interface Science*, **284** (1), 89-98.

Full Text: [2005\J Col Int Sci284, 89.pdf](2005/J%20Col%20Int%20Sci284,%2089.pdf)

Abstract: Bottom ash, a power plant waste, and de-oiled soya, an agricultural waste material, were employed for the removal and recovery of Quinoline Yellow, a water-soluble dye. Characterization of adsorbent materials was made by their infrared and differential thermal analysis curves. Along with batch adsorption studies, which involve effect of pH, adsorbate concentration, sieve size, adsorbent dosage, contact time, temperature, etc., kinetic studies and column operations were also made to remove the dye from wastewater. On the basis of kinetic studies, specific rate constants involved in the processes were calculated and first-order adsorption kinetics was observed in both the cases. The paper also incorporates Langmuir and Freundlich adsorption isotherm models, which are used to calculate thermodynamic parameters and also to suggest a plausible mechanism of the ongoing adsorption processes. Fixed bed columns were prepared for both the adsorbents and bulk removal of the dye was achieved by eluting aqueous solution of the dye and saturation factor for both columns were evaluated. Dilute NaOH solution was then percolated through the exhausted columns to recover the adsorbed dye.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherm, Aqueous-Solutions, Bottom Ash, Color, De-Oiled Soya, Desorption, Diffusion, Dye, Dyes, Effluents, Fertilizer Waste, Heavy-Metals, Kinetic Studies, Kinetics, Langmuir, Pore, Quinoline Yellow, Removal, Waste Material, Wastewater

? Ikhsan, J., Angove, M.J., Wells, J.D. and Johnson, B.B. (2005), Surface complexation modeling of the sorption of 2-, 3-, and 4-aminopyridine by montmorillonite. *Journal of Colloid and Interface Science*, **284** (2), 383-392.

Full Text: [2005\J Col Int Sci284, 383.pdf](2005/J%20Col%20Int%20Sci284,%20383.pdf)

Abstract: The sorption of 2-, 3-, and 4-aminopyridine on K-saturated Wyoming (SWy-K) and Texas (STx-K) and Ca-enriched Texas (STx-Ca) montmorillonite was measured at 25 °C with 10 mM KNO3 or 3.3 mM Ca(NO3)2 as the background electrolyte. The aminopyridines adsorbed to montmorillonite at low pH, but not at high pH. Extended constant capacitance surface complexation models (ECCMs) and attenuated total reflectance-FTIR data indicate that aminopyridines sorb to the silica-like faces by cation exchange, forming outer-sphere complexes between aminopyridinium ions and permanent negatively charged surface sites (X−). X-ray diffraction data and sorption kinetics suggest that sorption occurs not only at external X− sites but also at those in the interlayer spaces. Differences in the sorption behaviors of 2-, 3-, and 4-aminopyridine result from differences in their p*Ka*s. The extent of sorption of aminopyridines by the montmorillonite samples (SWy-K > STx-K > STx-Ca) results from the higher cation-exchange capacity of SWy-K, and from the fact that Ca2+ is much more effective than K+ in competing with protonated aminopyridines for the X− sites.

Keywords: Montmorillonite, Kaolin, Kaolinite, 2-Aminopyridine, 3-Aminopyridine, 4-Aminopyridine, Extended Constant Capacitance Model, ATR-FTIR, XRD

? Ikhsan, J., Angove, M.J., Johnson, B.B. and Wells, J.D. (2005), Cosorption of Zn(II) and 2-, 3-, or 4-aminopyridine by montmorillonite. *Journal of Colloid and Interface Science*, **284** (2), 400-407.

Full Text: [2005\J Col Int Sci284, 400.pdf](2005/J%20Col%20Int%20Sci284,%20400.pdf)

Abstract: Data from acid–base titrations at 25 °C of Zn(NO3)2 and 2-, 3-, or 4-aminopyridine in 10 mM KNO3 as background electrolyte suggested that soluble complexes ZnL2+ and Zn(OH)L+ form, where L represents aminopyridine. Zinc–hydroxyaminopyridine complexes have not been reported previously. The cosorption of Zn(II) with each of the aminopyridines to K-saturated Wyoming (SWy-K) and Texas (STx-K), and Ca-enriched Texas (STx-Ca) montmorillonites was measured at 25 °C, with 10 mM KNO3 or 3.3 mM Ca(NO3)2 as background electrolyte. Comparison with previous data for sorption of Zn(II) and the aminopyridines separately and surface complexation modeling of the cosorption data showed that under acid conditions competition between Zn2+ and aminopyridinium ions for the permanent negatively charged sites of montmorillonite results in suppression of the uptake of each sorbate by the other, but only when a large excess of the competing sorbate is present. Under alkaline conditions the sorption of Zn(II) was not affected by the presence of even a large excess of aminopyridine, but the sorption of 4-aminopyridine in particular was slightly enhanced when a large excess of Zn(II) was present. The enhancement was attributed to the formation of metal-bridged ternary surface complexes at the variable-charge sites on the edges of the montmorillonite crystals.

Keywords: Montmorillonite, 2-Aminopyridine, 3-Aminopyridine, 4-Aminopyridine, Surface Complexation Model, Extended Constant Capacitance Model

Lorenc-Grabowska, E. and Gryglewicz, G. (2005), Adsorption of lignite-derived humic acids on coal-based mesoporous activated carbons. *Journal of Colloid and Interface Science*, **284** (2), 416-423.

Full Text: [2005\J Col Int Sci284, 416.pdf](2005/J%20Col%20Int%20Sci284,%20416.pdf)

Abstract: The adsorption by a coal-based mesoporous activated carbon of humic acids (HAs) isolated from two Polish lignites was studied. For comparison, a commercial Aldrich humic acid was also included into this study. The differences in chemical structure and functional groups of HAs were determined by elemental analysis and infrared spectroscopy DRIFT. Two activated carbons used differed in terms of mesopore volume, mesopore size distribution, and chemical properties of the surface. The kinetics of adsorption of HAs have been discussed using three kinetic models, i.e., the first-order Lagergren model, the pseudo-second-order model, and the intraparticle diffusion model. It was found that the adsorption of HAs from alkaline solution on mesoporous activated carbon proceeds according to the pseudo-second-order model. The correlation coefficients were close to 1. The intraparticle diffusion of HA molecules within the carbon particle was identified to be the rate-limiting step. Comparing the two activated carbons, the carbon with a higher volume of pores with widths of 10–50 nm showed a greater removal efficiency of HA. An increase in the Freundlich adsorption capacity with decreasing carbon content of HA was observed. Among the HAs studied, S-HA shows characteristics indicating the highest contribution of small-size fraction. The S-HA was removed by both activated carbons to the highest extent. The effect of pH solution on the adsorption of HA was examined over the range pH 5.4–12.2. It was found that the extent of adsorption decreased with decreasing pH of the solution.

Keywords: Adsorption, Humic Acids, Kinetics, Activated Carbons

Wang, S.B., Zhu, Z.H., Coomes, A., Haghseresht, F. and Lu, G.Q. (2005), The physical and surface chemical characteristics of activated carbons and the adsorption of Methylene blue from wastewater. *Journal of Colloid and Interface Science*, **284** (2), 440-446.

Full Text: [2005\J Col Int Sci284, 440.pdf](2005/J%20Col%20Int%20Sci284,%20440.pdf)

Abstract: Adsorption of a basic dye, Methylene blue, from aqueous solutions onto as-received activated carbons and acid-treated carbons was investigated. The physical and surface chemical properties of the activated carbons were characterized using BET-N2 adsorption, X-ray photoelectron spectroscopy (XPS), and mass titration. It was found that acid treatment had little effect on carbon textural characteristics but significantly changed the surface chemical properties, resulting in an adverse effect on dye adsorption. The physical properties of activated carbon, such as surface area and pore volume, have little effect on dye adsorption, while the pore size distribution and the surface chemical characteristics play important roles in dye adsorption. The pH value of the solution also influences the adsorption capacity significantly. For Methylene blue, a higher pH of solution favors the adsorption capacity. The kinetic adsorption of Methylene blue on all carbons follows a pseudo-second-order equation.

Keywords: Activated Carbon, Dye Adsorption, Acid Treatment, Methylene Blue

? Prochaska, K. and Staszak, K. (2005), Adsorption at the liquid/liquid interface in mixed systems with hydrophobic extractants and modifiers. 1. Study of equilibrium interfacial tension at the hydrocarbon/water interface in binary mixed systems. *Journal of Colloid and Interface Science*, **285** (1), 1-8.

Full Text: [2005\J Col Int Sci285, 1.pdf](2005/J%20Col%20Int%20Sci285,%201.pdf)

Abstract: Equilibrium interfacial tension at the liquid/liquid interfaces for two chelating metal ion extractants, 2-hydroxy-5-nonylacetophenone oxime (HNAF) and 1-phenyldecane-1,3-dion (*β*-diketone), two solvating extractants, trioctylphosphine oxide (TOPO) and tributyl phosphate (TBP), and a modifier, decanol, were obtained with a drop volume tensiometer. Moreover, four equimolar binary mixtures of extractant/extractant and extractant/modifier type were considered. The composition of the mixed adsorbed monolayer and the molecular interaction parameters *β* were determined by the Rosen equation. It was found that in all the studied systems coadsorption exists; however, synergism in the reduction of interfacial tension was not observed. The obtained results indicate that in the case of three mixtures considered the composition of a mixed monolayer at the hydrocarbon/water interface was quite different from that in the bulk organic phase. Only for the TOPO/*β*-diketone mixture were the compositions at the interface and in the bulk organic phase similar. The obtained results indicate that it is impossible to predict the composition of a mixed monolayer by taking into account the interfacial activity of individual components of the mixture. In some cases the compound shows lower interfacial activity (smaller efficiency and effectiveness of adsorption) and occupies a dominant position at the interface, regardless of the type of hydrocarbon used as the organic diluent.

Keywords: Liquid/Liquid Interface, Mixed Monolayer, Binary Adsorption, Molecular Interaction Parameters *Β*, Metal Ion Extractants

? Shahwan, T., Akar, D. and Eroğlu, A.E. (2005), Physicochemical characterization of the retardation of aqueous Cs+ ions by natural kaolinite and clinoptilolite minerals. *Journal of Colloid and Interface Science*, **285** (1), 9-17.

Full Text: [2005\J Col Int Sci285, 9.pdf](2005/J%20Col%20Int%20Sci285,%209.pdf)

Abstract: The aim of this study was to carry out kinetic, thermodynamic, and surface characterization of the sorption of Cs+ ions on natural minerals of kaolinite and clinoptilolite. The results showed that sorption followed pseudo-second-order kinetics. The activation energies were 9.5 and 13.9 kJ/mol for Cs+ sorption on kaolinite and clinoptilolite, respectively. Experiments performed at four different initial concentrations of the ion revealed that the percentage sorption of Cs+ on clinoptilolite ranged from 90 to 95, compared to 28 to 40 for the kaolinite case. At the end of a 1 week period, the percentage of Cs+ desorption from clinoptilolite did not exceed 7%, while it amounted to more than 30% in kaolinite, indicating more stable fixation by clinoptilolite. The sorption data were best described using Freundlich and D–R isotherm models. Sorption showed spontaneous and exothermic behavior on both minerals, with Δ*H*0 being −6.3 and −11.4 kJ/mol for Cs+ uptake by kaolinite and clinoptilolite, respectively. Expanding the kaolinite interlayer space from 0.71 to 1.12 nm using DMSO intercalation, did not yield a significant enhancement in the sorption capacity of kaolinite, indicating that the surface and edge sites of the clay are more energetically favored. EDS mapping and elemental analysis of the surface of kaolinite and clinoptilolite revealed more intense signals on the surface of the latter with an even distribution of sorbed Cs+ onto the surfaces of both minerals.

Keywords: Kaolinite, Clinoptilolite, Cs+, Sorption

? Belyakov, V.,N. Belyakova, L.A., Varvarin, A.M., Khora, O.V., Vasilyuk, S.L., Kazdobin, K.A., Maltseva, T.V., Kotvitskyy, A.G. and Danil de Namor, A.F. (2005), Supramolecular structures on silica surfaces and their adsorptive properties. *Journal of Colloid and Interface Science*, **285** (1), 18-26.

Full Text: [2005\J Col Int Sci285, 18.pdf](2005/J%20Col%20Int%20Sci285,%2018.pdf)

Abstract: The study of adsorptive and chemical immobilization of *β*-cyclodextrin on a surface of hydroxylated silicas with various porous structure is described. Using IR spectroscopy, thermal gravimetrical analysis with a programmed heating, and chemical analysis of the silica surface, it is shown that the process of adsorption–desorption of *β*-cyclodextrin depends on the porous structure of the silica. The reaction of esterification was used for chemical grafting of *β*-cyclodextrin on the surface of hydroxylated silicas. Hydrolytic stability of silicas chemically modified by *β*-cyclodextrin apparently is explained by simultaneous formation of chemical and hydrogen bonds between surface silanol groups and hydroxyl groups of *β*-cyclodextrin. The uptake of the cations Cu(II), Cd(II), and Pb(II) and the anions Cr(VI) and As(V) by silicas modified with *β*-cyclodextrin is investigated as a function of equilibrium ion concentrations. The increase of ion uptake and selectivity of ion extraction in comparison with starting silicas is established. It is due to the formation of surface inclusion complexes of the “host–guest” type in which one molecule of *β*-cyclodextrin interacts simultaneously with several ions.

Keywords: Silica Surface, *Β*-Cyclodextrin, Adsorption, Reaction of Esterification, IR Spectroscopy, Uptake, Toxic Metal Ions

? da Fonseca, M.G., de Oliveira, M.M., Arakaki, L.N.H., Espinola, J.G.P. and Airoldi, C. (2005), Natural vermiculite as an exchanger support for heavy cations in aqueous solution. *Journal of Colloid and Interface Science*, **285** (1), 50-55.

Full Text: [2005\J Col Int Sci285, 50.pdf](2005/J%20Col%20Int%20Sci285,%2050.pdf)

Abstract: The natural highly charged lamellar silicate vermiculite was investigated as an exchanger matrix in doubly distilled water solution to exchange magnesium inside the lamella with the heavy cations copper, nickel, cobalt, and lead at the solid/liquid interface. The extension of each exchange reaction was dependent on time of reaction, pH, and cation concentration. The maximum time presented the following order Pb2+ < Ni2+ < Cu2+ < Co2+, which corresponds to 12, 24, 48, and 72 h, respectively. The best performance was observed for nickel, as represented by the exchange capacity *N*f, which gave values 0.59, 0.76, 0.84, and 0.93 mmol g−1 for Pb2+ < Co2+ < Cu2+ < Ni2+, respectively. This capacity is dependent on pH interval variation from 1 to 9, being significantly increased in alkaline condition. The isotherm data were adjusted to a modified Langmuir equation and from the data the spontaneous Gibbs free energy was calculated. Linear correlations were obtained through Gibbs free energy or the maximum capacity against the cationic radius plot, with the lowest values for the largest cation lead. An exponential correlation was also observed for the maximum capacity versus enthalpy of hydration plot, indicating a difficulty of the less hydrated cation, lead, in exchanging with magnesium inside the lamellar space, as suggested by the proposed mechanism. The saturated matrices with cations presented a decrease in interlayer distance in comparison with the original vermiculite, which can be related to the hydrated phases, characteristic for each cation, with a lowest value for lead.

Keywords: Ionic Exchanger, Vermiculite, Clays, Heavy Ions

? Gupta, R.K. and Singh, R.A. (2005), Preparation and characterization of electrically conducting Langmuir–Blodgett films of poly(*N*-octadecylaniline). *Journal of Colloid and Interface Science*, **285** (1), 67-73.

Full Text: [2005\J Col Int Sci285, 67.pdf](2005/J%20Col%20Int%20Sci285,%2067.pdf)

Abstract: A stable monolayer of *N*-octadecylaniline containing stearic acid at the air–water interface has been obtained. However, the Langmuir monolayer of pure poly(*N*-octadecylaniline) was not stable, but mixed Langmuir–Blodgett films of this polymer with stearic acid in different ratios as a spreading aid were stable. The electrical conductivity of these films increased by five orders of magnitude after doping with iodine as compared to that before iodine doping (5.8×10−7 S cm−1). Temperature-dependent electrical conductivity suggested that these films were semiconducting in nature with low thermal activation energy. Impedance analyses of these films revealed that the equivalent circuit for poly(*N*-octadecylaniline) was (RQ) whereas that for mixed poly(*N*-octadecylaniline) with stearic acid was (RQ)(RQ).

Keywords: Poly(*N*-Octadecylaniline), Langmuir–Blodgett Films, Semiconductor, Impedance Analysis

? Saikia, P.M., Bora, M. and Dutta, R.K. (2005), Acid–base equilibrium of anionic dyes partially bound to micelles of nonionic surfactants. *Journal of Colloid and Interface Science*, **285** (1), 382-387.

Full Text: [2005\J Col Int Sci285, 382.pdf](2005/J%20Col%20Int%20Sci285,%20382.pdf)

Abstract: The acid–base equilibria of the sulfonephthalein dyes, namely, bromothymol blue, thymol blue, and cresol red, in aqueous nonionic micellar solutions of Triton X-100, Tween-20, Tween-40, Tween-60, and Tween-80 have been investigated. The equilibrium constants of the partition of the dyes between micellar and aqueous pseudophases have been determined spectrophotometrically at fixed pH. The *K*ass increased with the surfactants in the order Tween-80 < Tween-60 < Tween-40 < Tween-20 < TX-100. The effect of such associations on the p*K*a2 of the dyes at various concentrations of the nonionic surfactant has been studied. The p*K*a2 of the dyes as a function of the concentrations of the surfactant was predicted from the equilibrium constants using a method developed to fit nonionic surfactants and was compared with experimental values determined directly. The p*K*a2s of the dyes predicted according to the present method have been found to be in good agreement with the experimental values.

Keywords: Sulfonephthalein Dyes, Partition Equilibrium, Nonionic Surfactant, Acid–Base Equilibrium, Micelles

? Cestari, A.R., Vieira, E.F.S., Matos, J.D.S. and dos Anjos, D.S.C. (2005), Determination of kinetic parameters of Cu(II) interaction with chemically modified thin chitosan membranes. *Journal of Colloid and Interface Science*, **285** (1), 288-295.

Full Text: [2005\J Col Int Sci285, 288.pdf](2005/J%20Col%20Int%20Sci285,%20288.pdf)

Abstract: In this work, vanillin-modified thin chitosan membranes were utilized as adsorbents for the removal of Cu(II) from aqueous solutions. A rise of temperature accelerates mass transfer of Cu(II) to the membranes surfaces. The kinetic data did present a rough fit to the traditional Lagergren adsorption kinetic equations. An alternative Avrami kinetic equation was successfully fitted to the kinetic adsorption quantities. From this new equation, from one to three regions presenting distinct kinetic parameters were found, and the use of the parameter *n* was also related to the determination of the kinetic orders. Variations of the adsorption rate in relation to the contact time and the temperature were also calculated and are discussed.

Keywords: Chitosan Membranes, Vanillin, Cu(II) Adsorption, Adsorption Kinetic Modeling, Avrami Adsorption Model

? Wang, S., Jin, X., Pang, Y., Zhao, H. and Zhou, X. (2005), The study of the effect of pH on phosphate sorption by different trophic lake sediments. *Journal of Colloid and Interface Science*, **285** (2), 448-457.

Full Text: [2005\J Col Int Sci285, 448.pdf](2005/J%20Col%20Int%20Sci285,%20448.pdf)

Abstract: This paper studies the effect of pH on phosphate sorption by the sediments of different trophic lakes, including sorption isotherms with different pH values, their effect on sorption rate, their impact on the kinetics of sorption and desorption. The following conclusions are drawn. (1) The phosphate sorption capacity of lake sediment is correlated with pH, but not with its trophic level; that is, pH at 7.0 > 5.5 > 9.0. The three isotherms models cannot well describe phosphate sorption by different trophic sediments with different pH, and its applicability seems irregular. (2) The power function equation is one of the best kinetic models, which can provide satisfactory fitting of the kinetic data of phosphate sorption by different trophic sediments, and there is no obvious difference between them. The quick phosphate sorption by the sediment takes place mainly at 0–0.5 h, the pH value has a remarkable effect on the rate of phosphate sorption by the sediment, and sediments in different trophic states tend to have similar trends of change, with pH 5.5 > 7.0 > 9.0. (3) The effect of pH on phosphate sorption shows a similar trend for different trophic sediments; namely, as pH increases phosphate sorption rate tends to increases sharply at first and then drop suddenly. After a while it increases slightly, and finally a slight decrease follows as the pH increases. The maximum and minimum of phosphate sorption capacity may be attributed to the rate of phosphate release. (4) pHosphate sorption by lake sediments is not completely reversible and strong bonding occurs between sediment particles and sorbed phosphate. This makes it difficult for the sorbed phosphate to be desorbed from the sediments. The amounts of desorbed phosphate are almost the same in different trophic sediments with different initial pH values; that is, the effect of pH on phosphate desorption is small.

Keywords: pH, pHosphate, Sorption, Isotherm, Kinetics, Lake Sediment

? Antelo, J., Avena, M., Fiol, S., López, R. and Arce, F. (2005), Effects of pH and ionic strength on the adsorption of phosphate and arsenate at the goethite–water interface. *Journal of Colloid and Interface Science*, **285** (2), 476-486.

Full Text: [2005\J Col Int Sci285, 476.pdf](2005/J%20Col%20Int%20Sci285,%20476.pdf)

Abstract: The surface properties of a well-crystallized synthetic goethite have been studied by acid–base potentiometric titrations, electrophoresis, and phosphate and arsenate adsorption isotherms at different pH and electrolyte concentrations. The PZC and IEP of the studied goethite were 9.3±0.1 and 9.3±0.2, respectively. pHosphate and arsenate adsorption decrease as the pH increases in either 0.1 or 0.01 M KNO3 solutions. pHosphate adsorption is more sensitive to changes in pH and ionic strength than that of arsenate. The combined effects of pH and ionic strength result in higher phosphate adsorption in acidic media at most ionic strengths, but result in lower phosphate adsorption in basic media and low ionic strengths. The CD-MUSIC model yields rather good fit of the experimental data. For phosphate it was necessary to postulate the presence of three inner-sphere surface complexes (monodentate nonprotonated, bidentate nonprotonated, and bidentate protonated). In contrast, arsenate could be well described by postulating only the presence of the two bidenate species. A small improvement of the arsenate adsorption data could be achieved by assuming the presence of a monodentate protonated species. Model predictions are in agreement with spectroscopic evidence, which suggest, especially for the case of arsenate, that mainly bidentate inner-sphere complexes are formed at the goethite–water interface.

Keywords: pHosphate Adsorption, Arsenate Adsorption, Oxide–Water Interface, Surface Charge, Electrophoretic Mobilities, CD-MUSIC Model

? Xue, M., Chitrakar, R., Sakane, K., Hirotsu, T., Ooi, K., Yoshimura, Y., Feng, Q. and Sumida, N. (2005), Selective adsorption of thiophene and 1-benzothiophene on metal-ion-exchanged zeolites in organic medium. *Journal of Colloid and Interface Science*, **285** (2), 487-492.

Full Text: [2005\J Col Int Sci285, 487.pdf](2005/J%20Col%20Int%20Sci285,%20487.pdf)

Abstract: Adsorption of the organic sulfur compounds thiophene (TP) and 1-benzothiophene (1-BTP) in an organic model solution of hydrodesulfurizated gasoline (heptane with 1 wt% toluene and 0.156 mM (5 ppmw as sulfur) TP or 1-BTP) was studied by a batch method at 80 °C using metal-ion-exchanged Y-zeolites. Although NaY-zeolite or its acid-treated material rarely adsorbed the organic sulfur compounds, NaY-zeolites exchanged with Ag+, Cu2+, and Ce3+ ions and NH4Y-zeolites exchanged with Ce3+ ions showed markedly high adsorptive capacities for TP and 1-BTP. The sulfur uptake increased in the order CuY-zeolite(Na) < AgY-zeolite(Na) < CeY-zeolite(Na) for both the organic sulfur compounds. The adsorption isotherms for TP and 1-BTP followed the Langmuir’s relationship and the saturation capacities by CeY-zeolite(Na) were calculated as 0.022 and 0.033 mmol/g, respectively. The mole ratios of TP/Ce and 1-BTP/Ce were 0.031 and 0.047, respectively. CeY-zeolite(NH4) which was prepared from NH4Y-zeolite showed less uptake of TP and 1-BTP than CeY-zeolite(Na), probably due to its lower cerium content.

Keywords: Metal Ion, Zeolite, Selective Adsorption, Thiophene, Benzothiophene, Organic Sulfur, Gasoline

? Ramstedt, M., Norgren, C., Shchukarev, A., Sjöberg, S. and Persson, P. (2005), Co-adsorption of cadmium(II) and glyphosate at the water–manganite (*γ*-MnOOH) interface. *Journal of Colloid and Interface Science*, **285** (2), 493-501.

Full Text: [2005\J Col Int Sci285, 493.pdf](2005/J%20Col%20Int%20Sci285,%20493.pdf)

Abstract: The co-adsorption of Cd(II) and glyphosate (*N*-(phosphonomethyl)glycine, PMG) at the manganite (*γ*-MnOOH) surface has been studied in the pH range 6–10 at 25 °C and with 0.1 M Na(Cl) as ionic medium. Batch adsorption experiments, Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS) and extended X-ray absorption fine structure (EXAFS) spectroscopy were used for the quantitative analysis and the determination of the molecular structure of the surface complexes. The adsorption of Cd(II) and PMG in the ternary Cd(II)–PMG–manganite system was compared with the adsorption in the binary Cd(II)–manganite and PMG–manganite systems. The formation of three inner sphere surface complexes was observed, a ternary Cd(II)–PMG–manganite complex, a binary Cd(II)–manganite complex and a binary PMG–manganite complex. The surface concentration of the ternary complex and the Cd(II)–manganite complex was more or less constant throughout the pH range studied. However, the surface concentration of the binary PMG–manganite complex decreased with increasing pH. The major part of the binary PMG–surface complex was protonated. The ternary surface complex displayed a type B structure (Cd(II)–PMG–manganite). The average Cd–Mn distance obtained from EXAFS (3.26 Å) indicates that the binary and ternary Cd(II)–surface complexes are formed by edge-sharing of Mn and Cd octahedra on the (010) plane of the manganite crystals.

Keywords: *N*-(phosphonomethyl)glycine, Glyphosate, Manganite, *γ*-MnOOH, Cadmium, EXAFS, XPS, FTIR, Ternary Surface Complexes

? Zimnitsky, D.S., Yurkshtovich, T.L. and Bychkovsky, P.M. (2005), Multilayer adsorption of amino acids on oxidized cellulose. *Journal of Colloid and Interface Science*, **285** (2), 502-508.

Full Text: [2005\J Col Int Sci285, 502.pdf](2005/J%20Col%20Int%20Sci285,%20502.pdf)

Abstract: The adsorption of amino acids (AA) (glycine, L-alanine, L-proline) on oxidized cellulose (OC) with various carboxyl contents and degrees of crystallinity from aqueous and water/ethanol solutions was studied. It was found that multilayer adsorption occurs in concentrated solutions of AA. It proceeds according to successive mechanisms via adsorption of AA zwitterions onto carboxyls of already adsorbed AA. This leads to formation of chain AA associates in the OC phase. A sharp increase in swelling accompanies multilayer adsorption. It was established that structural characteristics and degree of polymerization of OC are the main factors that affect multilayer adsorption. The distribution of carboxyls in the OC phase also plays an important role. Multilayer adsorption does not proceed in water/ethanol solutions and in the case of the cationic form of AA.

Keywords: Adsorption, Amino Acids, Oxidized Cellulose, Multilayer, FT-IR, Crystallinity, Degree of Polymerization

? Goldberg, S. (2005), Inconsistency in the triple layer model description of ionic strength dependent boron adsorption. *Journal of Colloid and Interface Science*, **285** (2), 509-517.

Full Text: [2005\J Col Int Sci285, 509.pdf](2005/J%20Col%20Int%20Sci285,%20509.pdf)

Abstract: Understanding anion adsorption mechanisms is necessary to allow prediction of anion adsorption behavior. This study was conducted to evaluate the ability of the triple layer model, a chemical surface complexation model, to describe the effect of changes in solution ionic strength (0.01–1.0 M NaCl) and solution pH (3–11) on B adsorption by the iron oxide, goethite, the aluminum oxide, gibbsite, the clay minerals, kaolinite and montmorillonite, and two arid zone soils. Ionic strength dependence of adsorption suggests an inner-sphere adsorption mechanism for goethite, kaolinite, montmorillonite, and the two soils and an outer-sphere adsorption mechanism for gibbsite. The triple layer model, containing an inner-sphere adsorption mechanism, was able to describe B adsorption on goethite, kaolinite, montmorillonite, and the two soils. The model was able to describe B adsorption on gibbsite using an outer-sphere adsorption mechanism. A problematic inconsistency exists in the triple layer model description of ionic strength dependent B adsorption between the type of B surface complex defined in the model and the ionic strength dependence of the model result. That is, postulating an inner-sphere adsorption mechanism in the triple layer model resulted in an ionic strength dependence appropriate for the formation of outer-sphere surface complexes and vice versa. Additional tests of the ability of the triple layer model to describe ionic strength dependent adsorption of additional ions are needed to establish whether the inconsistencies are limited to the B system or are of concern in other triple layer model applications.

Keywords: Surface Complexation Modeling, Inner-Sphere Surface Complex, Outer-Sphere Surface Complex, Goethite, Gibbsite, Kaolinite, Montmorillonite, Soil

? Pełech, R., Milchert, E. and Wróblewska, A. (2005), Desorption of chloroorganic compounds from a bed of activated carbon. *Journal of Colloid and Interface Science*, **285** (2), 518-524.

Full Text: [2005\J Col Int Sci285, 518.pdf](2005/J%20Col%20Int%20Sci285,%20518.pdf)

Abstract: The desorption of 1,2-dichloroethane from a bed of DTO activated carbon after adsorption from aqueous solution has been investigated. The desorption process was carried out using steam. The basic characteristics of the process were determined. The studies were performed in the temperature range 100–160 °C. A steam consumption indicator reduces with an increase of temperature from 100 to 140 °C. An elevation of temperature above 140 °C does not cause an improvement in the desorption efficiency. The number of performed cycles does not reduce the adsorption capacity of used activated carbon. Studies on the regeneration of the bed saturated with a seven-component mixture of chloroorganic compounds at temperature of 140 °C were carried out. The degree of removal of the sum of chloro-derivatives exceeded 0.96 at a volume ratio of steam (recalculated on the condensate) to bed of about 10. It was found that the dechlorination proceeds during desorption at elevated temperature. The quantitative ratio of chloro-derivatives in the desorbate was changed in comparison to the composition of wastewater directed to the adsorption.

Keywords: Desorption, Chloroorganic Compounds, Activated Carbon, Wastewater

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Full Text: [2005\J Col Int Sci285, 525.pdf](2005/J%20Col%20Int%20Sci285,%20525.pdf)

Abstract: Changes in the molecular mass distribution (MMD) for polymer as a result of adsorption from binary and ternary solutions have been studied by the exclusion chromatography method. It was found that the affinity of polymer components to a surface has a crucial influence on the changes in MMD of polymers. The diminution of polydispersity in solutions after adsorption was observed for two polymers. In the case of the polar polymer poly(butyl methacrylate) (PBMA) the diminution of polydispersity is caused mainly by the preferential adsorption of low-molecular-mass fractions, whereas in the case of the nonpolar polymer polystyrene (PS) it is caused by the transition of the high-molecular-mass fractions onto the adsorbent surface. The analysis of experimental results indicates that the quantity of the adsorbent affects the composition of the adsorption layer formed by polymers of different chemical nature.

Keywords: Polydispersity of Polymers, Molecular Mass Distribution (MMD), Adsorbent/Solution Ratio (A/V), Low-Molecular-Mass Fractions, High-Molecular-Mass Fractions

? Sakkayawong, N., Thiravetyan, P. and Nakbanpote, W. (2005), Adsorption mechanism of synthetic reactive dye wastewater by chitosan. *Journal of Colloid and Interface Science*, **286** (1), 36-42.

Full Text: [2005\J Col Int Sci286, 36.pdf](2005/J%20Col%20Int%20Sci286,%2036.pdf)

Abstract: Chitosan was able to remove the color from synthetic reactive dye wastewater (SRDW) under acidic and caustic conditions. The effect of the initial pH on SRDW indicated that electrostatic interaction occurred between the effective functional groups (amino groups) and the dye under acidic conditions. Moreover, SRDW adsorption under caustic conditions was also affected by the covalent bonding of dye and hydroxyl groups of chitosan. In addition, elution tests confirmed that chemical adsorption occurred under acidic conditions, while both physical and chemical adsorption appeared under caustic conditions. The spectra of attenuated total reflectance Fourier transform infrared spectrometry confirmed the functional groups of chitosan that affected the SRDW adsorption. However, the maximum adsorption capacities of chitosan increased when the temperature increased. The maximum adsorption capacity of chitosan obtained from the Langmuir model was 68, 110, and 156 mg g−1 under a system pH of 11.0 at 20, 40, and 60 °C, respectively. The negative values of enthalpy change (Δ*H*), free energy change (Δ*G*), and entropy change (Δ*S*) indicated an exothermic, spontaneous process and decreasing disorder of the system, respectively. Therefore, the mechanism of SRDW adsorption by chitosan was probably by chemical adsorption for a wide range of pH’s and at high temperatures.

Keywords: Adsorption, ATR-FTIR, Chitosan, Reactive Dye Wastewater, Electrostatic, Thermodynamic

? Donat, R., Akdogan, A., Erdem, E. and Cetisli, H. (2005), Thermodynamics of Pb2+ and Ni2+ adsorption onto natural bentonite from aqueous solutions. *Journal of Colloid and Interface Science*, **286** (1), 43-52.

Full Text: [2005\J Col Int Sci286, 43.pdf](2005/J%20Col%20Int%20Sci286,%2043.pdf)

Abstract: Removal of Pb2+ and Ni2+ from aqueous solutions by sorption onto natural bentonite was investigated. Experiments were carried out as a function of particle size, the amount of bentonite, pH, concentration of metals, contact time, and temperature. The adsorption patterns of metal ions onto followed the Langmuir, Freundlich, and Dubinin–Radushkevich isotherms. This included adsorption isotherms of single-metal solutions at 303 K by batch experiments. The thermodynamic parameters (Δ*H*, Δ*S*, Δ*G*) for Pb2+ and Ni2+ sorption onto bentonite were also determined from the temperature dependence. The adsorptions were endothermic reactions. The results suggested that natural bentonite is suitable as a sorbent material for recovery and adsorption of metal ions from aqueous solutions.

Keywords: Natural Bentonite, Pb2+ and Ni2+, Sorption Isotherm

? Gücek, A., Şener, S., Bilgen, S. and Mazmancı, M.A. (2005), Adsorption and kinetic studies of cationic and anionic dyes on pyrophyllite from aqueous solutions. *Journal of Colloid and Interface Science*, **286** (1), 53-60.

Full Text: [2005\J Col Int Sci286, 53.pdf](2005/J%20Col%20Int%20Sci286,%2053.pdf)

Abstract: The adsorption of cationic Methylene Blue (MB) and anionic Procion Crimson H-EXL (PC) dyes from aqueous medium on pyrophyllite was studied. Changes in the electrokinetics of pyrophyllite as a function of pH were investigated in the absence and presence of multivalent cations. The results show that pyrophyllite in water exhibits a negative surface charge within the range pH 2–12. Pyrophyllite is found to be a novel adsorbent for versatile removal of cationic and anionic dyes. The negative hydrophilic surface sites of pyrophyllite are responsible for the adsorption of cationic MB molecules. The adsorption of anionic PC dye is possible after a charge reversal by the addition of trivalent cation of Al. Nearly 2 min of contact time are found to be sufficient for the adsorption of both dyes to reach equilibrium. The experimental data follow a Langmuir isotherm with adsorption capacities of 70.42 and 71.43 mg dye per gram of pyrophyllite for MB and PC, respectively. For the adsorption of both MB and PC dyes, the pseudo-second-order chemical reaction kinetics provides the best correlation of the experimental data.

Keywords: Pyrophyllite, Zeta Potential, Dye, Adsorption Isotherm, Adsorption Kinetics

Notes: highly cited

? Vadivelan, V. and Kumar, K.V. (2005), Equilibrium, kinetics, mechanism, and process design for the sorption of Methylene blue onto rice husk. *Journal of Colloid and Interface Science*, **286** (1), 90-100.

Full Text: [2005\J Col Int Sci286, 90.pdf](2005/J%20Col%20Int%20Sci286,%2090.pdf)

Abstract: Batch experiments were carried out for the sorption of Methylene blue onto rice husk particles. The operating variables studied were initial solution pH, initial dye concentration, adsorbent concentration, and contact time. Equilibrium data were fitted to the Freundlich and Langmuir isotherm equations and the equilibrium data were found to be well represented by the Langmuir isotherm equation. The monolayer sorption capacity of rice husks for Methylene blue sorption was found to be 40.5833 mg/g at room temperature (32 °C). The sorption was analyzed using pseudo-first-order and pseudo-second-order kinetic models and the sorption kinetics was found to follow a pseudo-second-order kinetic model. Also the applicability of pseudo second order in modeling the kinetic data was also discussed. The sorption process was found to be controlled by both surface and pore diffusion with surface diffusion at the earlier stages followed by pore diffusion at the later stages. The average external mass transfer coefficient and intraparticle diffusion coefficient was found to be 0.01133 min−1 and 0.695358 mg/g min0.5. Analysis of sorption data using a Boyd plot confirms that external mass transfer is the rate limiting step in the sorption process. The effective diffusion coefficient, *D*i was calculated using the Boyd constant and was found to be 5.05×10−04 cm2/s for an initial dye concentration of 50 mg/L. A single-stage batch-adsorber design of the adsorption of Methylene blue onto rice husk has been studied based on the Langmuir isotherm equation.

Keywords: Sorption, Rice Husk, Methylene Blue, Kinetics, Equilibrium, Mechanism, Process Design

? Allen, S.J., Gan, Q., Matthews, R. and Johnson, P.A. (2005), Kinetic modeling of the adsorption of basic dyes by kudzu. *Journal of Colloid and Interface Science*, **286** (1), 101-109.

Full Text: [2005\J Col Int Sci286, 101.pdf](2005/J%20Col%20Int%20Sci286,%20101.pdf)

Abstract: The use of kudzu, a rapidly growing, high-climbing perennial leguminous vine, for the adsorption of basic dyes from aqueous solution has been investigated at various initial dye concentrations, masses of kudzu, and agitation rates. The extent and rate of adsorption of the three basic dyes (Basic Red 22, Basic Yellow 21, and Basic Blue 3) were analyzed using a pseudo-first-order and a pseudo-second-order kinetic model. While both rate mechanisms provided an acceptable degree of correlation with the experimental sorption rate data, the pseudo-second-order model gave a much higher degree of correlation, suggesting that this model could be used in design and simulation applications.

Keywords: Adsorption, Kudzu, Dye, Kinetics, First Order, Second Order

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Full Text: [2005\J Col Int Sci286, 425.pdf](2005/J%20Col%20Int%20Sci286,%20425.pdf)

Abstract: A thermodynamic model of gas/solid adsorption has been constructed from two elements. The first is the original Gibbs equation. The second consists of functions [ψ(Θ)](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4FW7R12-1&_mathId=mml9&_user=3281709&_cdi=6857&_rdoc=2&_handle=V-WA-A-W-CA-MsSAYVA-UUA-U-AAAYZDZYZD-AAAZWCDZZD-AAWVCEADU-CA-U&_acct=C000011279&_version=1&_userid=3281709&md5=66761e29603201c3d7ae214e8637e7bf" \o "Click to view the MathML source) or [ψ(P)](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4FW7R12-1&_mathId=mml10&_user=3281709&_cdi=6857&_rdoc=2&_handle=V-WA-A-W-CA-MsSAYVA-UUA-U-AAAYZDZYZD-AAAZWCDZZD-AAWVCEADU-CA-U&_acct=C000011279&_version=1&_userid=3281709&md5=410eb1e49719971ddd35558ca4785efd" \o "Click to view the MathML source) that are calculable from measured isotherms. Based on this model the characteristic adsorption functions (CAFs) were defined and calculated. The CAFs, which concentrate into one function all measured isotherms having the same change in relative free energy of the surface, are very sensitive to the structure of the adsorbents. This statement was tested with nitrogen isotherms measured at 77 K on well-characterized chemically/physically treated activated carbons prepared from poly(ethylene terephthalate). Changes in the surface structure were followed by small angle X-ray scattering (SAXS). This experimental approach made it possible to observe the correspondence between structural changes and the CAF.

Keywords: Characteristic Adsorption Functions (CAFs), Sensitivity of CAFs to Structure of Adsorbents, Nitrogen Isotherms Measured on Virgin and Treated Activated Carbons, Surface Structure Measured by SAXS, Correlations between CAF and SAXS Measurements

? Saha, T.K., Karmaker, S., Ichikawa, H. and Fukumori, Y. (2005), Mechanisms and kinetics of trisodium 2-hydroxy-1,1’-azonaphthalene-3,4’,6-trisulfonate adsorption onto chitosan. *Journal of Colloid and Interface Science*, **286** (2), 433-439.

Full Text: [2005\J Col Int Sci286, 433.pdf](2005/J%20Col%20Int%20Sci286,%20433.pdf)

Abstract: Chitosan, a naturally abundant biopolymer, has widely been studied for metal adsorption from various solutions, but the extension of chitosan as an adsorbent to remove organic substances from water and wastewater has seldom been explored. In this study, the adsorption of an azo dye, trisodium 2-hydroxy-1,1’-azonaphthalene-3,4’,6-trisulfonate (1), from aqueous solution onto the various degrees of deacetylated chitosan has been investigated. Equilibrium studies have been carried out to determine the capacity of chitosan for dye. The experimental data were analyzed using two isotherm correlations, namely, Langmuir and Freundlich equations. The linear correlation coefficients were determined for each isotherm and the Langmuir provided the best fit. The experimental adsorption isotherms were perfectly reproduced in the simulated data obtained from numerical analysis on the basis of the Langmuir model and the isotherm constants. Adsorption of (1) onto the chitosan flakes was found to be strongly depending on degrees of deacetylation in chitosan and temperatures. Significant amounts of (1) were adsorbed by chitosan 8B (higher degree of deacetylated chitosan), but the adsorption capacity was reduced remarkably with increasing solution temperatures. Thermodynamic parameters such as change in free energy (Δ*G*), enthalpy (Δ*H*), and entropy (Δ*S*) were also determined. In addition, kinetic study indicated that the adsorption process mechanisms were both transport- and attachment-limited.

Keywords: Chitosan, Dye adsorption, Mechanisms, Kinetics, Thermodynamics

? Yurdakoç, M., Seki, Y., Karahan, S. and Yurdakoç, K. (2005), Kinetic and thermodynamic studies of boron removal by Siral 5, Siral 40, and Siral 80. *Journal of Colloid and Interface Science*, **286** (2), 440-446.

Full Text: [2005\J Col Int Sci286, 440.pdf](2005/J%20Col%20Int%20Sci286,%20440.pdf)

Abstract: In this study, adsorption of boron onto Siral 5, Siral 40, and Siral 80 samples was studied in a batch system with a function of temperature and contact time. The results of adsorption studies indicate that adsorption process was well described with the Freundlich equation and Dubinin–Radushkevich (DR) equation. The Langmuir model does not appear to fit the adsorption better than Freundlich or DR. It has also been found that the magnitudes of free energies are less than 8 kJ mol−1 and within the energy range of physical adsorption. The intraparticle diffusion model and pseudo-first-order and pseudo-second-order kinetic model were tested to find out rate constants of adsorption. From kinetic experiments, it is realized that boron adsorption onto Siral samples obeyed the pseudo-second-order kinetic model. The thermodynamic studies showed that adsorption process was not spontaneous nature and endothermic. It could also be added that the randomness increased during the adsorption.

Keywords: Boron, Kinetic, Thermodynamic Parameters, FTIR

? Okada, K., Nishimuta, K., Kameshima, Y. and Nakajima, A. (2005), Effect on uptake of heavy metal ions by phosphate grafting of allophane. *Journal of Colloid and Interface Science*, **286** (2), 447-454.

Full Text: [2005\J Col Int Sci286, 447.pdf](2005/J%20Col%20Int%20Sci286,%20447.pdf)

Abstract: The effect of phosphate grafting on the uptake of various heavy metal ions was investigated using allophane, a clay mineral having a chemical composition of 1–2SiO2Al2O35–6H2O with hollow nanoparticles 3.5–5 nm in size. pHosphate grafting was performed on allophane with an atomic ratio Si/Al = 0.85 using the orthophosphates (NH4)2HPO4, Na2HPO4 and CaHPO4 and the triphosphate Na5P3O10. The cations in the phosphates were partially retained in the samples, along with the grafted phosphate. Uptake experiments were performed with various heavy metal ions (Cu2+, Zn2+, Ni2+, Co2+, and Mn2+) and alkaline earth ions (Mg2+ and Ca2+) using a batch method. With increasing amounts of grafted phosphate, the Cu2+ uptake capacity increases to about double of that of ungrafted allophane. Although part of the grafted phosphate is released during the uptake experiments, this can be largely suppressed by heat-treating the samples at 200–500 °C. The Cu2+ uptake ability of the (NH4)2HPO4-grafted sample showed a steep decrease with higher heating temperature according to the thermal decomposition of NH4+. The ratios of cations released from the samples to cations removed from solution (2Na/Cu and Ca/Cu) are close to unity. From these results, the replacement reaction is thought to be the main uptake mechanism of heavy metal ions in the present samples. The uptake abilities of the present samples for various cations are explained with respect to the solubilities of the corresponding metal phosphates.

Keywords: Allophane, pHosphate Grafting, Heavy Metal Ions, Uptake Mechanism, Aluminosilicate Hydrate

? Akbal, F. (2005), Adsorption of basic dyes from aqueous solution onto pumice powder. *Journal of Colloid and Interface Science*, **286** (2), 455-458.

Full Text: [2005\J Col Int Sci286, 455.pdf](2005/J%20Col%20Int%20Sci286,%20455.pdf)

Abstract: The adsorption of Methylene blue and crystal violet on pumice powder samples of varying compositions was investigated using a batch adsorption technique. The effects of various experimental parameters, such as adsorbent dosage, initial dye concentration, and contact time, were also investigated. The extent of dye removal increased with decreased initial concentration of the dye and also increased with increased contact time and amount of adsorbent used. Adsorption data were modeled using the Freundlich adsorption isotherm. The adsorption kinetic of Methylene blue and crystal violet could be described by the pseudo-second-order reaction model.

Keywords: Adsorption, Pumice Powder, Color Removal, Adsorption Isotherm

? Nagayasu, T., Imamura, K. and Nakanishi, K. (2005), Adsorption characteristics of various organic substances on the surfaces of tantalum, titanium, and zirconium. *Journal of Colloid and Interface Science*, **286** (2), 462-470.

Full Text: [2005\J Col Int Sci286, 462.pdf](2005/J%20Col%20Int%20Sci286,%20462.pdf)

Abstract: Adsorption characteristics of carboxylic acids, amines, an octapeptide composed of four l-alanine and four l-aspartic acid residues (Peptide-A4D4), and *β*-lactoglobulin (*β*-Lg) on tantalum (Ta), titanium (Ti), and zirconium (Zr) particles were examined at 30 °C and in some case, were compared with their adsorption onto SUS316L stainless steel particles (S6L). The adsorption isotherms on the Ta, Ti, and Zr particles could usually be expressed either by a Langmuir-type equation for reversible adsorption or by a modified Langmuir-type adsorption equation including terms for both reversible and irreversible adsorption. The adsorption equilibrium of benzoic acid, benzylamine, and *m*-xylylenediamine on all the metal surfaces followed a Langmuir-type equation, while those of phthalic acid, mellitic acid, and Peptide-A4D4 could be fitted to the modified Langmuir-type adsorption equation. The adsorption characteristics of different adsorbates on the different surfaces were discussed particularly with reference to the pH dependencies of the *q*irrev, *q*rev, and *K* values and the electrostatic properties of the oxidized surface of the metal particles. Fourier transform infrared spectroscopic analyses using a reflection/absorption technique (RA-IR) indicated that phthalic acid and mellitic acid are adsorbed in similar adsorption states irrespective of the type of metal. *β*-Lg was adsorbed onto the surfaces principally in an irreversible manner. The desorption behavior of *β*-Lg from Ta, Ti, and S6L surfaces was examined, in order to evaluate the extent of interaction between *β*-Lg and the metals.

Keywords: Adsorption Equilibrium, Carboxylic Acid, Amine, Protein, Tantalum, Titanium, Zirconium, FTIR

? Flogeac, K., Guillon, E. and Aplincourt, M. (2005), Adsorption of several metal ions onto a model soil sample: Equilibrium and EPR studies. *Journal of Colloid and Interface Science*, **286** (2), 596-601.

Full Text: [2005\J Col Int Sci286, 596.pdf](2005/J%20Col%20Int%20Sci286,%20596.pdf)

Abstract: Soils play an important role in the control of metallic cations in the environment. Therefore, knowledge of the adsorption properties of soil is crucial in understanding and solving pollution problems. Adsorption isotherms provide a macroscopic view of the retention phenomena. The aim of this paper is to study iron, manganese, and chromium adsorption onto a soil sample as a function of the reaction time, pH, and metal concentration. The adsorption isotherms allow the determination of the affinity order of metals for the surface of the soil sample as such: Fe3+ > Cr3+ > Mn2+. The equilibrium data fit well with the Langmuir and Freundlich models and confirm the affinity order of the soil sample for these metals. These adsorption data are combined with EPR spectroscopy to obtain structural information about the surface complexes formed. Iron is held in inner-sphere complexes. Manganese is simultaneously held in outer- and inner-sphere complexes. Due to poor resolution, chromium was not detected by EPR and thus it is impossible to infer coordination sphere and coordination number. Iron and manganese are in an octahedral environment.

Keywords: Soil, Iron, Manganese, Chromium, Adsorption Isotherms, EPR

? Chakrabarti, S. and Dutta, B.K. (2005), On the adsorption and diffusion of Methylene Blue in glass fibers. *Journal of Colloid and Interface Science*, **286** (2), 807-811.

Full Text: [2005\J Col Int Sci286, 807.pdf](2005/J%20Col%20Int%20Sci286,%20807.pdf)

Abstract: The adsorption and diffusion phenomena of Methylene Blue dye on glass fiber have been explored. Both isotherm and kinetics have been studied. Effect of process parameters such as pH, adsorbent loading, and initial dye concentration was investigated. Temperature had a little effect on adsorption. A diffusion model was developed to estimate the diffusivity of the dye in glass fiber. The diffusivity was found to be varying exponentially with the dye concentration.

Keywords: Adsorption, Glass Fiber, Dye, Methylene Blue, Diffusivity

? Seki, Y. and Yurdakoç, K. (2005), Paraquat adsorption onto clays and organoclays from aqueous solution. *Journal of Colloid and Interface Science*, **287** (1), 1-5.

Full Text: [2005\J Col Int Sci287, 1.pdf](2005/J%20Col%20Int%20Sci287,%201.pdf)

Abstract: Clays were compared with organoclays for the sorption of paraquat from aqueous solution. Sepiolite (S), bentonite (B), and illite (I) were used as clay samples. Organoclays were prepared by the modification of the clays with nonyl- and dodecylammonium chlorides, denoted as NS, DS, NB, DB, NI, and DI, respectively. Specific surface area and pore size distribution of the samples were determined by N2 adsorption–desorption at 77 K using the BET method. X-ray powder diffraction analysis of the samples was used to determine the effects of modifying agents on the layer structure of the clays. In the adsorption experiments, *C*m values increased from 0.038 mmol/g for DS to 0.223 mmol/g for NI. *K*d0.3 values ranged from 0.177 for DS to 0.843 for NI. The adsorption data indicated that illite and NI are the most effective adsorbents among these clays and organoclay samples, respectively.

Keywords: Paraquat, Adsorption, Clay, Organoclay, Bentonite, Sepiolite

? Al-Ghouti, M., Khraisheh, M.A.M., Ahmad, M.N.M. and Allen, S. (2005), Thermodynamic behaviour and the effect of temperature on the removal of dyes from aqueous solution using modified diatomite: A kinetic study. *Journal of Colloid and Interface Science*, **287** (1), 6-13.

Full Text: [2005\J Col Int Sci287, 6.pdf](2005/J%20Col%20Int%20Sci287,%206.pdf)

Abstract: The effect of solution temperature and the determination of the thermodynamic parameters of adsorption of Methylene blue (MB), Cibacron Reactive black C-NN (RB) and Cibacron Reactive golden yellow MI-2RN (RY) onto manganese-oxides-modified diatomite (MOMD), such as activation energy, *E*, enthalpy of activation, Δ*H*°, entropy of activation, Δ*S*°, and free energy of activation, Δ*G*°, on the adsorption rates is important in understanding the adsorption mechanism. The rate and the transport/kinetic processes of dye adsorption onto the adsorbents were described by applying various kinetic adsorption models. This would lead to a better understanding of the mechanisms controlling the adsorption rate. The pseudo-second-order model was the best choice among all the kinetic models to describe the adsorption behaviour of RB onto MOMD, suggesting that the adsorption mechanism might be a chemisorption process. The activation energies, *E*, for RB, RY and MB were −6.74, 56.65 and 99.80 kJ/mol, respectively. The negative value of the activation energy suggested that the rise in the solution temperature did not favour RB adsorption onto MOMD. Moreover, the activation energy of the diffusion process, *E*°, for RB, RY and MB increased as MB > RY >> RB. It means that the RB molecules are much faster moving and a lower energy is needed to diffuse into MOMD than RY and MB molecules. *E*°, the activation energy for adsorption into pores, of RY is higher than *E*, indicating that the rate-limiting step of RY adsorption onto MOMD might be diffusion controlled, while the activation energy of the diffusion process, *E*°, of MB is slightly lower than *E*, suggesting that the rate-limiting step is a combination of chemical and diffusion adsorption.

Keywords: Adsorption, Diatomite, Modified Adsorbents, Thermodynamic Parameters, Kinetic Studies, Reactive Dyes, Methylene Blue

? Ahmaruzzaman, M. and Sharma, D.K. (2005), Adsorption of phenols from wastewater. *Journal of Colloid and Interface Science*, **287** (1), 14-24.

Full Text: [2005\J Col Int Sci287, 14.pdf](2005/J%20Col%20Int%20Sci287,%2014.pdf)

Abstract: The present work involves an investigation of the possible use of coal, residual coal, and residual coal treated with H3PO4 as a means of removal of phenol from wastewater. The study was realized using batch experiments, with synthetic wastewater having phenol concentration of 1000 ppm. Other low-cost adsorbents such as petroleum coke, coke breeze, rice husk, and rice husk char have also been used. The effect of system variables such as pH, contact time, and temperature has been investigated. The suitability of the Freundlich, Langmuir, and Redlich–Peterson adsorption models to the equilibrium data was investigated for each phenol–adsorbent system. The results showed that the equilibrium data for all the phenol–sorbent systems fitted the Redlich–Peterson model best. Kinetic modeling of removal of phenols was done using the Lagergren first-order rate expression. A series of column experiments were performed to determine the breakthrough curves.

Keywords: Adsorption, Equilibrium Isotherm, Freundlich Isotherm, Redlich–Peterson Isotherm, Langmuir Isotherm, Kinetics, Column

? Yang, X.Y. and Al-Duri, B. (2005), Kinetic modeling of liquid-phase adsorption of reactive dyes on activated carbon. *Journal of Colloid and Interface Science*, **287** (1), 25-34.

Full Text: [2005\J Col Int Sci287, 25.pdf](2005/J%20Col%20Int%20Sci287,%2025.pdf)

Abstract: In this paper, adsorption equilibrium and kinetics of three reactive dyes from their single-component aqueous solutions onto activated carbon were studied in a batch reactor. Effects of the initial concentration and adsorbent particle size on adsorption rate were investigated Adsorption equilibrium data were then correlated with several well-known equilibrium isotherm models. The kinetic data were fitted using the pseudo-first-order equation, the pseudo-second-order equation, and the intraparticle diffusion model. The respective characteristic rate constants were presented. A new adsorption rate model based on the pseudo-first-order equation has been proposed to describe the experimental data over the whole adsorption process. The results show that the modified pseudo-first-order kinetic model generates the best agreement with the experimental data for the three single-component adsorption systems.

Keywords: Adsorption, Equilibrium, Kinetics, Pseudo-First-Order Equation, Pseudo-Second-Order Equation, Intraparticle Diffusion Model

? Lv, L. Hor, M.P., Su, F. and Zhao, X.S. (2005), Competitive adsorption of Pb2+, Cu2+, and Cd2+ ions on microporous titanosilicate ETS-10. *Journal of Colloid and Interface Science*, **287** (1), 178-184.

Full Text: [2005\J Col Int Sci287, 178.pdf](2005/J%20Col%20Int%20Sci287,%20178.pdf)

Abstract: In the present study, the competitive adsorption characteristics of binary and ternary heavy metal ions Pb2+, Cu2+, and Cd2+ on microporous titanosilicate ETS-10 were investigated in batch systems. Pure microporous titanosilicate ETS-10 was synthesized with P25 as the Ti source and characterized by the techniques of X-ray diffraction (XRD), field emission-scanning electron microscope (FESEM), nitrogen adsorption, and *ζ*-potential. Equilibrium and kinetic adsorption data showed that ETS-10 displays a high selectivity toward one metal in a two-component or a three-component system with an affinity order of Pb2+ > Cd2+ > Cu2+. The equilibrium behaviors of heavy metals species with stronger affinity toward ETS-10 can be described by the Langmuir equation while the adsorption kinetics of the metals can be well fitted to a pseudo-second-order (PSO) model.

Keywords: Microporous Titanosilicate ETS-10, Heavy Metal Ions, Competitive Adsorption, Selectivity

? Aworn, A., Thiravetyan, P. and Nakbanpote, W. (2005), Recovery of gold from gold slag by wood shaving fly ash. *Journal of Colloid and Interface Science*, **287** (2), 394-400.

Full Text: [2005\J Col Int Sci287, 394.pdf](2005/J%20Col%20Int%20Sci287,%20394.pdf)

Abstract: Wood shaving fly ash was used as an alternative adsorbent for gold preconcentration from gold slag. The maximum gold adsorption capacity of wood shaving fly ash washed with tap water (WSFW) at 20, 30, 40, and 60 °C was 8.68, 7.79, 7.44, and 7.25 mgAu/gadsorbent, respectively, while of activated carbon it was 76.78, 60.95, 56.13, and 51.90 mgAu/gadsorbent, respectively. Deionized water at 100 °C could elute gold adsorbed onto WSFW to 71%. The effect of the increasing temperature of water, 30, 60, and 100 °C, implied that the adsorption mechanism was mainly physical adsorption. The negative values of enthalpy change (Δ*H*) and free energy change (Δ*G*) indicated an exothermic and spontaneous process, respectively. The positive values of entropy change (Δ*S*) indicated increasing disorder of the system. The advantages of wood shaving fly ash are the purification of gold and the easier recycling of gold from the gold-adsorbed adsorbent.

Keywords: Adsorption, Gold Cyanide, Gold Slag, Wood Shaving, Fly Ash

? Xu, Z.H., Huang, M.X., Gu, Q.B., Wang, Y., Cao, Y., Du, X.M., Xu, D.P., Huang, Q. and Li, F.S. (2005), Competitive sorption behavior of copper(II) and herbicide propisochlor on humic acids. *Journal of Colloid and Interface Science*, **287** (2), 422-427.

Full Text: [2005\J Col Int Sci287, 422.pdf](2005/J%20Col%20Int%20Sci287,%20422.pdf)

Abstract: The competitive sorption behavior of Cu2+ and propisochlor on humic acids (HA) was investigated using a batch method. The sorption equilibrium time of propisochlor on HA was 12 h when its initial concentration was 4 or 10 mg L−1. The results showed that the Langmuir model can best describe the sorption behavior of propisochlor on HA. The added Cu2+ reduced the solid-phase concentration of propisochlor on HA, and the Langmuir model can also describe the sorption behavior of propisochlor on HA when the Cu2+ concentration is 100 and 200 mg L−1. The sorption of propisochlor on HA did not remarkably affect the sorption of Cu2+ on HA when the concentration of propisochlor was below 20 mg L−1. Cu2+ may compete with propisochlor for the sorption sites of HA, such as carboxylic and phenolic groups. It can be concluded that Cu2+ fast adsorbed to the HA matrix, altered its physical and chemical properties, and thus decreased the solid-phase concentrations of propisochlor on HA. In natural water, Cu2+ may promote the release of propisochlor from HA, and thus affect its transport, transformation, and fate in the environment.

Keywords: Competitive Sorption, Herbicide, Propisochlor, Cu2+, Humic Acids

? Tseng, R.L. and Tseng, S.K. (2005), Pore structure and adsorption performance of the KOH-activated carbons prepared from corncob. *Journal of Colloid and Interface Science*, **287** (2), 428-437.

Full Text: [2005\J Col Int Sci287, 428.pdf](2005/J%20Col%20Int%20Sci287,%20428.pdf)

Abstract: Carbonaceous adsorbents with controllable surface area were chemically activated with KOH at 780 °C from chars that were carbonized from corncobs at 450 °C. The pore properties, including BET surface area, pore volume, pore size distribution, and mean pore diameter of these activated carbons, were characterized by the *t*-plot method based on N2adsorption isotherms. Two groups are classified according to the types of adsorption/desorption isotherms. Group I corncob-derived activated carbons, with KOH/char ratios from 0.5 to 2, exhibited BET surface area ranging from 841 to 1221 m2 / g. Group II corncob-derived activated carbons, with KOH/char rations from 3 to 6, showed high BET surface areas, from 1976 to 2595 m2 / g. From scanning electron microscopic (SEM) results, the surface morphology of honeycombed holes on corncob-derived activated carbons was significantly influenced by the KOH/char ratios. The adsorption kinetics of Methylene blue, basic brown 1, acid blue 74, 2,4-dichlorophenol, 4-chlorophenol, and phenol from water at 30 °C were studied on the two groups of activated carbons, which were suitably described by two simplified kinetic models, pseudo-first-order and pseudo-second-order equations. The effective particle diffusivities of phenols and dyes at the corncob-derived activated carbons of group II are higher than those of ordinary activated carbons. The high-surface-area activated carbons were demonstrated to be promising adsorbents for pollution control and for other applications.

Keywords: Activated Carbons, KOH Activation, Corncob, Pore Properties, Adsorption

? Duong, T.D., Hoang, M. and Nguyen, K.L. (2005), Sorption of Na+, Ca2+ ions from aqueous solution onto unbleached kraft fibers—kinetics and equilibrium studies. *Journal of Colloid and Interface Science*, **287** (2), 438-443.

Full Text: [2005\J Col Int Sci287, 438.pdf](2005/J%20Col%20Int%20Sci287,%20438.pdf)

Abstract: The sorption of Na+ and Ca2+ from aqueous solutions onto unbleached kraft fiber was investigated. The sorption kinetics was found to be highly dependent on pH, initial concentration, and temperature. The sorption rate increased as the initial concentration and pH were increased. Thermodynamic and kinetic results indicated that the sorption of Na+ and Ca2+ onto kraft fiber was exothermic, reversible, and spontaneous with activation energies of 11.0 and 23.3 kJ/mol, respectively. The sorption kinetics followed a pseudo-second-order model and the equilibrium data followed the Langmuir isotherms. The fiber sorption capacities calculated from the Langmuir isotherms were similar to the fiber charges determined by potentiometric titration at pH>7.

Keywords: Kinetics, Thermodynamics, Sorption, Equilibrium, Kraft Pulps, Fiber Charges

? Alliot, C., Bion, L., Mercier, F. and Toulhoat, P. (2005), Sorption of aqueous carbonic, acetic, and oxalic acids onto α-alumina. *Journal of Colloid and Interface Science*, **287** (2), 444-451.

Full Text: [2005\J Col Int Sci287, 444.pdf](2005/J%20Col%20Int%20Sci287,%20444.pdf)

Abstract: The presence of organic complexing agents can modify the behavior of a surface. This study aims to better understand the impact of carboxylic acids (acetic, oxalic, and carbonic acids) issued from cellulose degradation and equally naturally present in soils. First, evidence of two different kinds of sites for chloride adsorption onto α-alumina and another for sodium sorption was provided. Consequently, no competition between these cation and anion sorptions occurs on α-alumina. The associated exchange capacities and ionic exchange constants were measured. Second, the adsorption behavior of the carboxylic acids was studied as a function of aqueous −log[H+] and 0.01 to 0.1 M ionic strength (NaCl), and modeled by using mass action law for ideal biphasic systems. The carboxylic acids were found to be adsorbed on the same sites as chloride ions. The competition between organic ligands and chloride ions was satisfactorily accounted for by the model assuming the deprotonated form of the ligands was sorbed on α-alumina. The model also allowed us to interpret the adsorption of all species under various conditions without any extra fitting parameters.

Keywords: Alumina, Acetate, Oxalate, Carbonate, Sorption, Ion-Exchange Theory

? Lee, V.A., Craig, R.G., Filisko, F.E. and Zand, R. (2005), Microcalorimetry of the adsorption of lysozyme onto polymeric substrates. *Journal of Colloid and Interface Science*, **288** (1), 6-13.

Full Text: [2005\J Col Int Sci288, 6.pdf](2005/J%20Col%20Int%20Sci288,%206.pdf)

Abstract: The conformation of blood proteins adsorbed on biomaterial surfaces probably plays a significant role in the biocompatibility of blood-contacting implants. This paper reports heats of adsorption of a globular protein, lysozyme, onto three uncharged polymeric substrates. Variations in heats among substrates reflect differences in the lysozyme/substrate interaction as well as the possibility of substrate-dependent conformations. In each case, a series of plateaus appeared in the adsorption isotherm with increasing concentration. In the cases of two substrates, polystyrene and poly(styrene-*co*-butyl methacrylate), endothermic discontinuities appeared at rises between plateaus. It is proposed that the step pattern in each isotherm reflects distinct conformational states of lysozyme on the substrate surfaces. Endothermic discontinuities may be latent heats associated with change to a more stable conformation after initial adsorption. The absence of discontinuities in the case of poly(styrene-*co*-allyl alcohol) suggests structural transitions occur to a smaller extent on this material and results in conformations different from those which occur when lysozyme is adsorbed by polystyrene or by poly(styrene-*co*-butyl methacrylate).

Keywords: Lysozyme, Protein Adsorption, Protein Conformation, Microcalorimetry, Biocompatibility, Interfacial Energy

? Guo, Z.J., Yu, X.M., Guo, F.H. and Tao, Z.Y. (2005), Th(IV) adsorption on alumina: Effects of contact time, pH, ionic strength and phosphate. *Journal of Colloid and Interface Science*, **288** (1), 14-20.

Full Text: [2005\J Col Int Sci288, 14.pdf](2005/J%20Col%20Int%20Sci288,%2014.pdf)

Abstract: Adsorption of Th(IV) (total concentration, 10−5–10−4 mol/L) was studied by a batch technique. The effects of pH, ionic strength, contact time, and phosphate on the adsorption of Th(IV) onto alumina were investigated. Adsorption isotherms of Th(IV) on alumina at approximately constant pH and three ionic strengths (0.05, 0.1, 0.5 mol/L KNO3) were determined. It was found that the pH values of aqueous solutions of both the Th(IV)–alumina and phosphate–alumina adsorption systems increase with increasing contact time, respectively. Adsorption of Th(IV) on alumina steeply increases with increasing pH from 1 to 4.5 and the adsorption edge consists of three regions. The phosphate added clearly enhances Th(IV) adsorption in the pH range 1–4. From the adsorption isotherms at approximately constant pH and three different ionic strengths, a reduced ionic strength effect was observed and is contradictory to the insensitive effect obtained from the adsorption edges on three oxides of Fe, Al, and Si at different ionic strengths. Compared with the adsorption edges at different ionic strengths, the adsorption isotherms at approximately constant pH and different ionic strengths are more advantageous in the investigation of ionic strength effect. The significantly positive effect of phosphate on Th(IV) adsorption onto alumina was attributed to strong surface binding of phosphate on alumina and the subsequent formation of ternary surface complexes involving Th(IV) and phosphate.

Keywords: Th(IV), Alumina, Adsorption, pH, pHosphate

? Arias, M., Pérez-Novo, C., Osorio, F., López, E. and Soto, B. (2005), Adsorption and desorption of copper and zinc in the surface layer of acid soils. *Journal of Colloid and Interface Science*, **288** (1), 21-29.

Full Text: [2005\J Col Int Sci288, 21.pdf](2005/J%20Col%20Int%20Sci288,%2021.pdf)

Abstract: The environmental and health effects of the contamination of soils by heavy metals depend on the ability of the soils to immobilize these contaminants. In this work, the adsorption and desorption of Cu and Zn in the surface layers of 27 acid soils were studied. Adsorption of CuII from 157–3148 μmol L−1 solutions was much greater than adsorption of ZnII from solutions at the same concentration. For both Cu and Zn, the adsorption data were fitted better by the Freundlich equation than by the Langmuir equation. Multiple regression analyses suggest that Cu and Zn adsorption depends to a significant extent on pH and CEC: for both metals these variables accounted for more than 80% of the variance in the Freundlich pre-exponential parameter *K*F, and pH also accounted for 57% of the variance in 1/*n* for Zn and, together with carbon content, for 41% of the variance in 1/*n* for Cu. The percentage of adsorbed metal susceptible to desorption into 0.01 M NaNO3 was greater for Zn than for Cu, but in both cases depended significantly on pH, decreasing as pH increased. In turn, both pHH2O and pHKCl are significantly correlated with cation exchange capacity. Desorption of metal adsorbed from solutions at relatively low concentration (787 μmol L−1) exhibited power-law dependence on *K*d, the quotient expressing distribution between soil and soil solution in the corresponding adsorption experiment, decreasing as increasing *K*d reflected increasing affinity of the soil for the metal. The absence of a similarly clear relationship when metal had been adsorbed from solutions at relatively high concentration (2361 μmol L−1) is attributed to the scant between-soil variability of *K*d at these higher concentrations. In general, adsorption was greater and subsequent desorption less in cultivated soils than in woodland soils.

Keywords: Adsorption–Desorption, Copper, Zinc, Acid Soils

? Chatterjee, S., Chatterjee, S., Chatterjee, B.P., Das, A.R. and Guha, A.K. (2005), Adsorption of a model anionic dye, eosin Y, from aqueous solution by chitosan hydrobeads. *Journal of Colloid and Interface Science*, **288** (1), 30-35.

Full Text: [2005\J Col Int Sci288, 30.pdf](2005/J%20Col%20Int%20Sci288,%2030.pdf)

Abstract: The process of sorption is being increasingly used for ecofriendly and economic remediation of textile dye effluents. The present model study deals with the adsorption of a model anionic dye, eosin Y, from wastewater using conditioned chitosan hydrobeads. Conditioning reduced the pH sensitivity and maintained the maximum sorption capacity of the beads near pH 8. To understand the chemicophysical characteristics of the adsorption process we studied, the kinetics and isotherm behavior of the system. It was observed that temperature played a significant role in the process. The Langmuir model was found to be most appropriate for the description of the adsorption process. The kinetic results followed a second-order equation. It was observed that 1 g of chitosan adsorbed ≈76 mg of eosin Y. The dye was desorbed from the beads by changing the pH of the solution, and the conditioned chitosan beads were reused five times without any loss of mechanical and chemical efficacy.

Keywords: Bioremediation, Anionic Dye, Chitosan Hydrobeads, Chemicophysical Study

? Kuo, Y.C. (2005), Deposition of cation-absorptive biocolloids onto a charged surface. *Journal of Colloid and Interface Science*, **288** (1), 36-44.

Full Text: [2005\J Col Int Sci288, 36.pdf](2005/J%20Col%20Int%20Sci288,%2036.pdf)

Abstract: Classical theoretical assumptions, which are implausible for describing biological behavior in real systems include uniform fixed charge distribution in colloidal outer membrane layer, uniform dielectric constant throughout the membrane phase, and point charge for ionic sizes. In the present study, absorption of cations by fixed functional groups in the membrane layer, variation in dielectric constant in a system, and effect of ionic sizes are considered to investigate the deposition of biocolloids each covered with an ion-penetrable membrane. The simulated results reveal that a larger numbers of cations involved in the formation of a cations–fixed groups complex, a smaller dielectric constant near a biological uncharged core, a larger dielectric constant of the membrane phase, a smaller cation-absorption equilibrium constant, a smaller concentration of total functional groups in the membrane layer, a thicker membrane, smaller cations, larger anions, and larger functional groups yield a faster rate of deposition.

Keywords: Cation absorption, Dielectric constant, Size, Deposition, Rate, Biocolloid

? Gupta, V.K., Saini, V.K. and Jain, N. (2005), Adsorption of As(III) from aqueous solutions by iron oxide-coated sand. *Journal of Colloid and Interface Science*, **288** (1), 55-60.

Full Text: [2005\J Col Int Sci288, 55.pdf](2005/J%20Col%20Int%20Sci288,%2055.pdf)

Abstract: Arsenic is a toxic element and may be found in natural waters as well as in industrial waters. Leaching of arsenic from industrial wastewater into groundwater may cause significant contamination, which requires proper treatment before its use as drinking water. The present study describes removal of arsenic(III) on iron oxide-coated sand in batch studies conducted as a function of pH, time, initial arsenic concentration, and adsorbent dosage. The results were compared with those for uncoated sand. The adsorption data fitted well in the Langmuir model at different initial concentration of As(III) at 20 g/l fixed adsorbent dose. Maximum adsorption of As(III) for coated sand is found to be much higher (28.57 μg/g) than that for uncoated sand (5.63 μg/g) at pH 7.5 in 2 h. The maximum As(III) removal efficiency achieved is 99% for coated sand at an adsorbent dose of 20 g/l with initial As(III) concentration of 100 μg/l in batch studies. Column studies have also been carried out with 400 μg/l arsenic (pH 7.5) by varying the contact time, filtration rate, and bed depth. Results of column studies demonstrated that at a filtration rate of 4 ml/min the maximum removal of As(III) observed was 94% for coated sand in a contact time of 2 h. The results observed in batch and column studies indicate that iron oxide-coated sand is a suitable adsorbent for reducing As(III) concentration to the limit (50 μg/l) recommended by Indian Standards for Drinking Water.

Keywords: Adsorbent, Adsorbent, Adsorption, Arsenic, Basic Dye, Biggest Arsenic Calamity, Coated Sand, Districts, Drinking-Water, Flow Rate, Ground-Water, Groundwater, India, Iron Oxide, Langmuir, Removal, Sand, Sorption, Wastewater, West-Bengal

? Churaev, N.V., Holdich, R.G., Prokopovich, P.P., Starov, V.M. and Vasin, S.I. (2005), Reversible adsorption inside pores of ultrafiltration membranes. *Journal of Colloid and Interface Science*, **288** (1), 205-212.

Full Text: [2005\J Col Int Sci288, 205.pdf](2005/J%20Col%20Int%20Sci288,%20205.pdf)

Abstract: A range of experiments were performed on the dead-end ultrafiltration (UF) of poly(ethylene glycol) (PEG) of different molecular weights. Deviations from a linear dependence of the filtration rate with the applied membrane pressure difference were found. It is shown that these deviations are not caused by an osmotic pressure influence but determined by the reversible adsorption of PEG molecules inside the pores of the ultrafiltration membranes used. A theoretical model of the process is suggested, which describes the reversible adsorption inside the membrane pores and the corresponding reduction of the filtration velocity. Comparison of the theory predictions with experimental data on the ultrafiltration of PEG shows a good agreement between the theoretical predictions and experimental data. A theory is presented for calculation of the PEG rejection coefficient in the case of ultrafiltration.

Keywords: Reversible Adsorption, Ultrafiltration, Permeability

? Álvarez-Merino, M.A., López-Ramón, V. and Moreno-Castilla, C. (2005), A study of the static and dynamic adsorption of Zn(II) ions on carbon materials from aqueous solutions. *Journal of Colloid and Interface Science*, **288** (2), 335-341.

Full Text: [2005\J Col Int Sci288, 335.pdf](2005/J%20Col%20Int%20Sci288,%20335.pdf)

Abstract: The effect of surface oxidation, solution pH, and ionic strength on the adsorption of Zn(II) ions from aqueous solution under static conditions was studied using commercial activated carbons in the form of grains and cloth. In addition, the effects of surface oxidation and the presence of dissolved natural organic matter (tannic acid) were studied under dynamic conditions using activated carbon cloth column beds. Under static conditions, surface oxidation largely increased Zn2+ uptake and two H+ ions were displaced from the oxidized carbon surface per Zn(II) ion adsorbed. It is proposed that adsorption of Zn(II) on the as-received basic carbons was due to C*π*–cation interactions. An increase in solution pH in the range 3–6 increased Zn(II) uptake, whereas an increase in ionic strength decreased Zn(II) uptake because of the screening effect of the added salt. In the experiments carried out with carbon column beds, the oxidized activated carbon cloth was also more effective than the as-received carbon to remove Zn(II) ions. In this case, the presence of tannic acid decreased the efficiency of the oxidized activated carbon cloth bed to remove Zn(II) ions. An increase in the tannic acid initial concentration had a greater effect on the removal of tannic acid than on the removal of Zn(II) by the column bed. This may be a consequence of the greater size of tannic acid molecules and their low affinity for oxidized carbon surfaces.

Keywords: Zn(II) Ion Adsorption, Carbon Materials, Surface Oxygen Complexes, Acid And Basic Carbon Surfaces, Tannic Acid Adsorption

? Arami, M., Limaee, N.Y., Mahmoodi, N.M. and Tabrizi, N.S. (2005), Removal of dyes from colored textile wastewater by orange peel adsorbent: Equilibrium and kinetic studies. *Journal of Colloid and Interface Science*, **288** (2), 371-376.

Full Text: [2005\J Col Int Sci288, 371.pdf](2005/J%20Col%20Int%20Sci288,%20371.pdf)

Abstract: The use of low-cost and ecofriendly adsorbents has been investigated as an ideal alternative to the current expensive methods of removing dyes from wastewater. Orange peel was collected from the fields of orange trees in the north of Iran and converted into a low-cost adsorbent. This paper deals with the removal of textile dyes from aqueous solutions by orange peel. Direct Red 23 (DR23) and Direct Red 80 (DR80) were used as model compounds. The adsorption capacity *Q*0 was 10.72 and 21.05 mg/g at initial pH 2. The effects of initial dye concentration (50, 75, 100, 125 mg/l), pH, mixing rate, contact time, and quantity of orange peel have been studied at 25 °C. The Langmuir and Freundlich models were used for this study. It was found that the experimental results show that the Langmuir equation fit better than the Freundlich equation. The results indicate that acidic pH supported the adsorption of both dyes on the adsorbent. Orange peel with concentrations of 8 and 4 g/l has shown adsorption efficiencies of about 92 and 91% for DR23 and DR80, respectively. Furthermore, adsorption kinetics of both dyes was studied and the rates of sorption were found to conform to pseudo-second-order kinetics with a good correlation (*R*≥0.998). Maximum desorption of 97.7% for DR23 and 93% for DR80 were achieved in aqueous solution at pH 2. Finally, the effect of adsorbent surface was analyzed by scanning electron microscope (SEM). SEM images showed reasonable agreement with adsorption measurements.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption, Aqueous-Solutions, Congo-Red, Desorption, Dye, Effluents, Isotherms, Low-Cost Adsorbents, Orange Peel, Sem, State

? Vieira, E.F.S., Cestari, A.R., Santos, E.B. and Dias, F.S. (2005), Interaction of Ag(I), Hg(II), and Cu(II) with 1,2-ethanedithiol immobilized on chitosan: Thermochemical data from isothermal calorimetry. *Journal of Colloid and Interface Science*, **289** (1), 42-47.

Full Text: [2005\J Col Int Sci289, 42.pdf](2005/J%20Col%20Int%20Sci289,%2042.pdf)

Abstract: The nature of interactions between metal ions Ag(I), Hg(II), Cu(II) and chitosan derivative of 1,2-ethanedithiol, QTDT, was investigated by isothermal calorimetry using the membrane breaking technique. Simultaneous determination of thermal effects, *Q*int, and amount of cation that interacts, *n*int, are described. The experimental data have been interpreted in terms of the Langmuir equation to determine the maximum adsorption capacity to form a monolayer, *N*mon, and the energy of interaction for a saturated monolayer per gram of QTDT, *Q*mon. With *N*mon and *Q*mon, the molar enthalpy of interaction for formation of a monolayer of anchored cations per gram of QTDT, Δmon*H*m, was determined. The Δmon*H*m values for Ag(I), Hg(II), and Cu(II) were −60.56, −58.05, and −84.36 kJ mol−1, respectively. Negative values of Δ*G* show the spontaneity of the interaction processes. The least entropically favourable processes, i.e., those which present more negative Δ*S* values, seem to be compensated by the more favourable enthalpic parameter.

Keywords: Isothermal Calorimetry, Interaction of Metal Ions, Adsorption, Chitosan

? Ma, X.D. and Pawlik, M. (2005), Effect of alkali metal cations on adsorption of guar gum onto quartz. *Journal of Colloid and Interface Science*, **289** (1), 48-55.

Full Text: [2005\J Col Int Sci289, 48.pdf](2005/J%20Col%20Int%20Sci289,%2048.pdf)

Abstract: The effect of cesium, potassium, sodium, and lithium cations on the adsorption of natural guar gum onto quartz was investigated. The role of these ions was analyzed in terms of their water structure-making or -breaking capabilities. In the presence of structure makers (Na+, Li+) the polymer adsorption density did not change compared to the adsorption levels observed in distilled water. However, in dilute solutions (0.01 N) of structure-breaking cations (Cs+, K+) the adsorption density of guar gum significantly increased, with potassium and cesium producing the same adsorption densities of the polymer. The resulting colloidal aggregation/dispersion equilibria in the quartz–guar gum system were discussed and mechanisms of guar gum–quartz interactions were also suggested. Assuming hydrogen bonding to be the driving adsorption mechanism, it was proposed that guar gum molecules compete with water for silanol surface sites. Structure-breaking cations disturb the interfacial water structure around the quartz particles thus allowing the polymer to more closely approach the quartz surface and interact with the surface groups.

Keywords: Guar Gum, Quartz, Polymer Adsorption, Ionic Strength, Water Structure

? Nguetnkam, J.P., Kamga, R., Villiéras, F., Ekodeck, G.E., Razafitianamaharavo, A. and Yvon, J. (2005), Assessment of the surface areas of silica and clay in acid-leached clay materials using concepts of adsorption on heterogeneous surfaces. *Journal of Colloid and Interface Science*, **289** (1), 104-115.

Full Text: [2005\J Col Int Sci289, 104.pdf](2005/J%20Col%20Int%20Sci289,%20104.pdf)

Abstract: Two clays of the areas of Kaélé and Kousseri (extreme North Cameroon) containing mainly smectites and minor amounts of kaolinite were activated with sulfuric acid (1 to 8 N). Crystal-chemical properties were studied using X-ray diffraction, Fourier transform infrared spectroscopy, and chemical analysis, while textural properties were analyzed by step-by-step nitrogen adsorption at 77 K and low-pressure quasi-equilibrium argon adsorption at 77 K. As is generally observed, smectite is more sensitive to acid leaching than kaolinite. As a result of smectite decomposition, amorphous Al-containing silica forms, leading to an increase in the specific surface area of the leached materials. The content of the clay minerals and amorphous silica can be estimated on the basis of changes in the chemical composition of the samples upon acid leaching. As far as adsorption energy distributions derived from low-pressure argon derivative adsorption isotherms are concerned, the main modifications occur when 1 N sulfuric acid is used, due to the replacement of calcium and sodium compensating cations by protons. When higher acid concentrations are used, variations in adsorption energy distribution can be assigned to the presence of amorphous silica. It was possible to model experimental adsorption energy distributions as weighted sums of argon adsorption energy distributions obtained on (i) 1 N samples representing protonated clays and (ii) a silica gel used as a reference aluminous silica. Using such an approach, increasing acid concentration results in an increase in the surface area of silica, whereas the surface area of the remaining clay minerals remains roughly constant.

Keywords: Clay minerals, Silica, Acid Leaching, Specific Surface area, Surface Heterogeneity

? Salon, M.C.B., Abdelmouleh, M., Boufi, S., Belgacem, M.N. and Gandini, A. (2005), Silane adsorption onto cellulose fibers: Hydrolysis and condensation reactions. *Journal of Colloid and Interface Science*, **289** (1), 249-261.

Full Text: [2005\J Col Int Sci289, 249.pdf](2005/J%20Col%20Int%20Sci289,%20249.pdf)

Abstract: The hydrolysis of three alkoxysilane coupling agents, *γ*-methacryloxypropyltrimethoxysilane (MPS), *γ*-aminopropyltriethoxysilane (APS), and *γ*-diethylenetriaminopropyltrimethoxysilane (TAS), was carried out in an ethanol/water (80/20) solution and followed by 1H, 13C, and 29Si NMR spectroscopy, which showed that its rate increased in the order MPS < APS < TAS. The formation of the silanol groups was followed by their self-condensation to generate oligomeric structure. APS and MPS only gave soluble products, whereas colloidal particles precipitated in the medium when TAS was hydrolyzed. Pristine and hydrolyzed MPS were then adsorbed onto a cellulose substrate and thereafter a thermal treatment at 110–120 °C under reduced pressure was applied to the modified fibers to create permanent bonding of the coupling agent at their surface.

? Tewari, B.B. and Boodhoo, M. (2005), Removal of *p*-aminophenol and *p*-nitrophenol from aqueous solution through adsorption on antimony, cadmium, and zirconium ferrocyanides. *Journal of Colloid and Interface Science*, **289** (2), 328-332.

Full Text: [2005\J Col Int Sci289, 328.pdf](2005/J%20Col%20Int%20Sci289,%20328.pdf)

Abstract: Adsorptive interaction of *p*-aminophenol and *p*-nitrophenol in the concentration range 10−4–10−5 M and at room temperature (30±°C) was studied with antimony, cadmium, and zirconium ferrocyanides. The interaction followed the Langmuir type of adsorption in general. The *p*-nitrophenol was found to have greater affinity for the antimony, cadmium, and zirconium ferrocyanides then the *p*-aminophenol.

Keywords: Removal, *p*-Aminophenol, *p*-Nitrophenol, Adsorption, Metal ferrocyanides

? Tsai, W.T., Chang, Y.M., Lai, C.W. and Lo, C.C. (2005), Adsorption of ethyl violet dye in aqueous solution by regenerated spent bleaching earth. *Journal of Colloid and Interface Science*, **289** (2), 333-338.

Full Text: [2005\J Col Int Sci289, 333.pdf](2005/J%20Col%20Int%20Sci289,%20333.pdf)

Abstract: The adsorption of basic dye (i.e., ethyl violet or basic violet 4) from aqueous solution onto the regenerated spent bleaching earth (RSBE) was carried out by varying the process parameters such as initial concentration, pH, and temperature. As analytical comparisons, activated bleaching earth (ABE) was also used as adsorbent for the adsorption of the basic dye at various initial concentrations. The experimental results showed that the adsorption process can be well described with the pseudo-second-order reaction model and less fitted by the intra-particle diffusion model. The kinetic parameters of both models obtained in the present work are in line with pore properties of the two adsorbents. According to the equilibrium adsorption capacity from the fitting of pseudo-second-order reaction model, it was further found that the both models of Langmuir and Freundlich appeared to fit well the isotherm data. In addition, the thermodynamic parameters were evaluated based on the pseudo-second-order rate constants, showing that the adsorption of ethyl violet onto the RSBE is endothermic in nature.

Keywords: Spent Bleaching Earth, Adsorption, Ethyl Violet, Kinetic Modeling, Isotherm

? Zhou, L., Sun, Y., Yang, Z.A. and Zhou, Y.P. (2005), Hydrogen and methane sorption in dry and water-loaded multiwall carbon nanotubes. *Journal of Colloid and Interface Science*, **289** (2), 347-351.

Full Text: [2005\J Col Int Sci289, 347.pdf](2005/J%20Col%20Int%20Sci289,%20347.pdf)

Abstract: Both H2 and CH4 are clean energy sources. Adsorption was considered a measure to enhance their storage, and many efforts have been dedicated to creating novel materials including carbon nanotubes as efficient carriers for them. In order to understand the uptake mechanism and the viability of practical application, eight adsorption isotherms of H2 on a sample of multiwall carbon nanotubes were collected. The heat of adsorption was determined and an isotherm model was presented. Isotherms of CH4 on the same sample were also collected. While the adsorption on dry samples behaves similarly to that of H2, the sorption behavior of CH4 in the water-loaded sample is quite different and five times higher uptake capacity was observed in the wet sample due to the formation of methane hydrates. However, carbon nanotubes are unlikely to be used as an energy carrier due to its limited surface area and pore volume.

Keywords: Sorption, Hydrogen, Methane, Carbon Nanotubes, Uptake Mechanism

? Lodeiro, P., Rey-Castro, C., Barriada, J.L., Sastre de Vicente, M.E. and Herrero, R. (2005), Biosorption of cadmium by the protonated macroalga *Sargassum muticum*: Binding analysis with a nonideal, competitive, and thermodynamically consistent adsorption (NICCA) model. *Journal of Colloid and Interface Science*, **289** (2), 352-358.

Full Text: [2005\J Col Int Sci289, 352.pdf](2005/J%20Col%20Int%20Sci289,%20352.pdf)

Abstract: Protonated biomass of the seaweed *Sargassum muticum* was investigated for its ability to remove cadmium(II) from aqueous solutions. In this work, a nonideal, semiempirical, thermodynamically consistent (NICCA) isotherm was proposed to fit the experimental ion binding data obtained in NaNO3 0.05 mol L−1. This model describes the competition between protons and metal ions satisfactorily. Moreover, it reflects the complexity of the macromolecular systems that take part in biosorption considering the heterogeneity of the sorbent. It was demonstrated in this work that the NICCA isotherm constitutes a great improvement with respect to a simpler Langmuir competitive equation, which was not able to describe all the experimental data satisfactorily. Potentiometric acid–base titrations in the absence of cadmium were made to estimate the maximum amount of acid functional groups (2.61 mmol g−1) and the conditional proton binding parameters, logKH (3.8) and *m*H (0.54). The values of the binding parameters for the cadmium ion were chosen to provide the best simultaneous description of the isotherm at pH 4.5, as well as the dependence of cadmium adsorption on pH. Values of logKCd (3.1), *n*Cd (1.8), and *p* (0.19) in the case of the NICCA isotherm or log*K*Cd (2.94–3.4) for Langmuir competitive models were obtained. Kinetic experiments were performed at two different pH values (3.0 and 4.5), establishing the time dependence that represents the sorption of cadmium with a pseudo-second-order kinetic model. It was observed that 4 h is enough to ensure that the equilibrium uptake was reached.

Keywords: Biosorption, Algae, Cadmium, *Sargassum Muticum*, Cross-Link, NICCA

? Islam, Md.N. and Kato, T. (2005), Adsorption and micellar properties of a mixed system of nonionic–nonionic surfactants. *Journal of Colloid and Interface Science*, **289** (2), 581-587.

Full Text: [2005\J Col Int Sci289, 581.pdf](2005/J%20Col%20Int%20Sci289,%20581.pdf)

Abstract: We study the surface adsorption and bulk micellization of a mixed system of two nonionic surfactants, namely, ethylene glycol mono-*n*-dodecyl ether (C12E1) and tetraethylene glycol mono-*n*-tetradecyl ether (C14E4), at different mixing ratios at 15 °C. The pure C14E4 monolayer cannot show any indicative features of phase transition because of both hydration-induced and dipolar repulsive interactions between the bulky head groups. On the other hand, the monolayers of pure C12E1 and its mixture with C14E4 undergo a first-order phase transition, showing a variety of surface patterns in the coexistence region between the liquid expanded (LE) and liquid condensed (LC) phases under the same experimental conditions. For pure C12E1, the domains are of a fingering pattern while those for the C12E1/C14E4 mixed system are found to be compact circular and small irregular structures at 2:1 and 1:1 molar ratios, respectively. The critical micelle concentration (cmc) values of both the pure and the mixed systems were measured to understand the micellar behavior of the surfactants in the mixture. The cmc values of the mixed system were also calculated assuming ideal behavior of the surfactants in the mixture. The experimental and calculated values are found to be very close to each other, suggesting an almost ideal nature of mixing. The interaction parameters for mixed monolayer and micelle formation were calculated to understand the mutual behavior of the surfactants in the mixture. It is observed that the interaction parameters for mixed monolayer formation are more negative than those of micelle formation, indicating a stronger interaction between the surfactants during monolayer formation. It is concluded that since both the surfactants bear EO units in their head groups, structural parity and hydrogen bonding between the surfactants allow them to be closely packed during monolayer and micelle formation.

Keywords: Brewster Angle Microscopy, Monoionic Surfactants, Adsorbed Monolayers, Critical Micelle Concentration

? Parida, K.M., Mallick, S. and Dash, S.S. (2005), Studies on manganese nodule leached residues: 2. Adsorption of aqueous phosphate on manganese nodule leached residues. *Journal of Colloid and Interface Science*, **290** (1), 22-27.

Full Text: [2005\J Col Int Sci290, 22.pdf](2005/J%20Col%20Int%20Sci290,%2022.pdf)

Abstract: Adsorption of phosphate onto manganese nodule leached residues was investigated as a possible alternative to conventional methods of phosphate removal from industrial effluents. Adsorption behaviors were studied as a function of time, temperature, pH, and concentration level of adsorbate and adsorbent in acetic acid–sodium acetate buffer medium. The adsorption of phosphate follows the Langmuir adsorption isotherms. The magnitude of adsorption of phosphate in manganese nodule leached residues was compared with that in naturally occurring Mn nodule. Manganese nodule leached residues show better affinity toward phosphate adsorption.

Keywords: Manganese Nodules, Manganese Nodule Leached Residues, Adsorption, Surface Area, Phosphates

? Srivastava, P., Singh, B. and Angove, M. (2005), Competitive adsorption behavior of heavy metals on kaolinite. *Journal of Colloid and Interface Science*, **290** (1), 28-38.

Full Text: [2005\J Col Int Sci290, 28.pdf](2005/J%20Col%20Int%20Sci290,%2028.pdf)

Abstract: Polluted and contaminated soils can often contain more than one heavy metal species. It is possible that the behavior of a particular metal species in a soil system will be affected by the presence of other metals. In this study we have investigated the adsorption of Cd(II), Cu(II), Pb(II), and Zn(II) onto kaolinite in single- and multi-element systems as a function of pH and concentration, in a background solution of 0.01 M NaNO3. In adsorption edge experiments, the pH was varied from 3.5 to 10.0 with total metal concentration 133.3 μM in the single-element system and 33.3 μM each of Cd(II), Cu(II), Pb(II), and Zn(II) in the multi-element system. The value of pH50 (the pH at which 50% adsorption occurs) was found to follow the sequence Cu < Zn < Pb < Cd in single-element systems, but Pb < Cu < Zn < Cd in the multi-element system. Adsorption isotherms at pH 6.0 in the multi-element systems showed that there is competition among various metals for adsorption sites on kaolinite. The adsorption and potentiometric titrations data for various kaolinite–metal systems were modeled using an extended constant-capacitance surface complexation model that assumed an ion-exchange process below pH 7.0 and the formation of inner-sphere surface complexes at higher pH. Inner-sphere complexation was more dominant for the Cu(II) and Pb(II) systems.

Keywords: Heavy Metals, Cadmium, Copper, Lead, Zinc, Kaolinite, Competitive Adsorption, Surface Complexation Modeling, Extended Constant-Capacitance Model

? Sinegani, A.A.S., Emtiazi, G. and Shariatmadari, H. (2005), Sorption and immobilization of cellulase on silicate clay minerals. *Journal of Colloid and Interface Science*, **290** (1), 39-44.

Full Text: [2005\J Col Int Sci290, 39.pdf](2005/J%20Col%20Int%20Sci290,%2039.pdf)

Abstract: The interaction of organic molecules with mineral surfaces is a subject of interest in a variety of disciplines. Enzymes are able to be sorbed and immobilized by clay minerals and humic colloids in soil environment. The present study was done to elucidate some aspects of sorption and immobilization of cellulase on soil components by analysis of the sorption, and immobilization of cellulase on Avicel, a soil sample, illite, kaolinite, montmorillonite, and palygorskite. Palygorskite displayed the highest sorption capacity. Sorbents coated with hydroxyaluminum displayed significantly higher capacity than uncoated sorbents. The positive effects of Al(OH)*x* coating on sorption capacities of the different sorbents were not equal. The effect decreased in the order soil > palygorskite > kaolinite > Avicel > montmorillonite > illite. The amount of sorbed cellulase desorbed from external surfaces of soil was quite low (about 16%), especially in coated samples (about 6%). X-ray diffraction analysis of K-montmorillonite and Ca-montmorillonite showed that Al(OH)*x* was intercalated between the montmorillonite layers. Immobilization of cellulase on the sorbents did not result in expansion of their crystal structures. Therefore, it may be concluded that the amount of cellulase immobilized on internal surfaces of the sorbents was negligible.

Keywords: Silicate Clay Minerals, Cellulase, Sorption, Immobilization, X-Ray Diffraction

? Chitrakar, R., Tezuka, S., Sonoda, A., Sakane, K., Ooi, K. and Hirotsu, T. (2005), Adsorption of phosphate from seawater on calcined MgMn-layered double hydroxides. *Journal of Colloid and Interface Science*, **290** (1), 45-51.

Full Text: [2005\J Col Int Sci290, 45.pdf](2005/J%20Col%20Int%20Sci290,%2045.pdf)

Abstract: Adsorptive properties of MgMn-3-300 (MgMn-type layered double hydroxide with Mg/Mn mole ratio of 3, calcined at 300 °C) for phosphate were investigated in phosphate-enriched seawater with a concentration of 0.30 mg-P/dm3. It showed the highest phosphate uptake from the seawater among the inorganic adsorbents studied (hydrotalcite, calcined hydrotalcite, activated magnesia, hydrous aluminum oxide, manganese oxide (δ-MnO2)). The phosphate uptake by MgMn-3-300 reached 7.3 mg-P/g at an adsorbent/solution ratio of 0.05 g/2 dm3. The analyses of the uptakes of other constituents (Na+, K+, Ca2+, Cl−, and SO24−) of seawater showed that the adsorbent had a markedly high selectivity for the adsorption of phosphate ions. Effects of initial phosphate concentration, temperature, pH, and salinity on phosphate uptake were investigated in detail by a batch method. The phosphate uptake increased slightly with an increase in the adsorption temperature. The adsorption isotherm followed Freundlich’s equation with constants of logKF = 1.25 and 1/n = 0.65, indicating that it could effectively remove phosphate even from a solution of markedly low phosphate concentration as well as with large numbers of coexisting ions. The pH dependence showed a maximum phosphate uptake around pH 8.5. The pH dependence curve suggested that selective phosphate adsorption progresses mainly by the ion exchange of HPO24−. The study on the effect of salinity suggested the presence of two kinds of adsorption sites in the adsorbent: one nonspecific site with weak interaction and one specific site with strong interaction. The effective desorption of phosphate could be achieved using a mixed solution of 5 M NaCl + 0.1 M NaOH (1 M = 1 mol/dm3), with negligible dissolution of adsorbent. The adsorbent had high chemical stability against the adsorption/desorption cycle; it kept a good phosphate uptake even after the repetition of the seventh cycle.

Keywords: Calcined Layered Double Hydroxides, Adsorption, Selectivity, Phosphate, Seawater

? Kundu, S. and Gupta, A.K. (2005), Analysis and modeling of fixed bed column operations on As(V) removal by adsorption onto iron oxide-coated cement (IOCC). *Journal of Colloid and Interface Science*, **290** (1), 52-60.

Full Text: [2005\J Col Int Sci290, 52.pdf](2005/J%20Col%20Int%20Sci290,%2052.pdf)

Abstract: Fixed-bed column studies were undertaken to evaluate the performance of iron oxide-coated cement (IOCC) in removing As(V), from aqueous environment, under varying operating conditions. Investigations revealed IOCC to be a very efficient media for the removal of As(V) from water. The Bohart and Adams sorption model was employed to determine characteristic parameters such as depth of exchange zone, time required for exchange zone to move its own height, adsorption rate, and adsorption capacity, useful for process design. The IOCC media effectively removed As(V) from a 2 mg/L solution with a maximum adsorption capacity of 505.3 mg/L. Predicted data points obtained using a Freundlich isotherm model were compared against experimental data points determined in the dynamic process. The effects of important design parameters such as flow rate and influent concentration on the As(V) breakthrough curves were also investigated. The bed depth service time (BDST) model was extended to the prediction of service times of columns operated at different flow rates and influent concentrations and these predicted values were compared with the experimental values. The columns were regenerated by eluting the bound As(V) with 10% NaOH after the adsorption studies.

Keywords: As(V); Iron oxide-coated cement; Adsorption; Column study; Breakthrough curve; BDST; Regeneration

? Singh, K.K., Rastogi, R. and Hasan, S.H. (2005), Removal of Cr(VI) from wastewater using rice bran. *Journal of Colloid and Interface Science*, **290** (1), 61-68.

Full Text: [2005\J Col Int Sci290, 61.pdf](2005/J%20Col%20Int%20Sci290,%2061.pdf)

Abstract: The novel biosorbent rice bran has been successfully utilized for the removal of Cr(VI) from wastewater. The maximum removal of Cr(VI) was found to be 99.4% at pH 2.0, initial Cr(VI) concentration of 200 mg l−1, and temperature 20 °C. The effect of different parameters such as contact time, adsorbate concentration, pH of the medium, and temperature was investigated. The adsorption kinetics was tested for first-order reversible, pseudo-first-order, and pseudo-second-order; reaction and the rate constants of kinetic models were calculated. Mass transfer of Cr(VI) from the bulk to the solid phase (rice bran) was studied at different temperatures. Different thermodynamic parameters, viz., changes in standard free energy, enthalpy, and entropy, have also been evaluated and it has been found that the reaction was spontaneous and endothermic in nature. The Langmuir and Freundlich equations for describing adsorption equilibrium were applied to data. The constants and correlation coefficients of these isotherm models were calculated and compared. Desorption studies was also carried out and found that complete desorption of Cr(VI) took place at pH of 9.5. The data were also subjected to multiple regression analysis and a model was developed to predict the removal of Cr(VI) from wastewater.

Keywords: Adsorption, Rice Bran, Cr(VI), Endothermic, Pseudo-First-Order, Monolayer

? Pełech, R., Bembnowska A. and Milchert, E. (2005), Kinetics of adsorption of hydrocarbon chloro-derivatives from seven-component aqueous solution onto a thin layer of DTO-activated carbon. *Journal of Colloid and Interface Science*, **290** (1), 83-90.

Full Text: [2005\J Col Int Sci290, 83.pdf](2005/J%20Col%20Int%20Sci290,%2083.pdf)

Abstract: The mass transfer and effective intraparticle diffusion coefficients were determined in the adsorption process of 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, chloroform, carbon tetrachloride, 1,1-dichloroethene, perchloroethene, and 1,1,2-trichloroethene from seven-component aqueous solution onto a thin layer of activated carbon. A modified constant-volume method was used in the studies. A correlation between similarity numbers in the form of Sh=2+1.54Re0.66Sc0.33 was derived for a range of the Reynolds numbers ∈ (1–15). Based on the Biot number, it was found that within the range of Reynolds numbers <14 the mass transport through a film decides the adsorption rate.

Keywords: Adsorption, Activated carbon, Diffusion, Kinetics, Chlorohydrocarbons

? Ishiguro, R., Yokoyama, Y., Maeda, H., Shimamura, A., Kameyama, K. and Hiramatsu, K. (2005), Modes of conformational changes of proteins adsorbed on a planar hydrophobic polymer surface reflecting their adsorption behaviors. *Journal of Colloid and Interface Science*, **290** (1), 391-101.

Full Text: [2005\J Col Int Sci290, 91.pdf](2005/J%20Col%20Int%20Sci290,%2091.pdf)

Abstract: Infrared spectra of hen egg white lysozyme and bovine serum albumin (BSA) adsorbed on a solid poly tris(trimethylsiloxy)silylstyrene (pTSS) surface in D2O solution were measured using attenuated total reflection (ATR) Fourier transform infrared spectroscopy. From the area and shape of the amide I′ band of each spectrum, the adsorption amount and the secondary structure were determined simultaneously, as a function of adsorption time. We could show that the average conformation for all the adsorbed lysozyme molecules was solely determined by the adsorption time, and independent of the bulk concentration, while the adsorption amount increased with the bulk concentration as well as the adsorption time. These results suggest that lysozyme molecules form discrete assemblies on the surface, and that the surface assemblies grow over several hours to have a definite architecture independent of the adsorption amount. As for BSA, the extent of the conformational change was solely determined by the adsorption amount, regardless of the bulk concentration and the adsorption time. These differences in the adsorption properties of lysozyme and BSA may reflect differences in their conformational stabilities.

Keywords: FTIR, ATR, Hen Egg White Lysozyme, Bovine Serum Albumin, Adsorption, Conformational Change

? Ding, H.M., Shao, L., Liu, R.J., Xiao, Q.G. and Chen, J.F. (2005), Silica nanotubes for lysozyme immobilization. *Journal of Colloid and Interface Science*, **290** (1), 102-106.

Full Text: [2005\J Col Int Sci290, 102.pdf](2005/J%20Col%20Int%20Sci290,%20102.pdf)

Abstract: Silica nanotubes were synthesized and used as enzyme immobilization carriers. The immobilization profiles were described by the adsorption of lysozyme molecules from aqueous solution onto the hydrophilic silica surface. The driving force of the adsorption, structure changes in the immobilized lysozyme molecules, and enzymatic activities were investigated. A study of the zeta potentials of silica with and without the immobilized lysozyme showed that there was an increase in the isoelectric point with the increase in the loading amount of lysozyme. FTIR spectra indicated that protein secondary structure was maintained well in the immobilized molecules. It was observed that enzymatic activities first increased and then decreased with increasing surface coverage of silica nanotubes by lysozyme, which suggested that the overlap and aggregation of lysozyme molecules reduced enzymatic activities of the adsorbed lysozyme molecules at high surface coverage.

Keywords: Lysozyme Immobilization, Silica Nanotubes, Enzymatic Activities, Surface Coverage

? Chen, R. and Hu, X. (2005), Electrosorption of thiocyanate anions on active carbon felt electrode in dilute solution. *Journal of Colloid and Interface Science*, **290** (1), 190-195.

Full Text: [2005\J Col Int Sci290, 190.pdf](2005/J%20Col%20Int%20Sci290,%20190.pdf)

Abstract: Adsorption and electrosorption of thiocyanate (SCN−) anions on active carbon felt electrodes were measured by UV spectroscopy and cyclic voltammetry to provide more knowledge of the application of electrosorption on high-area carbon material in industrial waste water purification. Positive polarization caused increased adsorption of SCN−. SCN− showed the highest electrosorption capacity at about pH 3. Reversible electrosorption of SCN− to different extents was observed by changing the direction of polarization currents, which is possibly accompanied by the accessible surface area of C-felt being increased by positive polarization and electrochemical oxidation of SCN−. The enhanced capacity for adsorption by positive polarization will improve reuse of active carbon felt.

Keywords: Active Carbon Felt, Electrosorption, Thiocyanate, Desorption, Electrical Double Layer (EDL)

? Zhou, S. (2005), Extending the simple weighted density approximation for a hard-sphere fluid to a Lennard–Jones fluid: II. Application. *Journal of Colloid and Interface Science*, **290** (2), 364-372.

Full Text: [2005\J Col Int Sci290, 364.pdf](2005/J%20Col%20Int%20Sci290,%20364.pdf)

Abstract: A simple weighted density approximation (SWDA) was extended to nonuniform Lennard–Jones fluids by following the spirit of a partitioned density function theory [S. Zhou, Phys. Rev. E 68 (2003) 061201] and mapping the hard-core part onto an effective hard-sphere fluid whose higher order terms beyond the second order of the functional perturbation expansion are treated by the SWDA. The resultant DFT formalism performs well for Lennard–Jones fluids under the influence of diverse external fields. With the present DFT formalism, we investigate in detail the structure and adsorption properties of a low-density LJ gas in a spherical cavity with a wall consisting of hard-sphere or LJ particles. It was found that when the cavity wall exerts an attractive external potential on the LJ particles in the cavity, the excess adsorption decreases as the temperature increases, while when the cavity wall exerts a hard repulsive external potential on the LJ particles in the cavity, the excess adsorption increases as the temperature increases.

? Lua, A.C. and Yang, T. (2005), Characteristics of activated carbon prepared from pistachio-nut shell by zinc chloride activation under nitrogen and vacuum conditions. *Journal of Colloid and Interface Science*, **290** (2), 505-513.

Full Text: [2005\J Col Int Sci290, 505.pdf](2005/J%20Col%20Int%20Sci290,%20505.pdf)

Abstract: Activated carbons with well-developed pore structures were prepared from pistachio-nut shells by chemical activation using zinc chloride under both nitrogen atmosphere and vacuum conditions. The effects of preparation parameters on the carbon pore structure were studied in order to optimize these parameters. It was found that under vacuum conditions, the characteristics of the activated carbons produced are better than those under nitrogen atmosphere. The impregnation ratio, the activation temperature, and the activation hold time are the important parameters that influence the characteristics of the activated carbons. The optimum experimental conditions for preparing predominantly microporous activated carbons with high pore surface area and micropore volume are an impregnation ratio of 0.75, an activation temperature of 400 °C, and a hold time of 1 h. Under these conditions, the BET surface areas of the carbons activated under nitrogen atmosphere and vacuum conditions were 1635.37 and 1647.16 m2/g, respectively. However, at a ZnCl2 impregnation ratio of 1.5, a furnace temperature of 500 °C, and a hold time of 2 h, the predominantly mesoporous activated carbon prepared under vacuum condition had a BET surface area of 2527 m2/g. Fourier transform infrared spectra were used to detect changes in the surface functional groups of the samples during the different preparation stages.

Keywords: Activated Carbon, Chemical Activation, Surface Areas, Pistachio-Nut Shell

? Janoš, P. and Šmídová, V. (2005), Effects of surfactants on the adsorptive removal of basic dyes from water using an organomineral sorbent—iron humate. *Journal of Colloid and Interface Science*, **291** (1), 19-27.

Full Text: [2005\J Col Int Sci291, 19.pdf](2005/J%20Col%20Int%20Sci291,%2019.pdf)

Abstract: The sorption of basic dyes (Methylene blue, malachite green, rhodamine B, crystal violet) onto a nonconventional organomineral sorbent—iron humate—was examined in the presence of various kinds of surfactants. It was found that nonionic (Triton X-100) and cationic (cetyltrimethylammonium bromide) surfactants exhibited a relatively small effect on the dye sorption. Anionic surfactants (sodium dodecyl sulfate), on the other hand, affected (in most cases) dramatically the sorption of basic (cationic) dyes. Typically, the dye sorption was enhanced in the presence of low concentrations of anionic surfactants. At high surfactant concentrations, a steep decrease in the dye sorption was observed in some systems, probably due to the formation of micelles that solubilize the dye molecules and prevent their sorption. A model describing these experimental dependencies was proposed. The sorption of basic dyes onto iron humate may be described by the pseudo-second-order kinetic equation. Diffusion processes were identified as the main mechanisms controlling the rate of the dye sorption.

Keywords: Adsorption Isotherms, Adsorption Kinetics, Basic Dyes, Surfactants, Humic Substances

? Roulia, M. and Vassiliadis, A.A. (2005), Interactions between C.I. Basic Blue 41 and aluminosilicate sorbents. *Journal of Colloid and Interface Science*, **291** (1), 37-44.

Full Text: [2005\J Col Int Sci291, 37.pdf](2005/J%20Col%20Int%20Sci291,%2037.pdf)

Abstract: Four aluminosilicate sorbents (montmorillonite, bentonite, raw perlite, and expanded perlite) were employed for retention of the cationic dye C.I. Basic Blue 41. Interactions between the clay and the dyestuff were investigated at several temperatures and clay:dye ratios. The mechanism behind the adsorption involves the formation of H-aggregates of the dye on both clays, followed by dye migration into the interlayer in the case of montmorillonite. Time-dependent absorbance spectra revealed the presence of various dye species in montmorillonite. Introduction of the dye molecules into the interlamellar space occurs more rapidly in bentonite than in montmorillonite. The dye molecules inserted between the clay leaves adopt different orientations and, eventually, stack in layers at increased dye loadings for both montmorillonite and bentonite. Higher dye aggregates are then present as suggested by diffuse reflectance spectroscopy. Dye sorption on both raw and expanded perlite proceeds via H-aggregate formation as well.

Keywords: Perlite, Clays, Montmorillonite, Bentonite, Adsorption, Dyes, C.I. Basic Blue 41

? Chubar, N.I., Samanidou, V.F., Kouts, V.S., Gallios, G.G., Kanibolotsky, V.A., Strelko, V.V. and Zhuravlev, I.Z. (2005), Adsorption of fluoride, chloride, bromide, and bromate ions on a novel ion exchanger. *Journal of Colloid and Interface Science*, **291** (1), 67-74.

Full Text: [2005\J Col Int Sci291, 67.pdf](2005/J%20Col%20Int%20Sci291,%2067.pdf)

Abstract: A novel ion exchanger based on double hydrous oxide (Fe2O3Al2O3*x*H2O) was obtained by the original sol–gel method from easily available and cheap raw materials and employed for adsorption of F−, Cl−, Br−, and BrO−3 from simultaneous solutions. Adsorbent was characterized by potentiometric titration, *ζ*-potential, and poremetrical characteristics. A technologically attractive pH effect of F−, Br−, and BrO−3 sorption on the investigated double hydroxide of Fe and Al, which is capable of working in the pH range 3 to 8.5, was observed. Kinetic data on fluoride and bromide sorption fit well the pseudo-second-order model. Isotherms of fluoride, bromide, chlorine, and bromate ion sorption on Fe2O3Al2O3*x*H2O were obtained at pH 4. The isotherm of F− sorption fit well the Langmuir model; sorption affinity (*K*=0.52 L/mg) and sorption capacity (90 mg F / g) were high. In the competitive adsorption of bromide and bromate, bromide dominated at equilibrium concentrations of the ions >40 mg / L. The mechanism of fluoride adsorption to the surface of the model cluster of the sorbent synthesized and the geometry of the cluster itself were modeled with the HyperChem7 program using the PM3 method.

Keywords: Inorganic Ion Exchangers, Adsorption, Anions, Isotherms, Quantum Chemistry Modeling

? Wang, J. and Somasundaran, P. (2005), Adsorption and conformation of carboxymethyl cellulose at solid–liquid interfaces using spectroscopic, AFM and allied techniques. *Journal of Colloid and Interface Science*, **291** (1), 75-83.

Full Text: [2005\J Col Int Sci291, 75.pdf](2005/J%20Col%20Int%20Sci291,%2075.pdf)

Abstract: Carboxymethyl cellulose (CMC) is a polysaccharide which is widely used in many industrial sectors including food, textiles, paper, adhesives, paints, pharmaceutics, cosmetics and mineral processing. It is a natural organic polymer that is non-toxic and biodegradable. These properties make it ideal for industrial applications. However, a general lack of understanding of the interaction mechanism between the polysaccharides and solid surfaces has hindered the application of this polymer. In this work, adsorption of CMC at the solid–liquid interface is investigated using adsorption and electrophoretic mobility measurements, FTIR, fluorescence spectroscopy, AFM and molecular modeling. CMC adsorption on talc was found to be affected significantly by changes in solution conditions such as pH and ionic strength, which indicates the important role of electrostatic force in adsorption. The pH effect on adsorption was further proven by AFM imaging. Electrokinetic studies showed that the adsorption of CMC on talc changed its isoelectric point. Further, molecular modeling suggests a helical structure of CMC in solution while it is found to adsorb flat on the solid surface to allow its OH groups to be in contact with the surface. Fluorescence spectroscopy studies conducted to investigate the role of hydrophobic bonding using pyrene probe showed no evidence of the formation of hydrophobic domains at talc–aqueous interface. Urea, a hydrogen bond breaker, markedly reduced the adsorption of CMC on talc, supports hydrogen bonding as an important factor. In FTIR study, the changes to the infrared bands, associated with the C-O stretch coupled to the C-C stretch and O-H deformation, were significant and this further supports the strong hydrogen bonding of CMC to the solid surface. In addition, Langmuir modeling of the adsorption isotherm suggests hydrogen bonding to be a dominant force for polysaccharide adsorption since the adsorption free energy of this polymer was close to that for hydrogen bond formation. All of the above results suggest that the main driving forces for CMC adsorption on talc are a combination of electrostatic interaction and hydrogen bonding rather than hydrophobic force.

Keywords: Talc, CMC, Polymer Adsorption, Fluorescence, AFM, Model, Zeta potential, FTIR

? Memon, S.Q., Hasany, S.M., Bhanger, M.I. and Khuhawar, M.Y. (2005), Enrichment of Pb(II) ions using phthalic acid functionalized XAD-16 resin as a sorbent. *Journal of Colloid and Interface Science*, **291** (1), 84-91.

Full Text: [2005\J Col Int Sci291, 84.pdf](2005/J%20Col%20Int%20Sci291,%2084.pdf)

Abstract: A simple and reliable method has been developed using polymeric material containing phthalic acid as a chelating agent to concentrate ultratrace amounts of lead ions in aqueous solutions. After characterization by CHN, IR, and thermal studies, the static and dynamic sorption behavior of Pb(II) ions onto new synthetic resin has been investigated. The sorption has been optimized with respect to pH, shaking speed, and contact time between the two phases. Maximum sorption is achieved from solution of pH 5–8 after 10 min agitation time. The lowest concentration for quantitative recovery is 5.8 ng cm−3 with a preconcentration factor of ~850. The kinetics of sorption follows the first-order rate equation with the rate constant *k*=0.58±0.04 min−1. The variation of the equilibrium constant *K*c with temperature between 10 and 50 °C yields values of Δ*H*, 52.4±1.65 kJ mol-1, Δ*S*, 186±5.21 J mol-1 K-1, and Δ*H*303K, -4.15±0.002 kJ mol-1. The sorption data of Pb(II) ions in the concentration range from 2.41×10−6 to 1.44×10-4 molL-1 follows the Langmuir, Freundlich, and Dubinin–Radushkevich (D–R) isotherms at all temperatures investigated. The sorption of Pb(II) ions onto synthesized resin in the presence of common anions and cations has also been measured. The possible sorption mechanism of Pb(II) ions onto phthalic acid modified XAD-16 is also discussed. The sorption procedure is utilized to preconcentrate Pb(II) ions prior to their determination in automobile exhaust particulates by atomic absorption spectrometry using direct and standard addition methods.

The aim of this work was to synthesize polymeric material containing phthalic acid as a chelating resin for the enrichment of ultra-trace amounts Pb(II) ions.

Keywords: Enrichment, Pb(II), Phthalic Acid, Sorption, Modified Sorbent, Thermodynamics, Kinetics

? Oulanti, O., Widmaier, J., Pefferkorn, E., Champ, S. and Auweter, H. (2005), Relaxation phenomena of hydrolyzed polyvinylamine molecules adsorbed at the silica/water interface: I. Saturated homogeneous polymer layers. *Journal of Colloid and Interface Science*, **291** (1), 98-104.

Full Text: [2005\J Col Int Sci291, 98.pdf](2005/J%20Col%20Int%20Sci291,%2098.pdf)

Abstract: Surface area exclusion chromatography was used to investigate the adsorption and reconformation characteristics of hydrolyzed polyvinylamine molecules at silica/water interfaces employing radiolabeled polymers. The polymer solution was injected at the inlet of the column, whereas the polymer was successively adsorbed on the stacked glass-fiber filters constituting the stationary phase of the column. The filters and effluent samples collected at the outlet were individually analyzed for radioactivity content, which provided the adsorption histogram and the relative affinity of the various polymers. For saturated polymer layers, the relaxation process was demonstrated when the exceedingly adsorbed molecules desorbed. Modifications in the adsorption on the successive filters were thus converted into changes in the interfacial area of adsorbed molecules, taking into account the deviation from the plateau adsorption expected for nonrelaxing systems. Adsorption characteristics of nonrelaxed polymer layers were determined from the adsorption values determined before relaxation occurred. Adsorption and relaxation characteristics were determined to depend strongly on molecular weight and degree of hydrolysis of the polyvinylamine molecules. Half-hydrolyzed polymers had adsorption and relaxation characteristics close to those of the fully hydrolyzed polyvinylamine. Accordingly, adsorption isotherms on the cellulose/water interface were carried out to possibly extend the main conclusions of the study.

Keywords: Hydrolyzed Polyvinylamine, Polyvinylamine Adsorption On Silica, Polyvinylamine Adsorption On Cellulose, Polymer Interfacial Reconformation, Polymer Layer Relaxation, Surface Area Exclusion Chromatography

? Oulanti, O., Pefferkorn, E., Champ, S. and Auweter, H. (2005), Relaxation phenomena of hydrolyzed polyvinylamine molecules adsorbed at the silica/water interface: II. Saturated heterogeneous polymer layers. *Journal of Colloid and Interface Science*, **291** (1), 105-111.

Full Text: [2005\J Col Int Sci291, 105.pdf](2005/J%20Col%20Int%20Sci291,%20105.pdf)

Abstract: Surface area exclusion chromatography (SAEC) was employed to determine the individual relaxation of polymer molecules within a saturated heterogeneous layer composed of two polymers of different molecular characteristics. The investigations focused on three systems differing in molecular weight and/or hydrolysis grade. The molecular relaxation process was determined to be different within the heterogeneous layer when compared with the behavior of the same polymer in the homogeneous layer. The modifications in the relaxation process of a given polymer were imposed by the interfacial characteristics of the second polymer. Finally, in heterogeneous layers, the relative variation of the interfacial area of the two polymers is expressed in a single relationship.

Keywords: Hydrolyzed Polyvinylamine, Polyvinylamine Adsorption on Silica, Heterogeneous Polymer Layers, Polymer Interfacial Reconformation, Polymer Layer Relaxation, Surface Area Exclusion Chromatography

? Oulanti, O., Pefferkorn, E., Champ, S. and Auweter, H. (2005), Relaxation phenomena of hydrolyzed polyvinylamine molecules adsorbed at the silica/water interface: III. Interfacial exchange and transfer processes. *Journal of Colloid and Interface Science*, **291** (1), 112-119.

Full Text: [2005\J Col Int Sci291, 112.pdf](2005/J%20Col%20Int%20Sci291,%20112.pdf)

Abstract:Surface area exclusion chromatography (SAEC) was employed to determine the stability characteristics of saturated homogeneous layers when interfacial exchange or transfer of molecules was promoted. In these experiments, the first polymer layer was established by elution of a column composed of stacked glass-fiber filters with one polymer. Then, after displacement of the void by water, the second polymer was subsequently injected under the same elution conditions. The experiments combine polymers of equal or different molecular weight and/or hydrolysis grade. Histograms of SAEC experiments demonstrate the great stability of the initially adsorbed layer. Domains of high and low adsorption values were determined to exist along the chromatography column after injection of the first polymer sample. The polymer injected second slightly modifies the initial adsorption histogram and mainly overadsorbs on the low adsorption domain of the first polymer. The major result relates to the relaxation phenomenon affecting or not the second adsorbed polymer when it adsorbs on filters belonging to the low adsorption domain of the polymer first injected. The relaxation is impeded when the relaxation of the first polymer is of great amplitude, whereas it occurs when the relaxation of the first polymer is small.

Keywords: Hydrolyzed Polyvinylamine, Polyvinylamine Adsorption on Silica, Heterogeneous Polymer Layers, Polymer Interfacial Exchange, Inhibition of Layer Relaxation, Surface Area Exclusion Chromatography

? Pokrovsky, O.S., Viers, J. and Freydier, R. (2005), Zinc stable isotope fractionation during its adsorption on oxides and hydroxides. *Journal of Colloid and Interface Science*, **291** (1), 192-200.

Full Text: [2005\J Col Int Sci291, 192.pdf](2005/J%20Col%20Int%20Sci291,%20192.pdf)

Abstract: Adsorption of Zn on goethite, hematite, birnessite, pyrolusite, corundum, and gibbsite was studied using a batch adsorption technique as a function of pH, zinc concentration in solution, and time of exposure. Adsorption from 0.01 M NaNO3 solutions undersaturated with respect to zinc (hydr)oxide at 3 < pH < 8 was found to be reversible and equilibrium was achieved in less than 24 h. A 2p*K* surface complexation model that assumes the constant capacitance of the electric double layer (CCM) and postulates the formation of positively charged >MeO-Zn+ complexes, where Me = Fe, Mn, and Al, was used to describe the dependence of adsorption equilibria on aqueous solution composition in a wide range of pH and Zn concentration. The logarithms of surface stability constant for Zn interaction with metal oxy(hydr)oxides (>MeOH0 + Zn2+ → MeO-Zn+) vary from −2.5 to 0.5. They are higher for oxy(hydr)oxides than for anhydrous oxides. Stable isotopes of zinc in several filtrates were measured using an ICP-MS Neptune multicollector which made it possible, for the first time, to assess the degree of isotopic fractionation between 66Zn and 64Zn during zinc adsorption on mineral surfaces. The isotopic offset between aqueous solution and mineral surfaces (Δ66/64Znsoln/solid=*δ*(66/64Zn)solution−*δ*(66/64Zn)surface) was found to be weakly dependent on percentage of adsorbed metal and equals 0.20±0.03, 0.17±0.06, −0.10±0.03, −0.10±0.09, and −0.13±0.12*‰* for goethite, birnessite, pyrolusite, corundum, and Al(OH)3. For hematite, Δ66/64Zn varies from −0.61±0.10*‰* at pH 5.5 to −0.02±0.09*‰* at 5.8 < pH < 6.7. Overall, zinc stable isotopic fractionation induced by adsorption on most mineral surfaces does not exceed 0.2‰. We do not observe any correlation between the sign and magnitude of isotopic offset and the chemical nature of solid phase (hydrous versus anhydrous minerals), zinc surface adsorption constants (surface complexation model of the present work), and coordination and first-neighbor distances of surface >MeO-Zn(H2O)*n* complexes (available literature data on X-ray absorption spectroscopy). Apparently, the fine structure of surface complexes and the position and bond strength for second neighbors of zinc are likely to control its isotopic fractionation during adsorption on mineral surfaces. Our results strongly suggest that inorganic processes controlling zinc isotope adsorption on soil and sediment minerals should be of second-order importance compared to biological factors.

Keywords: Zinc, Adsorption, Iron, Aluminum, Manganese, Oxide, Hydroxide, Surface Complexation, Stable Isotopes, Fractionation

? Borówko, M., Bucior, K., Sokołowski, S. and Staszewski, T. (2005), Adsorption of fluids in slitlike pores containing a small amount of mobile ions. *Journal of Colloid and Interface Science*, **291** (1), 223-228.

Full Text: [2005\J Col Int Sci291, 223.pdf](2005/J%20Col%20Int%20Sci291,%20223.pdf)

Abstract: We apply density functional theory to investigate changes in the phase behavior of a fluid caused by the presence of mobile ions inside the pore. The approach has been based on the fundamental measure density functional theory and on the theory of nonuniform electrolytes developed recently by O. Pizio, A. Patrykiejew, S. Sokołowski [J. Chem. Phys. 121 (2005) 11,957]. We have evaluated capillary condensation phase diagrams for pores of different widths and for different concentrations of confined ions. The calculations have demonstrated that the presence of ions leads to lowering the critical temperature and to an increase of the value of the chemical potential at the capillary condensation point.

Keywords: Capillary Condensation, Slitlike Pore, Density Functional Theory, Ionic Solution

? Alkan, M., Karadaş, M., Doğan M. and Demirbaş, Ö. (2005), Adsorption of CTAB onto perlite samples from aqueous solutions. *Journal of Colloid and Interface Science*, **291** (2), 309-318.

Full Text: [2005\J Col Int Sci291, 309.pdf](2005/J%20Col%20Int%20Sci291,%20309.pdf)

Abstract: In this study, the adsorption properties of unexpanded and expanded perlite samples in aqueous cetyltrimethylammonium bromide (CTAB) solutions were investigated as a function of ionic strength, pH, and temperature. It was found that the amount of cetyltrimethylammonium bromide adsorbed onto unexpanded perlite was greater than that onto expanded perlite. For both perlite samples, the sorption capacity increased with increasing ionic strength and pH and decreasing temperature. Experimental data were analyzed by Langmuir and Freundlich isotherms and it was found that the experimental data were correlated reasonably well by the Freundlich adsorption isotherm. Furthermore, the isotherm parameters (*K*F and *n*) were also calculated. The adsorption enthalpy was determined from experimental data at different temperatures. Results have shown that the interaction between the perlite surface and CTAB is a physical interaction, and the adsorption process is an exothermic one.

Keywords: Perlite, Zeta Potential, Surfactants, Adsorption, Adsorption Heat, Adsorption Isotherms

? Egirani, D.E, Baker, A.R. and Andrews, J.E. (2005), Copper and zinc removal from aqueous solution by mixed mineral systems: I. Reactivity and removal kinetics. *Journal of Colloid and Interface Science*, **291** (2), 319-325.

Full Text: [2005\J Col Int Sci291, 319.pdf](2005/J%20Col%20Int%20Sci291,%20319.pdf)

Abstract: This study investigates the reactivity and removal kinetics of Cu and Zn onto mixed mineral systems from aqueous solution related to acid mine drainage impacted areas. The sorbents used were kaolinite, Al-montmorillonite, goethite, and their mixtures. The effects of surface charge, proton coefficient, and sorption kinetics were studied at room temperature (23±2°C). Using an empirical model, mineral mixing reduced the exchange of protons for sorbing ions and the acidity of the reactive sites, thus impeding Cu and Zn removal by proton exchange. Based on the amount of Cu and Zn sorbed on the mixed mineral suspensions at ionic strength 0.01 to 0.1 M and pH 4, it is suggested that Cu and Zn removal from aqueous solution was by both inner and outer sphere complexation. Mineral mixing reduced the transfer rate of Cu relative to the single mineral suspensions in both slow and fast reaction phases. The behavior of the mixed suspensions in Cu and Zn sorption suggest that different reactive sites were involved at the onset of sorption, becoming similar to those of the single mineral components over time.

Keywords: Zinc, Copper, Clay Minerals, (Hydr)Oxides, Sorption, Freundlich Model, Mixed Mineral Systems, Reactivity, Removal Kinetics

? Kowalczyk, P., Kaneko, K., Terzyk, A.P., Tanaka, H., Kanoh, H. and Gauden, P.A. (2005), New approach to determination of surface heterogeneity of adsorbents and catalysts from the temperature programmed desorption (TPD) technique: One step beyond the condensation approximation (CA) method. *Journal of Colloid and Interface Science*, **291** (2), 334-344.

Full Text: [2005\J Col Int Sci291, 334.pdf](2005/J%20Col%20Int%20Sci291,%20334.pdf)

Abstract: Recovery of the desorption activation energy distribution from the experimental temperature programmed desorption (TPD) spectra is among the most difficult problems of adsorption science. Since the heterogeneity effects strongly influence on transport, diffusion, and catalytic reaction time, the estimation of their magnitude is very important for practical purposes. Up to the present, several theories have been used for the interpretation of the TPD results. Almost all advanced theoretical approaches take into account the effect of surface disorder (heterogeneity in desorption activation energy); however, they ignore the numerical difficulties coming from the “ill-posed” character of the linear Fredholm integral equations appearing in the theoretical description of the TPD results. Thus, there is a growing interest in developing novel methods supported by powerful numerical algorithms taking this into account. In the current study we propose a new approach and consider the theoretical aspect as well as numerical problems appearing in the TPD analysis. Our modeling is based on the well-known and generally accepted “absolute rate theory,” which has been used extensively for the interpretation of TPD results. We propose and verify (applying computer simulations) the new advanced numerical hybrid type algorithms taking into account the heterogeneity effects. They seem to be very promising in TPD spectra analysis. The stability of the proposed advanced numerical methods is confirmed by the computer simulation experiments, and the results are compared with those obtained from the condensation approximation (CA) method.

Keywords: Temperature Programmed Desorption, Adsorption Rate Theory, Computer Simulations

? Barakat, M.A. (2005), Adsorption behavior of copper and cyanide ions at TiO2–solution interface. *Journal of Colloid and Interface Science*, **291** (2), 345-352.

Full Text: [2005\J Col Int Sci291, 345.pdf](2005/J%20Col%20Int%20Sci291,%20345.pdf)

Abstract: Adsorption of both copper and cyanide ions in the absence and in the presence of their complexes at TiO2–solution interfaces was investigated. The objective of this study was to demonstrate the possibility of removing heavy metal ions, exemplified by Cu(II), from aqueous solution in the presence of a ligand, e.g., CN−. Several parameters such as pH and Cu(II) and CH− ion concentration that may affect the magnitude of copper and cyanide adsorption were studied. The equilibrium of Cu–CN speciation distribution in solution and stability constant calculations have been investigated to determine the adsorption behavior of Cu(II). Results revealed that free Cu(II) ions (in the absence of CN−) were completely separated at pH≥8, while the adsorption of free cyanide ions, in the absence of Cu(II), reached a maximum value of 48% at pH 7. For Cu–CN complexes, the presence of CN− in excessive amount with respect to Cu(II) retarded the adsorption of Cu(II). This is attributed to the formation of multivalent anionic cyano–copper complexes such as Cu(CN)2−3 and Cu(CN)3−4.

Keywords: Adsorption, Removal, Cu(II), CN− ions, TiO2

? Justi, K.C., Fávere, V.T., Laranjeira, M.C.M., Neves, A. and Peralta, R.A. (2005), Kinetics and equilibrium adsorption of Cu(II), Cd(II), and Ni(II) ions by chitosan functionalized with 2[-bis-(pyridylmethyl)aminomethyl]-4-methyl-6-formylphenol. *Journal of Colloid and Interface Science*, **291** (2), 369-374.

Full Text: [2005\J Col Int Sci291, 369.pdf](2005/J%20Col%20Int%20Sci291,%20369.pdf)

Abstract: Chitosan biopolymer chemically modified with the complexation agent 2[-bis-(pyridylmethyl)aminomethyl]-4-methyl-6-formylphenol (BPMAMF) was employed to study the kinetics and the equilibrium adsorption of Cu(II), Cd(II), and Ni(II) metal ions as functions of the pH solution. The maximum adsorption of Cu(II) was found at pH 6.0, while the Cd(II) and Ni(II) maximum adsorption occurred in acidic media, at pH 2.0 and 3.0, respectively. The kinetics was evaluated utilizing the pseudo-first-order and pseudo-second-order equation models and the equilibrium data were analyzed by Langmuir and Freundlich isotherms models. The adsorption kinetics follows the mechanism of the pseudo-second-order equation for all studied systems and this mechanism suggests that the adsorption rate of metal ions by CHS–BPMAMF depends on the number of ions on the adsorbent surface, as well as on their number at equilibrium. The best interpretation for the equilibrium data was given by the Langmuir isotherm and the maximum adsorption capacities were 109 mg g−1 for Cu(II), 38.5 mg g−1 for Cd(II), and 9.6 mg g−1 for Ni(II). The obtained results show that chitosan modified with BPMAMF ligand presented higher adsorption capacity for Cu(II) in all studied pH ranges.

Keywords: Cu(II), Cd(II), Ni(II), Chitosan, Biopolymer, Kinetics, Adsorption

? Tozuka, Y., Sasaoka, S., Nagae, A., Moribe, K., Oguchi, T. and Yamamoto, K. (2005), Rapid adsorption and entrapment of benzoic acid molecules onto mesoporous silica (FSM-16). *Journal of Colloid and Interface Science*, **291** (2), 471-476.

Full Text: [2005\J Col Int Sci291, 471.pdf](2005/J%20Col%20Int%20Sci291,%20471.pdf)

Abstract: Changes in the molecular state of benzoic acid (BA) in the presence of folded sheet mesoporous material (FSM-16), which has uniformly sized cylindrical mesopores and a large surface area, were assessed with several analyses. When BA was blended with FSM-16 for 5 min (BA content = 30%), the X-ray diffraction peaks of BA crystals disappeared, suggesting an amorphous state. Fluorescence analysis of the mixture showed a new fluorescence emission peak for BA at 386 nm after mixing with FSM-16. Fluorescence lifetime analysis of the BA component in the mixture at 386 nm showed a longer lifetime in comparison with that of BA crystals. The solid-state 13C CP/MAS and PST/MAS NMR spectra of the mixture with FSM-16 showed a significantly different spectral pattern from the mixture with nonporous glass, whose NMR spectra were identical to those of BA crystals. These results indicate that BA molecules disperse quickly into the hexagonal channels of FSM-16 by a simple blending procedure and adsorbed BA molecules had clearly different physicochemical properties to BA crystals.

Keywords: Porous Material, Adsorption, Solid-State NMR, Fluorescence Spectra, Benzoic Acid, FSM-16

? Ramesh, A., Lee, D.J. and Wong, J.W.C. (2005), Thermodynamic parameters for adsorption equilibrium of heavy metals and dyes from wastewater with low-cost adsorbents. *Journal of Colloid and Interface Science*, **291** (2), 588-592.

Full Text: [2005\J Col Int Sci291, 588.pdf](2005/J%20Col%20Int%20Sci291,%20588.pdf)

Abstract: This note revisits the literature evaluating the thermodynamic parameters of adsorption equilibrium uptakes of heavy metals and dyes from water and wastewater streams using low-cost adsorbents derived from agricultural waste, industrial wastes, inorganic particulates, or some natural products. We highlighted the possible flaws in some adsorption studies when their thermodynamic parameters were assessed, since compensation effects during enthalpy and entropy evaluation were possibly overlooked.

Keywords: Activated Carbon, Adsorption, Agricultural Waste, Aluminum-Industry Waste, Aqueous-Solution, Bagasse Fly-Ash, Column Operations, Dye, Enthalpy-Entropy Compensation, Equilibrium, Heavy Metal, Low-Cost Adsorbent, Low-Cost Adsorbents, Red Mud, Sodium Dodecyl-Sulfate, Sorption Dynamics, Thermodynamics, Wastewater

? Park, S.J. and Kim, B.J. (2005), Ammonia removal of activated carbon fibers produced by oxyfluorination. *Journal of Colloid and Interface Science*, **291** (2), 597-599.

Full Text: [2005\J Col Int Sci291, 597.pdf](2005/J%20Col%20Int%20Sci291,%20597.pdf)

Abstract: In this study, activated carbon fibers (ACFs) were produced by an oxyfluorination treatment to enhance the capacity of ammonia gas removal. The introduction of polar groups, such as C－F, C－O, and COOH, on the ACFs was confirmed by a XPS analysis, and N2/77 K adsorption isotherm characteristics including specific surface area and total and micropore volumes were studied by the BET and t-plot methods. The ammonia-removal efficiency was confirmed by a gas-detecting tube technique. As a result, the specific surface area and micropore volume of ACFs were slightly destroyed as the surface treatment time was increased. However, the oxyfluorinated ACFs led to an increase of fluorine and oxygen-containing polar functional groups in ACF surfaces, resulting in an increase in the ammonia-removal efficiency of the ACFs produced.

? Furmaniak, S., Terzyk, A.P., Gauden, P.A. and Rychlicki, G. (2005), Parameterization of the corrected Dubinin–Serpinsky adsorption isotherm equation. *Journal of Colloid and Interface Science*, **291** (2), 600-605.

Full Text: [2005\J Col Int Sci291, 600.pdf](2005/J%20Col%20Int%20Sci291,%20600.pdf)

Abstract: A recently proposed new modification of the Dubinin–Serpinsky adsorption isotherm equation, the CDS formula, is analyzed. We develop the equation describing the isosteric enthalpy of adsorption, and we give the meaning of the empirical parameters occurring in the CDS model. Finally the application of the CDS equation and related enthalpy formula describing experimental water adsorption and enthalpy data measured on two microporous carbons is shown. The simultaneous fit of the theoretical CDS isotherm and related enthalpy formula to experimental data is very good.

Keywords: Adsorption, Activated Carbon, Water, Dubinin–Serpinsky Equation

? Das, N., Pattanaik, P. and Das, R. (2005), Defluoridation of drinking water using activated titanium rich bauxite. *Journal of Colloid and Interface Science*, **292** (1), 1-10.

Full Text: J Col Int Sci292, 1

? Sugiyama, S., Yokoyama, M., Ishizuka, H., Sotowa, K.I., Tomida, T. and Shigemoto, N. (2005), Removal of aqueous ammonium with magnesium phosphates obtained from the ammonium-elimination of magnesium ammonium phosphate. *Journal of Colloid and Interface Science*, **292** (1), 133-138.

Full Text: [2005\J Col Int Sci292, 133.pdf](2005/J%20Col%20Int%20Sci292,%20133.pdf)

Abstract: In order to recycle magnesium ammonium phosphate (MgNH4PO46H2O: MAP) obtained from MAP process, which is one of the attractive processes for removal of aqueous ammonium and phosphate from wastewater, ammonium elimination from MAP to magnesium phosphates and ammonium incorporation into the magnesium phosphates have been investigated in the present study. It is confirmed that magnesium hydrogen phosphate (MgHPO4) is favorably obtained from the ammonium elimination from MAP at temperatures greater than 353 K, although magnesium phosphate (Mg3(PO4)2) and magnesium pyrophosphate (Mg2P2O7) have been suggested as possible candidates. Based on the dissolution–precipitation mechanism for the removal of aqueous ammonium with magnesium phosphates, three magnesium phosphates were employed for the removal of aqueous ammonium. The order of the removal rate of the aqueous ammonium was MgHPO4 > Mg3(PO4)2 > Mg2P2O7, as expected from the solubility of those magnesium phosphates. The removability of the solid obtained from ammonium elimination of MAP is also confirmed. The present results show that MAP can be employed as an advanced material for the removal/recovery of ammonium, although it is generally accepted that an excess of MAP obtained from the wastewater treatment can be only used as a slow-acting fertilizer.

Keywords: Recycle, Aqueous Ammonium, MAP, Magnesium Phosphates, Removal/Recovery Process

? Hossain, Md.M., Suzuki, T. and Kato, T. (2005), Interaction of an organic cation with Gibbs monolayers of *n*-hexadecyl phosphate. *Journal of Colloid and Interface Science*, **292** (1), 186-194.

Full Text: [2005\J Col Int Sci292, 186.pdf](2005/J%20Col%20Int%20Sci292,%20186.pdf)

Abstract: Surface phase behavior of *n*-hexadecyl phosphate (*n*-HDP) and its mixture with l-arginine (L-arg), which behaves as l-argininium cation (L-arg+) in aqueous solution, at a molar ratio 2:3 in Gibbs adsorption layers has been studied by film balance, Brewster angle microscopy (BAM) and surface tensiometry at ≤ 20 °C. The monolayers of *n*-HDP show three phases that are gas (G), intermediate (I) and liquid condensed (LC), and two phase transitions. A first-order G-I phase transition that is followed by a second-order I-LC phase transition is found in these monolayers. Although the monolayers of the mixtures containing *n*-HDP and L-arg show three phases, the nature of the middle phase is different from that of the *n*-HDP monolayers. The three phases observed for the mixed systems are G, liquid expanded (LE) and LC phases. A first-order G-LE phase transition is found at a low surface pressure at ≥ 10 °C. This transition is followed by another first-order LE-LC phase transition at a certain higher surface pressure. The first-order nature of the phase transitions for both the systems is confirmed by the presence of plateaus in the [*π*–*t*](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4GR8N3J-7&_mathId=mml1&_user=4033922&_cdi=6857&_rdoc=27&_handle=V-WA-A-W-VA-MsSAYWA-UUW-U-AABWYVBUYE-AABUVWBYYE-VWYWVVWEC-VA-U&_acct=C000010619&_version=1&_userid=4033922&md5=2517202f660a73fe58f10fa22e56c979) curves, which are accompanied by two surface phases. A second-order phase transition in the monolayers of *n*-HDP is indicated by a gradual change in the surface morphology, from a uniformly bright isotropic to an anisotropic mosaic textured phase, which is accompanied by a continuous change in the surface pressure. The domains formed during the first-order phase transition in the adsorption layers of *n*-HDP are circular and remain unaffected by changing the temperature. Although the domains of an LE phase are circular, those of an LC phase at the latter transition are fractal in the mixed system. A further branching of the arms of the fractal domains is found to occur by an increase in the temperature. All the results are explained by considering salt formation between anion from *n*-HDP and L-arg+.

Keywords: Gibbs Monolayers, Phase Transition, Surface Pressure, Surface Tension, Brewster Angle Microscopy, *n*-Hexadecyl Phosphate, l-Arginine

? Aranovich, G.L. and Donohue, M.D. (2005), The role of adsorption compression in nanocapillarity. *Journal of Colloid and Interface Science*, **292** (1), 202-209.

Full Text: [2005\J Col Int Sci292, 202.pdf](2005/J%20Col%20Int%20Sci292,%20202.pdf)

Abstract: Influence of adsorption compression on nanocapillarity is discussed. Kelvin’s equation for a compressible liquid is written in a form that takes into account not only Laplace’s pressure, but also adsorption compression. This leads to a simple analytical equation for pressure in nanocapillaries. It is shown that the ratio of Laplace’s pressure to the adsorption compression pressure determines different types of nanocapillary behavior. When the Laplace pressure dominates, it results in classical capillarity that is well studied and understood. There is an intermediate range where Laplace’s pressure is partially or fully compensated by adsorption compression, and the resulting pressure in a capillary is an interplay between attraction to walls and repulsions from neighboring molecules in compressed adsorbed fluid. If the adsorption compression pressure dominates, it results in inversion of capillary pressure and the fluid adsorbed in the nanocapillary presses on walls from inside. This phenomenon has been observed experimentally for fluids in nanoporous solids; in particular, high-precision measurements have shown significant expansion of nanoporous adsorbents loaded with various fluids. It is also shown that oscillatory adhesion forces and internal forces in nanoporous adsorbents have a common thermodynamic origin and can be discussed in the framework of adsorption compression mechanisms.

Keywords: Nanocapillarity, Kelvin’s Equation, Adsorption Compression, Capillary Pressure Inversion, Adhesion forces, Nanopores

? Dastgheib, S.A. and Karanfil, T. (2005), The effect of the physical and chemical characteristics of activated carbons on the adsorption energy and affinity coefficient of Dubinin equation. *Journal of Colloid and Interface Science*, **292** (2), 312-321.

Full Text: [2005\J Col Int Sci292, 312.pdf](2005/J%20Col%20Int%20Sci292,%20312.pdf)

Abstract: The dependency of adsorption energy (*E*) and affinity coefficient (*β*) of Dubinin equations (Dubinin–Radushkevich (DR) or Dubinin–Astakhov (DA)) on surface chemistry and porosity of activated carbons was investigated by analyzing adsorption of nitrogen, benzene, trichloroethylene (TCE), and water vapor by several surface-modified activated carbons and carbon fibers. For all studied nonpolar adsorbates, carbons with smaller average micropores showed higher adsorption energies independent of their surface chemistry. For water vapor, carbons with higher surface polarities showed higher adsorption energies due to specific adsorbate–adsorbent interactions. Adsorption energies increased with decreasing average micropore widths. *β*N2,DR for different carbons were observed to vary in the 0.292–0.539 range. Carbons with higher degrees of mesoporosity had higher *β*N2,DR values, while no dependency was observed between *β*N2,DR and surface chemistry. A comparison of DR and DA cases indicates that: (1) the average value of *β*N2,DA is considerably above the classical value of this parameter; and (2) the range of *β*N2,DA values were smaller compared to *β*N2,DR, despite a wide range of mesoporosity of carbons examined. Obtained *β*TCE,DR values varied in the 0.952–1.243 range, with an average value of 1.085±0.083, independent of surface chemistry or porosity of activated carbons. A similar result was observed for *β*TCE,DA. *β*H2O,DR values of different granular and fibrous activated carbons changed in the range of 0.081–0.271. They depended more on the carbon surface chemistry and less on the porosity. A similar result was obtained when DA equation was considered.

Keywords: Activated Carbon, Carbon Fiber, Adsorption; Dubinin Equation, Adsorption Energy, Affinity Coefficient, Carbon Fibers, Nitrogen, Benzene, Trichloroethylene, Water Vapor

? Castellini, E., Lusvardi, G., Malavasi, G. and Menabue, L. (2005), Thermodynamic aspects of the adsorption of hexametaphosphate on kaolinite. *Journal of Colloid and Interface Science*, **292** (2), 322-329.

Full Text: [2005\J Col Int Sci292, 322.pdf](2005/J%20Col%20Int%20Sci292,%20322.pdf)

Abstract: The adsorption of hexametaphosphate ion, an important deflocculant used in the ceramic industry, from aqueous solutions onto kaolinite has been studied at different temperatures. The adsorption isotherm follows the Langmuir model: the thermodynamic parameters ΔG0ads, ΔH0ads, and ΔS0ads were calculated and found to be consistent with an interaction model involving the formation of an inner-sphere complex between HMP and aluminol groups. Also, the dependence of the adsorption behavior on the kaolinite volume fraction has been studied and discussed in term of association processes between the clay particles.

? Lacin, O., Bayrak, B., Korkut, O. and Say, E. (2005), Modeling of adsorption and ultrasonic desorption of cadmium(II) and zinc(II) on local bentonite. *Journal of Colloid and Interface Science*, **292** (2), 330-335.

Full Text: [2005\J Col Int Sci292, 330.pdf](2005/J%20Col%20Int%20Sci292,%20330.pdf)

Abstract: The adsorption and ultrasonic desorption of toxic heavy metal cations (i.e., Cd(II) and Zn(II)) on natural bentonite have been modeled with the aid of a factorial design approach. The ability of untreated bentonite to remove Cd(II) and Zn(II) from aqueous and acidic solutions at different pH values has been studied for different metal concentrations by varying the amount of adsorbent, temperature, stirring speed, and contact time. The same factors, except stirring speed and metal concentration, were applied in desorption study. Ultrasound power was used for desorption instead of stirring speed. A flame atomic absorption spectrometer was used to measure the cadmium and zinc concentration before and after both experimental study. The highest adsorption for Zn and Cd was 99.85 and 96.84%, respectively, and the highest desorption for Zn and Cd obtained was 66.57 and 51.37%, respectively. It is believed that the models obtained for adsorption and desorption may provide a background for detailed mechanism searches and pilot and industrial scale applications.

? Wang, S.B., Li, L., Wu, H.W. and Zhu, Z.H. (2005), Unburned carbon as a low-cost adsorbent for treatment of Methylene blue-containing wastewater. *Journal of Colloid and Interface Science*, **292** (2), 336-343.

Full Text: [2005\J Col Int Sci292, 336.pdf](2005/J%20Col%20Int%20Sci292,%20336.pdf)

Abstract: Fly ash, natural zeolite, and unburned carbon separated from fly ash have been employed as low-cost adsorbents for dye adsorption in Methylene blue-containing wastewater. It is found that the unburned carbon exhibits a much higher adsorption capacity than raw fly ash and natural zeolite. The adsorption capacities of fly ash, natural zeolite, and unburned carbon for Methylene blue are 2×10−5, 5×10−5, and 2.5×10−4 mol/g, respectively. Investigation also indicates that adsorption is influenced by initial dye concentration, particle size, dye solution pH, and adsorption temperature. Adsorption on unburned carbon increases with the initial dye concentration, solution pH, and temperature, but reduces with the increasing particle size. Kinetic studies show that adsorption of Methylene blue on fly ash, natural zeolite, and unburned carbon can be best described by the pseudo-second-order adsorption model and that adsorption is a two-step diffusion process. The apparent activation energies for Methylene blue adsorption on unburned carbon in the first and second diffusion processes are 12.4 and 39.3 kJ/mol, respectively.

? Gecol, H., Ergican, E. and Miakatsindila, P. (2005), Biosorbent for tungsten species removal from water: Effects of co-occurring inorganic species. *Journal of Colloid and Interface Science*, **292** (2), 344-353.

Full Text: [2005\J Col Int Sci292, 344.pdf](2005/J%20Col%20Int%20Sci292,%20344.pdf)

Abstract: The effect of co-occurring inorganic species on the removal of tungsten from water was investigated using biosorbent (i.e., chitosan coated montmorillonite clay). Simulated natural water and well water from Fallon, NV were used for this study. The concentrations of tungsten (21–541 mg/L) and inorganic species ([H2CO3] = 0–4.2 mg/L, [H4SiO4] = 0–90 mg/L, and [SO2−4] = 0–400 mg/L) in simulated feed water were varied. The concentration of tungsten in the well water was 26 μg/L. The pH level of simulated feed water and well water was adjusted to 4 since this pH was found to be the most effective pH for the tungsten removal using chitosan coated clay. Tungsten removal without the existence of co-occurring inorganic species decreases from 99.8 to 87.1% with an increase in initial tungsten concentration from 21 to 541 mg/L. It reduces further as the co-occurring inorganic species concentration increases. The percentage of the tungsten removal ranges between 68.2–93.8%, 66.7–94.2%, and 53.6–93.7% for simulated natural water containing varied amount of H2CO3, H4SiO4, and SO42−, respectively. The adsorption kinetic data could be best described by the pseudo second order expression. The adsorption equilibrium data was modeled with the Langmuir, Temkin, and Freundlich equations and was found to be represented well by the Langmuir equation. The essential characteristics of the Langmuir isotherm indicate that the adsorption of tungsten on chitosan coated clay is favorable regardless of the presence of interfering species. Compared to natural clay, chitosan coated clay has about 116 times larger adsorption capacity per gram of chitosan, which makes it a superior adsorbent. However, the maximum tungsten adsorption capacity decreases in the presence of co-occurring species since the co-occurring species suppress the adsorption. For the well water treated with biosorbent, the tungsten concentration in the product water was found to be lower than the detection limit (1 μg/L) of the inductively coupled plasma mass spectrometer (ICP-MS). The repeatable results obtained from the treatment of both simulated and well water suggest that using chitosan coated clay can be an efficient adsorbent for tungsten removal from contaminated sites.

Keywords: Tungsten, Biosorbent, Chitosan, Clay, Water Treatment, Adsorption Kinetics, Adsorption Dynamics

? Kalavathy, M.H., Karthikeyan, T., Rajgopal, S. and Miranda, L.R. (2005), Kinetic and isotherm studies of Cu(II) adsorption onto H3PO4-activated rubber wood sawdust. *Journal of Colloid and Interface Science*, **292** (2), 354-362.

Full Text: [2005\J Col Int Sci292, 354.pdf](2005/J%20Col%20Int%20Sci292,%20354.pdf)

Abstract: Adsorption of Cu(II) from aqueous solution onto H3PO4-activated carbon using rubber wood sawdust (RSAC) was investigated in a batch system. Kinetic and isotherm studies were carried out by considering the effects of various parameters, such as initial concentration, contact time, pH, and temperature. The optimal pH value for Cu(II) adsorption onto RSAC was found to be 6.0. Thermodynamic parameters such as standard Gibbs free energy (ΔG0), standard enthalpy (ΔH0), and standard entropy (ΔS0) were evaluated by applying the Van’t Hoff equation. The thermodynamics of Cu(II) adsorption onto RSAC indicates its spontaneous and exothermic nature. Langmuir, Freundlich, and Temkin isotherms were used to analyze the equilibrium data at different temperatures. The Langmuir isotherm fits the experimental data significantly better than the other isotherms. Adsorption kinetics data were tested using pseudo-first-order, pseudo-second-order, and intraparticle diffusion models. Kinetic studies showed that the adsorption followed a pseudo-second-order reaction. The initial sorption rate, pseudo-first-order, pseudo-second-order, and intraparticle diffusion rate constants for different initial concentrations were evaluated and discussed. Adsorption mechanism studies revealed that the process was complex and followed both surface adsorption and particle diffusion. The rate-controlling parameter and effective diffusion coefficient were determined using the Reichenberg plot. It was found that the adsorption occurs through film diffusion at low concentrations and at higher concentration the particle diffusion becomes the rate-determining step.

Keywords: Adsorption, Rubber Wood Sawdust, Activated Carbon,Copper, Isotherms, Diffusion, Kinetics

? Cestari, A.R., Vieira, E.F.S., Pinto, A.A. and Lopes, E.C.N. (2005), Multistep adsorption of anionic dyes on silica/chitosan hybrid: 1. Comparative kinetic data from liquid- and solid-phase models. *Journal of Colloid and Interface Science*, **292** (2), 363-372.

Full Text: [2005\J Col Int Sci292, 363.pdf](2005/J%20Col%20Int%20Sci292,%20363.pdf)

Abstract: In this work, a hybrid silica/chitosan was synthesized and characterized by nitrogen elemental analysis and thermal analysis (TG, DTG, DTA, and DSC) and BET surface area. The hybrid was used in adsorption studies of two anionic dyes from aqueous solutions. A rise of temperature accelerates mass transfer of dyes into the hybrid. However, the maximum adsorption capacities reach similar values from 25 to 55 °C. The kinetic data were first evaluated in relation to the decrease of the time-related residual concentration of the dyes in solution, where the second-order model has presented the best fitting. The solid-phase interaction of dye data presents a rough fitting to the traditional first-order Lagergren kinetic model. However, a modified Avrami kinetic equation was successfully fitted to the kinetic quantities, where from five to seven kinetic regions were found. A pore-diffusion model has also demonstrated that the diffusion is the rate-controlling interaction mechanism. However, the experimental–calculated comparative values are the best way to evaluate a specific aqueous- or solid-phase kinetic model.

Keywords: Silica gel, Chitosan, Anionic dyes, Adsorption kinetics

? Somasundaran, P., Krishnakumar, S. and Mehta, S.C. (2005), A new model to describe the sorption of surfactants on solids in non-aqueous media. *Journal of Colloid and Interface Science*, **292** (2), 373-380.

Full Text: [2005\J Col Int Sci292, 373.pdf](2005/J%20Col%20Int%20Sci292,%20373.pdf)

Abstract: A new phenomenological model is developed to describe the sorption of surfactants on solids in non-aqueous media. This is based on the use of interaction parameters (δ) among solid, solute and solvent to assess the degree of the various interactions and computing an effective interaction parameter for the entire system represented by

δeff=abs{A|δsolid−δsolvent|+B|δsolute−δsolvent|−C|δsolid−δsolute|}.

The effective interaction parameter determines the extent of adsorption that can occur in a given system. Interaction parameters typically account for dispersive interactions between the different components. This new model is used to describe the sorption behavior of a number of surfactant/solvent/solid systems.

Keywords: Effective Interaction Parameter, Solubility Product, Hydrophobic Interaction, Sorption Model

? Gezici, O., Kara, H., Ersöz, M. and Abali, Y. (2005), The sorption behavior of a nickel-insolubilized humic acid system in a column arrangement. *Journal of Colloid and Interface Science*, **292** (2), 381-391.

Full Text: [2005\J Col Int Sci292, 381.pdf](2005/J%20Col%20Int%20Sci292,%20381.pdf)

Abstract: The sorption characteristics of insolubilized humic acid (IHA) were investigated for Ni(II) in a column arrangement. The sodium form of the IHA (INaA) was used as a solid phase. Column operations were performed with five steps and all of them were monitored continuously by a flowthrough cell-adapted UV-Vis spectrophotometer. Thus, all solid-phase extraction (SPE) steps were visualized by breakthrough curves and analyses progress were evaluated. However, all calculations and evaluations were focused on the atomic absorption spectrophotometric (AAS) analyses of the solutions collected during the stripping steps. There was a high correlation (r2, 0.972) between peak area and AAS data of stripping steps. The effect of concentration and pH of the loading solution onto sorption of Ni(II) by INaA was investigated. Sorption characteristics were evaluated by using Freundlich, Langmuir, and Dubinin–Radushkevich (D-R) adsorption isotherms, as well as by Scatchard plot analysis. Multilayer sorption was found to be agreeable for Ni(II). From the D-R isotherm the mean free energy of sorption (E) was calculated (6.65 kJ mol−1) and attributed to the multilayer sorption. Finally, the sorption characteristic of the INaA-Ni(II) system was compared with that of the INaA-Cu(II) system, and possible separation of two ions in a binary mixture system is discussed.

Keywords: Insolubilized Humic Acid, Solid-Phase Extraction, Breakthrough Curve, Nickel, Copper, Adsorption, Ion Exchange, Complexation, Stripping, Dubinin–Radushkevich

? Naja, G., Mustin, C., Berthelin, J. and Volesky, B. (2005), Lead biosorption study with *Rhizopus arrhizus* using a metal-based titration technique. *Journal of Colloid and Interface Science*, **292** (2), 537-543.

Full Text: [2005\J Col Int Sci292, 537.pdf](2005/J%20Col%20Int%20Sci292,%20537.pdf)

Abstract: Acid–base and metal-based potentiometric titration methods were used to analyze sorption mechanisms of lead by *Rhizopus arrhizus* fungal biomass. Biosorption was not considered globally but as the result of successive sorption reactions on various binding sites with different selectivities. Precipitation occurred rapidly when lead concentration increased. Lead was sorbed essentially by carboxylic groups and by phosphates and sulfonates (less abundant) of the organic matter. The lead affinity to carboxylic, sulfonate and phosphate binding sites depended on the association coefficient with proton or counter-ion and on the spatial distribution of the surface sites promoting the formation of mono- or bi-dentate complexes. Chemical bonds and binding sites were confirmed using microscopic and spectroscopic techniques (IR, MET-EDAX). It appeared that although the total organic acidity was reached, number of ionized and free carboxylic groups were not involved in lead sorption reactions. In spite of lead speciation in the solution, surface micro-precipitation was observed and the two processes, surface adsorption and micro-precipitation, are sequential and possibly overlapping. At low concentrations (<10−6 M) adsorption is the dominant phenomenon and beyond (>10−5 M) surface clusters appeared before the predicted solution precipitation phenomenon.

Keywords: Metal-Based High Resolution Potentiometric Titration, Acidic Functional Groups, Sorption Capacity, *Rhizopus Arrhizus* Fungal Biomass

? Gupta, V.K., Mittal, A., Krishnan, L. and Mittal, J. (2006), Adsorption treatment and recovery of the hazardous dye, Brilliant Blue FCF, over bottom ash and de-oiled soya. *Journal of Colloid and Interface Science*, **293** (1), 16-26.

Full Text: [2006\J Col Int Sci293, 16.pdf](2006/J%20Col%20Int%20Sci293,%2016.pdf)

Abstract: Two waste materials-bottom ash, a power plant waste, and de-oiled soya, an agricultural waste-are meticulously and successfully used as adsorbent for the removal and recovery of a hazardous triphenylmethane dye, Brilliant Blue FCF. Both the materials were characterized by chemical analysis, IR, DTA, SEM and XRD studies. Their physical characteristics like surface area, porosity, density and loss on ignition were also determined. The adsorption of the dye over both materials was achieved under different pH, adsorbate concentration, sieve size, adsorbent dosage, contact time and temperature, etc. conditions. For both the systems Langmuir and Freundlich adsorption isotherm models were applied and, based on these models, useful thermodynamic parameters were calculated. For both the adsorbents, the kinetic measurements indicate that the adsorption process follows first order kinetics and film diffusion and particle diffusion mechanisms are operative at lower and higher concentrations, respectively, in each case. By percolating the dye solution through fixed-bed columns the bulk removal of the Brilliant Blue FCF was carried out and necessary parameters were determined to find out the percentage saturation of both the columns. Recovery of Brilliant Blue FCF was made by eluting dilute NaOH of pH 11 through each column. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Bottom Ash, Brilliant Blue Fcf, De-Oiled Soya, Degradation, Dye, Food Colors, Identification, Kinetics, Langmuir, Meal, Pore, Removal, Soils, Sorption, Spectrometry, Toxicity

? Villacañas, F., Pereira, M.F.R., Órfão, J.J.M. and Figueiredo, J.L. (2006), Adsorption of simple aromatic compounds on activated carbons. *Journal of Colloid and Interface Science*, **293** (1), 128-136.

Full Text: [2006\J Col Int Sci293, 128.pdf](2006/J%20Col%20Int%20Sci293,%20128.pdf)

Abstract: The adsorption of model aromatic compounds (phenol, aniline, nitrobenzene) on modified activated carbons has been investigated. Electrostatic and dispersive adsorbate/adsorbent interactions are involved in this process. Their influence on the uptake of the above mentioned aromatic compounds has been evaluated using different solution pH conditions and activated carbon samples with different surface chemistries. These samples were obtained by modification of a commercial activated carbon by means of chemical treatment with HNO3 (acid sample) and thermal treatment under a flow of H2 (basic sample). The textural properties were not significantly changed after these modifications. The best uptake for all the adsorptives under most of the pH conditions used corresponded to the basic sample, which means that dispersive interactions are the most important in this process. However, electrostatic interactions cannot be neglected, as can be seen from the uptakes for the same sample at different pH. In the case of aniline at pH 2, electrostatic interactions are predominant, and the best uptake corresponds to the acid sample. The influence of textural properties on the adsorption process was also investigated, by comparing with another commercial activated carbon. As expected, for this type of organic compounds the uptake increases with the micropore surface area.

Keywords: Activated Carbon, Surface Chemistry, Phenol, Aniline, Nitrobenzene, Adsorption

? Bentouami, A. and Ouali, M.S. (2006), Cadmium removal from aqueous solutions by hydroxy-8 quinoleine intercalated bentonite. *Journal of Colloid and Interface Science*, **293** (2), 270-277.

Full Text: [2006\J Col Int Sci293, 270.pdf](2006/J%20Col%20Int%20Sci293,%20270.pdf)

Abstract: An Algerian bentonite was purified and modified by intercalation of 8-hydroxyquinolinium ion. These materials were characterized by X-ray diffraction, infrared spectroscopy, and thermal analysis. Comparative batch experiments were performed using bentonite–oxine complex (B–oxine) and sodic bentonite (B-Na) for removing cadmium from aqueous solutions. Kinetics study results of cadmium removal with B-Na and B–oxine fit a pseudo-second-order model. The adsorption isotherm data follow the Langmuir equation in which parameters were calculated. B–oxine has a better cadmium removal capacity (61.35 mg/g) than B-Na (29.41 mg/g). Calculated thermodynamic parameters using the van’t Hoff equation showed that the removal process is endothermic with B–oxine and exothermic with B-Na. A mechanism of ion exchange followed by complexation–precipitation is suggested for cadmium removal with B–oxine.

Keywords: Bentonite, 8-Hydroxyquinoleine, Cadmium, Complexation

? Pimenta, A.C.D. and Kilduff, J.E. (2006), Oxidative coupling and the irreversible adsorption of phenol by graphite. *Journal of Colloid and Interface Science*, **293** (2), 278-289.

Full Text: [2006\J Col Int Sci293, 278.pdf](2006/J%20Col%20Int%20Sci293,%20278.pdf)

Abstract: Uptake of phenol by graphite, and regeneration by methanol extraction, was measured to evaluate irreversible adsorption of phenols to carbon surfaces. The emphasis of this work was to identify the role of oxidative coupling, which has been invoked to explain irreversible phenol sorption by activated carbons. Graphite was chosen as a model carbon surface to eliminate potentially confounding effects of microporosity present in other types of carbonaceous sorbents. The isotherm data were well described by the Langmuir-Freundlich isotherm from pH 3 to 9. At pH 12, measured uptakes were higher than expected based on model predictions, suggesting the occurrence of an adsorption mechanism besides physisorption. One oxidative coupling product, 2,2’-dihydroxybiphenyl, was obtained exclusively after adsorption at pH values above 7, and appeared both in aqueous solution and in the methanol regenerant solution. The fraction of total uptake that was not recoverable by methanol extraction decreased with increasing phenol concentration in solution, suggesting preferential sorption by high-energy sites. However, absolute irreversible adsorption increased with phenol concentration in solution. Both fractional irreversible adsorption and 2,2’-dihydroxybiphenyl oxidative coupling product recovery as a function of pH and contact time demonstrated that irreversible sorption of phenol by graphite could not be explained by an oxidative coupling mechanism alone. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Graphite, Oxidative Coupling, Irreversible Adsorption, Phenol, Dihydroxybenzene, Activated Carbon, Dissolved-Oxygen, Copper, 2,6-Dimethylphenol, Polymerization, Regeneration, Equilibrium, Chemistry, Mechanism, Kinetics

? Yaneva, Z. and Koumanova, B. (2006), Comparative modelling of mono- and dinitrophenols sorption on yellow bentonite from aqueous solutions. *Journal of Colloid and Interface Science*, **293** (2), 303-311.

Full Text: [2006\J Col Int Sci293, 303.pdf](2006/J%20Col%20Int%20Sci293,%20303.pdf)

Abstract: Equilibrium removal of three substituted nitrophenols, namely 2-nitrophenol (2-NP), 4-nitrophenol (4-NP), and 2,4-dinitrophenol (2,4-DNP), by adsorption on yellow bentonite was tested. The batch kinetic data are described by the pseudo-first order, pseudo-second order, and intraparticle diffusion models. Results show that chemisorption processes could be rate limiting in the sorption step. The adsorption equilibrium was modelled by the Langmuir and Freundlich equations. The Langmuir model better represents the equilibrium isotherm data for 2-NP, 4-NP, and 2,4-DNP uptake on yellow bentonite. 4-NP is adsorbed in larger amounts than the disubstituted nitrophenol. Uptake of nitrophenols increases in the order 2-NP < 2,4-DNP < 4-NP.

Keywords: Adsorption, Nitrophenols, Yellow Bentonite, Kinetics Modeling, Equilibrium

? Wu, F.C. and Tseng, R.L. (2006), Preparation of highly porous carbon from fir wood by KOH etching and CO2 gasification for adsorption of dyes and phenols from water. *Journal of Colloid and Interface Science*, **294** (1), 21-30.

Full Text: [2006\J Col Int Sci294, 21.pdf](2006/J%20Col%20Int%20Sci294,%2021.pdf)

Abstract: Fir wood was first carbonized for 1.5 h at 450 °C, then soaked in a KOH solution KOH/char ratio of 1, and last activated for 1 h at 780 °C. During the last hour CO2 was poured in for further activation for 0, 15, 30, and 60 min, respectively. Carbonaceous adsorbents with controllable surface area and pore structure were chemically activated from carbonized fir wood (i.e., char) by KOH etching and CO2 gasification. The pore properties, including the BET surface area, pore volume, pore size distribution, and pore diameter, of these activated carbons were first characterized by the t-plot method based on N2 adsorption isotherms. Fir-wood carbon activated with CO2 gasification from 0 to 60 min exhibited a BET surface area ranging from 1371 to 2821 m2 g−1, with a pore volume significantly increased from 0.81 to 1.73 m2 g−1. Scanning electron microscopic (SEM) results showed that the surfaces of honeycombed holes in these carbons were significantly different from those of carbons without CO2 gasification. The adsorption of Methylene blue, basic brown 1, acid blue 74, p-nitrophenol, p-chlorophenol, p-cresol, and phenol from water on all the carbons studied was examined to check their chemical characteristics. Adsorption kinetics was in agreement with the Elovich equation, and all equilibrium isotherms were in agreement with the Langmuir equation. These results were used to compare the Elovich parameter (1/b) and the adsorption quantity of the unit area (qmon/Sp) of activated carbons with different CO2 gasification durations. This work facilitated the preparation of activated carbon by effectively controlling pore structures and the adsorption performance of the activated carbon on adsorbates of different molecular forms.

Keywords: Fir Wood, Activated Carbons, KOH Activation, CO2 Gasification, Physical Properties, Adsorption Equilibrium, Kinetics

? Yener, J., Kopac, T., Dogu, G. and Dogu, T. (2006), Adsorption of Basic Yellow 28 from aqueous solutions with clinoptilolite and amberlite. *Journal of Colloid and Interface Science*, **294** (2), 255-264.

Full Text: [2006\J Col Int Sci294, 255.pdf](2006/J%20Col%20Int%20Sci294,%20255.pdf)

Abstract: The objective of this study was to investigate the adsorption of Basic Yellow 28 that is a cationic dye on clinoptilolite and amberlite XAD-4. Both equilibrium and batch rate adsorption in aqueous solutions of the dyestuff were investigated. Adsorption rate data were analysed using the pseudo-first order kinetic model of Lagergren and the pseudo-second order model to determine adsorption rate constants at 20, 30 and 40 °C. The adsorption equilibrium data were analysed using various adsorption isotherm models and the results have shown that adsorption behaviour of Basic Yellow 28 by clinoptilolite and amberlite could be described by either Langmuir or Freundlich models. Langmuir adsorption isotherm constants corresponding to adsorption capacity, *Q*0, were found to be 59.6, 52.9 and 56.7 mg/g for clinoptilolite at 20, 30 and 40 °C, respectively. Lower adsorption capacities for Basic Yellow 28 on amberlite were obtained. The increase of adsorption rate constants with an increase in temperature for BY 28 adsorption on amberlite indicated chemisorption with dissociation and increased availability of sites due to higher penetration of adsorbing molecules into the pores.

Keywords: Clinoptilolite, Amberlite XAD-4, Basic Yellow 28 Dye, Adsorption Isotherms, Adsorption Rate

? Liu, B.J. and Ren, Q.L. (2006), Sorption of levulinic acid onto weakly basic anion exchangers: Equilibrium and kinetic studies. *Journal of Colloid and Interface Science*, **294** (2), 281-287.

Full Text: [2006\J Col Int Sci294, 281.pdf](2006/J%20Col%20Int%20Sci294,%20281.pdf)

Abstract: The equilibrium and dynamics of levulinic acid sorption on two weakly basic anion exchangers, in free base form, in single-component aqueous solutions were investigated. Adsorption isotherms such as Langmuir, Sips, Radke–Prausnitz, and Toth were applied to correlate the experimental data in the temperature range 285–315 K. Modeling results showed that the Toth model is the best one to correlate the sorption isotherms. The resulting Toth equations were used with the Clausius–Clapeyron equation to determine the isosteric heat of sorption. The sorption kinetics was experimentally measured via a completely stirred finite-bath batch experiment under different initial concentrations and at varying solution temperatures. The pseudo-second-order kinetic model and the Elovich equation were used to represent the kinetic data and the equation parameter values were also evaluated. The pseudo-second-order equation cannot simulate the experimental kinetic data, while the Elovich equation fitted the sorption dynamic data very well under all the operating conditions studied. Finally, the apparent activation energy of sorption was also determined.

Keywords: Levulinic Acid, Anion Exchanger, Sorption Equilibrium, Batch Kinetics, Toth, Elovich, Pseudo-Second Order, Isosteric Heat

? Bujdák, J., Remko, M. and Rode, B.M. (2006), Selective adsorption and reactivity of dipeptide stereoisomers in clay mineral suspension. *Journal of Colloid and Interface Science*, **294** (2), 304-308.

Full Text: [2006\J Col Int Sci294, 304.pdf](2006/J%20Col%20Int%20Sci294,%20304.pdf)

Abstract: Preferential adsorption of dipeptide diastereomers (dialanine, Val-Ala) on clay mineral surfaces was observed. Significantly higher adsorption of dipeptides composed from only one type of enantiomer of amino acid units in comparison to those containing both L- and D-type of amino acid units in their molecules, was experimentally proven. This selectivity was explained in terms of different hydrophobic properties of diastereomers, which are probably controlled by intramolecular interactions between nonpolar and polar parts of dipeptide molecules affected by their stereochemistry. A significantly higher reactivity of stereoisomers composed from the same type of amino acid enantiomers to form amide bonds was proven as well. Theoretical study could distinguish different properties of the diastereomers. The results of the calculations indicate possible effects of molecular stability in the stereoselectivity during the adsorption and reactions of Ala2 diastereomers.

Keywords: Adsorption, Diastereomers, Dipeptides, Clay Minerals, Chemical Evolution

? Hizal, J. and Apak, R. (2006), Modeling of copper(II) and lead(II) adsorption on kaolinite-based clay minerals individually and in the presence of humic acid. *Journal of Colloid and Interface Science*, **295** (1), 1-13.

Full Text: [2006\J Col Int Sci295, 1.pdf](2006/J%20Col%20Int%20Sci295,%201.pdf)

Abstract: The aim of this study is to explain how clay minerals adsorb heavy metals individually and in the presence of humic acid, and to model heavy metal adsorption specifically based on surface–metal binary and surface–metal–ligand ternary complexation. The adsorption of Cu(II) and Pb(II) on kaolinite-based clay minerals has been modeled by the aid of the FITEQL3.2 computer program using single- and double-site binding models of the Langmuir approach. Potentiometric titrations and adsorption capacity experiments were carried out in solutions containing different concentrations of the inert electrolyte NaClO4; however, the modeling of binary and ternary surface complexation was deliberately done at high ionic strength (0.1 M electrolyte) for eliminating adsorption onto the permanent negatively charged sites of kaolinite. A “two-site, two p*K*a” model was adapted, and as for the two surface sites responsible for adsorption, it may be arbitrarily assigned that ≡S1OH sites represent silanol and organic functional groups such as carboxyl having p*K*a values close to that of silanol, and ≡S2OH sites represent aluminol and organic functional groups such as phenolics whose p*K*a values are close to that of aluminol, as all the studied clays contained organic carbon. Copper(II) showed a higher adsorption capacity and higher binding constants, while lead(II), being a softer cation (in respect to HSAB theory) preferred the softer basic sites with aluminol–phenol functional groups. Heavy metal cations are assumed to bind to the clay surface as the sole (unhydrolyzed) M(II) ion and form monodentate surface complexes. Cu(II) and Pb(II) adsorption in the presence of humic acid was modeled using a double-site binding model by the aid of FITEQL3.2, and then the whole system including binary surface–metal and surface–ligand and ternary surface–metal–ligand complexes was resolved with respect to species distributions and relevant stability constants. Electrostatic effects were accounted for using a diffuse layer model (DLM) requiring minimum number of adjustable parameters. Metal adsorption onto clay at low pH increased in the presence of humic acid, and the metal adsorption vs pH curves of metal–kaolinite–humic acid suspensions were much steeper (and distinctly S shaped) compared to the wider pH-gradient curves observed in binary clay–metal systems. The clay mineral in the presence of humic acid probably behaved more like a chelating ion-exchanger sorbent for heavy metals rather than being a simple inorganic ion exchanger.

? Yang, J.K., Lee, S.M. and Davis, A.P. (2006), Effect of background electrolytes and pH on the adsorption of Cu(II)/EDTA onto TiO2. *Journal of Colloid and Interface Science*, **295** (1), 14-20.

Full Text: [2006\J Col Int Sci295, 14.pdf](2006/J%20Col%20Int%20Sci295,%2014.pdf)

Abstract: Cu(II)/EDTA adsorption onto TiO2 has been studied with a variation of pH, ionic strength, and type of background electrolytes. Cu(II) adsorption onto TiO2 increased as ionic strength increased when NaClO4 was used as a background electrolyte. This can be explained by the increase of exp(−*FΨ*/*RT*) as a part of the electrostatic correction within a surface complexation model. Model predictions described experimental adsorption trends. Types of background anions (ClO4, Cl, NO2, NO3, SO3, and PO4) did not affect adsorption trends and adsorption amounts of Cu(II) onto TiO2. However, different trends were observed with various types of background ions used as ionic strength in EDTA and Cu(II)–EDTA adsorption. EDTA adsorption was decreased by using Na2SO3 and Na3PO4 as background ions, while NaClO4, NaCl, NaNO2, and NaNO3 showed negligible interference on the EDTA adsorption, which matched well with model predictions. The presence Na2SO3 and Na3PO4 also interfered with Cu(II)–EDTA adsorption, to a somewhat greater extent compared to EDTA adsorption, especially at lower pH. This interference was also noted in Cu(II)–EDTA adsorption with a variation of Cu(II)–EDTA concentration at constant ionic strength (3×10−3 M) by using Na2SO3 and Na3PO4, especially at lower ratios of Cu(II)–EDTA to Na2SO3 and Na3PO4. These results suggest that the ratio of Cu(II)–EDTA to Na2SO3 and Na3PO4 is an important factor for the controlling of competition between these background ions and Cu(II)–EDTA onto TiO2. Model prediction generally matched well with experimental adsorption using NaClO4, NaCl, NaNO2, and NaNO3 as backgrounds ions, while a severe deviation was observed in the presence of Na2SO3 and Na3PO4. These results suggest that the mobility of copper ions as Cu(II)–EDTA can be increased from polluted area in the presence of multivalent background ions, especially as the ratio of adsorbates/background ions decreased.

? Sen Gupta, S. and Bhattacharyya, K.G. (2006), Adsorption of Ni(II) on clays. *Journal of Colloid and Interface Science*, **295** (1), 21-32.

Full Text: [2006\J Col Int Sci295, 21.pdf](2006/J%20Col%20Int%20Sci295,%2021.pdf)

Abstract: The present work investigates the adsorptive interactions of Ni(II) ions with kaolinite, montmorillonite, and their poly(oxo zirconium) and tetrabutylammonium derivatives in aqueous medium. Batch adsorption studies were carried out with various Ni(II) concentrations, amount of clay adsorbents, pH, agitation time and temperature. The adsorption is strongly dependent on pH of the medium with enhanced adsorption as the pH turns from acidic to alkaline side till precipitation sets in. The process was very fast initially and maximum adsorption was observed within 180 min of agitation. The kinetics of the interactions, tested with pseudo first order Lagergren equation, second order kinetics, Elovich equation, liquid film diffusion model and intra-particle diffusion mechanism, showed better agreement with second order kinetics (k2=1.3×10−2 to 5.3×10-2 g/(g min)). The adsorption data gave good fits with Langmuir and Freundlich isotherms and yielded Langmuir monolayer capacity of 2.75 to 21.14 mg/g and Freundlich adsorption capacity of 0.70 to 3.40 mg(1−1/n) l1/n/g for the clay adsorbents. The adsorption process was exothermic with ΔH in the range of −24.0 to −45.1 kJ/mol accompanied by decrease in entropy (ΔS: −118.2 to −160.5 J/(mol K)) and Gibbs energy (ΔG: −34.6 to −49.5 kJ/mol). The results have shown that montmorillonite has the largest adsorption capacity followed by ZrO-montmorillonite, TBA-montmorillonite, kaolinite, ZrO-kaolinite and TBA-kaolinite. Introduction of ZrO- and TBA- groups into the clays reduced their adsorption capacity by blocking the available adsorption sites.

Keywords: Kaolinite, Montmorillonite, Poly(Oxo Zirconium) Clay, Tetrabutylammonium Clay, Adsorption, Adsorption Kinetics, Adsorption Isotherm, Temperature, Enthalpy

? Zimnitsky, D.S., Yurkshtovich, T.L. and Bychkovsky, P.M. (2006), Adsorption of zwitterionic drugs onto oxidized cellulose. *Journal of Colloid and Interface Science*, **295** (1), 33-40.

Full Text: [2006\J Col Int Sci295, 33.pdf](2006/J%20Col%20Int%20Sci295,%2033.pdf)

Abstract: Adsorption of zwitterionic drugs (*β*-lactam antibiotics and amino acids) onto samples of oxidized cellulose (OC) with various carboxyl contents and structural characteristics from aqueous and water/alcohol solutions was investigated. The adsorption process can be described according to the theory of localized stoichiometric adsorption and represented by Langmuir isotherms. It was established that the constants of interfacial distribution mainly increase with increased relative sorbate hydrophobicity. The dependencies of adsorption on pH of equilibrium drug solution have a maximum at pH 3–3.5, which is caused by peculiarities of dissociation of OC and sorbates. The drug uptake is shown to increase with an increase of alcohol mole fraction in the solution and transfer to the binary water/isopropanol from water/ethanol solutions. The dominant contribution to the increase of uptake is the desolvation of ionic groups of zwitterions in the solution, which increases with increased alcohol content. The degree of crystallinity of the sorbent has no considerable effect on drug adsorption from aqueous solutions. In water/alcohol solutions the adsorption of drugs by OC samples with similar exchange capacity increases with reducted uniformity of carboxylic group distribution in the volume of the polymer, which is connected with increased accessibility of carboxylic groups for sorbate molecules.

Keywords: Adsorption, Langmuir Isotherm, *Β*-Lactam Antibiotics, Amino Acids, Oxidized Cellulose, Degree of Crystallinity

? Zhang, Z., Fenter, P., Cheng, L., Sturchio, N.C., Bedzyk, M.J., Machesky, M.L., Anovitz, L.M. and Wesolowski, D.J. (2006), Zn2+ and Sr2+ adsorption at the TiO2 (110)–electrolyte interface: Influence of ionic strength, coverage, and anions. *Journal of Colloid and Interface Science*, **295** (1), 50-64.

Full Text: [2006\J Col Int Sci295, 50.pdf](2006/J%20Col%20Int%20Sci295,%2050.pdf)

Abstract: The X-ray standing wave technique was used to probe the sensitivity of Zn2+ and Sr2+ ion adsorption to changes in both the adsorbed ion coverage and the background electrolyte species and concentrations at the rutile (*α*-TiO2) (110)–aqueous interface. Measurements were made with various background electrolytes (NaCl, NaTr, RbCl, NaBr) at concentrations as high as 1 *m*. The results demonstrate that Zn2+ and Sr2+ reside primarily in the condensed layer and that the ion heights above the Ti–O surface plane are insensitive to ionic strength and the choice of background electrolyte (with <0.1 Å changes over the full compositional range). The lack of any specific anion coadsorption upon probing with Br−, coupled with the insensitivity of Zn2+ and Sr2+ cation heights to changes in the background electrolyte, implies that anions do not play a significant role in the adsorption of these divalent metal ions to the rutile (110) surface. Absolute ion coverage measurements for Zn2+ and Sr2+ show a maximum Stern-layer coverage of ~0.5 monolayer, with no significant variation in height as a function of Stern-layer coverage. These observations are discussed in the context of Gouy–Chapman–Stern models of the electrical double layer developed from macroscopic sorption and pH-titration studies of rutile powder suspensions. Direct comparison between these experimental observations and the MUltiSIte Complexation (MUSIC) model predictions of cation surface coverage as a function of ionic strength revealed good agreement between measured and predicted surface coverages with no adjustable parameters.

? Wang, S.B., Li, H.T. and Xu, L.Y. (2006), Application of zeolite MCM-22 for basic dye removal from wastewater. *Journal of Colloid and Interface Science*, **295** (1), 71-78.

Full Text: [2006\J Col Int Sci295, 71.pdf](2006/J%20Col%20Int%20Sci295,%2071.pdf)

Abstract: MCM-22 was employed as an effective adsorbent for removal of basic dyes including Methylene blue, crystal violet, and rhodamine B from aqueous solution. The adsorption kinetics and isotherms were investigated. The adsorption capacity of MCM-22 for three dyes follows an order of MB > CV ~ RB. Kinetic studies indicate that the adsorption follows the pseudo second-order kinetics and the adsorption is a two-step diffusion process with film diffusion dominating the process. The adsorption isotherm can be well fitted by both the Langmuir and the Freundlich models. Thermodynamic calculations suggest that the adsorption of basic dyes on MCM-22 is an endothermic reaction.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Kinetics, Aqueous Solution, Aqueous-Solutions, Basic Dye, Basic Dyes, Capacity, Color Removal, Crystal Violet, CV, Diffusion, Dye, Dye Removal, Dyes, Film, Fly-Ash, Freundlich, Isotherm, Isotherms, Kinetics, Langmuir, MCM-22, Mechanism, Methylene Blue, Methylene-Blue, Models, Process, Pseudo-Second-Order, Reaction, Reactive Dyes, Removal, Rhodamine B, Rice Husk, Second-Order Kinetics, Sorption, Wastewater, Wastewater Treatment, Zeolite

? Illés, E. and Tombácz. E. (2006), The effect of humic acid adsorption on pH-dependent surface charging and aggregation of magnetite nanoparticles. *Journal of Colloid and Interface Science*, **295** (1), 115-1234.

Full Text: [2006\J Col Int Sci295, 115.pdf](2006/J%20Col%20Int%20Sci295,%20115.pdf)

Abstract: The pH-dependent adsorption of humic acid (HA) on magnetite and its effect on the surface charging and the aggregation of oxide particles were investigated. HA was extracted from brown coal. Synthetic magnetite was prepared by alkaline hydrolysis of iron(II) and iron(III) salts. The pH-dependent particle charge and aggregation, and coagulation kinetics at pH~4 were measured by laser Doppler electrophoresis and dynamic light scattering. The charge of pure magnetite reverses from positive to negative at pH~8, which may consider as isoelectric point (IEP). Near this pH, large aggregates form, while stable sols exist further from it. In the presence of increasing HA loading, the IEP shifts to lower pH, then at higher loading, magnetite becomes negatively charged even at low pHs, which indicate the neutralization and gradual recharging positive charges on surface. In acidic region, the trace HA amounts are adsorbed on magnetite surface as oppositely charged patches, systems become highly unstable due to heterocoagulation. Above the adsorption saturation, however, the nanoparticles are stabilized in a way of combined steric and electrostatic effects. The HA coated magnetite particles form stable colloidal dispersion, particle aggregation does not occur in a wide range of pH and salt tolerance is enhanced.

Keywords: Iron Oxide, Magnetite, Humic Acid, Adsorption, Surface Modification, Colloidal Stability, Heterocoagulation, Aggregation, Magnetic Separation

? Mahmoodi, N.M., Arami, M., Limaee, N.Y. and Tabrizi, N.S. (2006), Kinetics of heterogeneous photocatalytic degradation of reactive dyes in an immobilized TiO2 photocatalytic reactor. *Journal of Colloid and Interface Science*, **295** (1), 159-164.

Full Text: [2006\J Col Int Sci295, 159.pdf](2006/J%20Col%20Int%20Sci295,%20159.pdf)

Abstract: The photocatalytic degradation of two reactive dyes has been investigated by UV/TiO2/H2O2 using an immobilized TiO2 photocatalytic reactor. Reactive Blue 8 (RB 8) and Reactive Blue 220 (RB 220) textile dyes were used as model compounds. Photocatalytic degradation processes were performed using a 5-L solution containing dyes. The initial concentrations of dyes were 50 mg/L. The radiation source was two 15 W UV-C lamps. A batch mode immersion photocatalytic reactor was utilized. UV–vis and ion chromatography (IC) analyses were employed to obtain the details of the photodegradation of the selected dyes. Colored synthetic waters were completely decolorized in relatively short time after UV irradiation in the presence of various concentrations of hydrogen peroxide. Formate, acetate, oxalate, and glyoxylate anions were detected as dominant aliphatic intermediates where they were further oxidized slowly to CO2. The UV/TiO2/H2O2 process was able to oxidize the dyes with partial mineralization of carbon, nitrogen, and sulfur heteroatoms into CO2, NO3−, and SO42−, respectively. Kinetics analysis indicates that the photocatalytic decolorization rates of the dye can be approximated by a pseudo-first-order model. The UV/TiO2/H2O2 process proved to be capable of decolorization and mineralization of the reactive dyes (RB 8 and RB 220).

? Wang, L.J., Lu, A.H., Wang, C.Q., Zheng, X.S., Zhao, D.J. and Liu, R. (2006), Nano-fibriform production of silica from natural chrysotile. *Journal of Colloid and Interface Science*, **295** (2), 436-439.

Full Text: 2006\J Col Int Sci295, 436.pdf

Abstract: Nano-fibriforin silica was extracted from chrysotile by the acid-leaching method. The acid-leached residue of chrysotile has been studied by TEM, XRD, FTAR, and thermal analysis techniques, etc. When the magnesium leaching degree (MLD) is over 90%, the nano-fibriform silica consists of hydrous silicon dioxide (above 90%) with small amount of magnesium trapped inside the Si-O network. The amount of hydroxyl on surface of nano-fibriform silica is 6 unit nm-2. This value is between the values of turned and precipitated silica. This study shows that nanofibriform silica is a kind of amorphous matter with a high special surface area (368 m2/g), a high adsorption (330 cm3/g), and a larger pore volume (0.51 cm3/g). The diameter of a single silica fiber is 20-30 rim. The nitrogen adsorption isotherm is similar to Type TV curve. The nano-fibriform silica is one of mesopores materials. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Chrysotile, Isotherm, Magnesium Leaching Degree, Nano-Fibriform, Nano-Fibriform Silica, Pore, Production, Rice Hull Ash, Silica, Surface, TEM, XRD

? Akçay, M. (2006), Characterization and adsorption properties of tetrabutylammonium montmorillonite (TBAM) clay: Thermodynamic and kinetic calculations. *Journal of Colloid and Interface Science*, **296** (1), 16-21.

Full Text: [2006\J Col Int Sci296, 16.pdf](2006/J%20Col%20Int%20Sci296,%2016.pdf)

Abstract: The montmorillonite has been subjected to modification through ion-exchange reaction by tetrabutylammonium bromide (TBAB). The modified sample was studied by X-ray diffraction (XRD) technique, Fourier transform infrared (FTIR) spectroscopy, and thermogravimetric analysis (TGA) methods. The basal spacing of modified montmorillonite was determined as 14.40 Å. The IR spectra of modified montmorillonite showed C-H vibrations. The characterization of tetrabutylammonium montmorillonite (TBAM) and the adsorption of p-chlorophenol (p-CP) on organomontmorillonite was studied as a function of the solution concentration and temperature. The observed adsorption rates were found to fit to the pseudo-second-order kinetics. The rate constants were calculated for temperatures ranging between 25.0–35.0 °C at constant concentration. The adsorption energy, E, and adsorption capacity, (qm), for phenolic compounds adsorbing on organomontmorillonite were estimated using the Dubinin–Radushkevich (D–R) equation. Thermodynamic parameters (Δga=−11.063 and −11.802 kJ/mol, Δha=−30.032 and −30.789 kJ/mol, Δsa=−0.0636 and −0.0637 kJ/mol K for 298 and 308 K, respectively) were calculated by a new approximation from the adsorption isotherms of p-CP on organomontmorillonite. These isotherms were modeled according to Freundlich and Dubinin–Radushkevich adsorption isotherms, through which the first-order and second-order coefficients (K1ads=0.0152 and 0.0127 μmol/g min, K2ads=0.0130 and 0.0108 L/min μmol, respectively) were obtained at 298 and 308 K.

? Furmaniak, S., Terzyk, A.P., Gauden, P.A. and Rychlicki, G. (2006), Simple models of adsorption in nanotubes. *Journal of Colloid and Interface Science*, **296** (1), 310-317.

Full Text: [2006\J Col Int Sci296, 310.pdf](2006/J%20Col%20Int%20Sci296,%20310.pdf)

Abstract: We present two very simple models of adsorption in cylindrical pores. It is assumed that a layer-by-layer mechanism occurs similarly to that in the BET theory. The major assumption is that in the pores having an adsorption space with cylindrical geometry, the surface area of the upper surface (in comparison with the bottom surface) should be diminished in proportion to the radii of a cylinder. Two cases are considered: the adsorbate–adsorbate interactions are neglected or they are taken into account according to the lattice model developed by Fowler and Guggenheim. It is shown that the data simulated by Ohba and Kaneko for adsorption of nitrogen in the internal space of carbon nanotubes are successfully described by our models. On the basis of the fitted data we show that the relation between the monolayer capacity in cylindrical pores and on flat surfaces is in excellent agreement with the equation developed recently by Salmas and Androutsopoulos. Moreover, our models are verified for two sets of experimental data reported by Kaneko et al. We obtain excellent agreement between the values of the pore diameters calculated by us and suggested by these authors (from HRTEM, the GCMC simulations, and the IDBdB model). It is concluded that proposed simple and fast models can be applied as a first approximation to the estimation of the internal nanotube diameters if they do not exceed ca. 5 nm and are slightly dispersed.

? Angove, M.J., Wells, J.D. and Johnson, B.B. (2006), The influence of temperature on the adsorption of mellitic acid onto goethite. *Journal of Colloid and Interface Science*, **296** (2), 30-40.

Full Text: [2006\J Col Int Sci296, 30.pdf](2006/J%20Col%20Int%20Sci296,%2030.pdf)

Abstract: The adsorption of mellitic acid (benzene-1,2,3,4,5,6-hexacarboxylic acid) onto goethite was investigated at five temperatures between 10 and 70 °C. Mellitic acid adsorption increased with increasing temperature below pH 7.5, but at higher pH the effect of increasing temperature was to reduce the amount adsorbed. Potentiometric titrations were conducted and adsorption isotherms were measured over the same temperature range, and the data obtained were used in conjunction with adsorption edge data to develop an Extended Constant Capacitance Surface Complexation Model of mellitic acid adsorption. A single set of reactions was used to model the adsorption for the three different experiment types at the five temperatures studied. The adsorption reactions proposed for mellitate ion (L6−) adsorption at the goethite surface (SOH) involved the formation of two outer-sphere complexes:

SOH+L6−+3H+right harpoon over left[(SOH2)+(LH2)4−]3−,

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This mechanism is consistent with recent ATR-FTIR spectroscopic measurements of the mellitate-goethite system. Thermodynamic parameters calculated from the temperature dependence of the equilibrium constants for these reactions indicate that the adsorption of mellitic acid onto goethite is accompanied by a large entropy increase.

? Rybolt, T.R., Ziegler, K.A., Thomas, H.E., Boyd, J.L. and Ridgeway, M.E. (2006), Adsorption energies for a nanoporous carbon from gas–solid chromatography and molecular mechanics. *Journal of Colloid and Interface Science*, **296** (2), 41-50.

Full Text: [2006\J Col Int Sci296, 41.pdf](2006/J%20Col%20Int%20Sci296,%2041.pdf)

Abstract: Gas–solid chromatography was used to obtain second gas–solid virial coefficients, *B*2*s*, in the temperature range 342–613 K for methane, ethane, propane, butane, 2-methylpropane, chloromethane, chlorodifluoromethane, dichloromethane, and dichlorodifluoromethane. The adsorbent used was Carbosieve S-III (Supelco), a carbon powder with fairly uniform, predominately 0.55 nm slit width pores and a N2 BET surface area of 995 m2/g. The temperature dependence of *B*2*s* was used to determine experimental values of the gas–solid interaction energy, *E*\*, for each of these molecular adsorbates. MM2 and MM3 molecular mechanics calculations were used to determine the gas–solid interaction energy, E\*cal, for each of the molecules on various flat and nanoporous model surfaces. The flat model consisted of three parallel graphene layers with each graphene layer containing 127 interconnected benzene rings. The nanoporous model consisted of two sets of three parallel graphene layers adjacent to one another but separated to represent the pore diameter. A variety of calculated adsorption energies, E\*cal, were compared and correlated to the experimental E\* values. It was determined that simple molecular mechanics could be used to calculate an attraction energy parameter between an adsorbed molecule and the carbon surface. The best correlation between the E\*cal and E\* values was provided by a 0.50 nm nanoporous model using MM2 parameters.

Keywords: Adsorption, Henry’s Law; Adsorption, Gas–Solid Chromatography, Adsorption, Carbon, on, *B*2*s*, Correlations of, Virial Coefficients, Gas–Solid, Molecular Mechanics Surface Energy, Adsorption Energy

? Guan, X.H., Shang, C. and Chen, G.H. (2006), Competitive adsorption of organic matter with phosphate on aluminum hydroxide. *Journal of Colloid and Interface Science*, **296** (2), 51-58.

Full Text: [2006\J Col Int Sci296, 51.pdf](2006/J%20Col%20Int%20Sci296,%2051.pdf)

Abstract: The effects of orthophosphate on the adsorption of natural organic matter (NOM) on aluminum hydroxide were investigated using three organic compounds as surrogates, including humic acid (HA), phthalic acid, and 2,3-dihydroxybenzoic acid (2,3-DHBA). The adsorption of phthalic acid and 2,3-DHBA was very limited compared to that of HA, whereas their adsorption was reduced much more significantly than that of HA by phosphate. The efficiency of phosphate in reducing HA adsorption increased with increasing phosphate concentration. Phosphate adsorption was slightly reduced by phthalic acid and 2,3-DHBA but moderately suppressed by HA. The adjacent carboxylic groups mainly contributed to the adsorption of humic acid at low pH, while the adjacent phenol groups were responsible for the adsorption of humic acid at high pH. HPLC–SEC and SUVA analysis revealed that HA molecules with high molecular weight were adsorbed preferentially but were easily displaced by the specifically adsorbed phosphate. TM–AFM images revealed that the aggregation of HA molecules and the protonation of carboxylic groups at low pH facilitated the adsorption under acidic conditions. The presence of phosphate increases the coagulant dosage for NOM removal as some sites on the coagulant precipitates become utilized by phosphate.

? Gupta, V.K., Rastogi, A., Saini, V.K. and Jain, N. (2006), Biosorption of copper(II) from aqueous solutions by *Spirogyra* species. *Journal of Colloid and Interface Science*, **296** (2), 59-63.

Full Text: [2006\J Col Int Sci296, 59.pdf](2006/J%20Col%20Int%20Sci296,%2059.pdf)

Abstract: Batch studies were conducted to investigate the kinetics and isotherms of Cu(II) biosorption on the biomass of green alga *Spirogyra* species. It is observed that the biosorption capacity of the biomass strongly depends on pH and algal dose. The maximum biosorption capacity of 133.3 mg Cu(II)/g of dry weight of biomass was observed at an optimum pH of 5 in 120 min with an algal dose of 20 g/L. Desorption studies were conducted with 133.3 mg/g of Cu(II) loaded biomass using different desorption agents including HCl, EDTA, H2SO4, NaCl, and H2O. The maximum desorption of 95.3% was obtained with HCl in 15 min. The results indicate that with the advantages of high metal biosorption capacity and satisfactory recovery of Cu(II), *Spirogyra* can be used as an efficient and economic biosorbent material for the removal and recovery of toxic heavy metals from polluted water.

? Blokhus, A.M., and Djurhuus, K. (2006), Adsorption of poly(styrene sulfonate) of different molecular weights on α-alumina: Effect of added sodium dodecyl sulfate. *Journal of Colloid and Interface Science*, **296** (2), 64-70.

Full Text: [2006\J Col Int Sci296, 64.pdf](2006/J%20Col%20Int%20Sci296,%2064.pdf)

Abstract: The adsorption of poly(styrene sulfonate), PSS, of different molecular weights (70,000, 500,000, and 1,000,000 mol/kg), from aqueous solutions on α-alumina has been investigated. PSS of the lower molecular weight adsorbs less than the others whose adsorption isotherms overlap. The adsorption is found to increase with increasing ionic strength of the solutions indicating that both electrostatic and non-electrostatic contributions are involved in the adsorption process. Upon addition of the anionic surfactant, sodium dodecyl sulfate, SDS, PSS is found to adsorb less the more SDS added. SDS is found to be preferentially adsorbed as shown both from the simultaneous adsorption of the components and also from the sequential adsorption process where SDS in all cases displaces preadsorbed PSS from the solid surface. The displacement of preadsorbed polyelectrolyte by surfactant is a very slow process and the displacement is less pronounced as the molecular mass of the polyelectrolyte increases indicating the fewer number of contact points to the surface. This is further underlined by the effect on the displacement of PSS by SDS upon increasing the ionic strength of the solutions.

? Mishra, S.P. and (Miss) Vijaya, (2006), Inorganic particulates in removal of heavy metal toxic ions—Part X: Rapid and efficient removal of Hg(II) ions from aqueous solutions by hydrous ferric and hydrous tungsten oxides. *Journal of Colloid and Interface Science*, **296** (2), 383-388.

Full Text: [2006\J Col Int Sci296, 383.pdf](2006/J%20Col%20Int%20Sci296,%20383.pdf)

Abstract: A radiotracer technique has been used to study the removal of Hg(II) ions from aqueous solutions by synthesized and well-characterized hydrous ferric oxide (HFO) and hydrous tungsten oxide (HTO). Adsorptive concentration (10−4–10−8 mol dm−3), pH (ca 4.0–10.0) and temperatures (303–333 K) were examined for assessing optimal conditions for removal of these ions. The uptake of Hg(II) ions, fitted well with the Freundlich isotherm, increased with increasing temperature. No significant desorption took place in the present temperature range. The presence of other anions and cations affected the uptake of Hg(II) markedly. Irradiation of hydrous ferric oxide and tungsten oxide by using a 11.1×109 Bq (Ra–Be) neutron source having a neutron flux of 3.9×106 cm-2 s-1 with the associated *γ*-dose rate of 1.72 Gy h−1 did not influence the extent of adsorption of Hg(II) significantly.

? Khalfaoui, M., Baouab, M.H.V., Gauthier, R. and Lamine, A.B. (2005), Acid dye adsorption onto cationized polyamide fibres. Modeling and consequent interpretations of model parameter behaviours. *Journal of Colloid and Interface Science*, **296** (2), 419-427.

Full Text: [2006\J Col Int Sci296, 419.pdf](2006/J%20Col%20Int%20Sci296,%20419.pdf)

Abstract: Experimental adsorption isotherms of four acid dyes named Acid Blue 25, Acid Yellow 99, Reactive Yellow 23, and Acid Blue 74 from aqueous solution onto cationized nylon-6,6 have been analyzed using a double layer adsorption model. The parameters involved in the analytical expression of this model such as the number or fraction of adsorbed dye molecule per site, *n*, the number of receptor sites per gram of adsorbent, *N*M, and the concentration at half-saturation, *c*1/2, are determined from adsorption isotherms at four temperatures between 293 and 353 K. The evolution of these parameters with temperature is discussed in relation with adsorption process and the behaviours of the different dyes taking into account their particular structure. The results are compared with those already published dealing with the adsorption of these same dyes onto cationized cotton. The configurational entropy at various temperatures has been studied. This parameter allowed to deduce some results related to the evolution of the disorder during the adsorption process.

Keywprds: Adsorption, Statistical Physics, Modeling, Polyamide Fibres, Anionic Dyes

? Mellah, A., Chegrouche, S. and Barkat, M. (2006), The removal of uranium(VI) from aqueous solutions onto activated carbon: Kinetic and thermodynamic investigations. *Journal of Colloid and Interface Science*, **296** (2), 434-441.

Full Text: [2006\J Col Int Sci296, 434.pdf](2006/J%20Col%20Int%20Sci296,%20434.pdf)

Abstract: The adsorption of uranium(VI) from aqueous solutions onto activated carbon has been studied using a batch adsorber. The parameters that affect the uranium(VI) adsorption, such as contact time, solution pH, initial uranium(VI) concentration, and temperature, have been investigated and optimized conditions determined (contact time 240 min; pH 3.0±0.1; initial uranium concentration 100 mg/L; temperature 293.15 K). The experimental data were analyzed using sorption kinetic models (pseudo-first- and pseudo-second-order equations) to determine the equation that fits best our experimental results. Equilibrium isotherm studies were used to evaluate the maximum sorption capacity of activated carbon and experimental results showed this to be 28.30 mg/g. The Freundlich, Langmuir, and Dubinin–Radushkevich (D–R) models have been applied and the data correlate well with Freundlich model and that the sorption is physical in nature (the activation energy Ea=7.91 kJ/mol). Thermodynamic parameters (ΔH0ads = -50.53 kJ/mol, ΔS0ads = -98.76 J/mol K, ΔG0ads(293.15K) = -21.61 kJ/mol) showed the exothermic heat of adsorption and the feasibility of the process.

Keywords: Uranium, Activated Carbon, Sorption, Removal, Isotherms

? Moorkanikkara, S.N. and Blankschtein, D. (2006), Short-time behavior of mixed diffusion-barrier controlled adsorption. *Journal of Colloid and Interface Science*, **296** (2), 442-457.

Full Text: [2006\J Col Int Sci296, 442.pdf](2006/J%20Col%20Int%20Sci296,%20442.pdf)

Abstract: This paper focuses on the short-time adsorption kinetics of nonionic surfactants onto water/air surfaces, analyzed in the context of the mixed diffusion-barrier controlled adsorption modeling framework. Specifically, we reconcile the apparent contradiction between theoretical prediction and experimental observations on the adsorption kinetics mechanism at short times: while the mixed diffusion-barrier controlled model predicts a barrier-controlled adsorption, as well as the impossibility of a diffusion-controlled adsorption at asymptotic short times, the short-time experimental dynamic surface tension (DST) behavior of many nonionic surfactants has been interpreted to result from diffusion-controlled adsorption at asymptotic short times. This is because the short-time experimental DST of these surfactants displays a t0.5 variation, which is considered as a fingerprint for the existence of diffusion-controlled adsorption, based on the short-time asymptotic behavior of the diffusion-controlled adsorption model. As a result of this interpretation, the fundamental physical nature of the energy barrier has been proposed to be associated with high surfactant surface concentrations. In this paper, we derive a new nonasymptotic short-time formalism of the mixed diffusion-barrier controlled model to describe surfactant adsorption onto a spherical pendant-bubble surface, including determining the ranges of time and surfactant surface concentration values where the short-time formalism is applicable. Based on this formalism, we find that one can expect to observe an apparent t0.5 variation of the DST at short times even for the mixed diffusion-barrier controlled adsorption model. We analyze the consequence of this finding by re-evaluating the existing notions of the energy barrier. We conclude that the energy barrier is associated with the adsorption of a single surfactant molecule onto a clean surface.

Keywords: Nonionic Surfactants, Adsorption Kinetics, Dynamic Surface Tension, Energy Barrier

? Pełech, R., Milchert, E. and Bartkowiak, M. (2006), Fixed-bed adsorption of chlorinated hydrocarbons from multicomponent aqueous solution onto activated carbon: Equilibrium column model. *Journal of Colloid and Interface Science*, **296** (2), 458-464.

Full Text: [2006\J Col Int Sci296, 458.pdf](2006/J%20Col%20Int%20Sci296,%20458.pdf)

Abstract: The results of studies on the adsorption dynamics of light chlorinated hydrocarbons, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, chloroform, carbon tetrachloride, 1,1-dichloroethene, perchloroethylene and 1,1,2-trichloroethene, from a seven-component solution on to activated carbon are presented. The experimental results were described using the equilibrium model. The application of this model allows to determine the location of the midpoint of the breakthrough profile.

Keywords: Activated carbon, Adsorption, Chlorinated hydrocarbons, Fixed bed, Wastewater

? Tekin, N., Kadıncı, E., Demirbaş, Ö., Alkan, M. and Kara, A. (2006), Adsorption of polyvinylimidazole onto kaolinite. *Journal of Colloid and Interface Science*, **296** (2), 472-479.

Full Text: [2006\J Col Int Sci296, 472.pdf](2006/J%20Col%20Int%20Sci296,%20472.pdf)

Abstract: The adsorption of polyvinylimidazole (PVI) onto kaolinite from aqueous solutions has been investigated systematically as a function of parameters such as calcination temperature of kaolinite, pH, ionic strength, and temperature. According to the experimental results, the adsorption of PVI increases with pH from 8.50 to 11.50, temperature from 25 to 55 °C, and ionic strength from 0 to 0.1 mol L−1. The kaolinite sample calcined at 600 °C has a maximum adsorption capacity. Adsorption isotherms of PVI onto kaolinite have been determined and correlated with common isotherm equations such as Langmuir and Freundlich isotherm models. The Langmuir isotherm model appeared to fit the isotherm data better than the Freundlich isotherm model. The physical properties of this adsorbent are consistent with the parameters obtained from the isotherm equations. Furthermore, the zeta potentials of kaolinite suspensions have been measured in aqueous solutions of different PVI concentrations and pH. From the experimental results, (i) pH strongly alters the zeta potential of kaolinite; (ii) kaolinite has an isoelectric point at about pH 2.35 in water and about pH 8.75 in 249.9 ppm PVI concentration; (iii) PVI changes the interface charge from negative to positive for kaolinite. The study of temperature effect has been quantified by calculating various thermodynamic parameters such as Gibbs free energy, enthalpy, and entropy changes. The dimensionless separation factor (RL) has shown that kaolinite can be used for adsorption of PVI from aqueous solutions.

Keywords: Adsorption, Polyelectrolyte, Polyvinylimidazole, Kaolinite, Adsorption Isotherms, Zeta Potential

? Órfão, J.J.M., Silva, A.I.M., Pereira, J.C.V., Barata, S.A., Fonseca, I.M., Faria, P.C.C. and Pereira, M.F.R. (2006), Adsorption of a reactive dye on chemically modified activated carbons—influence of pH. *Journal of Colloid and Interface Science*, **296** (2), 480-489.

Full Text: [2006\J Col Int Sci296, 480.pdf](2006/J%20Col%20Int%20Sci296,%20480.pdf)

Abstract: The surface chemistry of a commercial activated carbon with a slightly basic nature was modified by appropriate treatments in order to obtain two additional samples, respectively with acidic and basic properties, without changing its textural parameters significantly. Different techniques (N2 adsorption at 77 K, temperature programmed desorption, and determination of acidity, basicity, and pH at the point of zero charge) were used to characterize the adsorbents. Kinetic and equilibrium adsorption data of a selected textile reactive dye (Rifafix Red 3BN, C.I. reactive red 241) on the mentioned materials were obtained at the pH values of 2, 7, and 12. The kinetic curves are fitted using the second-order model. The respective rate constants seem to diminish progressively with the initial concentration for the more diluted solutions tested, reaching a constant value at higher concentrations, which depends on the experimental system under consideration (adsorbent and pH). In general, the Langmuir model provides the best fit for the equilibrium data. The different uptakes obtained are discussed in relation to the surface chemical properties of the adsorbents. It is shown that the adsorption of the reactive (anionic) dye on the basic sample (prepared by thermal treatment under H2 flow at 700 °C) is favored. This conclusion is explained on the basis of the dispersive and electrostatic interactions involved. Moreover, it is also shown that the optimal adsorption condition for all the activated carbons tested corresponds to solution pH values not higher than the pHpzc of the adsorbents, which may be interpreted by taking into account the electrostatic forces present.

? Cestari, A.R., Vieira, E.F.S. and Silva, E.S. (2006), Interactions of anionic dyes with silica–aminopropyl: 1. A quantitative multivariate analysis of equilibrium adsorption and adsorption Gibbs free energies. *Journal of Colloid and Interface Science*, **297** (1), 22-30.

Full Text: [2006\J Col Int Sci297, 22.pdf](2006/J%20Col%20Int%20Sci297,%2022.pdf)

Abstract: In this work silica–aminopropyl (Sil–NH2) was synthesized and employed to evaluate the quantitative roles of temperature, pH, dye concentration, and Hg(II) or anionic surfactant SDB interferents in the adsorptions of blue and red remazol dyes in aqueous medium using four distinct 24 factorial designs. The results were analyzed statistically using multiple regressions, Student’s t-test, analysis of variance, and F-test. Polynomial modelings were used to define the most important factors affecting dye adsorption. The results indicate that the principal effects of dye concentration and pH, as well as most of the interactions of all factors, are statistically very important in relation to the equilibrium adsorption quantities. However, the adsorption Gibbs free energies are influenced, in general, only by pH, dye concentration, and some binary interactions. Temperature changes do not affect the ΔG values significantly.

Keywords: Aminopropyl–Silica, Adsorption, Anionic Dyes, Factorial Designs, Chemometrics

? Marouf, R., Khelifa, N., Marouf-Khelifa, K., Schott, J. and Khelifa, A. (2006), Removal of pentachlorophenol from aqueous solutions by dolomitic sorbents. *Journal of Colloid and Interface Science*, **297** (1), 45-53.

Full Text: [2006\J Col Int Sci297, 45.pdf](2006/J%20Col%20Int%20Sci297,%2045.pdf)

Abstract: The partial decomposition of dolomite carried out within the temperature range 600–1000 °C provides new sorbents, called dolomitic sorbents. Their surface properties and identification by X-ray diffraction are discussed. The lowest specific surface area value was found for the raw dolomite, while the highest value was achieved by the D-1000 sample. The adsorption equilibrium of pentachlorophenol from aqueous solutions on the examined sorbents was investigated at 30, 40, and 50 °C via a bath process. Langmuir, Freundlich, Langmuir–Freundlich, and Redlich–Petersen models were fitted to experimental equilibrium data, and their goodnesses of fit are compared. The adjustable parameters of Langmuir–Freundlich and Redlich–Petersen isotherms were estimated by nonlinear least-squares analysis. Langmuir and Freundlich models were found insufficient to explain the adsorption equilibrium, while Langmuir–Freundlich and Redlich–Petersen isotherms provide the best correlation of the pentachlorophenol adsorption onto dolomitic sorbents.

Keywords: Pentachlorophenol Removal, Dolomite, Thermal Treatment, Adsorption Isotherms

? Jiang, R., Ma, Y.H. and Zhao, J.X. (2006), Adsorption dynamics of binary mixture of Gemini surfactant and opposite-charged conventional surfactant in aqueous solution. *Journal of Colloid and Interface Science*, **297** (2), 412-418.

Full Text: [2006\J Col Int Sci297, 412.pdf](2006/J%20Col%20Int%20Sci297,%20412.pdf)

Abstract: The maximum bubble pressure technique has been used to study the adsorption kinetics of binary mixtures of an anionic Gemini surfactant C9pPHCNa with a cationic conventional surfactant C10TABr in aqueous solutions. The dynamic surface tension data were analyzed using the revised Ward and Tordai equations as well as the micelle dissociation kinetic model suggested by Joos et al. The apparent diffusion coefficient Da below the cmc, the adsorption barrier εa and the micelle dissociation constant kmic were obtained. The Das at short times and at long times were respectively 0.2–16×1010 and 0.08-0.9×1010 m2s−1, the latter corresponded to the adsorption barrier εa of 10–20 kJ mol−1. The minimum εa appeared at the mole fraction of C9pPHCNa (α1, on a surfactant-only basis) in the bulk solution being 0.33. The kmics of the mixed micelles were about 16–2300 s−1. The most stable mixed micelles were formed at α1 = 0.2 rather than at α1 = 0.33 owing to great discrepancy of hydrophobicity between the two components. These results indicated that the composition of mixed solution was an important factor affecting the adsorption kinetics and the micelle stability.

Keywords: Adsorption Dynamics, Gemini Surfactant, Cationic–Anionic Surfactants Mixtures, Adsorption Barrier, Micellar Dissociation

? Mallick, S., Dash, S.S. and Parida, K.M. (2006), Adsorption of hexavalent chromium on manganese nodule leached residue obtained from NH3–SO2 leaching. *Journal of Colloid and Interface Science*, **297** (2), 419-425.

Full Text: [2006\J Col Int Sci297, 419.pdf](2006/J%20Col%20Int%20Sci297,%20419.pdf)

Abstract: Adsorption of hexavalent chromium onto manganese nodule leached residues was investigated as a possible alternative to the conventional methods of its removal from aqueous synthetic solutions. Adsorption behavior was studied as a function of time, pH, temperature, and concentration of adsorbate and adsorbent in acetic acid–sodium acetate buffer medium. Cr (VI) removal was pH dependent and was found to be of a maximum at pH 3. The applicability of the Langmuir isotherm to the present system was tested. Increased adsorption capacity with increased temperature indicates that the adsorption reaction was endothermic in nature. Based on these studies, thermodynamic parameters such as Gibbs free energy change (ΔG°), standard enthalpy change (ΔH°), and standard entropy change (ΔS°) were calculated.

Keywords: Manganese Nodule Leached Residues, Hexavalent Chromium, Adsorption, Thermodynamic Parameters

? Chitrakar, R., Tezuka, S., Sonoda, A., Sakane, K., Ooi, K. and Hirotsu, T. (2006), Selective adsorption of phosphate from seawater and wastewater by amorphous zirconium hydroxide. *Journal of Colloid and Interface Science*, **297** (2), 426-433.

Full Text: [2006\J Col Int Sci297, 426.pdf](2006/J%20Col%20Int%20Sci297,%20426.pdf)

Abstract: Phosphate adsorption from single electrolyte (NaH2PO4), phosphate-enriched seawater, and model wastewater was studied using amorphous zirconium hydroxide, ZrO(OH)2(Na2O)0.051.5H2O, as an adsorbent. Batch experiments were carried out to investigate the adsorption of phosphate. The effect of pH on phosphate adsorption from seawater showed that the uptake of phosphate increased with an increase in pH up to 6, and then decreased sharply with a further increase in pH of the solution. The equilibrium data of phosphate adsorption were followed with a Freundlich isotherm. The uptake of phosphate at the adsorbent/solution ratio 0.05 g/2 L was 10 and 17 mg-P/g for the phosphate-enriched seawater and the model wastewater, respectively. A much higher adsorptivity toward phosphate ions in seawater was observed on ZrO(OH)2 (Na2O)0.051.5H2O than on other representative adsorbents based on layered double hydroxides of Mg(II)–Al(III), Mg(II)–Fe(III), and Ni(II)–Fe(III). The effective desorption of phosphate ions on ZrO(OH)2(Na2O)0.051.5H2O could be achieved using a 0.1 M NaOH solution. The usefulness of experimental data for practical applications in removing phosphate in seawater and wastewater is discussed.

Keywords: Zirconium Hydroxide, Adsorption, Selectivity, Phosphate, Seawater

? Chingombe, P., Saha, B. and Wakeman, R.J. (2006), Effect of surface modification of an engineered activated carbon on the sorption of 2,4-dichlorophenoxyacetic acid and benazolin from water. *Journal of Colloid and Interface Science*, **297** (2), 434-442.

Full Text: [2006\J Col Int Sci297, 434.pdf](2006/J%20Col%20Int%20Sci297,%20434.pdf)

Abstract: The performance of a conventional (F400) and a surface modified activated carbon (F400AN) has been investigated for the sorption of benazolin and 2,4-dichlorophenoxy acetic acid (2,4-D) from water. It was observed that the modified carbon, F400AN, which was obtained by annealing the conventional sample had a higher BET surface area (960 m2 g−1 compared to 790 m2 g−1) and it had a higher proportion of micropores. This was attributed to the loss of oxygen containing functional groups during the thermal treatment. Zeta potential and pH titration measurements also showed that acidic functionality had been lost on the F400AN sample. The adsorption data were analysed and were fitted well using the Langmuir isotherm. The modified carbon marginally out-performed the conventional activated carbon for sorption of these two herbicides. Thermodynamic parameters (ΔG0, ΔH0, and ΔS0) were determined and their values indicated that the sorption process was spontaneous and endothermic for both herbicides. A pseudo-second-order kinetic model was employed for analysing the kinetic data. It was concluded that the herbicide sorption process was controlled by a film diffusion mechanism.

? Nano, G.V. and Strathmann, T.J. (2006), Ferrous iron sorption by hydrous metal oxides. *Journal of Colloid and Interface Science*, **297** (2), 443-454.

Full Text: [2006\J Col Int Sci297, 443.pdf](2006/J%20Col%20Int%20Sci297,%20443.pdf)

Abstract: Ferrous iron is critical to a number of biogeochemical processes that occur in heterogeneous aquatic environments, including the abiotic reductive transformation of subsurface contaminants. The sorption of Fe(II) to ubiquitous soil minerals, particularly iron-free mineral phases, is not well understood. Colloidal TiO2, γ-AlOOH, and γ-Al2O3 were used as model hydrous oxides to investigate Fe(II) sorption to iron-free mineral surfaces. Rapid Fe(II) sorption during the first few hours is followed by a much slower uptake process that continues for extended periods (at least 30 days). For equivalent solution conditions, the extent of Fe(II) sorption decreases in the order TiO2 >γ-Al2O3 >> γ-AlOOH. Short-term equilibrium sorption data measured over a wide range of conditions (pH, ionic strength, Fe(II)-to-sorbent ratio) are well described by the diffuse double layer model. Fe(II) sorption to TiO2 is best described by a single-site model that considers formation of two surface complexes, ≡SOFe+ and ≡SOFeOH0. For γ-AlOOH and γ-Al2O3, sorption data are best described by a two-site model that considers formation of ≡SOFe+ complexes at weak- and strong-binding surface sites. Accurate description of sorption data for higher Fe(II) concentrations at alkaline pH conditions requires the inclusion of a Fe(II) surface precipitation reaction in the model formulation. The presence of common groundwater constituents (calcium, sulfate, bicarbonate, or fulvic acid) had no significant effect on Fe(II) sorption. These results demonstrate that iron-free soil minerals can exert a significant influence on Fe(II) sorption and speciation in heterogeneous aquatic systems.

Keywords: Ferrous Iron, Sorption, Surface Complexation, Metal Oxide, Titanium Dioxide, Aluminum Oxide, Anoxic Environments

? Mohan, D., Pittman, Jr., C.U. and Steele, P.H. (2006), Single, binary and multi-component adsorption of copper and cadmium from aqueous solutions on Kraft lignin: A biosorbent. *Journal of Colloid and Interface Science*, **297** (2), 489-504.

Full Text: [2006\J Col Int Sci297, 489.pdf](2006/J%20Col%20Int%20Sci297,%20489.pdf)

Abstract: A new biosorbent for removing toxic metal ions from water/industrial wastewater has been investigated using by-product lignin from paper production. Lignin was extracted from black liquor waste, characterized and utilized for the removal of copper and cadmium from aqueous solutions in single, binary and multi-component systems. Adsorption studies were conducted at different temperatures, lignin particle sizes, pHs and solid to liquid ratios. All the studies were conducted by a batch method to determine equilibrium and kinetic parameters. The Langmuir and Freundlich isotherm models were applied. The Langmuir model fits best the equilibrium isotherm data. The maximum lignin adsorption capacities at 25 °C were 87.05 mg/g (1.37 mmol/g) and 137.14 mg/g (1.22 mmol/g) for Cu(II) and Cd(II), respectively. Adsorption of Cu2+ (68.63 mg/g at 10 °C and 94.68 mg/g at 40 °C) and Cd2+ (59.58 mg/g at 10 °C and 175.36 mg/g at 40 °C) increased with an increase in temperature. Copper and cadmium adsorption followed pseudo-second order rate kinetics. From kinetic studies, various rate and thermodynamic parameters such as effective diffusion coefficients, activation energy, and activation entropy were evaluated. Adsorption occurs through a particle diffusion mechanism at temperatures 10 and 25 °C while at 40 °C it occurs through a film diffusion mechanism. The sorption capacity of black liquor lignin is higher than many other adsorbents/carbons/biosorbents utilized for the removal of Cu(II) and Cd(II) from water/wastewater in single and multi-component systems.

Keywords: Lignin, Black Liquor, Multi-Component Adsorption, Copper, Cadmium, Metal Ions Removal

? Moriguchi, T., Tahara, M. and Yaguchi, K. (2006), Adsorbability and photocatalytic degradability of humic substances in water on Ti-modified silica. *Journal of Colloid and Interface Science*, **297** (2), 678-686.

Full Text: [2006\J Col Int Sci297, 678.pdf](2006/J%20Col%20Int%20Sci297,%20678.pdf)

Abstract: From the viewpoint of development of a removal agent for humic substances, we prepared Ti-modified silica gel, SiO2–Ti, from titanium alkoxide and microsized silica gel. The prepared silica agent was investigated in adsorption and photocatalytic degradation of humic substances in water. In these experiments, four humic substances, commercially available Wako humic acid (Wako-HA), Nordic aquatic humic acid (Nordic-HA), Nordic aquatic fulvic acid (Nordic-FA), and Suwannee river fulvic acid (Suwannee-FA), were used, and Freundlich constants (KF and 1/n) and photodegradation rates were evaluated. Wako-HA, which has the highest aromaticity ratio [Ar–OH]/[COOH] and molecular weight, had the highest adsorbability (KF = 17.5 (mg/g)(L/mg)1/n, 1/n = 0.67) but the lowest photodegradability (<80%). On the other hand, Suwannee-FA, which has the lowest aromaticity, [Ar–OH]/[COOH] ratio, and molecular weight, afforded lesser adsorbability (KF = 7.1 (mg/g)(L/mg)1/n, 1/n = 0.39) but the highest photodegradability (>99%). Nordic-HA and Nordic-FA afforded adsorbabilities similar to that for Suwannee-FA, and medium photodegradabilities between those for Wako-HA and Suwannee-FA. Adsorption and photodegradation capacities of SiO2–Ti were improved with increased Ti content and phosphorescence emission amount, respectively. From XRD analysis, we found that the structure of anatase-type TiO2 features the Ti modifiers of SiO2–Ti. Therefore, humic substance molecules effectively interact with the Ti modifiers and are decomposed by OH radicals generated in situ. We hope that SiO2–Ti will be used as a photodegradation catalyst in water purification plants.

Keywords: Titanium, Silica Gel, Humic Substances, Freundlich Constants, Adsorption, Photocatalytic Degradation

? Tsai, W.T., Lai, C.W. and Hsien, K.J. (2006), Characterization and adsorption properties of diatomaceous earth modified by hydrofluoric acid etching. *Journal of Colloid and Interface Science*, **297** (2), 749-754.

Full Text: [2006\J Col Int Sci297, 749.pdf](2006/J%20Col%20Int%20Sci297,%20749.pdf)

Abstract: This work was a study of the chemical modification of diatomaceous earth (DE) using hydrofluoric acid (HF) solution. Under the experimental conditions investigated, it was found that HF under controlled conditions significantly etched inward into the interior of the existing pore structure in the clay mineral due to its high content of silica, leaving a framework possessing a larger BET surface area (ca. 10 m2 g−1) in comparison with that (ca. 4 m2 g−1) of its precursor (i.e., DE). Further, the results indicated that the HF concentration is a more determining factor in creating more open pores than other process parameters (temperature, holding time, and solid/liquid ratio). This observation was also in close agreement with the examinations by the silicon analysis, scanning electron microscopy, X-ray diffraction, and Fourier transform infrared spectroscopy. The adsorption kinetics and the adsorption isotherm of Methylene blue onto the resulting clay adsorbent can be well described by a pseudo-second-order reaction model and the Freundlich model, respectively.

Keywords: Diatomaceous Earth, Chemical Modification, Hydrofluoric Acid, Characterization, Adsorption

? López Valdivieso, A., Reyes Bahena, J.L., Song, S. and Herrera Urbina, R. (2006), Temperature effect on the zeta potential and fluoride adsorption at theα-Al2O3/aqueous solution interface. *Journal of Colloid and Interface Science*, **298** (1), 1-5.

Full Text: [2006\J Col Int Sci298, 1.pdf](2006/J%20Col%20Int%20Sci298,%201.pdf)

Abstract: The effect of temperature and pH on the zeta potential of α-Al2O3 and adsorption of fluoride ions at the α-Al2O3/aqueous solution interface has been investigated through electrophoretic mobility measurements and adsorption studies, to delineate mechanisms involved in the removal of fluoride ions from water using alumina as adsorbent. When the temperature increases from 10 to 40 °C, the pH of the point of zero charge (pHpzc) shifts to smaller values, indicating proton desorption from the alumina surface. The pHpzc increases linearly with [1/T](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4HWX8YG-C&_mathId=mml1&_user=1495547&_cdi=6857&_rdoc=3&_handle=V-WA-A-W-ZA-MsSAYVA-UUW-U-AAVEVYCECE-AAVDUZZDCE-YCUWCYEVA-ZA-U&_acct=C000053193&_version=1&_userid=1495547&md5=bcb082e196be5c108670eadcd14b6153), which allowed estimation of the standard enthalpy change for the surface-deprotonation process. Fluoride ion adsorption follows a Langmuir-type adsorption isotherm and is affected by the electric charge at theα-Al2O3/aqueous solution interface and the surface density of hydroxyl groups. Such adsorption occurs through an exchange between fluoride ions and surface-hydroxyl groups and it depends on temperature, pH, and initial fluoride ion concentration. At 25 and 40 °C, maximum fluoride adsorption density takes place between pH 5 and 6. Increasing the temperature from 25 to 40 °C lowers the adsorption density of fluoride.

Keywords: Fluoride Removal, Alumina, Electrokinetics, Adsorption, Water Treatment, Fluorosis

? Mohapatra, M., Sahoo, S.K., Anand, S. and Das, R.P. (2006), Removal of As(V) by Cu(II)-, Ni(II)-, or Co(II)-doped goethite samples. *Journal of Colloid and Interface Science*, **298** (1), 6-12.

Full Text: [2006\J Col Int Sci298, 6.pdf](2006/J%20Col%20Int%20Sci298,%206.pdf)

Abstract: The present study reports removal of As(V) by adsorption onto laboratory-prepared pure and Cu(II)-, Ni(II)-, and Co(II)-doped goethite samples. The X-ray diffraction patterns showed only goethite as the crystalline phase. Doping of ions in the goethite matrix resulted in shift of d-values. Various parameters chosen for adsorption were nature of adsorbent, percentage of doped cations in goethite matrix, contact time, solution pH, and percentage of adsorbate. It was observed that the pHpzc of the goethite surface depended on the nature and concentration of metal ions. The surface area as well as the loading capacity increased with the increase of dopant percentage in goethite matrix. A maximum loading capacity of 19.55 mg/g was observed for 2.7% Cu(II)-doped goethite. The adsorption kinetics for Ni(II), Co(II) and for undoped goethite attained a quasi-equilibrium state after 30 min with almost negligible adsorption beyond this time. In case of Cu(II)-doped goethite samples, the quasi-equilibrium state for As(V) adsorption was observed after 60 min. At each studied pH condition, it was observed that the percentage of adsorption of As(V) decreased in the order Cu(II)-doped goethite ≥ Ni(II)-doped goethite > Co(II)-doped goethite > pure goethite. The adsorption followed: Langmuir isotherm, indicating monolayer formation.

Keywords: Adsorption, As(V) Removal, Goethite, Doping, Heavy Metal, Langmuir Isotherm, pH

? Lee, S., Dyer, J.A., Sparks, D.L., Scrivner, N.C. and Elzinga, E.J. (2006), A multi-scale assessment of Pb(II) sorption on dolomite. *Journal of Colloid and Interface Science*, **298** (1), 20-30.

Full Text: [2006\J Col Int Sci298, 20.pdf](2006/J%20Col%20Int%20Sci298,%2020.pdf)

Abstract: Macroscopic sorption studies indicated that Pb sorption capacity was independent of pH over the pH range 5–7, while sorption as a function of reaction time up to two weeks for systems with no bulk precipitate phases showed continuous Pb uptake on dolomite. This could be due to diffusion of Pb into the micropores of dolomite as well as an increase in surface sites caused by particle size reduction during suspension mixing. Normalized XANES spectra for systems undersaturated with respect to Pb carbonate precipitates resembled the spectrum of Pb4(OH)44+, suggesting that Pb is mainly coordinated to dolomite as an inner-sphere surface complex. On the other hand, the XANES spectrum for 10−3 M Pb at 1 atm CO2(g) in a 2 M Mg(NO3)2 background electrolyte solution resembled that of cerussite, while a sample at 5×10−4 M Pb in equilibrium with air and 2 M Mg(NO3)2 resembled that of hydrocerussite. EXAFS analyses of sorption samples in chloride solutions showed that there were only first-shell contributions under 1 atm CO2(g), while higher shell contributions from Ca/Mg were seen at 10−3.42 atm CO2(g). On the other hand, EXAFS samples prepared in nitrate solutions showed noticeable differences in speciation under different reaction conditions—from outer-sphere surface complexes at low Pb concentrations and pH, to inner-sphere surface complexes at moderate Pb concentrations and neutral pH, to the formation of Pb carbonate precipitates at the highest Pb loadings.

Keywords: Pb, Sorption, Dolomite, Underground Injection, EXAFS, XANES, XPS

? Zhou, S.Q. (2006), Polymer density functional theory approach based on scaling second-order direct correlation function. *Journal of Colloid and Interface Science*, **298** (1), 31-38.

Full Text: [2006\J Col Int Sci298, 31.pdf](2006/J%20Col%20Int%20Sci298,%2031.pdf)

Abstract: A second-order direct correlation function (DCF) from solving the polymer-RISM integral equation is scaled up or down by an equation of state for bulk polymer, the resultant scaling second-order DCF is in better agreement with corresponding simulation results than the un-scaling second-order DCF. When the scaling second-order DCF is imported into a recently proposed LTDFA-based polymer DFT approach, an originally associated adjustable but mathematically meaningless parameter now becomes mathematically meaningful, i.e., the numerical value lies now between 0 and 1. When the adjustable parameter-free version of the LTDFA is used instead of the LTDFA, i.e., the adjustable parameter is fixed at 0.5, the resultant parameter-free version of the scaling LTDFA-based polymer DFT is also in good agreement with the corresponding simulation data for density profiles. The parameter-free version of the scaling LTDFA-based polymer DFT is employed to investigate the density profiles of a freely jointed tangent hard sphere chain near a variable sized central hard sphere, again the predictions reproduce accurately the simulational results. Importance of the present adjustable parameter-free version lies in its combination with a recently proposed universal theoretical way, in the resultant formalism, the contact theorem is still met by the adjustable parameter associated with the theoretical way.

? Rawajfih, Z. and Nsour, N. (2006), Characteristics of phenol and chlorinated phenols sorption onto surfactant-modified bentonite. *Journal of Colloid and Interface Science*, **298** (1), 39-49.

Full Text: [2006\J Col Int Sci298, 39.pdf](2006/J%20Col%20Int%20Sci298,%2039.pdf)

Abstract: Surfactant-modified bentonite was synthesized by replacing adsorbed Na+ with long-chain alkyl quaternary ammonium cation, hexadecyltrimethylammonium bromide (HDTMAB). The sorption isotherms of phenol, p-chlorophenol, and 2,4-dichlorophenol were modeled according to the Langmuir and Freundlich equations. The Langmuir isotherm was found to describe the equilibrium adsorption data well. The mechanisms and characteristics of sorption of these ionizable organic contaminants onto surfactant-modified bentonite from water were investigated systematically and described quantitatively. The sorption properties are affected by the treatment conditions, such as amount of organobentonite, and the properties of organic compounds. Results indicated that adsorption of phenols from water was in proportion to their hydrophobicities, which increased with chlorine addition (phenol<p-chlorophenol < 2,4-dichlorophenol). Sorption isotherms of these phenols were typically nonlinear. Both adsorption and partition contribute to the sorption of investigated phenols to organobentonite. The separate contributions of adsorption and partition to the total sorption of these compounds to organobentonite is analyzed mathematically. Results indicate that the partition effect is weak and linear with contaminant concentration, whereas the adsorption effect is more powerful and nonlinear with contaminant concentration. The sorption of phenols onto organobentonite was dominated by adsorption at low concentrations and partition started to dominate at high concentrations, making the organobentonites powerful sorbents for organic contaminants over a wide range of concentrations.

Keywords: Adsorption, Chlorinated Phenols, Phenol, Partitioning, Sorption, Surfactant-Modified Clay

? Terzyk, A.P., Gauden, P.A. and Rychlicki, G. (2006), Corrected thermodynamic description of adsorption via formalism of the theory of volume filling of micropores. *Journal of Colloid and Interface Science*, **298** (1), 66-73.

Full Text: [2006\J Col Int Sci298, 66.pdf](2006/J%20Col%20Int%20Sci298,%2066.pdf)

Abstract: Based on the series of benzene adsorption and related enthalpy of adsorption data measured on porous carbons that possess various porous structures, we show that the creation of a solidlike structure in pores depends on the average pore diameter of an adsorbent. Taking into account the solidlike adsorbed phase in the thermodynamic description of the adsorption process via the formalism of the theory of volume filling of micropores (TVFM) leads to very good agreement between the data measured experimentally and those calculated from TVFM. Finally we show that the boundary between solidlike and liquidlike structures of benzene molecules in carbon pores is located around the average pore diameter, close to ca. 2.1–2.4 nm.

Keywords: Adsorption, Activated Carbon, Porosity, Theory of Volume Filling of Micropores, Thermodynamics

? Vieira, E.F.S., Cestari, A.R., de Santos, E.B. and Rezende, C.X. (2006), Measurement of cation binding to immobilized vanillin by isothermal calorimetry. *Journal of Colloid and Interface Science*, **298** (1), 74-78.

Full Text: [2006\J Col Int Sci298, 74.pdf](2006/J%20Col%20Int%20Sci298,%2074.pdf)

Abstract: Isothermal calorimetry was used to determine enthalpy changes for interaction of divalent cobalt, nickel, copper, and zinc chlorides with silica gel functionalized with vanillin, Sil−Van. The thermal effect, Qint, and the corresponding amount of cation that interacts, nint, were obtained in the same experiment. Langmuir expressions for adsorption isotherms were applied to determine the maximum adsorption capacity to form a monolayer, Nmon, and the energy of interaction for a saturated monolayer per gram of Sil−Van, Qmon. From knowledge of Nmon and Qmon, the molar enthalpy of interaction for formation of a monolayer of anchored cations per gram of Sil−Van, ΔmonHm, was determined. Interactions between the Lewis-acidic cations and the donor atom attached to silica are reflected by ΔmonHm values in the order Ni2+ > Cu2+ > Zn2+ ≅ Co2+.

Keywords: Isothermal Calorimetry, Adsorption Of Cations, Vanillin, Silica Gel

? Gupta, V.K., Mohan, D. and Saini, V.K. (2006), Studies on the interaction of some azo dyes (naphthol red-J and direct orange) with nontronite mineral. *Journal of Colloid and Interface Science*, **298** (1), 79-86.

Full Text: [2006\J Col Int Sci298, 79.pdf](2006/J%20Col%20Int%20Sci298,%2079.pdf)

Abstract: The adsorption of two azo dyes, namely naphthol red-J and direct orange, on nontronite mineral was studied as a function of pH and temperature. All the sorption studies were conducted in batch mode. The Langmuir and Freundlich isotherm models were applied. The isotherms are Langmuirian in nature, while the Freundlich equation is only valid over the low concentration range. The adsorption of the two dyes increases with increased temperature and decreases with increased pH. The data have been explained in terms of the area of contact of the dye molecule on the clay platelet vis-à-vis the area per anion exchange site. Estimated area per anion exchange site of the mineral and area associated per anionic dye molecule at nontronite surface was 642 and 454 Å2 for naphthol red-J and 642 and 440 Å2 for direct orange respectively. This has been further supported by X-ray measurements. Thermodynamic parameters of the process were evaluated.

Keywords: Adsorption, Azo Dyes, Clays, Nontronite Mineral

? Rusu, M., Kuckling, D., Möhwald, H. and Schönhoff, M. (2006), Adsorption of novel thermosensitive graft-copolymers: Core–shell particles prepared by polyelectrolyte multilayer self-assembly. *Journal of Colloid and Interface Science*, **298** (1), 124-131.

Full Text: [2006\J Col Int Sci298, 124.pdf](2006/J%20Col%20Int%20Sci298,%20124.pdf)

Abstract: The adsorption properties of thermosensitive graft-copolymers are investigated with the aim of developing self-assembled multilayers from these copolymers. The copolymers consist of a thermoreversible main chain of poly(N-isopropylacrylamid) and a weak polyelectrolyte, poly(2-vinylpyridine), as grafted side chains. ζ-Potential, single particle light scattering and adsorption isotherms monitor the adsorption of the thermoreversible copolymers to precoated colloidal particles. The results show a smaller surface coverage for a larger density of grafted chains. The surface coverage is discussed in terms of surface charge density in the adsorbed monolayer. Taking into account the monolayer adsorption properties, conditions are developed for the multilayer formation from these copolymers. A low pH provides a sufficient charge density of the grafted chains to achieve a surface charge reversal of the colloids upon adsorption. The charge reversal after each adsorbed layer is monitored by ζ-potential and the increase of the thickness is determined by light scattering. Stable and reproducible multilayers are obtained. The results imply that the conformation of the thermosensitive component in multilayers depends strongly on the grafting density, where the polymer with a higher grafting density adsorbs in a flat conformation while that with a lower grafting density adsorbs with more loops.

Keywords: Polyelectrolyte, Layer-by-Layer, Self-Assembly, Multilayer, Thermosensitive, Thermoreversible, Colloid, Ζ-Potential, Adsorption Isotherm, Poly(N-Isopropylacrylamid)

? Pellenc, D., Berry, H. and Gallet, O. (2006), Adsorption-induced fibronectin aggregation and fibrillogenesis. *Journal of Colloid and Interface Science*, **298** (1), 132-144.

Full Text: [2006\J Col Int Sci298, 132.pdf](2006/J%20Col%20Int%20Sci298,%20132.pdf)

Abstract: Fibronectin (Fn), a high molecular weight glycoprotein, is a central element of extracellular matrix architecture that is involved in several fundamental cell processes. In the context of bone biology, little is known about the influence of the mineral surface on fibronectin supramolecular assembly. We investigate fibronectin morphological properties induced by its adsorption onto a model mineral matrix of hydroxyapatite (HA). Fibronectin adsorption onto HA spontaneously induces its aggregation and fibrillation. In some cases, fibronectin fibrils are even found connected into a dense network that is close to the matrix synthesized by cultured cells. Fibronectin adsorption-induced self-assembly is a time-dependant process that is sensitive to bulk concentration. The N-terminal domain of the protein, known to be implicated in its self-association, does not significantly inhibit the protein self-assembly while increasing ionic strength in the bulk alters both aggregation and fibrillation. The addition of a non-ionic surfactant during adsorption tends to promote aggregation with respect to fibrillation. Ultimately, fibronectin fibrils appear to be partially structured like amyloid fibrils as shown by thioflavine T staining. Taken together, our results suggest that there might be more than one single organization route involved in fibronectin self-assembly onto hydroxyapatite. The underlying mechanisms are discussed with respect to Fn conformation, Fn/surface and Fn/Fn interactions, and a model of fibronectin fibrillogenesis onto hydroxyapatite is proposed.

Keywords: Fibronectin, Aggregation, Fibrillogenesis, Protein Adsorption, Hydroxyapatite, Biomaterials

? Hossain, Md.M., Iimura, K.I. and Kato, T. (2006), Effect of temperature on the surface phase behavior of n-hexadecyl dihydrogen phosphate in adsorption layers at the air–water interface. *Journal of Colloid and Interface Science*, **298** (1), 348-355.

Full Text: [2006\J Col Int Sci298, 348.pdf](2006/J%20Col%20Int%20Sci298,%20348.pdf)

Abstract: We present the adsorption kinetics and the surface phase behavior of n-hexadecyl dihydrogen phosphate (n-HDP) at the air–water interface by film balance and Brewster angle microscopy (BAM). A phase diagram, which shows a triple point at about 25.8 °C, is constructed by measuring the surface pressure (π)–time (t) adsorption isotherms. Below 25.8 °C, each of the π–t curves shows a plateau at about zero surface pressure indicating the existence of a first-order phase transition. The BAM observation confirms the order of this phase transition by presenting two-surface phases during this plateau. However, the BAM observation also shows clearly another second-order phase transition from an isotropic phase to a mosaic-textured liquid condensed (LC) phase. The initial phase is a gas (G) phase. Considering the peculiarity of the middle phase, we suggest this phase as an intermediate (I) phase. Above the triple point, the π–t curves predict the existence of two-step first-order phase transitions. Similar to the results at lower temperatures, the BAM images show two-surface phases during these first-order phase transitions together with a second-order phase transition from an isotropic phase to an LC phase. These transitions are classified as a first-order G–LE (liquid expanded) phase transition, which is followed by another first-order LE–I phase transition. The second-order phase transition is an I–LC phase transition. Contrary to these results, at 36 °C both the π–t measurements and the BAM observation present only two first-order phase transitions, which are G–LE at zero surface pressure and LE–LC transition at higher surface pressure. The shape of the domains during the main transitions shows a peculiar change from a circular at 20 °C to an elongated at 24 °C and finally to a circular shape at 36 °C. Such a change in the domain shapes has been explained considering the dehydration effect at higher temperatures as well as the nature of phases.

Keywords: Gibbs Monolayers, Phase Transition, Phase Diagram, Surface Pressure, Brewster Angle Microscopy, N-Hexadecyl Dihydrogen Phosphate

? Uheida, A., Salazar-Alvarez, G., Björkman, E., Yu, Z. and Muhammed, M. (2006), Fe3O4 and γ-Fe2O3 nanoparticles for the adsorption of Co2+ from aqueous solution. *Journal of Colloid and Interface Science*, **298** (2), 501-507.

Full Text: [2006\J Col Int Sci298, 501.pdf](2006/J%20Col%20Int%20Sci298,%20501.pdf)

Abstract: The adsorption of Co2+ ions from nitrate solutions using iron oxide nanoparticles of magnetite (Fe3O4) and maghemite (γ-Fe2O3) has been studied. The adsorption of Co2+ ions on the surface of the particles was investigated under different conditions of oxide content, contact time, solution pH, and initial Co2+ ion concentration. It has been found that the equilibrium can be attained in less than 5 min. The maximum loading capacity of Fe3O4 and γ-Fe2O3 nanoparticles is 5.8×10−5 and 3.7×10−5 mol m-2, respectively, which are much higher than the previously studied, iron oxides and conventional ion exchange resins. Co2+ ions were also recovered by dilute nitric acid from the loaded γ-Fe2O3 and Fe3O4 with an efficiency of 86 and 30%, respectively. That has been explained by the different mechanisms by including both the surface and structural loadings of Co2+ ions. The surface adsorption of Co2+ on Fe3O4 and γ-Fe2O3 nanoparticles has been found to have the same mechanism of ion exchange reaction between Co2+ in the solution and proton bonded on the particle surface. The conditional equilibrium constants of surface adsorption of Co2+ on Fe3O4 and γ-Fe2O3 nanoparticles have been determined to be logK = −3.3±0.3 and −3.1±0.2, respectively. The structural loading of Co2+ions into Fe3O4 lattice has been found to be the ion exchange reaction between Co2+ and Fe2+ while that into γ-Fe2O3 lattice to fill its vacancy. The effect of temperature on the adsorption of Co2+ was also investigated, and the value of enthalpy change was determined to be 19 kJ mol−1.

Keywords: Adsorption, Magnetite, Maghemite, Cobalt(II), Nanoparticles

? de Souza Macedo, J., da Costa Júnior, N.B., Almeida, L.E., da Silva Vieira, E.F., Cestari, A.R., de Fátima Gimenez, I., Carreño, N.L.V., and Barreto, L.S. (2006), Kinetic and calorimetric study of the adsorption of dyes on mesoporous activated carbon prepared from coconut coir dust. *Journal of Colloid and Interface Science*, **298** (2), 515-522.

Full Text: [2006\J Col Int Sci298, 515.pdf](2006/J%20Col%20Int%20Sci298,%20515.pdf)

Abstract: Mesoporous activated carbon has been prepared from coconut coir dust as support for adsorption of some model dye molecules from aqueous solutions. The Methylene blue (MB) and remazol yellow (RY) molecules were chosen for study of the adsorption capacity of cationic and anionic dyes onto prepared activated carbon. The adsorption kinetics was studied with the Lagergren first- and pseudo-second-order kinetic models as well as the intraparticle diffusion model. The results for both dyes suggested a multimechanism sorption process. The adsorption mechanisms in the systems dyes/AC follow pseudo-second-order kinetics with a significant contribution of intraparticle diffusion. The samples simultaneously present acidic and basic sites able to act as anchoring sites for basic and acidic dyes, respectively. Calorimetric studies reveal that dyes/AC interaction forces are correlated with the pH of the solution, which can be related to the charge distribution on the AC surface. These AC samples also exhibited very short equilibrium times for the adsorption of both dyes, which is an economically favorable requisite for the activated carbon described in this work, in addition to the local abundance of the raw material.

Keywords: Activated Carbon, Coir Dust, Porosity, Adsorption Kinetics, Heat of Adsorption

? Duc, M., Lefèvre, G. and Fédoroff, M. (2006), Sorption of selenite ions on hematite. *Journal of Colloid and Interface Science*, **298** (2), 556-563.

Full Text: [2006\J Col Int Sci298, 556.pdf](2006/J%20Col%20Int%20Sci298,%20556.pdf)

Abstract: The sorption of selenite from aqueous solutions onto hematite was investigated as a function of pH (2–12), ionic strength (0.01–0.1 M), and concentration of selenium (10−7–10−2 M). The sorption may proceed according to two processes: surface complexation, followed by the precipitation of ferric selenite starting at approximate [Se]=4×10−4 M (surface coverage > ca. 2 at nm−2). The sorption isotherms have been fitted by a Tempkin equation. A surface complexation model (2-p*K*/Constant Capacitance Model) was used to fit the sorption data. The nature of the surface species of selenite cannot be determined by modeling since monodentate >FeO－Se(O)O− or >FeO－Se(O)OH and bidentate (>FeO)2SeO surface complexes are both able to fit the experimental data. The reversibility and kinetics of sorption were also studied. The affinity of selenite ions toward hematite, expressed as the distribution coefficient with respect to the surface area (*K*D in L m−2), was compared with results published for other ferric oxides (goethite and amorphous ferric oxide). It was found that the reactivity toward selenite is similar, contrary to acid–base properties which depend on the nature of the oxide and its level of purity.

Keywords: Selenium; Iron oxide, Isotherm, Surface complex

? Vega, F.A., Covelo, E.F. and Andrade, M.L. (2006), Competitive sorption and desorption of heavy metals in mine soils: Influence of mine soil characteristics. *Journal of Colloid and Interface Science*, **298** (2), 582-592.

Full Text: [2006\J Col Int Sci298, 582.pdf](2006/J%20Col%20Int%20Sci298,%20582.pdf)

Abstract: Many mine soils are chemically, physically, and biologically unstable and deficient. They are sometimes amended with sewage sludge and ashes but often contain heavy metals that increase the already high mine soils’ heavy metal contents. Cd, Cr, Cu, Ni, Pb, and Zn in mutual competition were added to five mine soils (Galicia, Spain). Soil capacities for heavy metal sorption and retention were determined by means of distribution coefficients and selectivity sequences among metals. Influence of soil characteristics on sorption and retention was also examined. Retention selectivity sequences indicate that, in most of the soils, Pb is the preferred retained metal, followed by Cr. The last metals in these sequences are Ni, Cd, and Zn. Soil organic matter content plays a fundamental role in control of Pb sorption. Gibbsite, goethite, and mica influence Cr retention. Soil organic matter, oxides, and chlorite contents are correlated with Click to view the MathML source. Heavy metals are weakly adsorbed by soils and then desorbed in high amounts. To recover these soils it is necessary to avoid the use of residues or ashes that contain heavy metals due to their low heavy metal retention capacity.

Keywords: Mine Soils, Heavy Metals, Sorption–Desorption, Selectivity Sequences

? Polat, M. (2006), Kinetic estimation of the adsorbate distribution on the surface from adsorbed amounts. *Journal of Colloid and Interface Science*, **298** (2), 593-601.

Full Text: [2006\J Col Int Sci298, 593.pdf](2006/J%20Col%20Int%20Sci298,%20593.pdf)

Abstract: A phenomenological multilayer adsorption model for a well-dispersed, homogeneous, nonporous adsorbent and a molecular adsorbate is presented. The model provides explicit kinetic expressions associating the adsorbed amounts to the fraction of the surface occupied and reduces to the first- and second-order adsorption models for special cases. Parameters of the model are a pair of true rate constants related to the adsorbate–adsorbent and adsorbate–surface adsorbate affinities. A general graphical procedure and analytical equations for special cases are provided to estimate the rate constants from kinetic adsorption data. Data from the adsorption of sodium stearate onto α-alumina from water were used to test the model. The predicted values of the rate constants suggested that the stearate was distributed homogeneously on the alumina surface and essentially adsorbed as a monolayer before starting to form the second layer.

Keywords: Adsorption, Modeling, Kinetics, Multilayer

? Chitrakar, R., Tezuka, S., Sonoda, A., Sakane, K., Ooi, K. and Hirotsu, T. (2006), Phosphate adsorption on synthetic goethite and akaganeite. *Journal of Colloid and Interface Science*, **298** (2), 602-608.

Full Text: [2006\J Col Int Sci298, 602.pdf](2006/J%20Col%20Int%20Sci298,%20602.pdf)

Abstract: Low crystalline iron hydroxides such as goethite (α-FeOOH) and akaganeite (β-FeOOH) were synthesized, and the selective adsorption of phosphate ions from phosphate-enriched seawater was examined. The results of the distribution coefficients ([Kd](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4J6W760-3&_mathId=mml4&_user=1495547&_cdi=6857&_rdoc=16&_handle=V-WA-A-W-ZD-MsSAYVA-UUW-U-AACUAACZEC-AAVDZEZVEC-YZDDBEUBU-ZD-U&_acct=C000053193&_version=1&_userid=1495547&md5=4d854734757e73d66998c44835c15905)) of oxoanions in mixed anion solutions at pH 8 follow the selectivity order Cl−, NO3−, SO2−4 << CO3−2, HPO42− for goethite, and Cl−, CO3−2 < NO3− < SO42− << HPO42− for akaganeite. In seawater, both adsorbents show high selectivity for phosphate ions despite the presence of large amounts of major cations and anions in seawater. The adsorption isotherms fitted better with the Freundlich equation and the maximum uptake of phosphate from phosphate-enriched seawater was 10 mg P/g at an equilibrium phosphate concentration of 0.3 mg P/L on both adsorbents. The phosphate adsorption/desorption cycles show that akaganeite is an excellent adsorbent even after 10 cycles and its chemical stability is good.

Keywords: Goethite; Akaganeite; Phosphate; Seawater; Adsorption

? Ma, X.D. and Pawlik, M. (2006), Adsorption of guar gum onto quartz from dilute mixed electrolyte solutions. *Journal of Colloid and Interface Science*, **298** (2), 609-614.

Full Text: [2006\J Col Int Sci298, 609.pdf](2006/J%20Col%20Int%20Sci298,%20609.pdf)

Abstract: The effect of potassium, sodium, calcium, magnesium, and hydrogen cations on adsorption of guar gum onto quartz was investigated at natural pH. The role of the background ions was analyzed in terms of their water-structure making or breaking capabilities. In dilute solutions (0.01 mol/L) of structure-makers (NaCl, HCl, CaCl2, and MgCl2), the guar gum adsorption density did not change compared to the adsorption densities obtained in distilled water. Potassium, the only structure-breaking ion (chaotrope) among the tested cations, significantly enhanced guar gum adsorption. The results obtained in mixed electrolytes demonstrate that the strong structure-breaking properties of K+ overcome any contributions from weak structure making ions (kosmotropes), and guar gum adsorption remains at the levels observed in KCl alone. Only when strongly hydrated Mg2+ ions are mixed with KCl, the overall effect becomes additive and the influence of potassium is proportionally reduced by increasing concentrations of magnesium cations. In this approach, guar gum adsorption on quartz is viewed as a competition between polysaccharide and water molecules for silanol surface sites. The hydration of the quartz surface inhibits the adsorption process but the competition equilibrium, and hence polysaccharide adsorption, can be affected by the presence of chaotropes or kosmotropes.

Keywords: Guar Gum, Quartz, Polymer Adsorption, Ionic Strength, Water Structure

? Kosmulski, M. (2006), pH-dependent surface charging and points of zero charge: III. Update. *Journal of Colloid and Interface Science*, **298** (2), 730-741.

Full Text: [2006\J Col Int Sci298, 730.pdf](2006/J%20Col%20Int%20Sci298,%20730.pdf)

Abstract: The recently published points of zero charge (PZC) of various materials are compiled to update previous compilations [M. Kosmulski, Chemical Properties of Material Surfaces, Dekker, New York, 2001; M. Kosmulski, J. Colloid Interface Sci. 253 (2002) 77; M. Kosmulski, J. Colloid Interface Sci. 275 (2004) 214]. The recent results corroborate the previously found PZC with a few exceptions. The PZC of alumina obtained from the second-harmonic generation response is substantially lower than the PZC obtained by means of standard methods, while for titania the difference is less significant. PZC of Tl2O3 at pH 7.9 was reported for the first time. A surprisingly insignificant temperature effect on the IEP of rutile was found. Recent model studies aimed at explanation of the effect of the nature of 1–1 electrolytes on the course of charging curves and of discrepancies in the PZC of different materials having the same chemical formula are summarized.

Keywords: Point of Zero Charge, Isoelectric Point, Surface Charge, Zeta Potential

? Blanc, P., Saada, A. and Baranger, P. (2006), A nonlinear parametric model for phenanthrene sorption. *Journal of Colloid and Interface Science*, **299** (1), 14-21.

Full Text: [2006\J Col Int Sci299, 14.pdf](2006/J%20Col%20Int%20Sci299,%2014.pdf)

Abstract: Two models for phenanthrene sorption prediction are discussed and checked against experimental data. The first model, based on a two-site Langmuir expression, displays too large uncertainties. The second is based on a modified Langmuir relation and provides a better description of the whole dataset. It includes an experimentally derived relation between the site maximal concentration and chemical parameters of the substrate: TOC amount and polarity index (O + N)/C. The model is tested against sorption isotherms of phenanthrene acquired with six different substrates. Calculated values display satisfying accordance with experimental data. Validity of the model is tested with an isotherm that does not belong to the set of data used for the regression, with good results. Some discrepancies may arise from analytical uncertainty and structural aspects not included within the model.

Keywords: Phenanthrene, PAH, Sorption, Langmuir, Isotherm

? Montes-Hernandez, G. and Rihs, S. (2006), A simplified method to estimate kinetic and thermodynamic parameters on the solid–liquid separation of pollutants. *Journal of Colloid and Interface Science*, **299** (1), 49-55.

Full Text: [2006\J Col Int Sci299, 49.pdf](2006/J%20Col%20Int%20Sci299,%2049.pdf)

Abstract: The aim of the present study was to propose a simplified experimental–theoretical method for estimating the kinetic and thermodynamic parameters for the solid–liquid separation of pollutants by using kinetic studies with batch reactors, i.e., the removed quantity of dissolved ion as a function of time at different initial concentration. This method was applied to the removal of uranyl ion (UO2+2) from aqueous solutions onto synthetic manganese oxide (birnessite). The pseudo-second-order kinetics and one-site saturation models were proposed to fit the experimental and calculated data, the fitting parameters being estimated by nonlinear regression, using the least-squares method. For initial concentration range 0.2–11.8 μM, the results showed that the uranyl removal process in dispersed batch reactors can be efficiently modeled by the proposed models. Then, several kinetic and thermodynamic parameters were calculated, such as maximal removed quantity of uranyl, [qr,max](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4JJ87XH-4&_mathId=mml9&_user=1495547&_cdi=6857&_rdoc=8&_handle=V-WA-A-W-CD-MsSAYZA-UUW-U-AACAWCCZVA-AAVYYBZVVA-YEZEDUCVC-CD-U&_acct=C000053193&_version=1&_userid=1495547&md5=fadb49fab6224ec151507db649b74be9), half-removal time, t1/2, initial rate of uranyl-ion removal, v0, initial uranyl-removal coefficient, K, maximal rate of uranyl removal, v0,max, mass transfer coefficient, Dtransfer, equilibrium Langmuir constant, KL, and constant separation factor, Ks. These parameters make it possible to demonstrate that the removal of U onto birnessite is favorable, and that the maximum surface coverage of the uranyl ions represents about 3% of vacant sites in the Mn layer.

Keywords: Removal, Uranyl Ions, Manganese Oxide, Pseudo-Second-Order Kinetics, One-Site Saturation Models, Batch Reactors

? Mohan, D. and Chander, S. (2006), Single, binary, and multicomponent sorption of iron and manganese on lignite. *Journal of Colloid and Interface Science*, **299** (1), 76-87.

Full Text: [2006\J Col Int Sci299, 76.pdf](2006/J%20Col%20Int%20Sci299,%2076.pdf)

Abstract: Acid mine drainage (AMD) has long been a significant environmental problem resulting from the microbial oxidation of iron pyrite in the presence of water and air, affording an acidic solution that contains toxic metal ions. The main objective of this study was to remove metal ions [Fe(II), Fe(III), Mn(II), Zn(II)] from AMD using lignite, a low-cost adsorbent. The lignite sorbent was utilized for the sorption of ferrous, ferric, manganese, zinc, and calcium ions in aqueous solutions. Studies were performed at different pH to find optimum pH. Equilibrium isotherms were determined to assess the maximum adsorption capacity of lignite for different metal ions. Sorption capacities were compared in single, binary, ternary, and multicomponent systems. The sorption data are correlated with Freundlich and Langmuir isotherms in each system. Both Freundlich and Langmuir isotherms fit the data reasonably well in terms of regression coefficients. Sorption studies were also performed at different temperatures to obtain the thermodynamic parameters of the process. The maximum lignite adsorption capacities at 25 °C were 34.22, 25.84, and 11.90 mg/g for Fe(II), Mn(II), and Fe(III), respectively. Adsorption of Fe2+ (24.70 mg/g at 10 °C and 46.46 mg/g at 40 °C) increased with increased temperature, while Mn2+ adsorption (28.11 mg/g at 10 °C and 7.70 mg/g at 40 °C) decreased with increased temperature.

Keywords: Adsorption, Heavy Metals, Adsorbent, Lignite, Acid Mine Drainage

? Kovaios, I.D., Paraskeva, C.A., Koutsoukos, P.G. and Paya, A.Ch. (2006), Adsorption of atrazine on soils: Model study. *Journal of Colloid and Interface Science*, **299** (1), 88-94.

Full Text: [2006\J Col Int Sci299, 88.pdf](2006/J%20Col%20Int%20Sci299,%2088.pdf)

Abstract: The adsorption of the widely used herbicide atrazine onto three model inorganic soil components (silica gel, γ-alumina, and calcite (CaCO3) was investigated in a series of batch experiments in which the aqueous phase equilibrated with the solid, under different solution conditions. Atrazine did not show discernible adsorption on γ-alumina (θ = 25°C, 3.8<pH<12.1) or calcite (θ = 25°C, 7.7<pH<11.7). Significant and completely reversible adsorption from solutions was found for silica gel suspensions. The adsorption isotherms obtained for atrazine uptake on silica gel particles were best fitted with the Freundlich model. An increase of the ionic strength of the electrolytic solution induced an increase of the surface concentration of atrazine on silica gel, indicating significant electrostatic interactions between atrazine and silica gel particles, possibly through interaction with the surface silanol groups of the solid substrate. Increase of the pH value of the electrolyte solution from 6 to 9 considerably decreased the amount of atrazine adsorbed on the silica gel substrate. Decrease of the solution pH from 6 to 3 had only a slight effect on the surface concentration of the adsorbed atrazine. The adsorption of atrazine on silica gel increased when the temperature was decreased from 40 to 25 °C, an indication that the adsorption is exothermic. The calculated enthalpy of adsorption (~10 kJ/mol) indicates that the uptake at the solid–liquid equilibrium pH (6.1) was largely due to physisorption.

Keywords: Atrazine, Adsorption From Solution, Thermodynamics Of Adsorption, Adsorption Isotherms, Silica, Alumina, Calcium Carbonate

? Gonen, Y. and Rytwo, G. (2006), Using the dual-mode model to describe adsorption of organic pollutants onto an organoclay. *Journal of Colloid and Interface Science*, **299** (1), 95-101.

Full Text: [2006\J Col Int Sci299, 95.pdf](2006/J%20Col%20Int%20Sci299,%2095.pdf)

Abstract: Adsorption of 2,4,5-trichlorophenol (TCP) and picric acid (PA) by montmorillonite preloaded with crystal violet (CV) up to 80, 100, and 125% of the cation exchange capacity was studied. The adsorption isotherms indicated a strong interaction of TCP and PA with the organoclay. While the adsorption isotherms of both pollutants can be described by the Langmuir model with relatively good fit, the adsorption of TCP is more adequately described by the dual-mode model (DMM), which combines the Langmuir equation with a partition mechanism. Competitive adsorption experiments and adsorption experiments in water:ethanol mixed medium as a solvent confirmed the assumption that the removal of TCP from water by the organoclay follows two different mechanisms: site-specific adsorption occurs in the low concentration range, whereas a partition mechanism dominates the high concentration range. This double mechanism in organoclays exhibits both complete removal at low pollutant concentrations and high sorption capacity in the high concentration range, and therefore may be effective in water treatment for a wide range of pollution levels.

Keywords: Adsorption, Organoclays, Langmuir Equation, Dual-Mode Model

? Xiarchos, I. and Doulia, D. (2006), Interaction behavior in ultrafiltration of nonionic surfactant micelles by adsorption. *Journal of Colloid and Interface Science*, **299** (1), 102-111.

Full Text: [2006\J Col Int Sci299, 102.pdf](2006/J%20Col%20Int%20Sci299,%20102.pdf)

Abstract: Adsorption of nonionic surfactant micelles onto ultrafiltration (UF), membranes was studied. Two homologous series of nonionic surfactants, namely, Tritons (alkylphenol ethoxylates) and Neodols (alcohol ethoxylates), were used to characterize surface properties of two polymeric ultrafiltration membranes with 20,000 nominal cutoff. Particularly, a cellulose acetate and a polysulfone membrane were investigated. Static adsorption experiments were carried out using surfactant solutions at concentrations above their critical micelle concentration. The characterization of surface properties of UF membranes was based on the adsorption behavior of surfactant species. The adsorption extent on UF membranes was affected by the hydrophobicity-to-hydrophilicity ratio mainly determining the interactions developed at the membrane–surfactant species interface. Adsorption experimental data seem generally to fit the Langmuir isotherm model. Atomic force microscopy was used to examine the alteration of the top membrane surface morphology.

Keywords: UF Membrane, Surfactant, Adsorption, Interaction, AFM

? Azizian, S. and Yahyaei, B. (2006), Adsorption of 18-crown-6 from aqueous solution on granular activated carbon: A kinetic modeling study. *Journal of Colloid and Interface Science*, **299** (1), 112-115.

Full Text: [2006\J Col Int Sci299, 112.pdf](2006/J%20Col%20Int%20Sci299,%20112.pdf)

Abstract: Granular activated carbon was used for the removal of 18-crown-6 from aqueous solution by adsorption. The influence of two experimental parameters, initial 18-crown-6 concentration and temperature, on the adsorption kinetics was evaluated. The kinetics data obtained were modeled by pseudo-first-order and pseudo-second-order models, respectively. The process of adsorption follows a pseudo-second-order rate model. The most important result of the present study is that the correlation coefficient is not a sufficient criterion for selection of a kinetic model, and therefore several criteria are suggested for its selection.

Keywords: Adsorption, Kinetics, 18-Crown-6, Pseudo-First-Order, Pseudo-Second-Order, Granular Activated Carbon

? Anirudhan,T.S. and Ramachandran, M. (2006), Adsorptive removal of tannin from aqueous solutions by cationic surfactant-modified bentonite clay. *Journal of Colloid and Interface Science*, **299** (1), 116-124.

Full Text: [2006\J Col Int Sci299, 116.pdf](2006/J%20Col%20Int%20Sci299,%20116.pdf)

Abstract: The removal of tannin from aqueous media by cationic surfactant-modified bentonite clay was studied in a batch system. The surfactant used was hexadecyltrimethylammonium chloride. Adsorbent characterizations were investigated using X-ray diffraction, infrared spectroscopy, surface area analysis, and potentiometric titration. The effects of pH, contact time, initial solute concentration, adsorbent dose, ionic strength, and temperature on the adsorption of tannin onto modified clay were investigated. The adsorbent exhibited higher tannin removal efficiency (>99.0%) from an initial concentration of 10.0 μmol/L at pH 3.0. Adsorption capacity decreased from 90.1 to 51.8% with an increase in temperature from 10 to 40 °C at an initial concentration of 25.0 μmol/L. The adsorption process was found to follow pseudo-first-order kinetics. Film diffusion was found to be the rate-limiting step. Tannin adsorption was found to decrease with increase in ionic strength. The tannin equilibrium adsorption data were fitted to Langmuir and Freundlich isotherm models, the former being found to provide the best fit of the experimental data. The maximum monolayer adsorption capacity for tannin was 69.80 μmol/g at 30 °C. Comparison of adsorption capacity of the modified clay with reported adsorbents in the literature was also presented. Adsorbed tannin on modified clay can be recovered by treatment with 0.1 M NaOH solution. Regeneration experiments were tried for four cycles and results indicate a capacity loss of <10.0%. From the results it can be concluded that the surfactant-modified clay could be a good adsorbent for treating tannin-contaminated waters.

Keywords: Organoclay, Bentonite, Tannin, Adsorption Kinetics, Isotherm, Desorption

? Gereli, G., Seki, Y., Kuşoğlu, İ.M. and Yurdakoç, K. (2006), Equilibrium and kinetics for the sorption of promethazine hydrochloride onto K10 montmorillonite. *Journal of Colloid and Interface Science*, **299** (1), 155-162.

Full Text: [2006\J Col Int Sci299, 155.pdf](2006/J%20Col%20Int%20Sci299,%20155.pdf)

Abstract: This study presents the adsorption of cationic drug, promethazine hydrochloride from aqueous solution onto K10 montmorillonite. The effects of pH and temperature on adsorption process were investigated. Maximum adsorption pH was obtained to be about 7.5. Thermodynamic parameters found in this study depict the exothermic nature of adsorption. The process was favorable and spontaneous. From kinetic studies, it was found that adsorption process obeyed the pseudo-second-order kinetic model. The Langmuir, Freundlich, Dubinin–Radushkevich (DR) models were applied to describe the equilibrium isotherms and the isotherm constants were determined. The fit of the Langmuir and DR models appeared to be good. Physisorption mainly controls the whole adsorption process but chemisorption also shows a particular contribution.

Keywords: K10, Adsorption, Kinetic, Thermodynamic Parameters, SEM

? Patel, U. and Suresh, S. (2006), Dechlorination of chlorophenols by magnesium-silver bimetallic system. *Journal of Colloid and Interface Science*, **299** (1), 249-259.

Full Text: [2006\J Col Int Sci299, 249.pdf](2006/J%20Col%20Int%20Sci299,%20249.pdf)

Abstract: More than 85% of 10 mg L-1 of pentachlorophenol (PCP) was removed by magnesium/silver (206/1.47 mM) bimetal system in the presence of acetic acid. Dechlorination was found to be sequential and phenol was identified as the ultimate hydrocarbon skeleton along with some accumulation of tetra-, tri-, and dichlorophenols. The dechlorination reaction was found to follow second-order kinetics. Lower PCP removal efficiency (35%) was observed when the reaction was carried out in the absence of acid using Mg-0/Ag system. When the reaction was conducted using Mg-0 alone in the presence of acid, substantial sorption Of PCP Occurred with very low efficiency of PCP dechlorination. Dechlorination studies on 10 mg L-1 initial concentrations of 2,3,4,6-tetrachlorophenol (2,3,4,6-TeCP) and 2,4,5-trichlorophenol (2,4,5-TCP), under identical conditions as to PCP, revealed that dechlorination efficiency and reaction rate constants decrease with decreasing number of chlorine atoms on the target compound. A correlation (R-2 > 0.9) between the dechlorination rate constants and E-LUMO for chlorophenols was obtained. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Chlorophenol, Dechlorination, Silver, Magnesium, Pentachlorophenol, Zerovalent, Zero-Valent Iron, Reductive Dechlorination, Rapid Dechlorination, Fluidized-Bed, Pentachlorophenol, Biodegradation, Dehalogenation, Particles, Sludge, Water

? Messina, P.V. and Schulz, P.C. (2006), Adsorption of reactive dyes on titania–silica mesoporous materials. *Journal of Colloid and Interface Science*, **299** (1), 305-320.

Full Text: [2006\J Col Int Sci299, 305.pdf](2006/J%20Col%20Int%20Sci299,%20305.pdf)

Abstract: This paper presents a study on the adsorption of two basic dyes, Methylene blue (MB) and rhodamine B (RhB), from aqueous solution onto mesoporous silica–titania materials. The effect of dye structure, adsorbent particle size, TiO2 presence, and temperature on adsorption was investigated. Adsorption data obtained at different solution temperatures (25, 35, and 45 °C) revealed an irreversible adsorption that decreased with the increment of T. The presence of TiO2 augmented the adsorption capacity (qe). This would be due to possible degradation of the dye molecule in contact with the TiO2 particles in the adsorbent interior. The adsorption enthalpy was relatively high, indicating that interaction between the sorbent and the adsorbate molecules was not only physical but chemical. Both Langmuir and Freundlich isotherm equations were applied to the experimental data. The obtained parameters and correlation coefficients showed that the adsorption of the two reactive dyes (MB and RhB) on the adsorbent systems at the three work temperatures was best predicted by the Langmuir isotherm, but not in all cases. The kinetic adsorption data were processed by the application of two simplified kinetic models, first and second order, to investigate the adsorption mechanism. It was found that the adsorption kinetics of Methylene blue and rhodamine B onto the mesoporous silica–titania materials surface under different operating conditions was best described by the first-order model.

Keywords: Adsorption, TiO2 Nanoparticles, Silica–Titania Mesoporous Materials, Surfactant Templates, Reactive Dyes, Energetic Surface Heterogeneity, Decontamination, Isotherms, Kinetics, Thermodynamic

? Pande, S., Ghosh, S.K., Nath, S., Praharaj, S., Jana, S., Panigrahi, S., Basu, S. and Pal, T. (2006), Reduction of Methylene blue by thiocyanate: Kinetic and thermodynamic aspects. *Journal of Colloid and Interface Science*, **299** (1), 421-427.

Full Text: [2006\J Col Int Sci299, 421.pdf](2006/J%20Col%20Int%20Sci299,%20421.pdf)

Abstract: This article reports the reduction of Methylene blue (MB) by thiocyanate ions (SCN−) in aqueous and micellar solutions. Thiocyanate ions are found to be an effective reducing agent for the decolorization of Methylene blue under ambient condition. Effects of salting-in and salting-out agents have been investigated for real-time application in the reduction process. The salting-in agent urea has been found to uniquely enhance the rate of the reduction of MB by thiocyanate ion in the presence of micelles. Again, the catalytic activity of nanoparticles in the reduction of MB has also been studied. Detailed kinetic and thermodynamic aspects have been considered to realize the interaction between Methylene blue and thiocyanate. Kinetic studies revealed that the reaction is reversible and follows first-order reaction kinetics.

Keywords: Methylene Blue, Thiocyanate, Catalysis, Micelle, Salting-In and Salting-Out Agents, Nanoparticles

? Tsai, W.T., Hsu, H.C., Su, T.Y., Lin, K.Y. and Lin, C.M. (2006), Adsorption characteristics of bisphenol-A in aqueous solutions onto hydrophobic zeolite. *Journal of Colloid and Interface Science*, **299** (2), 513-519.

Full Text: [2006\J Col Int Sci299, 513.pdf](2006/J%20Col%20Int%20Sci299,%20513.pdf)

Abstract: The adsorption behavior of bisphenol-A, which is a hydrophobic organic compound and also listed as one of endocrine disrupting chemicals, from aqueous solution onto hydrophobic zeolite at 25 °C have been studied using a batch adsorption process in terms of a pseudo-second-order equation and three common isotherms (i.e., the Langmuir, Freundlich, and Redlich–Peterson). The pore properties of the Y-type zeolite have been determined using N2 adsorption–desorption isotherms, indicating that it is a supermicroporous adsorbent associated with a lower percentage of mesopores. Based on the kinetic model the effects of particle size, initial bisphenol-A concentration, initial solution pH, and adsorbent dosage on the adsorption rate constant and equilibrium capacity have been estimated, showing that the adsorption process could be simulated well by the simplified kinetic model. From the data on the equilibrium adsorption capacities obtained by fitting the pseudo-second-order model, the adsorption isotherm could be better described by the three-parameter Redlich–Peterson model than by the two-parameter models (i.e., the Langmuir and Freundlich).

Keywords: Bisphenol-A, Liquid-Phase Adsorption, Hydrophobic Zeolite, Kinetic Modeling, Isotherm

? Malandrino, M., Abollino, O., Giacomino, A., Aceto, M. and Mentasti, E. (2006), Adsorption of heavy metals on vermiculite: Influence of pH and organic ligands. *Journal of Colloid and Interface Science*, **299** (2), 537-546.

Full Text: [2006\J Col Int Sci299, 537.pdf](2006/J%20Col%20Int%20Sci299,%20537.pdf)

Abstract: The sorption behaviour of vermiculite has been studied with respect to cadmium, copper, lead, manganese, nickel and zinc as a function of pH and in the presence of different ligands. The continuous column method was used in order to evaluate the feasibility to use the clay in wastewater purification systems. The total capacity of vermiculite was found to decrease in the following order: Mn > Ni > Zn > Cd > Cu > Pb. The adsorption of metal ions on vermiculite decreases with decreasing pH and increasing ionic strength. In general the metal uptake on the clay was hindered by the presence of strong complexing agents in solution and it decreases with increasing of the complexation constants of the ligands with exception of cysteine and tiron. It is necessary, hence, to consider all these factors to effectively predict the uptake efficiency of this sorbent. However, it is possible to conclude that the vermiculite has good potentialities for costeffective treatments of metal-contaminated wastewaters.

Keywords: Vermiculite, Heavy Metals, Wastewaters, Adsorption, Metal Complexes, Breakthrough

? Gupta, V.K., Ali, I., Suhas and Saini, V.K. (2006), Adsorption of 2,4-D and carbofuran pesticides using fertilizer and steel industry wastes. *Journal of Colloid and Interface Science*, **299** (2), 556-563.

Full Text: [2006\J Col Int Sci299, 556.pdf](2006/J%20Col%20Int%20Sci299,%20556.pdf)

Abstract: The removal of 2,4-dichlorophenoxyacetic acid (2,4-D) and carbofuran from aqueous solution was studied by using fertilizer industry waste (carbon slurry) and steel industry wastes (blast furnace slag, dust, and sludge) as adsorbents in batch. Adsorption was found to be in decreasing order: carbon slurry, blast furnace sludge, dust, and slag, respectively. Carbonaceous adsorbent prepared from carbon slurry exhibited the uptake capacity of 212 and 208 mg g−1 for 2,4-D and carbofuran, respectively at 25 °C and pH 7.5. Adsorption equilibrium, kinetics, and thermodynamics were investigated as a function of initial pH, temperature, and pesticide concentrations. Equilibrium data fitted well to the Langmuir equilibrium model in the studied concentration range of 2,4-D and carbofuran at all the temperatures studied. Two simplified models, including pseudo-first-order and pseudo-second-order kinetic models, were used to test the adsorption kinetics. Adsorption of 2,4-D and carbofuran on carbon slurry at 25, 35, and 45 °C could be best fitted in the pseudo-second-order kinetic model. Pore diffusion was confirmed as the essential rate-controlling step with the help of Bangham’s equation.

Keywords: Pesticides, Industrial Wastes, Adsorbent, Activated Carbon, Adsorption

? Li, L., Wang, S.B. and Zhu, Z.H. (2006), Geopolymeric adsorbents from fly ash for dye removal from aqueous solution. *Journal of Colloid and Interface Science*, **300** (1), 52-59.

Full Text: [2006\J Col Int Sci300, 52.pdf](2006/J%20Col%20Int%20Sci300,%2052.pdf)

Abstract: Adsorbents from coal fly ash treated by a solid-state fusion method using NaOH were prepared. It was found that amorphous aluminosilicate geopolymers would be formed. These fly ash-derived inorganic polymers were assessed as potential adsorbents for removal of some basic dyes, Methylene blue and crystal violet, from aqueous solution. It was found that the adsorption capacity of the synthesised adsorbents depends on the preparation conditions such as NaOH:fly-ash ratio and fusion temperature with the optimal conditions being at 1.2:1 weight ratio of Na:fly-ash at 250–350 °C. The synthesised materials exhibit much higher adsorption capacity than fly ash itself and natural zeolite. The adsorption isotherm can be fitted by Langmuir and Freundlich models while the two-site Langmuir model producing the best results. It was also found that the fly ash derived geopolymeric adsorbents show higher adsorption capacity for crystal violet than Methylene blue and the adsorption temperature influences the adsorption capacity. Kinetic studies show that the adsorption process follows the pseudo second-order kinetics.

Keywords: Adsorbents, Adsorption, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Process, Amorphous, Aqueous Solution, Ash, Basic Dyes, Capacity, Coal, Conversion, Crystal Violet, Dye, Dye Removal, Dyes, Fly Ash, Fly Ash Basic Dyes, Freundlich, Fusion, Fusion Method, Geopolymer, Inorganic, Isotherm, Kinetics, Langmuir, Materials, Methylene Blue, Model, Models, Natural, Natural Zeolite, Polymers, Process, Pseudo-Second-Order, Red, Removal, Second-Order Kinetics, Sorption, Temperature, Waste-Water, Zeolite, Zeolites

? Sánchez-Polo, M., Rivera-Utrilla, J., Salhi, E. and von Gunten, U. (2006), Removal of bromide and iodide anions from drinking water by silver-activated carbon aerogels. *Journal of Colloid and Interface Science*, **300** (1), 437-441.

Full Text: [2006\J Col Int Sci300, 437.pdf](2006/J%20Col%20Int%20Sci300,%20437.pdf)

Abstract: The aim of this study is to analyze the use of Ag-doped activated carbon aerogels for bromide and iodide removal from drinking water and to study how the activation of Ag-doped aerogels affects their behavior. It has been observed that the carbonization treatment and activation process of Ag-doped aerogels increased the surface area value (*S*N2), whereas the volume of meso- (*V*2) and macropores (*V*3) decreased slightly. Chemical characterization of the materials revealed that carbonization and especially activation process considerably increased the surface basicity of the sample. Original sample (A) presented acidic surface properties (pHPZC = 4.5) with 21% surface oxygen, whereas the sample that underwent activation showed mainly basic surface chemical properties (pHPZC = 9.5) with only 6% of surface oxygen. Carbonization and especially, activation process considerable increased the adsorption capacity of bromide and iodide ions. This would mainly be produced by (i) an increase in the microporosity of the sample, which increases Ag-adsorption sites available to halide anions, and (ii) a rise of the basicity of the sample, which produces an increase in attractive electrostatic interactions between the aerogel surface, positively charged at the working pH (pHsolution < pHPZC), and the corresponding halide. To test the applicability of these aerogels in water treatment, adsorption of bromide and iodide was studied under dynamic conditions using waters from Lake Zurich. Results obtained showed that the carbonization and activation processes increased the adsorptive capacity of the aerogel sample. However, results showed that the adsorption capacity of the aerogel samples studied was considerably lower in water from Lake Zurich. Results showed *X*0.02 (amount adsorbed to initial breakthrough) values of 0.1 and 4.3 mg/g for chloride anion and dissolved organic carbon (DOC), respectively, during bromide adsorption process in water from Lake Zurich. This indicates that the adsorptive capacity reduction observed may be due to (i) blocking of the porosity, caused by adsorption of dissolved organic matter on the aerogel surface, that would impede the access of bromide and iodide ions to Ag-adsorption sites, and (ii) the competition of chloride anions for the same adsorption sites. Bromide- and iodide-saturated columns were regenerated with NH3 (0.02 M), observing little change in column characteristics. Moreover, the organic polymer precursors were not dissolved and the concentration of surface Ag-adsorption sites is not significantly changed after two adsorption/regeneration cycles. According to these results, Ag-doped activated carbon aerogels could be a very promising agents to remove bromide and iodide from drinking water.

? Shahwan, T., Erten, H.N. and Unugur, S. (2006), A characterization study of some aspects of the adsorption of aqueous Co2+ ions on a natural bentonite clay. *Journal of Colloid and Interface Science*, **300** (2), 447-452.

Full Text: [2006\J Col Int Sci300, 447.pdf](2006/J%20Col%20Int%20Sci300,%20447.pdf)

Abstract: The natural bentonite used in this study contained montmorillonite in addition to low cristobalite. The uptake of aqueous Co2+ ions was investigated as a function of time, concentration, and temperature. In addition, the change in the interlayer space of montmorillonite was analyzed using XRPD, and the distribution of fixed Co2+ ions on the heterogeneous clay surface was recorded using EDS mapping. The sorbed amount of Co2+ appeared to closely follow Freundlich isotherm, with the sorption process showing apparent endothermic behavior. The relevance of the apparent Δ*H*o values is briefly discussed. Analysis of the Co-sorbed bentonite samples using SEM/EDS showed that the montmorillonite fraction in the mineral was more effective in Co2+ fixation than the cristobalite fraction. XRPD analysis demonstrated that the interlayer space of montmorillonite was slightly modified at the end of sorption.

Keywords: Co2+, Bentonite, Adsorption

? Chen, J.G., Kong, H.N., Wu, D.Y., Hu, Z.B., Wang, Z.S. and Wang, Y.H. (2006), Removal of phosphate from aqueous solution by zeolite synthesized from fly ash. *Journal of Colloid and Interface Science*, **300** (2), 491-497.

Full Text: [2006\J Col Int Sci300, 491.pdf](2006/J%20Col%20Int%20Sci300,%20491.pdf)

Abstract: Fifteen Chinese fly ashes were converted hydrothermally into zeolites, and phosphate immobilization capacity (PIC) of the synthesized zeolites and the corresponding raw fly ashes were determined using an initial phosphate concentration of 1000 mg/L. Results showed that there was a remarkable increase in PIC (from 1.2 to 7.6 times) following the synthesis process. Fractionation of immobilized phosphorus indicated that Fe + Al-P increased most significantly and consistently among all the phosphorus fractions following the conversion of fly ash to zeolite. The PIC and Ca + Mg-P were closely related to Ca content (with *r* values of 0.9683 and 0.9651, respectively) rather than Mg content (with *r* values of 0.3920 and 0.3212, respectively). The *r* values of PIC and Fe + Al-P with Fe content (with *r* values of 0.4686 and 0.6385, respectively) were higher than those with Al content (with *r* values of −0.7857 and −0.3770, respectively). Although calcium and iron components were mainly involved in phosphate immobilization, there was no significant change of Ca and Fe content following the conversion of fly ash to zeolite. Increase in dissociated Fe2O3 and specific surface area probably accounted for the enhancement in PIC of synthesized zeolites compared with corresponding fly ashes. The PIC value of zeolites showed a significant correlation with dissociated Fe2O3 (*r*=0.6186). The specific surface area increased 26.0–89.4 times as a result of the conversion of fly ash to zeolite. The maximum removal of phosphate occurred within different pH ranges for zeolites which were synthesized from high, medium and low calcium fly ashes and this behavior was explained by the reaction of phosphate with calcium and iron components.

Keywords: Fly Ash, Synthesized Zeolite, Phosphate, Immobilization, Composition, Correlation

? Tor, A., Cengeloglu, Y., Aydin, M.E., and Ersoz, M. (2006), Removal of phenol from aqueous phase by using neutralized red mud. *Journal of Colloid and Interface Science*, **300** (2), 498-503.

Full Text: [2006\J Col Int Sci300, 498.pdf](2006/J%20Col%20Int%20Sci300,%20498.pdf)

Abstract: The objective of this study is to remove the phenol from aqueous solution by using the neutralized red mud in batch adsorption technique. The study was carried out as functions of contact time, pH, initial phenol concentration, red mud dosage and effect of salt addition. The experiments demonstrated that maximum phenol removal was obtained in a wide pH range of 1–9 and it takes 10 h to attain equilibrium. The adsorption data was analyzed using the Langmuir and the Freundlich isotherm models and it was found that the Freundlich isotherm model represented the measured sorption data well. The influence of addition of salt on phenol removal depends on the relative affinity of the anions for the red mud surface and the relative concentrations of the anions.

Keywords: Adsorption, Equilibrium Isotherm, Freundlich Isotherm, Langmuir Isotherm, Phenol, Red Mud

? Ishiguro, M., Makino, T. and Hattori, Y. (2006), Sulfate adsorption and surface precipitation on a volcanic ash soil (allophanic andisol). *Journal of Colloid and Interface Science*, **300** (2), 504-510.

Full Text: [2006\J Col Int Sci300, 504.pdf](2006/J%20Col%20Int%20Sci300,%20504.pdf)

Abstract: Sulfate strongly adsorbs on metal oxides and soils with variable charges. However, its surface precipitation has not been clearly evaluated and its adsorption mechanism has been in dispute. In the present study, an allophanic andisol, a typical volcanic ash soil having both negative and positive variable charges, was used to identify the adsorption mechanism of sulfate. Sulfate adsorption isotherms were obtained by a batch method at pH values of 4, 5, 6, and 7 in a wide range of concentrations in an Na–H–SO4–OH system. Theoretical isotherms were applied to the measured values for the evaluation. The surface precipitation was detected by the measured adsorption isotherms, and the BET isotherm confirmed the presence of multilayer adsorption. Stronger and weaker adsorption sites were suggested by using the Langmuir isotherm for the monolayer adsorption. The adsorption energies obtained from the Langmuir equation and recent spectroscopic analysis suggested that the stronger adsorption corresponded to an inner-sphere surface complex and that the weaker adsorption corresponded to outer-sphere surface complexation. The BET and Langmuir equations showed three types of adsorption mechanisms for the sulfate adsorption on the soil.

Keywords: Surface Precipitation, Sulfate Adsorption, BET Equation, Langmuir Equation, Allophanic Soil, Variable Charge, Adsorption Isotherm, Multilayer Adsorption

? Luengo, C., Brigante, M., Antelo, J. and Avena, M. (2006), Kinetics of phosphate adsorption on goethite: Comparing batch adsorption and ATR-IR measurements. *Journal of Colloid and Interface Science*, **300** (2), 511-518.

Full Text: [2006\J Col Int Sci300, 511.pdf](2006/J%20Col%20Int%20Sci300,%20511.pdf)

Abstract: The adsorption kinetics of phosphate on goethite has been studied by batch adsorption experiments and by in situ ATR-IR spectroscopy at different pH, initial phosphate concentrations and stirring rates. Batch adsorption results are very similar to those reported by several authors, and show a rather fast initial adsorption taking place in a few minutes followed by a slower process taking place in days or weeks. The adsorption kinetics could be also monitored by integrating the phosphate signals obtained in ATR-IR experiments, and a very good agreement between both techniques was found. At pH 4.5 two surface complexes, the bidentate nonprotonated (FeO)2PO2 and the bidentate protonated (FeO)2(OH)PO complexes, are formed at the surface. There are small changes in the relative concentrations of these species as the reaction proceeds, and they seem to evolve in time rather independently. At pH 7.5 and 9 the dominating surface species is (FeO)2PO2, which is accompanied by an extra unidentified species at low concentration. They also seem to evolve independently as the reaction proceeds. The results are consistent with a mechanism that involve a fast adsorption followed by a slow diffusion into pores, and are not consistent with surface precipitation of iron phosphate.

Keywords: Adsorption Kinetics, Oxide–Water Interface, Surface Complexes, Adsorption Mechanism

? Cao, M., Song, X.Y., Wang, J.B. and Wang, Y.L. (2006), Adsorption of hexyl-α,ω-bis(dodecyldimethylammonium bromide) gemini surfactant on silica and its effect on wettability. *Journal of Colloid and Interface Science*, **300** (2), 519-525.

Full Text: [2006\J Col Int Sci300, 519.pdf](2006/J%20Col%20Int%20Sci300,%20519.pdf)

Abstract: The adsorption of hexyl-[*α*,*ω*](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4JN72C8-3&_mathId=mml3&_user=1495547&_cdi=6857&_rdoc=4&_handle=V-WA-A-W-Y-MsSAYVA-UUA-U-AACCEZZUWV-AACBCVZYWV-AWECDZBU-Y-U&_acct=C000053193&_version=1&_userid=1495547&md5=a29fa09cd853cc5e7ea42bb98d7af979)-bis(dodecyldimethylammonium bromide) (C12C6C12Br2) gemini surfactant on silica and its effect on wettability have been studied. The structure of the adsorbed aggregates experiences an evolving course with the increase of C12C6C12Br2 concentration. It is from no aggregates to circular islands, then to semicontinuous islands, and at last to the two-bilayer structure. No matter what kind of aggregates are in existence, their thickness values are to be the same [3.3±0.3 nm](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4JN72C8-3&_mathId=mml4&_user=1495547&_cdi=6857&_rdoc=4&_handle=V-WA-A-W-Y-MsSAYVA-UUA-U-AACCEZZUWV-AACBCVZYWV-AWECDZBU-Y-U&_acct=C000053193&_version=1&_userid=1495547&md5=9dc5cf7c32dc343a38d85226adaab19f). The fraction of silica surface covered by the surfactant aggregates also varies from nearly zero at 0.05 mM to not, vert, similar0.92 at 5.0 mM. The variation of contact angle against C12C6C12Br2 concentration shows two distinct regions. The upward shift indicates that the surfactant molecules are adsorbed with their hydrophobic tails facing air upon increasing concentration, while the downward shift reveals that the surfactant aggregates are in existence with the hydrophilic headgroups facing air. IR spectra suggest that two different courses are involved with the increase of the surfactant concentration. One possible course is that the surfactant tails pack more closely and orderly, and the other may be that the spacer changes from stretched profile to bended conformation upon increasing the surfactant concentration.

Keywords: Gemini Surfactant, Adsorption, Surfactant Aggregates, Silica Surface, Solid–Solution Interface, AFM

? You, L.J., Wu, Z.J., Kim, T.H. and Lee, K.T. (2006), Kinetics and thermodynamics of bromophenol blue adsorption by a mesoporous hybrid gel derived from tetraethoxysilane and bis(trimethoxysilyl)hexane. *Journal of Colloid and Interface Science*, **300** (2), 526-535.

Full Text: [2006\J Col Int Sci300, 526.pdf](2006/J%20Col%20Int%20Sci300,%20526.pdf)

Abstract: A mesoporous hybrid gel is prepared with tetraethoxysilane (TEOS) and bis(trimethoxysilyl)hexane (TSH) as precursors without using any templating agent. Nitrogen sorption, TG-DTA, FTIR, and point of zero charge (PZC) measurement are used to characterize the gel. The gel has a specific surface area of 695 m2 g−1 with a pore size of 3.5 nm, a pore volume of 0.564 cm3 g−1, and a point of zero charge (PZC) of 6.2. The kinetics and thermodynamics of bromophenol blue (BPB) adsorption by the gel in aqueous solution are investigated comprehensively. The effects of initial BPB concentration, pH, ionic strength, and temperature on the adsorption are investigated. Kinetic studies show that the kinetic data are well described by the pseudo-second-order kinetic model. Initial adsorption rate increases with the increase in initial BPB concentration and temperature. Adsorption activation energy is found to be 62.5–67.5 kJ mol−1 depending on the initial BPB concentration. Internal diffusion appears to be the rate-limiting step for the adsorption process. The equilibrium adsorption amount increases with the increase in the initial BPB concentration, solution acidity, and ionic strength, but decreases with the increase in temperature. The thermodynamic analysis indicates that the adsorption is spontaneous and exothermic. The adsorption isotherms can be well described with Freundlich equation indicating the heterogeneity of the hybrid gel surface. Electrostatic and hydrophobic interactions are suggested to be the dominant mechanism for adsorption.

Keywords: Bromophenol Blue, Adsorption Kinetics, Adsorption Thermodynamics, Adsorption Mechanism, Mesoporous Hybrid Gel, Bis(Trimethoxysilyl)Hexane

? Erdemoğlu, M. and Sarıkaya, M. (2006), Effects of heavy metals and oxalate on the zeta potential of magnetite. *Journal of Colloid and Interface Science*, **300** (2), 795-804.

Full Text: [2006\J Col Int Sci300, 795.pdf](2006/J%20Col%20Int%20Sci300,%20795.pdf)

Abstract: Zeta potential is a function of surface coverage by charged species at a given pH, and it is theoretically determined by the activity of the species in solution. The zeta potentials of particles occurring in soils, such as clay and iron oxide minerals, directly affect the efficiency of the electrokinetic soil remediation. In this study, zeta potential of natural magnetite was studied by conducting electrophoretic mobility measurements in single and binary solution systems. It was shown that adsorption of charged species of Co2+, Ni2+, Cu2+, Zn2+, Pb2+, and Cd2+ and precipitation of their hydroxides at the mineral surface are dominant processes in the charging of the surface in high alkaline suspensions. Taking Pb2+ as an example, three different mechanisms were proposed for its effect on the surface charge: if pH < 5, competitive adsorption with H3O+; if 5 < pH < 6, adsorption and surface precipitation; and if pH > 6, precipitation of heavy metal hydroxides prevails. Oxalate anion changed the associated surface charge by neutralizing surface positive charges by complexing with iron at the surface, and ultimately reversed the surface to a negative zeta potential. Therefore the adsorption ability of heavy metal ions ultimately changed in the presence of oxalate ion. The changes in the zeta potentials of the magnetite suspensions with solution pH before and after adsorption were utilized to estimate the adsorption ability of heavy metal ions. The mechanisms for heavy metals and oxalate adsorption on magnetite were discussed in the view of the experimental results and published data.

Keywords: Magnetite, Zeta Potential, Heavy Metals, Oxalate, Adsorption

? Rybolt, T.R. and Hansel, R.A. (2006), Determining molecule–carbon surface adsorption energies using molecular mechanics and graphene nanostructures. *Journal of Colloid and Interface Science*, **300** (2), 805-808.

Full Text: [2006\J Col Int Sci300, 805.pdf](2006/J%20Col%20Int%20Sci300,%20805.pdf)

Abstract: Five model surfaces were developed using molecular mechanics with MM2 parameters. A smooth, flat model surface was constructed of three parallel graphene layers where each graphene layer contained 127 interconnected benzene rings. Four rough surfaces were constructed by varying the separation between a pair of graphene nanostructures placed on the topmost layer of graphene. Each nanostructure contained 17 benzene rings arranged in a linear strip. The parallel nanostructures were moved closer together to increase the surface roughness and to enhance the molecule–surface interaction. Experimental adsorption energy values from the temperature variation of second gas–solid virial coefficients values were available for 16 different alkanes, haloalkanes, and ether molecules adsorbed on Carbopack B (Supelco, 100 m2/g). For each of the five different surface models, sets of 16 calculated adsorption energies, E\*cal, were determined and compared to the available experimental adsorption energies, *E*\*. The best linear regression correlation between E\* and E\*cal was found for a 1.20 nm internuclei separation of the surface nanostructures, and for this surface model the calculated gas–solid interaction energies closely matched the experimental values (E\* = 1.018E\*cal, [*r*2=0.964](http://www.sciencedirect.com/science?_ob=MathURL&_method=retrieve&_udi=B6WHR-4JT8DKR-F&_mathId=mml22&_user=1495547&_cdi=6857&_rdoc=7&_handle=V-WA-A-W-Y-MsSAYVA-UUA-U-AACCEZZUWV-AACBCVZYWV-AWECDZBU-Y-U&_acct=C000053193&_version=1&_userid=1495547&md5=342338c778a41a67dd6dbf5d65388f17)).

Keywords: Adsorption, Henry’s Law, Adsorption, Carbon, On, Virial Coefficients, Gas–Solid, Molecular Mechanics Surface Energy, Adsorption Energy

? Tamai, H., Nagoya, H. and Shiono, T. (2006), Adsorption of methyl mercaptan on surface modified activated carbon. *Journal of Colloid and Interface Science*, **300** (2), 814-817.

Full Text: [2006\J Col Int Sci300, 814.pdf](2006/J%20Col%20Int%20Sci300,%20814.pdf)

Abstract: The influence of surface modification of activated carbon on the adsorption of methyl mercaptan in N2 was investigated. The modification of the activated carbon was carried out by treatment with HNO3/H2SO4 solutions, heat-treatment in Ar, and adsorption of cetylamine. Acid-treatment increased the adsorption of methyl mercaptan compared with the original activated carbon, and the adsorbed amounts increased with ratio of H2SO4 in HNO3/H2SO4 solutions. This result suggests that hydrogen bonding between acidic groups formed by acid-treatment and thiol groups of methyl mercaptan plays a role in adsorption of methyl mercaptan on activated carbon.

Keywords: Activated Carbon, Surface Modification, Methyl Mercaptan Adsorption

? Wang, Y.F. and Gao, H.Z. (2006), Compositional and structural control on anion sorption capability of layered double hydroxides (LDHs). *Journal of Colloid and Interface Science*, **301** (1), 19-26.

Full Text: [2006\J Col Int Sci301, 19.pdf](2006/J%20Col%20Int%20Sci301,%2019.pdf)

Abstract: Layered double hydroxides (LDHs) have shown great promise as anion getters. In this paper, we demonstrate that the sorption capability of a LDH for a specific oxyanion can be greatly increased by appropriately manipulating material composition and structure. We have synthesized a large set of LDH materials with various combinations of metal cations, interlayer anions, and molar ratios of divalent cation M(II) to trivalent cation M(III). The synthesized materials have then been tested systematically for their sorption capabilities for pertechnetate (TcO4−). It is discovered that for a given interlayer anion (either CO32− or NO3−) the Ni–Al LDH with a Ni/Al ratio of 3:1 exhibits the highest sorption capability among all the materials tested. The sorption of TcO4− on M(II)–M(III)–CO3 LDHs may be dominated by the edge sites of LDH layers and correlated with the basal spacing *d*003 of the materials, which increases with the decreasing radii of both divalent and trivalent cations. The sorption reaches its maximum when the layer spacing is just large enough for a pertechnetate anion to fit into a cage space among three adjacent octahedra of metal hydroxides at the edge. Furthermore, the sorption is found to increase with the crystallinity of the materials. For a given combination of metal cations and an interlayer anion, the best crystalline LDH material is obtained generally with a M(II)/M(III) ratio of 3:1. Synthesis with readily exchangeable nitrate as an interlayer anion greatly increases the sorption capability of a LDH material for pertechnetate. The work reported here will help to establish a general structure–property relationship for the related layered materials.

Keywords: Layered Double Hydroxide, Pertechnetane Anion, Surface Adsorption, Edge Site Adsorption, Structure–Property Relationship, Cage Effect, Oxyanion, Waste Disposal

? Ondaral, S., Wågberg, L. and Enarsson, L.E. (2006), The adsorption of hyperbranched polymers on silicon oxide surfaces. *Journal of Colloid and Interface Science*, **301** (1), 32-39.

Full Text: [2006\J Col Int Sci301, 32.pdf](2006/J%20Col%20Int%20Sci301,%2032.pdf)

Abstract: The electrostatic interaction between quarternised hyperbranched polymers (polyesteramides) and a silicon oxide (SiO2) surface has been studied via adsorption studies with quartz crystal microbalance instrument with dissipation (QCM-D). Frequency shift (Δ*f*) results show that the increase in both pH and salt concentration positively affect the adsorbed amount of these polymers, calculated by Sauerbrey equation, on the QCM crystal. The adsorbed amount of HA1 (with lower molecular weight and higher charge density) was lower than that of HA2 (with higher molecular weight and lower charge density) in all experiments. It was also observed that there are no significant changes in the dissipation after adsorption of these polymers. This indicated that both hyperbranched polymers formed rigid adsorbed layers on the negative SiO2 surface. Additionally, the results were compared with adsorption of poly-DADMAC and the results showed that the hyperbranched polymers formed thicker and more rigid layers as compared with the poly-DADMAC.

Keywords: Hyperbranched Polymers, Quartz Crystal Microbalance, Adsorption, Sauerbrey Equation, Layer Thickness, Silicon Oxide

? Berber-Mendoza, M.S., Leyva-Ramos, R., Alonso-Davila, P., Fuentes-Rubio, L. and Guerrero-Coronado, R.M. (2006), Comparison of isotherms for the ion exchange of Pb(II) from aqueous solution onto homoionic clinoptilolite. *Journal of Colloid and Interface Science*, **301** (1), 40-45.

Full Text: [2006\J Col Int Sci301, 40.pdf](2006/J%20Col%20Int%20Sci301,%2040.pdf)

Abstract: The ion exchange equilibrium of Pb(II) on clinoptilolite modified with NH4Cl and NaCl can be represented by two types of isotherms. The first one is the ion exchange isotherm based upon the constant of thermodynamic equilibrium for the ion exchange reaction; however, the fitting procedure for this isotherm can be very tedious due to all the calculations involved and additional thermodynamic data. The second one is the Langmuir isotherm. The use of the Langmuir isotherm to represent ion exchange equilibrium has increased in recent last years since it adequately fits the equilibrium data and, furthermore, its calculation is much simpler. A comparison between the two isotherms showed that they fitted the experimental data reasonably well, but the Langmuir isotherm is much simpler and easier to use.

Keywords: Clinoptilolite, Ion exchange, Isotherm, Lead, Zeolite

? Paulino, A.T., Guilherme, M.R., Reis, A.V., Campese, G.M., Muniz, E.C. and Nozaki, J. (2006), Removal of Methylene blue dye from an aqueous media using superabsorbent hydrogel supported on modified polysaccharide. *Journal of Colloid and Interface Science*, **301** (1), 55-62.

Full Text: [2006\J Col Int Sci301, 55.pdf](2006/J%20Col%20Int%20Sci301,%2055.pdf)

Abstract: The removal of Methylene blue (MB) in water with the superabsorbent hydrogel (SH) formed by modified gum arabic, polyacrylate, and polyacrylamide was investigated. The SH exhibited excellent performance in MB absorption. The maximum absorption capacity was 48 mg of the dye per g of SH, representing 98% of the MB removed. Experimental parameters were used as follows: pH 8, hydrogel mass 50 mg, and initial concentration of MB 50 mg L−1. In a procedure with an individual solution of orange II, an opposite effect related to the MB was observed: the hydrogel only absorbed water, resulting in an orange II-richer solution. The orange II concentration in solution increased about 50 times (relative to the initial concentration). In another experiment using an aqueous mixture of orange II and MB, the SH absorbed the MB exclusively. Compared to the MB, the orange II is separated from water by SH selectivity-absorption through an inverse process. This effect was attributed to the formation of a ionic complex between the imine groups of MB and the ionized carboxylic groups of SH.

Keywords: Textile Wastewater, Color Removal, Superabsorbent Hydrogel, Gum Arabic

? Broniatowski, M. and Dynarowicz-Łątka, P. (2006), Semifluorinated alcohols in Langmuir monolayers – A comparative study. *Journal of Colloid and Interface Science*, **301** (1), 315-322.

Full Text: [2006\J Col Int Sci301, 315.pdf](2006/J%20Col%20Int%20Sci301,%20315.pdf)

Abstract: A series of semifluorinated alcohols differing in the proportion of the perfluorinated to hydrogenated chains length was synthesized and investigated in Langmuir monolayers using surface pressure and surface potential measurements. All the investigated semifluorinated alcohols were found to be capable of stable floating monolayer formation. The stability of monolayers was found to be higher upon increasing the length of the perfluorinated segment. A lower stability of the monolayers from alcohols having shorter perfluorinated fragment was attributed to the aggregation process, which was visualized with Brewster Angle Microscopy (BAM). Most condensed monolayers were formed by compounds with longer perfluorinated moiety, whereas monolayers composed by molecules with an iso-branched perfluorinated segment were found to be more expanded. The change of electric surface potential was negative along the whole compression. The maximum absolute values of ΔV varies, depending on the number of CF2 groups, from ca. -400 mV for F6H10OH to ca. -700 mV for F10H10OH. The dipole moments of free molecules were calculated with Hyperchem, and the obtained values were approximately the same (within the experimental error), i.e. 2.8 D for all the investigated molecules, independently on the perfluorinated fragment length. The dipole moment vector was found to be virtually aligned to the main molecular axis for the studied compounds. Therefore, the observed differences in the measured values of ΔV can result from a different dielectric permittivity of a particular monolayer.

Keywords: Semifluorinated Alcohols, Langmuir Monolayers, Air/Water Interface, Dipole Moments

? Oskarsson, H. and Holmberg, K. (2006), Adsorption of ethoxylated cationic surfactants on self-assembled monolayers of alkanethiols on gold using surface plasmon resonance detection. *Journal of Colloid and Interface Science*, **301** (2), 360-369.

Full Text: [2006\J Col Int Sci301, 360.pdf](2006/J%20Col%20Int%20Sci301,%20360.pdf)

Abstract: Adsorption of a series of ethoxylated cationic surfactants at model surfaces of alkanethiol self-assembled monolayers was studied by the surface plasmon resonance technique. Model surfaces were tailor-made by choosing alkanethiols or mixtures of alkanethiols with methyl, hydroxyl, carboxyl, and trimethylammonium groups in terminal position. The ethoxylated and quaternized cationic surfactants having from 2 to 18 oxyethylene units, showed a decrease in adsorbed amount with increasing oxyethylene chain length for both hydrophobic and hydrophilic surfaces. On a negatively charged surface, containing carboxylate groups, the surfactant with only two oxyethylene groups adsorbed strongly due to electrostatic attraction and the adsorption increased with increasing amount of surface carboxylate groups. This work shows the usefulness of self-assembled alkanethiols on gold as a tool for performing surfactant adsorption studies on surfaces with variable hydrophobicity and charge.

Keywords: Cationic Surfactant, Adsorption, Self-Assembled Monolayer, Surface Plasmon Resonance

? Mustafa, S., Zaman, M.I. and Khan, S. (2006), pH effect on phosphate sorption by crystalline MnO2. *Journal of Colloid and Interface Science*, **301** (2), 370-375.

Full Text: [2006\J Col Int Sci301, 370.pdf](2006/J%20Col%20Int%20Sci301,%20370.pdf)

Abstract: The phosphate anions sorption on manganese dioxide was studied as a function of pH in the range 3 – 9 and at 293 K. The sorption was observed to increase with the increase in concentration of phosphate and decrease with the increase in pH. No effect of the phosphate adsorption upon the PZC of the solid suggested that the only outer sphere complexes were formed on the surface of the solid. The potentiometric titrations studies of the solid were also performed in the presence of different phosphate concentrations (0.53, 1.053 and 2.11 mmol L-1). The calculated pKa values showed that the solid protonation played a dominant role in the uptake of phosphate anions by the solid. Graphical abstract: The present study shows that phosphate is sorbed by MnO2 according to the reaction, where n is the charge of the phosphate anions sorbed by the solid and may vary from 1-3 for the sorption of H2PO4−, HPO42− and 3 PO43− respectively.

Keywords: Manganese Dioxide, Point of Zero Charge, Sorption, Surface Complexation, Potentiometric Titrations

? Tian, F.P., Wu, W.C., Jiang, Z.X., Liang, C.H., Yang, Y.X., Ying, P.L., Sun, X.P., Cai, T.X. and Li, C. (2006), The study of thiophene adsorption onto La(III)-exchanged zeolite NaY by FT-IR spectroscopy. *Journal of Colloid and Interface Science*, **301** (2), 395-401.

Full Text: [2006\J Col Int Sci301, 395.pdf](2006/J%20Col%20Int%20Sci301,%20395.pdf)

Abstract: Zeolites NaY and LaNaY (ion-exchanged with aqueous lanthanum nitrate solution) were used as adsorbents for removing organic sulfur compounds from model gasoline solutions (without and with toluene) and fluid catalytic cracked gasoline in fixed-bed adsorption equipment at room temperature and atmosphere pressure. The adsorptive selectivity for organic sulfur compounds was significantly increased when Na+ ions in zeolite NaY were exchanged with lanthanum ions. IR spectra of thiophene adsorption indicate that thiophene is adsorbed onto La3+ ions via direct S–La3+ interaction and Na+ ions via *π*-electronic interaction for La3+-exchanged zeolite NaY, but only via *π*-electronic interaction with Na+ ions for NaY. The amount of adsorbed thiophene on La3+-exchanged zeolite Y was slightly decreased by coadsorption of benzene, but greatly reduced on NaY. The adsorption of thiophene via interaction with La3+ on La3+-exchanged zeolite Y is hardly replaced by benzene coadsorption. The direct S–La3+ interaction might be the essential reason for the evidently improved adsorptive selectivity of LaNaY for removing organic sulfur compounds from solutions containing large amount of aromatics.

Keywords: Adsorption, Desulfurization, Thiophene, Aromatics, IR Spectra, Gasoline, La3+-Exchanged Zeolite

? Uheida, A., Iglesias, M., Fontàs, C., Hidalgo, M., Salvadó, V., Zhang, Y. and Muhammed, M. (2006), Sorption of palladium(II), rhodium(III), and platinum(IV) on Fe3O4 nanoparticles. *Journal of Colloid and Interface Science*, **301** (2), 402-408.

Full Text: [2006\J Col Int Sci301, 402.pdf](2006/J%20Col%20Int%20Sci301,%20402.pdf)

Abstract: The adsorption of palladium(II), rhodium(III), and platinum(IV) from diluted hydrochloric acid solutions onto Fe3O4 nanoparticles has been investigated. The parameters studied include the contact time and the concentrations of metals and other solutes such as H+ and chloride. The equilibrium time was reached in less than 20 min for all metals. The maximum loading capacity of Fe3O4 nanoparticles for Pd(II), Rh(III), and Pt(IV) was determined to be 0.103, 0.149, and 0.068 mmol g−1, respectively. A sorption mechanism for Pd(II), Rh(III), and Pt(IV) has been proposed and their conditional adsorption equilibrium constants have been determined to be log*K*=1.72, 1.69, and 1.84, respectively. Different compositions of eluting solution were tested for the recovery of Pt(IV), Pd(II), and Rh(III) from Fe3O4 nanoparticles. It was found that 0.5 mol L−1 HNO3 can elute all of the metal ions simultaneously, while 1 mol L−1 NaHSO3 was an effective eluting solution for Rh(III), and 0.5 mol L−1 NaClO4 for Pt(IV). In competitive adsorption, the nanoparticles showed stronger affinity for Rh(III) than for Pd(II) and Pt(IV).

Keywords: Adsorption, Magnetite, Platinum Group Metals, Nanoparticles

? Guan, X.H., Chen, G.H. and Shang, C. (2006), Combining kinetic investigation with surface spectroscopic examination to study the role of aromatic carboxyl groups in NOM adsorption by aluminum hydroxide. *Journal of Colloid and Interface Science*, **301** (2), 419-427.

Full Text: [2006\J Col Int Sci301, 419.pdf](2006/J%20Col%20Int%20Sci301,%20419.pdf)

Abstract: The adsorption of a series of aromatic carboxylic acids, with different numbers and positions of carboxyl groups in the phenyl ring, on aluminum hydroxide was investigated with ATR-FTIR and kinetic analyses to verify the role of aromatic carboxyl groups in the surface complexation of NOM with aluminum hydroxide. It was revealed that the formation of outer-sphere complexes dominated the adsorption of most of the aromatic carboxylates over the pH range examined in this study. Inner-sphere complexes were only detected at some pH levels for some aromatic carboxylates adsorption. The aromatic carboxylates were most likely to be adsorbed onto the first surface layer of hydroxyl groups and water molecules without forming coordinative bonds with the aluminum hydroxide surfaces, but strong hydrogen bonds were formed in this process. The adsorption data fitted the pseudo-second-order kinetic model very well. The activation energies of adsorption calculated from the rate constants of pseudo-second-order kinetics agreed with the ATR-FTIR analysis that the aromatic carboxylates, except pyromellitate, were adsorbed predominantly as outer-sphere complexes on aluminum hydroxide at pH 7. This study revealed that phenolic groups may be more significant than carboxylic groups for the chemical adsorption of NOM onto minerals. The presence of additional carboxylic groups enhanced the adsorption considerably, while the enhancement was limited when there were three or four carboxylic groups on the phenyl ring. The adsorption of aromatic carboxylates was affected by the positions and p*Ka* values of the donor groups and the solution pH.

Keywords: Adsorption, Aluminum Hydroxide, Aqueous-Solution Interface, Aromatic Carboxylate, Enhanced Coagulation, Gamma-Alooh Interface, Humic Substances, Hydrous Oxides, Kinetic Model, Kinetics, Model, Natural Organic Matter, Natural Organic-Matter, Phenolic Complexes, Pseudo Second Order Kinetics, Pseudo-Second-Order, Salicylic-Acid, Situ ATR-FTIR, Surface Complexation, Transform Infrared-Spectroscopy, Water-Treatment

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Full Text: [2006\J Col Int Sci301, 428.pdf](2006/J%20Col%20Int%20Sci301,%20428.pdf)

Abstract: The adsorption of polyethylene oxide (PEO) homologues in a wide range of molecular weight (from MPEO=200 to 106) at the air/aqueous solution interface was investigated by dynamic and static surface tension measurements. An approximate estimate for the lower limit of PEO concentration was given at which reliable equilibrium surface tension can be determined from static surface tension measurements. It was shown that the observed jump in the earlier published σ-lg(cPEO) curves is attributable to the non-equilibrium surface tension values at low PEO concentrations. The adsorption behavior of short chain PEO molecules (MPEO≤1000) is similar to that of the ordinary surfactants. The estimated standard free energy of PEO adsorption, ΔG°, increases linearly with the PEO molecular weight until MPEO=1000. In this molecular weight range ΔG° was found to be approximately the fifth of the hydrophobic driving force related to the adsorption of a surfactant with the same number of Methylene groups. In the case of the longer chain PEO-s the driving force of adsorption is so high that the adsorption isotherm is near saturation in the experimentally available polymer concentration range. Above a critical molecular weight the PEO adsorption reveals universal features, e.g. the surface tension and the surface density of segments do not depend on the polymer molecular weight.

Keywords: Polymer Adsorption, Fluid/Fluid Interface, Equilibration Criteria, Macromolecule, Surface Tension, Adsorption Driving Force

? Choong, T.S.Y., Wong, T.N., Chuah, T.G. and Idris, A. (2006), Film-pore-concentration-dependent surface diffusion model for the adsorption of dye onto palm kernel shell activated carbon. *Journal of Colloid and Interface Science*, **301** (2), 436-440.

Full Text: [2006\J Col Int Sci301, 436.pdf](2006/J%20Col%20Int%20Sci301,%20436.pdf)

Abstract: The rate of dye adsorption from aqueous effluents onto palm kernel shell (PKS) activated carbon has been studied experimentally using the batch adsorption method. The adsorption rates of Methylene blue on PKS for systems of different initial dye concentrations are modeled using a film-pore-concentration dependent surface diffusion (FPCDSD) model. The FPCDSD model is sufficiently general and can be reduced easily to describe other simplified models. Using the FPCDSD model, only a single set of mass transfer parameters is required to describe the Methylene blue/PKS system for different initial concentrations. A different set of mass transfer parameters are needed to obtain the best fitting if the pore diffusion is not included in the model.

Keywords: Dye, Adsorption, Diffusion, Activated Carbon, Palm Kernel Shell

? Duong, T.D., Nguyen, K.L. and Hoang, M. (2006), Competitive sorption of Na+ and Ca2+ ions on unbleached kraft fibres—A kinetics and equilibrium study. *Journal of Colloid and Interface Science*, **301** (2), 446-451.

Full Text: [2006\J Col Int Sci301, 446.pdf](2006/J%20Col%20Int%20Sci301,%20446.pdf)

Abstract: In a binary system the sorption of Na+ and Ca2+ by kraft pulps follows a second order kinetics, and the isotherms follow the Langmuir model. The sorption capacity is dependent on pH and temperature. The thermodynamic parameters indicate that the sorption is exothermic and spontaneous. In a single-component system, the sorption capacity of the kraft pulp for Na+ and Ca2+ increases with the degree of dissociation of ionisable cellulosic components of the kraft pulp fibres. In a binary system the exchange of Na+ and Ca2+ is highly dependent on pH. SEM and X-ray analysis indicated that at pH above 11.0 calcium forms a precipitate bound to the surface of the fibres.

Keywords: Adsorption, Cation-Exchange, Electrokinetic, Fiber Charge, Isotherms, Kinetics, Kraft Pulps, Metal-Ions, Model, Models, Pulp Suspensions, Second-Order, SEM, Sodium, Sorption, Titration

? Paulino, A.T., Minasse, F.A.S., Guilherme, M.R., Reis, A.V., Muniz, E.C. and Nozaki, J. (2006), Novel adsorbent based on silkworm chrysalides for removal of heavy metals from wastewaters. *Journal of Colloid and Interface Science*, **301** (2), 479-487.

Full Text: [2006\J Col Int Sci301, 479.pdf](2006/J%20Col%20Int%20Sci301,%20479.pdf)

Abstract: In this contribution, maximum capacity for adsorption of Pb2+, Ni2+, and Cu2+ by silkworm chrysalides (SC) was determined. The raw silkworm chrysalides (SCr) and chrysalides after acidic washing (SCw) were used. Chitin (CT), extracted from SC, and chitosan (CS), with 85% deacetylation, were employed as reference samples. Adsorption tests showed that all the studied adsorbents exhibited excellent performance in removal of metals. The choice of a more appropriate adsorbent is related to its efficiency for removal of a specific metal. The studied materials presented different intensities for metal adsorption as follows: (i) Ni2+ > Cu2+ > Pb2+ for SCr; (ii) Pb2+ > Cu2+ > Ni2+ for SCw; (iii) Ni2+ > Cu2+ > Pb2+ for CT; and (iv) Cu2+ > Pb2+ > Ni2+ for CS. Metal adsorption onto SCr and CS was analyzed by Freundlich and Langmuir isotherm equations. Adsorption values for CS–Pb and SCr–Ni were provided by the Freundlich model, while the adsorption values for CS–Cu, CS–Ni, SCr–Pb, and SCr–Cu were provided by the Langmuir model. The studied adsorbents are suitable for use in treatment of wastewater. From the economic point of view, the use of SCr as an adsorbent of heavy metals (mainly Ni2+) on the large industrial scale would be more appropriate.

Keywords: Adsorption, Raw Silkworm Chrysalides, Chitosan, Chitin, Heavy Metals, Wastewater

? Moorkanikkara, S.N. and Blankschtein, D. (2006), New methodology to determine the rate-limiting adsorption kinetics mechanism from experimental dynamic surface tension data. *Journal of Colloid and Interface Science*, **302** (1), 1-19.

Full Text: [2006\J Col Int Sci302, 1.pdf](2006/J%20Col%20Int%20Sci302,%201.pdf)

Abstract: We present a new methodology to determine the rate-limiting adsorption kinetics mechanism (diffusion-controlled vs mixed diffusion-barrier controlled), including deducing the kinetics parameters (the diffusion coefficient, *D*, and the energy-barrier parameter, *β*), from the experimental short-time dynamic surface tension (DST) data. The new methodology has the following advantages over the existing procedure used to analyze the experimental DST data: (a) it does not require using a model for the equilibrium adsorption isotherm, and (b) it only requires using the experimental short-time DST data measured at two initial surfactant bulk solution concentrations. We apply the new methodology to analyze the experimental short-time DST data of the following alkyl poly(ethylene oxide), C*i*E*j*, nonionic surfactants: C12E4, C12E6, C12E8, and C10E8 measured using the pendant-bubble apparatus. We find that for C12E4 and C12E6, the effect of the energy barrier on the overall rate of surfactant adsorption can be neglected for surfactant bulk solution concentrations below their respective critical micelle concentrations (CMCs), and therefore, that the rate-limiting adsorption kinetics mechanism for C12E4 and C12E6 is diffusion-controlled at any of their premicellar surfactant bulk solution concentrations. On the other hand, for C12E8 and C10E8, we find that their respective CMC values are large enough to observe a significant effect of the energy barrier on the overall rate of surfactant adsorption. In other words, for C12E8 and C10E8, the rate-limiting adsorption kinetics mechanism shifts from diffusion-controlled to mixed diffusion-barrier controlled as their premicellar surfactant bulk solution concentrations increase. We test the new methodology by predicting the short-time DST profiles at other initial surfactant bulk solution concentrations, and then comparing the predicted DST profiles with those measured experimentally. Very good agreement is obtained for the four C*i*E*j* nonionic surfactants considered. We also compare the results of implementing the new methodology with those of implementing the existing procedure, and conclude that using a model for the equilibrium adsorption isotherm can lead not only to different values of *D* and *β*, but it can also lead to a completely different determination of the rate-limiting adsorption kinetics mechanism. Since the new methodology proposed here does not require using a model for the equilibrium adsorption isotherm, we conclude that it should provide a more reliable determination of the rate-limiting adsorption kinetics mechanism, including the deduced kinetics parameters, *D* and *β*.

Keywords: Nonionic surfactants, Adsorption kinetics, Diffusion-controlled, Mixed-controlled, Dynamic surface tension, Alkyl poly(ethylene oxide) nonionic surfactants

? Zhang, L. and Somasundaran, P. (2006), Adsorption of mixtures of nonionic sugar-based surfactants with other surfactants at solid/liquid interfaces. I. Adsorption of n-dodecyl-β-D-maltoside with anionic sodium dodecylsulfate on alumina. *Journal of Colloid and Interface Science*, **302** (1), 20-24.

Full Text: [2006\J Col Int Sci302, 20.pdf](2006/J%20Col%20Int%20Sci302,%2020.pdf)

Abstract: Sugar-based surfactants can be synthesized from renewable materials and are environmentally benign. They have some unique solution and interfacial properties and have potential applications in a wide variety of processes, and there is a need for corresponding information on their behavior at various interfaces. In this study, co-adsorption of nonionic sugar-based n-dodecyl-β-D-maltoside(DM) and anionic sodium dodecylsulfate(SDS) on alumina was studied as a function of mixing ratios and solution pHs. It is found that at solid-liquid interface, depending on the solid type and the solution conditions, there are various interactions that dictate synergy or antagonism. At pH 6 where alumina is positively charged, marked synergistic effects between DM and SDS were observed, while at pH 11 where alumina is negatively charged, SDS shows antagonistic adsorption effects with DM. The ratios of surfactant components on solids change as a function of surfactant structure and concentrations as well, indicating various interactions at solid/liquid interface under different conditions that can be utilized for many industrial processes.

Keywords: Adsorption; Surfactant mixtures; Sugar-based surfactants; *n*-Dodecyl-*β*-d-maltoside; Solid/liquid interface

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Full Text: [2006\J Col Int Sci302, 25.pdf](2006/J%20Col%20Int%20Sci302,%2025.pdf)

Abstract: Synergy and antagonism between sugar-based surfactants, a group of environmentally benign surfactants, and cationic surfactants and nonionic ethoxylated surfactants have been investigated in this study with solids which adsorbs only one or other when presented alone. Sugar-based *n*-dodecyl-β-d-maltoside (DM) does not adsorb on silica by itself. However, in mixtures with cationic dodecyltrimethylammonium bromide (DTAB) and nonionic nonylphenol ethoxylated decyl ether (NP-10), DM adsorbs on silica through hydrophobic interactions. In contrast, although DM does adsorb on alumina, the presence of NP-10 reduces the adsorption of DM as well as that of the total surfactant adsorption. Such synergistic/antagonistic effects of sugar-based *n*-dodecyl-β-d-maltoside (DM) in mixtures with other surfactants at solid/liquid interfaces were systematically investigated and some general rules on synergy/antagonism in mixed surfactant systems are identified. These results have implications for designing surfactant combinations for controlled adsorption or prevention of adsorption.

Keywords: Adsorption, Surfactant Mixtures, Sugar-Based Surfactants, n-dodecyl-β-d-maltoside, Solid/Liquid Interfaces

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Full Text: [2006\J Col Int Sci302, 47.pdf](2006/J%20Col%20Int%20Sci302,%2047.pdf)

Abstract: Mesoporous carbon, CMK-3, was prepared using hexagonal SBA-15 mesoporous silica as the template and the adsorption of nonylphenol ethoxylates (NPE) onto CMK-3 was investigated. The adsorption process was well described using pseudo-second-order kinetics. At initial NPE concentrations of 107 and 530 mg l−1, the adsorption rate constants were found to be 5.6×10−3 and 8.7×10−4 g mg−1 min−1, indicating that a higher initial concentration or adsorption amount resulted in a lower adsorption rate. NPE adsorption onto CMK-3 fitted a Langmuir–Freundlich model and the maximum amounts of NPE absorbed at 15, 25, and 35 °C were 923, 720, and 463 mg g−1, suggesting an elevated adsorption capacity of CMK-3 for NPE with decreased adsorption temperature. In addition, increasing adsorption temperature led to the change of the adsorption model from the Langmuir–Freundlich to the Langmuir model. N2 adsorption results showed that the adsorption of NPE led to a decrease in the mesopore volume of CMK-3. However, the pore width of NPE-loaded CMK-3 was found to be identical to that of CMK-3.

Keywords: Mesoporous Carbon CMK-3, Characterization, Nonylphenol Ethoxylates, Adsorption

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Full Text: [2006\J Col Int Sci302, 76.pdf](2006/J%20Col%20Int%20Sci302,%2076.pdf)

Abstract: The heterogeneity of adsorbent was characterized by a novel and simple method that uses adsorption kinetic data from solution. On the basis of different simulated adsorption kinetic data for heterogeneous adsorbents with two different adsorption sites, it was found that there is a deviation from linearity in pseudo-second-order adsorption kinetic models. The patterns of obtained diagrams (*t*/*qt* vs *t*) shows five main classes of adsorption. On the basis of this novel and simple method it is possible to show that the surface of adsorbents is homogeneous or heterogeneous, and in the case of heterogeneous surfaces it is possible to find the differences between adsorption sites. For finding kinetic constants of adsorption on heterogeneous surfaces with two different sites, a new equation was presented and called the two-site pseudo-second-order (TS-PSO) model. Finally, some experimental kinetic data of adsorption were analyzed by the new method.

Keywords: Adsorption Kinetic, Pseudo-Second-Order, TS-PSO, Surface Heterogeneity, Kinetic Modeling

? Iyota, H., Tomimitsu, T. and Aratono, M. (2006), Charge number effect on the miscibility of inorganic salt and surfactant in adsorbed film and micelle: Inorganic salt–dodecylammonium chloride mixtures. *Journal of Colloid and Interface Science*, **302** (1), 330-334.

Full Text: [2006\J Col Int Sci302, 330.pdf](2006/J%20Col%20Int%20Sci302,%20330.pdf)

Abstract: The effect of inorganic salts with different charge numbers of cations on the adsorption and micelle formation of dodecylammonium chloride (DAC) was clarified by applying the thermodynamic treatment of surfactant mixtures to mixtures of DAC with calcium and lanthanum chlorides and comparing the results with those of the sodium chloride–DAC mixture in the previous study. Surface tension of aqueous solutions of the salt–DAC mixture was measured as a function of the total molality of the mixture and the mole fraction of DAC in the mixture at 298.15 K under atmospheric pressure. Judging from the phase diagrams of adsorption and micelle formation obtained from the surface tension measurement, dodecylammonium cations expel inorganic cations from the adsorbed film and micelle and the repulsive interaction between dodecylammonium and inorganic cations increases with increasing charge number of the inorganic cation.

Keywords: Charge Number of Inorganic Ion, Mixture of Inorganic Salt and Dodecylammonium Chloride, Surface Tension of A Mixture, Miscibility in Adsorbed Film and Micelle, Phase Diagrams of Adsorption and Micelle Formation

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Full Text: [2006\J Col Int Sci302, 374.pdf](2006/J%20Col%20Int%20Sci302,%20374.pdf)

Abstract: Axisymmetric spreading of a liquid drop containing a soluble surfactant on a smooth solid substrate is numerically investigated for the case in which surfactant mass transfer between the interface and the bulk liquid is sorption/kinetic controlled. The fastest spreading rate is achieved by drops with *O*(1) values of Biot number for which the rate of surface convection is comparable to the sorption rate, and the surfactant molecules transferred to the interface are effectively convected to the contact line region.

Keywords: Surfactants, Drops, Spreading, Marangoni Stress

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Full Text: [2006\J Col Int Sci302, 203.pdf](2006/J%20Col%20Int%20Sci302,%20203.pdf)

Abstract: Thermally activated hydrotalcite based upon a Zn/Al hydrotalcite with carbonate in the interlayer has been used to remove nitrate anions from an aqueous solution resulting in the reformation of a hydrotalcite with a mixture of nitrate and carbonate in the interlayer. X-ray diffraction of the reformed hydrotalcites with a d(003) spacing of 7.60 Å shows that the nitrate anion is removed within a 30 min period. Raman spectroscopy shows that two types of nitrate anions exist in the reformed hydrotalcite (a) nitrate bonded to the ‘brucite-like’ hydrotalcite surface and (b) aquated nitrate anion in the interlayer. Kinetically the nitrate is replaced by the carbonate anion over a 21 h period. Two types of carbonate anions are observed. This research shows that the reformation of a thermally activated hydrotalcite can be used to remove anions such as nitrate from aqueous systems.

Keywords: Hydrotalcite, Brucite, Pyroaurite, Takovite, Nitrate Removal, Raman Microscopy, Memory Effect

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Full Text: [2006\J Col Int Sci302, 379.pdf](2006/J%20Col%20Int%20Sci302,%20379.pdf)

Abstract: Sewage sludge and industrial waste oil sludge were pyrolyzed in an inert atmosphere at 650 or 950 °C, either as single components or as 50:50 mixtures. Composite materials were used as adsorbents of copper ions from aqueous solution. The capacity for copper removal was comparable to that of commercial activated carbon. To relate the performance of materials to their properties, the surface features were characterized using adsorption of nitrogen, thermal analysis, XRF, potentiometric titration, and elemental analysis. The results indicated that a high copper removal capacity could be linked to basic surface pH and specific compounds present on the surface. The high removal ability of materials obtained at 650 °C is attributed to cation exchange reactions between calcium and magnesium in aluminosilicates, formed on their surface during heat treatment, and copper. On the other hand, the high degree of mineralization of the surface of the materials obtained at 950 °C promotes copper complexation and its surface precipitation as hydroxides or hydroxylcarbonate entities.

Keywords: Industrial Sludges, Pyrolysis, Copper Adsorption, Surface Chemistry, Porosity

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Full Text: [2006\J Col Int Sci302, 396.pdf](2006/J%20Col%20Int%20Sci302,%20396.pdf)

Abstract: 7-Amine-4-azaheptylsitica(AAH Si) and 10-amine-4-azadecylsilica(AAD Si) were prepared and used for removal of Cu(II), Pb(II), and Fe(III) from aqueous solutions. Full 23 factorial designs with two pseudo-central points were carried out in order to achieve the best conditions of the batch adsorption procedure for metallic ion uptake by the adsorbents. To continue the optimizations, central composite surface design was also employed. These two independent statistical designs of experiments lead to the following conditions: m = 30.0 mg of adsorbent; pH 6.0 for Cu(II) and Pb(II), pH 4.0 for Fe(III); t of contact 180 min to guarantee equilibration at higher adsorbate concentration. After optimization of the conditions, isotherms of the metallic ions adsorbed on the AAH Si and AAD Si adsorbents were obtained, which were fitted to nonlinear Langmuir and Freundlich isotherm models. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Grafting Silica Gel, Cu(II), Pb(II), and Fe(III), Isotherm Models, Statistical Design of Experiments, Heavy-Metal Ions, Absorption Spectrometric Determination, Silica-Gel, Aqueous-Solution, Factorial Design, Activated Carbon, Natural-Waters, Waste-Water, Removal, Biosorption

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Full Text: [2006\J Col Int Sci302, 408.pdf](2006/J%20Col%20Int%20Sci302,%20408.pdf)

Abstract: The sorption of atrazine from water has been studied using a conventional activated carbon, F400, an annealed carbon sample, F400AN, and an aminated carbon sample, F400NH2. Characterisation of the carbon samples showed that sample F400NH2 had the highest proportion of micropores, but had the lowest values of point of zero charge (PZC) and iso-electric point (IEP). This was attributed to the existence of a high proportion of oxygen containing functional groups. Sorption data showed that sample F400AN was superior in the sorption of atrazine to samples F400 and F400NH2. It was noted that pore size distribution alone was not the only contributing factor for the uptake of atrazine onto the activated carbons. The sorption data were fitted well using the Freundlich isotherm. The free energy change showed that sorption of atrazine on activated carbons is a spontaneous process. A pseudo-second order kinetic model was used for analysing the kinetic data, and it was concluded that adsorption of atrazine was controlled by a film diffusion mechanism.

Keywords: Activated Carbon, Surface Modification, Characterisation, Sorption, Atrazine, Adsorption Isotherms, Kinetic Studies, Pseudo-Second Order Kinetic Model

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Full Text: [2006\J Col Int Sci302, 417.pdf](2006/J%20Col%20Int%20Sci302,%20417.pdf)

Abstract: The study on the adsorption of hexokinase (HK) onto silicon wafers was carried out by means of in situ ellipsometry and atomic force microscopy in the liquid. The thickness values of the adsorbed HK layer determined by both techniques were in excellent agreement and evidenced HK monolayer formation. The adsorption of HK onto Si wafers was favored at low ionic strength, indicating that the adsorption is mainly driven by electrostatic forces, since salt screens not only the segment–segment repulsion but also the segment–surface attraction when the salt concentration increases. The enzymatic activity of free HK and of adsorbed HK was measured as a function of time. Free HK in solution lost activity upon storage. Contrarily, adsorbed HK kept its activity level even after 48 h storage at room temperature. This outstanding behavior was attributed to specific orientation of the HK active site to the solution.

Keywords: Hexokinase, Ellipsometry, AFM, Adsorption, Enzymatic Activity

? Doušová, B., Grygar, T., Martaus, A., Fuitová, L., Koloušek, D. and Machovič, V. (2006), Sorption of AsV on aluminosilicates treated with FeII nanoparticles. *Journal of Colloid and Interface Science*, **302** (2), 424-431.

Full Text: [2006\J Col Int Sci302, 424.pdf](2006/J%20Col%20Int%20Sci302,%20424.pdf)

Abstract: Adsorption of arsenic on clay surfaces is important for the natural and simulated removal of arsenic species from aqueous environments. In this investigation three samples of clay minerals (natural metakaoline, natural clinoptilolite-rich tuff and synthetic zeolite) in both untreated and Fetreated forms were used for the sorption of arsenate from model aqueous solution. The treatment of minerals consisted of exposing them to concentrated solution of FeII. Within this process the mineral surface has been laden with FeIII oxyhydroxides whose high affinity for the AsV adsorption is well known. In all investigated systems the sorption capacity of FeII treated sorbents increased significantly in comparison to the untreated material (from about 0.5 to >20.0 mg/g, which represented more than 95 % of the total As removal). The changes of Fe-bearing particles in the course of treating process and subsequent As sorption were investigated by the diffuse reflectance spectroscopy and the voltammetry of microparticles. IR spectra of treated and AsV saturated solids showed characteristic bands caused by FeIII-SO4, FeIII-O and As-O vibrations. In untreated AsV saturated solids no significant As-O vibrations were observed due to the negligible content of sorbed arsenate.

Keywords: Arsenic, FeII Nanoparticles, Treated Clays, Adsorption, IR Spectra, Voltammetry, DRS, Analysis

? Sarkar, M., Banerjee, A., Pramanick, P.P. and Sarkar, A.R. (2006), Use of laterite for the removal of fluoride from contaminated drinking water. *Journal of Colloid and Interface Science*, **302** (2), 432-441.

Full Text: [2006\J Col Int Sci302, 432.pdf](2006/J%20Col%20Int%20Sci302,%20432.pdf)

Abstract: The effects of different operational variables on the mechanistic function of laterite in removal of fluoride have been investigated. Thermodynamic parameters such as free energy change, enthalpy, and entropy of the process, as well as the sorption isotherm, were evaluated. The extent of solute removal is determined by initial solute concentration, operational conditions, laterite dose, and solution pH. For a fixed set of experimental conditions, a model equation is developed from which the percent removal corresponding to each load of fluoride is determined. The mechanism of fluoride adsorption is governed by the zero point charge of laterite and follows a first-order rate equation. pH has a vital role influencing the surface characteristics of laterite. To simulate the flow dynamics, fluoride solution was run through a fixed bed column. The pattern of breakthrough curves for different influent fluoride concentration, pH, and column bed height was characterized. The column efficiency was tested from the bed depth–service time model. The elution of the retained fluoride was studied and the effectiveness of column operation was determined by the retention–elution cycles.

Keywords: Fluoride, Adsorption, Laterite, Equilibrium, Kinetics, Dynamics

? Deliyanni, E.A., Nalbandian, L. and Matis, K.A. (2006), Adsorptive removal of arsenites by a nanocrystalline hybrid surfactant–akaganeite sorbent. *Journal of Colloid and Interface Science*, **302** (2), 458-466.

Full Text: [2006\J Col Int Sci302, 458.pdf](2006/J%20Col%20Int%20Sci302,%20458.pdf)

Abstract: Removal of toxic arsenite ions from aqueous solutions was investigated using an innovative hybrid nanocrystalline surfactant-modified akaganeite. This sorbent was prepared using ferric chloride as the precursor and a cationic surfactant, hexadecyltrimethylammonium bromide. From the experimental work, the material was found to be an effective adsorbent for the separation of arsenites. The chemical kinetics of the process was studied, described by a pseudo-second-order equation. The Freundlich adsorption isotherm was determined to examine the mechanism of sorption. FTIR measurements and XPS analysis gave useful information both on the sorbent synthesized and on the arsenite removal process.

Keywords: Iron oxide hydroxide; Surfactant-modified adsorbent; Freundlich model

? Kim, B.K., Ryu, S.K., Kim, B.J. and Park, S.J. (2006), Adsorption behavior of propylamine on activated carbon fiber surfaces as induced by oxygen functional complexes. *Journal of Colloid and Interface Science*, **302** (2), 695-697.

Full Text: [2006\J Col Int Sci302, 695.pdf](2006/J%20Col%20Int%20Sci302,%20695.pdf)

Abstract: In this study, the surfaces of activated carbon fibers (ACFs) were modified by nitric acid to introduce surface oxygen complexes and to observe the influence of those complexes on the propylamine adsorption of the ACFs. It was found that the oxygen complexes including carboxylic and phenolic groups were predominantly increased, resulting in the increase of total surface acidity. However, the specific surface areas and the total pore volumes of the modified ACFs were decreased by 5–8% due to the increased blocking (or demolition) of micropores in the presence of newly introduced complexes. Despite the decrease of textural properties, it was found that the amount of propylamine adsorbed by the modified ACFs was increased by approximately 17%. From the XPS results, it was observed that propylamine reacted with strong or weak acidic groups, such as COOH or OH, on the ACF surfaces, resulting in the formation of pyrrolic-, pyridonic-, or pyridine-like structures. c 2006 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon Fibers, Surface Oxygen Complexes, Propylamine, Surface Treatment

? Ma, W.Q. and Fang, Y. (2006), Experimental (SERS) and theoretical (DFT) studies on the adsorption of p-, m-, and o-nitroaniline on gold nanoparticles. *Journal of Colloid and Interface Science*, **303** (1), 1-8.

Full Text: [2006\J Col Int Sci303, 1.pdf](2006/J%20Col%20Int%20Sci303,%201.pdf)

Abstract: Surface-enhanced Raman scattering (SERS) spectra of *p*-, *m*-, and *o*-nitroaniline (PNA, MNA, and ONA) adsorbed on gold nanoparticles were studied, respectively, in a gold colloidal solution and on dried gold-coated filter paper. Significant changes were found in the SERS spectra of *p*-, *m*-, and *o*-nitroaniline molecules adsorbed on the two substrates, indicating that the behavior of *p*-, *m*-, and *o*-nitroaniline adsorbed on gold nanoparticles coated on filter paper was different from that in gold aqueous colloids. Moreover, on the filter paper it was found that the SERS spectra of the PNA molecules changed with the coverage density of the gold nanoparticles, while the MNA and ONA did not evidently change. The analyses showed that the origins of these changes were the different adsorption behavior of molecules adsorbed on the gold nanoparticles and that the adsorption behavior of molecules was greatly affected by the surface characteristic of the substrate and the surface configuration of the adsorbate. In addition, the vibrational frequencies and Raman scattering intensities of the three nitroanilines were calculated by use of the density functional theory (DFT-B3LYP/6-31G(d)) method. The combination of SERS spectroscopy and DFT calculation is quite useful for studies of adsorption orientation of a molecule on a metal nanoparticle.

Keywords: Adsorption Behavior, Surface-Enhanced Raman Scattering (SERS), n-Nitroaniline, Gold Nanoparticles

? Ma, W.Q. and Fang, Y. (2006), Experimental (SERS) and theoretical (DFT) studies on the adsorption of p-, m-, and o-nitroaniline on gold nanoparticles. *Journal of Colloid and Interface Science*, **303** (1), 18-24.

Full Text: [2006\J Col Int Sci303, 18.pdf](2006/J%20Col%20Int%20Sci303,%2018.pdf)

Abstract: The preparation and anion exchange properties of 3-*n*-propyl(4-methylpyridinium) silsesquioxane chloride polymer are described. This new polymer was prepared by the sol-gel processing method and is designated as SiPic+Cl−. It is insoluble in water and showed an anion exchange capacity of 1.45×10-3molg-1. The adsorption isotherms of ZnCl2, CdCl2 and HgCl2 were determined from aqueous solutions and the adsorption equilibria simulations fit the model of fixed bidentate centers with the absence of lateral interactions and energetic heterogeneity between them. The metal ions diffuse into the solid solution interface and are dominantly present as MCl2−4 species for Zn(II), MCl2−4 and MCl−3 species for Cd(II) and MCl−3 species for Hg(II).

Keywords: 3-n-Propyl(4-Methylpyridinium) Silsesquioxane Chloride, Ion Exchanger, Adsorption of MCl2 (M = Zn, Cd and Hg), Adsorption Isotherms, Adsorption Equilibria Simulation

? Naveau, A., Monteil-Rivera, F., Guillon, E. and Dumonceau, J. (2006), XPS and XAS studies of copper(II) sorbed onto a synthetic pyrite surface. *Journal of Colloid and Interface Science*, **303** (1), 25-31.

Full Text: [2006\J Col Int Sci303, 25.pdf](2006/J%20Col%20Int%20Sci303,%2025.pdf)

Abstract: Compounds containing copper are likely candidates to delay iodide migration in environmental media through the formation of sparingly soluble phases. Preliminary experiments showed that iodide was neither sorbed onto chalcopyrite nor by a binary system pyrite/copper(II), although significant amounts of copper were present at the pyrite surface. In the present study, spectroscopic studies (XPS, XANES and EXAFS) were thus performed to determine the nature of sorbed copper species. Although introduced as Cu(II), copper was mainly present at the oxidation state (I) on the pyrite surface suggesting a heterogeneous reduction process. Moreover, copper appeared tetrahedrally coordinated to two sulfur and two oxygen atoms onto the pyrite surface, a chemical environment, which seemingly stabilized the metal and made it unreactive towards iodide.

Keywords: Pyrite, Copper, Sorption, Reduction, XPS, Absorption Spectroscopy

? Pal, S., Lee, K.H., Kim, J.U., Han, S.H. and Song, J.M. (2006), Adsorption of cyanuric acid on activated carbon from aqueous solution: Effect of carbon surface modification and thermodynamic characteristics. *Journal of Colloid and Interface Science*, **303** (1), 39-48.

Full Text: [2006\J Col Int Sci303, 39.pdf](2006/J%20Col%20Int%20Sci303,%2039.pdf)

Abstract: The performance of a conventional and two surface-modified activated carbon samples was investigated for the sorption of cyanuric acid from aqueous solution by varying the process parameters such as initial concentration, pH, temperature, dose of adsorbents, and agitation time. The modified carbon samples obtained by acid and ammonia treatment of the conventional sample had a higher BET surface area (989 and 1010 m2 g−1, respectively) and higher specific mesopore surface area (27.36 and 33.21 m2 g−1, respectively) compared to the untreated material (820 and 18.25 m2 g−1). The solute removal was found to be favored at lower solute concentration, increased agitation time, increased adsorbent dose, and lower temperature. The modified adsorbents outperformed the conventional activated carbon for sorption of cyanuric acid especially at higher pH (*>*7.5) and with increasing temperature. The Freundlich model appears to fit the isotherm data better than the Langmuir model. The thermodynamic parameters (Δ*G*°ads, Δ*H*°, and Δ*S*°) were evaluated showing that the sorption process was thermodynamically favorable, spontaneous, and exothermic. The findings can be used for predictive modeling for analysis and design adsorption systems for removal of cyanuric acid and other polar atrazine degradation products from environmental aqueous samples. c 2006 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Surface Modification, Cyanuric Acid, Operational Parameters, Adsorption Isotherm, Thermodynamic Characteristics

? Duong, T.D., Nguyen, K.L. and Hoang, M. (2006), Isotherm sorption of Cd2+, Co2+, and Ni2+ onto high-yield kraft fibers. *Journal of Colloid and Interface Science*, **303** (1), 69-74.

Full Text: [2006\J Col Int Sci303, 69.pdf](2006/J%20Col%20Int%20Sci303,%2069.pdf)

Abstract: The sorption capacity of high-yield kraft fibers for Cd2+, Co2+, and Ni2+ increased with pH and concentration of the cations in the liquid phase. Within the concentration range for the experiments, which was less than 2 mM, the experimental results fitted the Langmuir, Freundlich, and Sips models with regression coefficient greater than 0.97. Of the three cations investigated, Ni2+ had the highest sorption affinity, followed by Cd2+ and Co2+. The effect of the hydrated radius on the sorption affinity was discussed. Thermodynamically, the sorption was spontaneous and exothermic in the temperature range 283–308 K.

Keywords: Heavy Metal, Sorption, Kraft Fiber

? Gupta, V.K., Mittal, A., Jain, R., Mathur, M. and Sikarwar, S. (2006), Adsorption of Safranin-T from wastewater using waste materials— activated carbon and activated rice husks. *Journal of Colloid and Interface Science*, **303** (1), 80-86.

Full Text: [2006\J Col Int Sci303, 80.pdf](2006/J%20Col%20Int%20Sci303,%2080.pdf)

Abstract: Textile effluents are major industrial polluters because of high color content, about 15% unfixed dyes and salts. The present paper is aimed to investigate and develop cheap adsorption methods for color removal from wastewater using waste materials activated carbon and activated rice husk—as adsorbents. The method was employed for the removal of Safranin-T and the influence of various factors such as adsorbent dose, adsorbate concentration, particle size, temperature, contact time, and pH was studied. The adsorption of the dye over both the adsorbents was found to follow Langmuir and Freundlich adsorption isotherm models. Based on these models, different useful thermodynamic parameters have been evaluated for both the adsorption processes. The adsorption of Safranin-T over activated carbon and activated rice husks follows first-order kinetics and the rate constants for the adsorption processes decrease with increase in temperature.

Keywords: Safranin-T, Adsorption, Activated Carbon, Activated Rice Husk

? Boonfueng, T., Axe, L., Xu, Y. and Tyson, T.A. (2006), Nickel and lead sequestration in manganese oxide-coated Montmorillonite. *Journal of Colloid and Interface Science*, **303** (1), 87-98.

Full Text: [2006\J Col Int Sci303, 87.pdf](2006/J%20Col%20Int%20Sci303,%2087.pdf)

Abstract: Amorphous hydrous manganese oxide (HMO) is an important mineral in soils and sediments influencing the mobility and bioavailability of metal contaminants. In this study, nickel and lead sorption to discrete HMO and HMO-coated montmorillonite was investigated mechanistically. The effect of pH and concentration revealed that when normalized to the mass of oxide present, the HMO-coated montmorillonite behaved similarly to the discrete Mn oxide, where both ions sorbed onto HMO-coated montmorillonite as inner-sphere complexes. Ni coordinated to the vacancy sites in the Mn oxide structure, while Pb formed bidentate corner-sharing complexes. These coordination environments were observed not only as a function of loading, pH, and ionic strength, but also in long-term studies where sorption increased by as much as 100% (from 6×10-4 to 1.2×10-3 mol of Ni g-1 HMO-coated montmorillonite). In this slower sorption process, intraparticle diffusion, the internal surface sites along microporous walls appear to be no different than external ones. Best fit diffusivities ranged from 10-12 to 10-13 cm2/s for Ni and 10-17 to 10-20 cm2/s for Pb. The significant difference in the diffusivities for the two ions is consistent with site activation theory, where theoretical surface diffusivities were predicted and given their error were in agreement with experimental results. Mn oxides sequester heavy metals in the environment.

? Liu, C., Bai, R. and Hong, L. (2006), Diethylenetriamine-grafted poly(glycidyl methacrylate) adsorbent for effective copper ion adsorption. *Journal of Colloid and Interface Science*, **303** (1), 99-108.

Full Text: [2006\J Col Int Sci303, 99.pdf](2006/J%20Col%20Int%20Sci303,%2099.pdf)

Abstract: Amine-functionalized adsorbents have attracted increasing interest in recent years for heavy metal removal. In this study, diethylenetriamine (DETA) was successfully grafted (through a relatively simple solution reaction) onto poly(glycidyl methacrylate) (PGMA) microgranules to obtain an adsorbent (PGMA-DETA) with a very high content of amine groups and the PGMA-DETA adsorbent was examined for copper ion removal in a series of batch adsorption experiments. It was found that the PGMA-DETA adsorbent achieved excellent adsorption performance in copper ion removal and the adsorption was most effective at pH > 3 in the pH range of 1-5 examined. X-ray photoelectron spectroscopy (XPS) revealed that there were different types of amine sites on the surfaces of the PGMA-DETA adsorbent but copper ion adsorption was mainly through forming surface complexes with the neutral amine groups on the adsorbent, resulting in better adsorption performance at a higher solution pH value.-The adsorption isotherm data best obeyed the Langmuir-Freundlich model and the adsorption capacity reached 1.5 mmol/g in the case of pH 5 studied. The adsorption process was fast (with adsorption equilibrium time less than 1-4 h) and closely followed the pseudo-second-order kinetic model. Desorption of copper ions from the PGMA-DETA adsorbent was most effectively achieved in a 0.1 M dilute nitric acid solution, with 80% of the desorption being completed within the first 1 min. Consecutive adsorption-desorption experiments showed that the PGMA-DETA adsorbent can be reused almost without any loss in the adsorption capacity. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Poly(Glycidyl Methacrylate) Granules, Diethylenetriamine, Surface Grafting, Adsorption, Copper Ion Removal, Transfer Radical Polymerization, Divalent Metal-Ions, Aqueous-Solutions, Activated Carbon, Hydrogel Beads, Textural Properties, Removal, Equilibrium, Chitosan, Sorption

? Chen, Y.X., Liu, S.Y. and Wang, G.Y. (2006), Kinetics and adsorption behavior of carboxymethyl starch on *α*-alumina in aqueous medium. *Journal of Colloid and Interface Science*, **303** (2), 380-387.

Full Text: [2006\J Col Int Sci303, 380.pdf](2006/J%20Col%20Int%20Sci303,%20380.pdf)

Abstract: The adsorption of carboxymethyl starch (CMS) at the *α*-alumina/aqueous solution interface has been investigated through adsorption studies, electrokinetics mobility measurements, and FTIR spectroscopy. Zeta potential measurements show that the addition of CMS results in a more dramatic increase in the absolute zeta potential in the alkaline region, as well as a shift of the isoelectric point to lower values, indicating the adsorption of CMS from the aqueous solution onto the alumina surface. The positive hydrophilic surface sites of alumina are responsible for the adsorption of CMS molecules. The adsorption of CMS is possible after charge reversal by the addition of excess CMS. Nearly 30 min of contact time are found to be sufficient for the adsorption of CMS to reach equilibrium. CMS adsorption follows a Langmuir isotherm with adsorption capacities of 91.74 mg CMS per gram of *α*-alumina. For the adsorption of CMS, pseudo-second-order chemical reaction kinetics provides the best correlation with the experimental data. FTIR analysis indicated that CMS forms outer complexes with alumina surfaces depending on the shifting of the asymmetric and symmetric bands.

Keywords: Carboxymethyl Starch, Alumina, Zeta Potential, Adsorption Isotherm, Kinetic Model

? Sprynskyy, M., Buszewski, B., Terzyk, A.P. and Namieśnik, J. (2006), The study of selection mechanism of heavy metals (Pb2+, Cu2+, Ni2+ and Cd2+) adsorption on Clinoptilolite. *Journal of Colloid and Interface Science*, **304** (1), 21-28.

Full Text: [2006\J Col Int Sci304, 21.pdf](2006/J%20Col%20Int%20Sci304,%2021.pdf)

Abstract: The study was carried out on the heavy metals (Ni2+, Cu2+, Pb2+, Cd2+) sorption under static conditions from single-and multi-component aqueous solutions by raw and pretreated clinoptilolite. The sorption has an ion exchange nature and consists of three stages. i.e. the adsorption on microcrystals’ surface. The inversion stage and the moderate adsorption in the microcrystals’ interior. The finer clinoptilolite fractions sorb higher amounts of the metals due to relative enriching by the zeolite proper and higher cleavage. The slight difference between adsorption capacity of the clinoptilolite towards lead. copper and cadmium from single and multi-component solutions may testify to individual sorption centers of the zeolite for each metal. Decrease of nickel adsorption from multi-component solutions is probably caused by propinquity of its sorption forms to the other metals and by competition. The maximum sorption capacity towards Cd2+ is determined as 4.22 mg/g at initial concentration of 80 mg/L and towards Pb2+. Cu2+ and Ni2+ as 27.7. 25.76 and 13.03 mg/g at 800 mg/L. The sorption results fit well to the Langmuir and the Freundlich models. The second one is better for adsorption modeling at high metals concentration.

Keywords: Clinoptilolite, Sorption, Ion Exchange, Heavy Metals

? Polat, M., Sato, K., Nagaoka, T. and Watari, K. (2006), Effect of pH and hydration on the normal and lateral interaction forces between alumina surfaces. *Journal of Colloid and Interface Science*, **304** (2), 378-387.

Full Text: [2006\J Col Int Sci304, 378.pdf](2006/J%20Col%20Int%20Sci304,%20378.pdf)

Abstract: Interaction forces between alumina surfaces were measured using an AFM–colloid probe method at different pHs. For an *α*-alumina–sapphire system at acidic pH, the force curve exhibited a well-defined repulsive barrier and an attractive minimum. At basic pH, the interactive force was repulsive at all separations with no primary minimum. Lateral force measurements under the same conditions showed that frictional forces were nearly an order of magnitude smaller at basic pH than those observed at acidic pH. This behavior was attributed to the hydration of the alumina surface. Normal and lateral force measurements with the strongly hydrated *ρ*-alumina surfaces supported these findings. 2006 Elsevier Inc. All rights reserved.

Keywords: Atomic force Microscopy, Colloid Probe, Force Curve, DLVO theory

? Díaz, E., Ordóñez, S. and Vega, A. (2007), Adsorption of volatile organic compounds onto carbon nanotubes, carbon nanofibers, and high-surface-area graphites. *Journal of Colloid and Interface Science*, **305** (1), 7-16.

Full Text: [2007\J Col Int Sci305, 7.pdf](2007/J%20Col%20Int%20Sci305,%207.pdf)

Abstract: The adsorption of different alkanes (linear and cyclic), aromatics, and chlorohydrocarbons onto different nonmicroporous carbons-multiwalled carbon nanotubes (CNTs), carbon nanofibers (CNFs), and high-surface-area graphites (HSAGs)-is studied in this work by inverse gas chromatography (IGC). Capacity of adsorption was derived from the isotherms of adsorption, whereas thermodynamic properties (enthalpy of adsorption, surface free energy characteristics) have been determined from chromatographic retention data. HSAGs present the highest adsorption capacity, followed by CNTs and CNFs (although CNTs present an intermediate surface area between the two HSAG studied). Among the different adsorbates tested, benzene exhibits the highest adsorption capacity, and the same trend is observed in the enthalpy of adsorption. From surface free energy data, enthalpies of adsorption of polar compounds were divided into dispersive and specific contributions. The interactions of cyclic (benzene and cyclohexane) and chlorinated compounds (trichloroethylene, tetrachloroethylene, and chloroform) with the surfaces are mainly dispersive over all the carbons tested, CNTs being the material with the highest dispersive contribution, as was deduced also from the entropy parameter. Adsorption parameters were correlated with morphological and chemical properties of the materials. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Activated Carbons, Adsorption, Adsorption Capacity, Alkanes, Benzene, Calorimetry, Capacity, Carbon, Carbon Nanofibers, Carbon Nanotubes, Catalysts, Chemical, Chemical Properties, Chromatography, Cyclohexane, Energy, Entropy, Fibers, Gas Chromatography, High-Surface-Area Graphites, Hydrodechlorination, Hydrogen Adsorption, Interactions, Inverse Gas Chromatography, Inverse Gas-Chromatography, Isotherms, Materials, Organic, Organic Compounds, Parameters, Polar, Properties, Retention, Storage, Surface, Surface Area, Surface Free Energy, Surfaces, Tetrachloroethylene, Thermodynamic, Thermodynamic Properties, Trend, Volatile, Volatile Organic Compounds, Zeolites

? Lv, L., Wang, K. and Zhao, X.S. (2007), Effect of operating conditions on the removal of Pb2+ by microporous titanosilicate ETS-10 in a fixed-bed column. *Journal of Colloid and Interface Science*, **305** (2), 218-225.

Full Text: [2007\J Col Int Sci305, 218.pdf](2007/J%20Col%20Int%20Sci305,%20218.pdf)

Abstract: The breakthrough behavior of Pb2+ in an ETS-10 fixed bed was experimentally examined at various operating conditions. Results showed that the adsorption amount of Pb2+ ions per unit mass of ETS-10 particles in a column is about 1.68 mmol/g under the experimental conditions. This amount was not markedly affected by the operating conditions because of the rapid adsorption rate of Pb2+ ions on ETS-10. In the presence of competitive metal ions, the amount of Pb2+ adsorbed on ETS-10 was slightly reduced. An overshoot of the effluent concentrations of competitive metal ions Cu2+ and Cd2+ was observed in the adsorption systems of binary and ternary solutions. This is ascribed to the replacement of pre-adsorbed Cu2+ and Cd2+ ions by Pb2+ ions. The ETS-10 column broken up by Pb2+ ions can be regenerated by using an EDTA-Na-2 solution and the regenerated column can be reused. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption, Adsorption Rate, Behavior, Concentrations, Cu2+, Effluent, Fixed Bed, Heavy Metal Ions, Metal, Metal Ions, Metal-Ions, Microporous, Microporous Titanosilicate ETS-10, Operating Conditions, Particles, Regeneration, Removal, Replacement, Zeolite

? Zhang, J.S., Stanforth, R.S. and Pehkonen, S.O. (2007), Effect of replacing a hydroxyl group with a methyl group on arsenic(V) species adsorption on goethite (alpha-FeOOH). *Journal of Colloid and Interface Science*, **306** (1), 16-21.

Full Text: [2007\J Col Int Sci306, 16.pdf](2007/J%20Col%20Int%20Sci306,%2016.pdf)

Abstract: Arsenate and methylated arsenicals, such as dimethylarsinate (DMA) and monomethylarsonate (MMA), are being found with increasing frequency in natural water systems. The mobility and bioavailability of these arsenic species in the environment are strongly influenced by their interactions with mineral surface, especially iron and aluminum oxides. Goethite (alpha-FeOOH), one of the most abundant ferric (hydr)oxides in natural systems, has a high retention capacity for arsenic species. Unfortunately, the sorption mechanism for the species is not completely understood, which limits our ability to model their behavior in natural systems. The purpose of this study is to investigate the effect of replacing a hydroxyl croup with a methyl group on the adsorption behaviors of arsenic (V) species using adsorption edges. the influence of the background electrolyte on arsenic adsorption, and their effect on the zeta potential of goethite. The affinity of the three species to the goethite surface decreases in the order of ASO(4) = MMA > DMA. The uptake of DMA and MMA is independent of the concentration of background electrolyte, indicating that both species form inner-sphere complexes on the goethite surface and the most charge of adsorbed DMA and MMA locates at the surface plane. Arsenate uptake increases with increasing concentrations of background electrolyte at pH above 4, possibly due to that the charge of adsorbed arsenate is distributed between the surface plane and another electrostatic plane. DMA and lower concentrations of MMA have small effect on the zeta potential, whereas the zeta potential of goethite decreases in the presence of arsenate. The small effect on zeta potential of DMA or MMA adsorption suggests that the sorption sites for the anions is not important in controlling the surface charge. This observation is inconsistent with most adsorption models that postulate a singly coordinated hydroxyls contributing to both the adsorption and the surface charge, but supports the thesis that the charge on the goethite surface comes primarily from protonation of the triply bound oxygen atoms on the surface. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aluminum, Anions, Arsenate, Arsenic, Arsenic(V), Behavior, Bioavailability, Capacity, Chromate Retention Mechanisms, Competitive Adsorption, Complexes, Concentration, Concentrations, DMA, Electrolyte, Environment, Ferrihydrite, Goethite, Group, Hydroxyl, Interactions, Ion Adsorption, Iron, Iron-Oxides, Mechanism, Mineral, MMA, Mobility, Model, Models, Natural, Natural Water, Observation, Oxides, Oxygen, pH, Phosphate Adsorption, Protonation, Retention, Retention Capacity, Sites, Soils, Sorption, Sorption Mechanism, Supports, Surface, Uptake, Water, Well-Water, Zeta Potential, Zeta-Potential

? Das, M.R. and Mahiuddin, S. (2007), The influence of functionality on the adsorption of *p*-hydroxy benzoate and phthalate at the hematite–electrolyte interface. *Journal of Colloid and Interface Science*, **306** (2), 205-215.

Full Text: [2007\J Col Int Sci306, 205.pdf](2007/J%20Col%20Int%20Sci306,%20205.pdf)

Abstract: Kinetics of adsorption of *p*-hydroxy benzoate and phthalate on hematite–electrolyte interface were investigated at a constant ionic strength, I = 5×10-4 mol dm-3, pH 5 and at three different temperatures. The state of equilibrium for the adsorption of *p*-hydroxy benzoate onto hematite surfaces was attained at 70 h, whereas it was 30 h for phthalate–hematite system. None of the three kinetics models (Bajpai, pseudo first order and pseudo second order) is applicable in the entire experimental time period; however, the pseudo second order kinetics model is considered to be better than the pseudo first order kinetics model in estimating the equilibrium concentration both the *p*-hydroxy benzoate–hematite and phthalate–hematite systems. The variation of adsorption density of *p*-hydroxy benzoate and phthalate onto hematite surfaces as a function of concentration of adsorbate was studied over pH range 5–9 at a constant ionic strength, I = 5×10-4 mol dm-3 and at constant temperature. The adsorption isotherms for both the systems were Langmuir in nature and the maximum adsorption density (*Γ*max) of *p*-hydroxy benzoate is not, vert, similar1.5 times more than that of phthalate on hematite at pH 5 and 30 °C in spite of an additional carboxylic group at ortho position in phthalate. This is due to the more surface area coverage by phthalate than that of *p*-hydroxy benzoate on hematite surface. The activation energy was calculated using Arrhenius equation and the activation energy for adsorption of *p*-hydroxy benzoate at hematite–electrolyte interface is ~1.8 times more than that of phthalate–hematite system. The negative Gibbs free energy indicates that the adsorption of *p*-hydroxy benzoate and phthalate on hematite surfaces is favourable. The FTIR spectra of *p*-hydroxy benzoate and phthalate after adsorption on hematite surfaces were recorded for obtaining the bonding properties of adsorbates. The phenolic *ν*C－O appears at ~1271 cm−1 after adsorption of *p*-hydroxy benzoate on hematite surfaces, which shifted by 10 cm−1 to higher frequency region. The phenolic group is not deprotonated and is not participating in the surface complexation. The shifting of the *ν*as(－COO−) and *ν*s(－COO−) bands and non-dissolution of hematite suggest that the *p*-hydroxy benzoate and phthalate form outer-sphere surface complex with hematite surfaces in the pH range of 5–7.

Keywords: Adsorption, p-Hydroxy Benzoate, Phthalate, Hematite, FTIR, Kinetics

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Full Text: [2007\J Col Int Sci307, 9.pdf](2007/J%20Col%20Int%20Sci307,%209.pdf)

Abstract: A spent bleaching earth from an edible oil refinery was treated by impregnation with a normal sodium hydroxide solution followed by mild thermal treatment (100 °C). The obtained material (TSBE) was washed, dried, and characterized by X-ray diffraction, FTIR, SEM, BET, and thermal analysis. The clay structure was not apparently affected by the treatment and the impregnated organic matter was quantitatively removed. We have investigated the comparative sorption of safranine and Methylene blue on this material, the spent bleaching earth (SBE), and the virgin bleaching earth (VBE). The kinetic results fit the pseudo-second-order kinetic model and the Weber and Morris intraparticle diffusion model. The pH had no effect on the sorption efficiency. The sorption isotherms followed the Langmuir model for various sorbent concentrations with good values of the determination coefficient. A linear relationship was found between the calculated maximum removal capacity and the solid/solution ratio. A comparison between the results obtained with this material and those of the literature highlighted the low cost and the good removal capacity of treated spent bleaching earth.

Keywords: Acid, Activated Carbon, Adsorption, Analysis, Basic Dyes, Bleaching, Capacity, Clay, Concentrations, Cost, Determination, Diffusion, Dyes, Earth, Edible Oil, Efficiency, FTIR, Impregnation, Isotherms, Kinetic, Kinetic Model, Langmuir, Low, Matter, Methylene Blue, Methylene-Blue, Model, Oil, Oil Refinery, Organic, Organic Matter, Organic-Dyes, pH, Pseudo-Second-Order, Removal, Rice-Husk, Sem, Sodium, Sodium Hydroxide, Sorption, Sorption Efficiency, Sorption Isotherms, Spent Bleaching Earth, Structure, Thermal Analysis, Thermal Treatment, Treatment, Water, X-Ray Diffraction

? Antonio, P., Iha, K. and Suárez-Iha, M.E.V. (2007), Kinetic modeling of adsorption of di-2-pyridylketone salicyloylhydrazone on silica gel. *Journal of Colloid and Interface Science*, **307** (1), 24-28.

Full Text: [2007\J Col Int Sci307, 24.pdf](2007/J%20Col%20Int%20Sci307,%2024.pdf)

Abstract: The kinetics of DPKSH (di-2-pyridylketone salicyloylhydrazone) adsorption onto silica gel has been investigated at 25±1°C and pH 1 and 4.7. The kinetics of adsorption of DPKSH is discussed using three kinetic models, the first-order Lagergren model, the pseudo-second-order model, and the intraparticle diffusion model. The adsorption of DPKSH, at pH 1 and 4.7, onto silica gel proceeds according to the pseudo-second-order model and the correlation coefficients were very close to 1. The intraparticle diffusion of DPKSH molecules within the silica gel particles was identified as the rate-limiting step. The parameters of the pseudo-second-order model are *q*max,calc=1.02×10−4 and 1.5×10−4 g DPKSH/g silica; *k*2=3.01×104 and 9.67×104 h-1 silica/g DPKSH, respectively, for pH 1 and 4.7.

Keywords: Adsorption, Aqueous-Solutions, Correlation, Diffusion, DPKSH, Dyes, Gel, Ketone Salicyloylhydrazone, Kinetic, Kinetic Models, Kinetics, Kinetics of Adsorption, Metal-Ions, Model, Modeling, Models, Parameters, Particles, pH, Pseudo-Second-Order, Rate Limiting, Removal, Silica, Silica Gel, Sorption, Wastes, Water

? Chia, C.H., Duong, T.D., Nguyen, K.L. and Zakaria, S. (2007), Thermodynamic aspects of sorption of Fe2+ onto unbleached kraft fibres. *Journal of Colloid and Interface Science*, **307** (1), 29-33.

Full Text: [2007\J Col Int Sci307, 29.pdf](2007/J%20Col%20Int%20Sci307,%2029.pdf)

Abstract: The sorption of Fe2+ onto unbleached kraft fibre was investigated at different conditions such as pH, temperature, and concentrations. The sorption, which increased with concentration and temperature, followed the Langmuir isotherm. Thermodynamically, the process was spontaneous and endothermic. It was found that the precipitation of Fe2+ was highly dependent on pH and reached 100% when pH exceeded similar to 8. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aqueous-Solutions, Bentonite, Concentration, Concentrations, Equilibrium, Exchange, Isotherm, Kinetics, Kraft Pulp, Langmuir, Langmuir Isotherm, Langmuir Isotherms, Metal-Ions, pH, Precipitation, Process, Pulp Suspensions, Removal, Sorption, Temperature

? Boudesocque, S., Guillon, E., Aplincourt, M., Marceau, E. and Stievano, L. (2007), Sorption of Cu(II) onto vineyard soils: Macroscopic and spectroscopic investigations. *Journal of Colloid and Interface Science*, **307** (1), 40-49.

Full Text: [2007\J Col Int Sci307, 40.pdf](2007/J%20Col%20Int%20Sci307,%2040.pdf)

Abstract: The sorption of Cu on five vineyard soils was examined via macroscopic and spectroscopic investigations. The composition of the soils was previously determined using X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS). X-ray absorption spectroscopy (XAS) was employed to determine the metal environment with regard to the identity and interaction of the nearest atomic neighbors, the bond distances, and the coordination numbers. The five soils present similar sorption properties and there is no XAS evidence that the nature of the soil samples affects the local chemical environment of Cu(II). The kinetics of the Cu sorption reactions is rapid, with the equilibrium loading of Cu on the surface achieving approximately 200 mu mol g-1, i.e., 12.7 mg g-1. The XAS data indicate that Cu is adsorbed in the form of inner-sphere complexes with first shell Cu-O parameters of four equatorial Cu-O bonds equal to 1.93 angstrom and two axial Cu-O bonds at 2.43 angstrom. This is in accordance with a Jahn-Teller distorted octahedron environment around copper. Our results provide evidence of the complexation of Cu(II) onto soil organic matter coated with an inorganic surface (quartz, clay, and goethite). (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Absorption, Absorption Spectroscopy, Chemical, Clay, Complexation, Complexes, Composition, Coordination, Copper, Copper(II) Complexes, Cu, DRX, Electron-Paramagnetic-Resonance, Environment, Equilibrium, EXAFS, Goethite, Humic Substances, Identity, Inorganic, Interaction, Investigations, Kinetics, Loading, Local, Matter, Metal, Organic, Organic Matter, Organic-Matter, Parameters, Photoelectron Spectroscopy, Photoelectron-Spectroscopy, Properties, Soil, Soil Organic Matter, Soils, Sorption, Sorption Properties, Spectroscopy, Surface, Vineyard, X-Ray Absorption Spectroscopy, X-Ray Diffraction, X-Ray Photoelectron Spectroscopy, X-Ray-Absorption, Xanes, Xps, Xrd

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Full Text: [2007\J Col Int Sci307, 309.pdf](2007/J%20Col%20Int%20Sci307,%20309.pdf)

Abstract: The use of a natural palygorskite clay for the removal of Pb(II) from aqueous solutions for different contact times, pHs of suspension, and amounts and particle sizes of palygorskite clay were investigated. The variations of the pH value of Pb(II) solutions on natural palygorskite in the adsorption process were determined. Batch adsorption kinetic experiments revealed that the adsorption of Pb(II) onto palygorskite clay involved fast and slow processes. It was found that the adsorption mechanisms in the lead/palygorskite system follow pseudo-second-order kinetics with a significant contribution from film diffusion. SEM observations demonstrated that an important interaction at the lead–granule interface occurred during the adsorption process. The adsorption isotherms were described by means of the Langmuir and Freundlich isotherms and the Langmuir model represents the adsorption process better than the Freundlich model. The maximum adsorption capacity of Pb(II) onto natural palygorskite was 104.28 mg g−1.

Keywords: Adsorption, Adsorption Capacity, Adsorption Isotherms, Adsorption Kinetic, Adsorption Process, Capacity, Clay, Diffusion, Equilibrium, Film, Freundlich, Heavy-Metals, Interaction, Interface, Ion, Isotherm, Isothermal, Isotherms, Kinetic, Kinetics, Langmuir, Lead, Mechanisms, Model, Natural, Palygorskite, Palygorskite Clay, Particle, Pb(II), pH, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Removal, Retention, Sem, Sepiolite, Sorption, Suspension, Water, Zeolite

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Full Text: [2007\J Col Int Sci307, 317.pdf](2007/J%20Col%20Int%20Sci307,%20317.pdf)

Abstract: Illite samples from Fithian, IL were purified and saturated with Na+ ions. The acid–base surface chemistry of the Na-saturated illite was studied by potentiometric titration experiments with 0.1, 0.01, and 0.001 M NaNO3 solutions as the background electrolyte. Results showed that the titration curves obtained at different ionic strengths did not intersect in the studied pH range. The adsorption of Cd(II), Cu(II), Ni(II), Pb(II), and Zn(II) onto illite was investigated as a function of pH and ionic strength by batch adsorption experiments. Two distinct mechanisms of metal adsorption were found from the experimental results: nonspecific ion-exchange reactions at lower pH values on the basal surfaces and ‘frayed edges’ and specific adsorption at higher pH values on the mineral edges. Ionic strength had a greater effect on the ion-exchange reactions. The binding constants for the five heavy metals onto illite were determined using the least-square fitting computer program FITEQL. Linear free energy relationships were found between the surface binding constants and the first hydrolysis constants of the metals.

Keywords: Adsorption, Base Surface-Chemistry, Binding, Cadmium, Cd(II), Citric-Acid, Clay-Minerals, Constant Capacitance Model, Copper, Electrolyte, Energy, Function, Heavy Metals, Hydrolysis, Illite, Initial Concentration, Ion Exchange, Ion-Exchange, Ionic Strength, Ionic-Strength, Kaolinite, Lead, Linear Free Energy Relationships, Mechanisms, Metal, Metal Adsorption, Metals, Mineral, Montmorillonite, Muloorina Illite, Ni(II), Nickel, Pb(II), pH, Ph Values, Potentiometric, Potentiometric Titration, Program, Range, Saturated Marblehead Illite, Sorption, Strength, Strengths, Surface, Surface Chemistry, Surface Complexation, Surfaces, Titration, Zinc

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Full Text: [2007\J Col Int Sci307, 326.pdf](2007/J%20Col%20Int%20Sci307,%20326.pdf)

Abstract: The wheat husk, an agricultural by-product, has been activated and used as an adsorbent for the adsorption of Reactofix Navy Blue 2 GFN from aqueous solution. In this work, adsorption of Reactofix Navy Blue 2 GFN on wheat husk and charcoal has been studied by using batch studies. The equilibrium adsorption level was determined to be a function of the solution pH, adsorbent dosage, dye concentration and contact time. The equilibrium adsorption capacities of wheat husk and charcoal for dye removal were obtained using Freundlich and Langmuir isotherms. Thermodynamic parameters such as the free energies, enthalpies and entropies of adsorption were also evaluated. Adsorption process is considered suitable for removing color, COD from waste water.

Keywords: Acid Dyes, Activated Carbon, Adsorbent, Adsorption, Agricultural, Azo Dyes, Basic-Dyes, Charcoal, COD, Color Removal, Concentration, Desorption, Dosage, Dye, Dye Removal, Equilibrium, Freundlich, Function, Industry, Isotherms, Langmuir, Parameters, pH, Reactofix Navy Blue 2 GFN, Removal, Solution pH, Sorption, Techniques, Textile Effluents, Waste, Waste Water, Water, Wheat, Wheat Husk

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Full Text: [2007\J Col Int Sci307, 333.pdf](2007/J%20Col%20Int%20Sci307,%20333.pdf)

Abstract: Selenite adsorption on water-washed manganese nodule leached residues (WMNLR) was studied with the aim of detoxifying industrial effluents before their safe disposal into the environment. WMNLR, a solid waste material, was characterized with the help of XRD, FTIR, TG-DTA, pHpzc, BET surface area, surface oxygen, surface hydroxyl group, and chemical analyses. The adsorption behavior of WMNLR toward selenite was studied as a function of time, pH, temperature, and concentration of adsorbate and adsorbent. Increased adsorption capacity with rise in temperature indicates that the adsorption process was endothermic in nature. Based on the thermodynamic parameters such as the Gibbs free energy change, standard enthalpy change, and standard entropy change, the adsorption process was found to be spontaneous and endothermic in nature. Adsorption followed second-order kinetics. The adsorption capacity of the material was found to be 54.6 mg g−1 at 60 mg L−1 of selenite concentration at pH 5 in 3 h contact time.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption Process, Aqueous-Solution, Behavior, California, Capacity, Chemical, Competitive Adsorption, Concentration, Disposal, Effluents, Energy, Entropy, Environment, FTIR, Function, Group, Hydroxides, Hydroxyl, Industrial, Industrial Effluents, Kaolinite, Kinetics, Langmuir Isotherm, Manganese, Manganese Nodule Leached Residues, Oxygen, Parameters, pH, Phosphate Adsorption, Removal, Residues, San-Joaquin Valley, Second-Order Kinetics, Selenite, Solid Waste, Sorption, Standard, Surface, Surface Area, Temperature, Thermodynamic, Thermodynamic and Kinetic Parameters, Thermodynamic Parameters, Waste, XRD

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Full Text: [2007\J Col Int Sci307, 398.pdf](2007/J%20Col%20Int%20Sci307,%20398.pdf)

Abstract: A comparative study between Langmuir and Gibbs monolayers of a hyperbranched polyol, poly(propylene glycol) homopolymers, and poly(propylene glycol)-poly(ethylene glycol) copolymers with different structure and molecular weight, is reported. Dynamic surface tension (DST) and surface pressure measurements have been carried out to characterize these amphiphilic water-soluble polymers. The adsorption kinetics results are consistent with a rapid diffusion stage followed by a slow reorganization at the air-water interface. The characteristic times of these steps, calculated by the Joos model, point out differences among the polymers in the diffusion rate and rearrangement mechanisms for diluted solutions. Short time analysis of DST data leads to diffusion coefficients in qualitative agreement with the diffusion times calculated with Joos’ model. Spread monolayers remain stable for long periods of time. The desorption process seems quite inoperative. As a consequence, the surface pressure of the spread monolayers can be studied over a broad surface concentration range. 2D first-order phase transitions have been evidenced from plateaux observed in Langmuir and Gibbs isotherms. It has been found that Gibbs monolayers lead to lower surface tension states than the Langmuir ones. (c) 2006 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Kinetics, Air-Water Interface, Air, Water Interface, Analysis, Comparative Study, Concentration, Continuous-Flow Tensiometry, Copolymers, Desorption, Diffusion, Dilational Viscoelasticity, Equilibrium, Films, Flexible Proteins, Hexadecane, Water Interface, Interface, Isotherms, Kinetics, Langmuir, Lead, Measurements, Mechanisms, Model, Monolayer, Phase Transition, Poly(Ethylene Oxide) Monolayers, Polymers, Pressure, Properties, Qualitative, Range, Reorganization, Shear, Sodium Poly(Styrenesulfonate), Structure, Surface, Surface Tension, Surfactant, Surfactant Polymer, Symmetric Triblock Copolymers

? Yan, L.G., Shan, X.Q., Wen, B. and Zhang, S.Z. (2007), Effect of lead on the sorption of phenol onto montmorillonites and organo-montmorillonites. *Journal of Colloid and Interface Science*, **308** (1), 11-19.

Full Text: [2007\J Col Int Sci308, 11.pdf](2007/J%20Col%20Int%20Sci308,%2011.pdf)

Abstract: The effect of lead (Pb) on the sorption of phenol onto montmorillonite-based sorbents was studied using a batch equilibration method when phenol and Pb were sorbed simultaneously and either Pb or phenol was previously sorbed. The sorbents were Na+-, Ca2+-, hexadecyl trimethylammonium (HDTMA)-Na+-, and HDTMA-Ca2+-montmorillonites. Pb diminished the sorption of phenol largely onto Na+- or Ca2+-montmorillonites, while phenol had little effect on the sorption of Pb onto all sorbents. Pb had no effect on the sorption of phenol onto HDTMA-Na+- or HDTMA-Ca2+-montmorillonites either. The sorption capacity of phenol followed the order HDTMA-Na+- > HDTMA-Ca2+- > Na+- > Ca2+-montmorillonites. The pseudo-second-order equation described the kinetics of phenol sorption well. Sorption isotherms of phenol followed the Freundlich equation. Phenol sorption on HDTMA-Na+- and HDTMA-Ca2+-montmorillonites was linear, while that on Na+- and Ca2+-montmorillonites was nonlinear.

Keywords: Adsorbents, Adsorption, Bentonite, Capacity, Chlorobenzene, Clays, Contaminants, Freundlich, Glyphosate, Isotherms, Kinetics, Lead, Na+-, Ca2+-, Hdtma-Na+-, and Hdtma-Ca2+-Montmorillonites, Organobentonite, P-Nitrophenol, Pb, Phenol, Sorbed, Sorption, Sorption Capacity, Sorption Kinetics, Water

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Full Text: [2007\J Col Int Sci308, 40.pdf](2007/J%20Col%20Int%20Sci308,%2040.pdf)

Abstract: The adsorption of phosphate on goethite is generally modeled by assuming a simple ligand exchange reaction with surface hydroxyl groups. This study investigates the binding forms of phosphate on goethite by evaluating the proton interaction and surface charge change during phosphate adsorption. It is found that OH− release stoichiometry increases with phosphate coverage, which suggests that different mechanisms predominate at different phosphate loadings. It demonstrates that surface binding changes from monodentate complexation to bidentate complexation with increasing surface phosphate coverage. The net OH− release accompanying this transformation is best interpreted with a 2pKa multisite model.

Keywords: Phosphate, Goethite, Adsorption, OH− Release Stoichiometry, Monodentate Complex, Bidentate Complex

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Full Text: [2007\J Col Int Sci308, 53.pdf](2007/J%20Col%20Int%20Sci308,%2053.pdf)

Abstract: Phosphate adsorption on hematite was characterized as a function of pH (3.5–8.9) and phosphate concentration (5–500 μM) by in situ ATR-FTIR spectroscopy. Under most conditions a mixture of different (inner-sphere) phosphate complexes existed at the hematite surface, with the relative importance of these complexes varying with pH and surface coverage. Experiments using D2O and H2O indicated the presence of two protonated phosphate surface complexes at pH/pD = 3.5–7.0. Comparison to spectra of protonated aqueous phosphate species suggested that these surface complexes are monoprotonated. The difference in the IR spectra of these complexes is tentatively interpreted to result from a different surface coordination, with one surface complex coordinated in a monodentate binuclear (bridging) fashion, and the second as a monodentate mononuclear complex. Alternatively, the bridging complex may be a (protonated) monodentate mononuclear complex exhibiting strong hydrogen bonding to an adjacent surface site, and the second species a monodentate complex exhibiting limited hydrogen bonding. Formation of the bridging complex is favored at lower pH values and higher surface loadings in the 3.5–7.0 pH range. At the highest pH values studied (8.5–9.0) a third complex, interpreted to be a nonprotonated monodentate mononuclear complex, is present along with the monodentate monoprotonated surface species. The importance of the nonprotonated monodentate complex increases with increasing surface coverage at these high pH values.

Keywords: Adsorption, ATR-FTIR Spectroscopy, Phosphate, Hematite, In Situ, Speciation, Protonation, Surface Complexation

? Hu, Q.H., Xu, Z.P., Qiao, S.Z., Haghseresht, F., Wilson, M. and Lu, G.Q. (2007), A novel color removal adsorbent from heterocoagulation of cationic and anionic clays. *Journal of Colloid and Interface Science*, **308** (1), 191-199.

Full Text: [2007\J Col Int Sci308, 191.pdf](2007/J%20Col%20Int%20Sci308,%20191.pdf)

Abstract: We report the preparation and characterization of a novel nanocomposite adsorbent for anionic dye removal. The nanocomposite adsorbent was prepared by heterocoagulation of delaminated bentonite and layered double hydroxide (LDH) colloids. The effects of preparation conditions, LDH loading, particle size, and calcination temperature of the modified material on the physicochemical properties of this composite adsorbent have been investigated. The optimal conditions for best Reactive Yellow 2 (RY2) dye removal efficiency are a weight ratio of LDH to bentonite of 1:1, LDH particle size 100 nm, and calcination temperature 673 K. The adsorption equilibrium data can be fitted well by the widely accepted adsorption isotherm models.

Keywords: Color removal, Adsorbent, Bentonite, Layered Double Hydroxide, Clay

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Full Text: [2007\J Col Int Sci308, 438.pdf](2007/J%20Col%20Int%20Sci308,%20438.pdf)

Abstract: The defluoridation capacity (DC) of a chelating resin, namely Indion FR 10 (IND), and Ceralite IRA 400 (CER), an anion-exchange resin, were compared under various equilibrating conditions for the identification of selective sorbent. The results showed that chelating resin is more selective than an anion-exchange resin for fluoride removal. The fluoride sorption was reasonably explained using Freundlich and Langmuir isotherms. The surface morphology of resins before and after fluoride sorption was observed using scanning electron microscopy (SEM). Fourier transform infrared spectroscopy (FTIR) was used for the determination of functional groups responsible for fluoride sorption. Various thermodynamic parameters such as Δ*G*0, Δ*H*0, Δ*S*0, and *E*a have been calculated to understand the nature of sorption. The sorption kinetic mechanism was studied with reaction-based and diffusion-based models. The sorption process was found to be controlled by pseudo-second-order and particle diffusion models. The performance of the resins studied has been tested with field samples collected from a fluoride-endemic area.

Keywords: Adsorption, Anion Exchange, Aqueous-Solution, Bone Char, Cadmium Ions, Capacity, Ceralite IRA 400, Copper Ions, Determination, Diffusion, Electron Microscopy, Fluoride, Fourier Transform Infrared Spectroscopy, Freundlich, FTIR, Functional Groups, Functional-Groups, Groups, Identification, Indion FR 10, Infrared Spectroscopy, Ion Exchange, Isotherms, Kinetic, Kinetic Mechanism, Langmuir, Mechanism, Metal-Ions, Microscopy, Models, Morphology, Parameters, Particle, Particle Diffusion, Performance, Pore Diffusion, Pseudo-First Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Resins, Scanning Electron Microscopy, Selective, SEM, Sorption, Spectroscopy, Sphagnum Moss Peat, Surface, Surface Morphology, Thermodynamic, Thermodynamic Parameters, Tree Fern

? Cestari, A.R., Vieira, E.F.S., Vieira, G.S. and Almeida, L.E. (2007), Aggregation and adsorption of reactive dyes in the presence of an anionic surfactant on mesoporous aminopropyl silica. *Journal of Colloid and Interface Science*, **309** (2), 402-411.

Full Text: [2007\J Col Int Sci309, 402.pdf](2007/J%20Col%20Int%20Sci309,%20402.pdf)

Abstract: A surface tension technique was used to determine the critical aggregation concentration (cac) of a yellow and a red dye in relation to the presence of the anionic surfactant sodium dodecylbenzene sulfonate (DBS) and to temperature changes in buffered aqueous solutions. The cac values of the yellow dye increase from 25 to 45 °C (from 41.37 to 50.32 mg L−1) and decrease from 45 to 55 °C (from 50.32 to 38.72 mg L−1). The cac values for the red dye/DBS aggregates decrease (from 124.52 to 88.50 mg L−1) from 25 to 55 °C. Adsorption of the two dyes onto a mesoporous aminopropyl silica (Sil–NH2) was also studied. The adsorption of the yellow dye increases with an increase in temperature from 25 to 55 °C. In the presence of DBS the adsorption on Sil–NH2 for the yellow dye decreases, and for the red dye increases from 25 to 55 °C. Adsorptions occurred below and above the cac of the anionic dyes/DBS aggregates. Adsorption of the dyes onto Sil–NH2 fitted well to the Langmuir, Freundlich, and Redlich–Peterson adsorption models. However, in the presence of DBS, only the Freundlich model fit the experimental adsorption data at low dye concentrations (less than 400 mg L−1). In this case, the Redlich–Peterson model was only fitted to the red dye adsorption data. The magnitude of the Dubinin–Radushkevich energetic parameters (*E*, from 7.00 to 15.00 kJ mol−1) indicates that the adsorption of the dyes onto Sil–NH2, in the absence and in the presence of DBS, is controlled by water adsorbed/dye in solution ion-exchange interactions. It is observed that the values of Δads*H* are positive for both dyes and the values are quite similar to each other. The exception is the adsorption of the yellow dye in the presence of DBS, which is slightly exothermic. The Δads*G* values are all negative. However, the interactions of the dyes with Sil–NH2 silica are more spontaneous in the presence of the surfactant. The positive adsorption entropy values (Δads*S*) for the interaction of the dyes suggest that entropy is a driving force of the dye adsorptions. However, the entropic contribution is higher for the adsorptions in the presence of DBS. It was suggested that the chemical structures of the dyes play an important role in the formation of the dye/DBS aggregates and in dye adsorption onto the aminopropyl silica.

Keywords: Silica Gel, Aminopropyl Silica, Dye/Surfactant Aggregations, Adsorption Thermodynamics

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Full Text: [2007\J Col Int Sci309, 485.pdf](2007/J%20Col%20Int%20Sci309,%20485.pdf)

Abstract: An experimental study was performed to determine the feasibility of using hexadecyltrimethylammonium bentonite clay (HDTMA-clay) and benzyltriethylammonium bentonite clay (BTEA-clay) for simultaneous sorption of benzene and one of four heavy metals (Pb, Cd, Zn and Hg). Specifically, the role of competition between benzene and each heavy metal was studied. The sorption of Pb, Cd, and Zn on both BTEA- and HDTMA-clay decreases in the presence of benzene relative to the sorption obtained without benzene present. This indicates that there is competition between Pb, Cd, and Zn and organic compounds during sorption onto both organoclays. On BTEA-clay, Cd, Pb and Zn sorption was reduced by 24, 37, and 51%, respectively. On HDTMA-clay, Cd, Pb, and Zn sorption was reduced by 25, 30, and 57%, respectively. Hg sorption was not affected either by the presence of benzene or by the organoclays used. The sorption of benzene onto BTEA-clay in the presence of Hg, Zn, Pb, and Cd was less than the sorption observed when no heavy metal was present. The presence of Hg resulted in the most significant decrease in sorption, causing a 59% reduction in benzene sorption. The presence of Zn, Pb, and Cd caused a 41, 35, and 31% reduction in benzene sorption, respectively. In general, sorption of benzene onto HDTMA-clay was not affected by the presence of the heavy metals, indicating there are no competitive effects observed with Zn, Cd, and Hg when HDTMA-clay was the sorbent. However, the presence of Pb did cause a 20% reduction in benzene sorption to HDTMA-clay. Both organoclays tested had dual sorptive properties for both heavy metals and an organic contaminant. While the competitive effects were greater for the BTEA clay, both organoclays are capable of simultaneously removing benzene and either Zn, Cd, Hg, or Pb from aqueous solution.

Keywords: Organoclay, Heavy Metals, Benzene, Sorption, Competition

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Full Text: J Col Int Sci310, 1

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Full Text: [2007\J Col Int Sci310, 18.pdf](2007/J%20Col%20Int%20Sci310,%2018.pdf)

Abstract: Calcium hydroxyapatite (CaHAP) and barium hydroxyapatite (BaHAP) have been prepared by a wet method from aqueous solutions with cation/P molar ratio of 1.67. The prepared particles were characterized using XRD, IR, TG–DTA and BET-N2 adsorption measurements. The potential of the synthesized hydroxyapatites to remove Zn(II) from aqueous solutions was investigated in batch reactor under different experimental conditions. Both hydroxyapatites remove Zn(II) from aqueous solutions with an efficiency higher than 98% at initial pH around 6–8. The data reveal that the initial uptake was rapid and equilibrium was established in 20 and 60 min for CaHAP and BaHAP. The sorption process follows the pseudo-first-order kinetic with a rate constant (*k*ads) equals to 1.06×10−2 and 1.91×10−2 min−1 for CaHAP and BaHAP, respectively. Zn(II) removal was quantitatively evaluated using Langmuir isotherm model and the monolayer sorption capacity (*Q*max) shows the values 102.04 and 36.62 mg g−1 for CaHAP and BaHAP clarifying the high affinity of these novel sorbents for Zn(II) ions. Kinetically, the prepared apatites are feasible sorbents retain Zn(II) ions through a favorable and spontaneous sorption process. The possibility of metal recovery and regeneration of hydroxyapatites were investigated using several eluting agents include hydrochloric acids, double distilled water, calcium chloride, barium hydroxide, and copper chloride. Different desorption levels were obtained with the different adsorbents and the maximum recovery yield was achieved with copper chloride.

Keywords: Hydroxyapatite, Characterization, Sorption, Zn(II), Desorption

? Valderrama, C., Cortina, J.L., Farran, A., Gamisans, X. and Lao, C. (2007), Kinetics of sorption of polyaromatic hydrocarbons onto granular activated carbon and Macronet hyper-cross-linked polymers (MN200). *Journal of Colloid and Interface Science*, **310** (1), 35-46.

Full Text: [2007\J Col Int Sci310, 35.pdf](2007/J%20Col%20Int%20Sci310,%2035.pdf)

Abstract: Polymeric supports are presented as an alternative to granular activated carbon (GAC) for organic contaminant removal from groundwater using permeable reactive barriers (PRB). The search for suitable polymeric sorbents for hydrocarbon extraction from aqueous streams has prompted the synthesis of new resins incorporating new functionalities or modifying the polymer network properties that solve many of the existing problems. Between them, the new type of polymeric sorbents Macronet Hypersol containing a styrene–divinylbenzene macroporous hyperreticulated network has been evaluated. Because of their potential sorptive properties, tests were conducted to determine the feasibility of using them as a low-cost reactive material for groundwater applications. The present work describes the sorption of six polycyclic hydrocarbons (PAHs) from aqueous solution onto both Macronet polymeric sorbent MN200 and granular activated carbon. Batch experiments were performed to determine loading rates of a family of PAHs (naphthalene, fluorene, anthracene, acenaphthene, pyrene, and fluoranthene), from a simple two-rings PAH (naphthalene) up to a four-ring PAH (pyrene). The behavior of a non-functionalized Macronet support (MN200) was compared with the behavior of a recognized material, granular activated carbon (GAC). Analyses of the respective rate data with three theoretical models (pseudo-first- and pseudo-second-order reaction models and the Elovich model) were used to describe the PAH sorption kinetics. Sorption rate constants were determined by graphical analysis of the proposed models. The study showed that sorption systems followed a pseudo-first-order reaction model, although the pseudo-second-order reaction model provides an acceptable description of the sorption process. Graphical analysis showed that the sorption process with activated carbon is a more complex process than the one observed for hyper-cross-linked polymers (MN200). A simulation of the barrier thickness needed to treat a PAH-polluted plume showed that 0.1–1 m of sorption media is enough even for high water fluxes such as 0.1–2 m3/m2/day for both sorbents.

Keywords: PAHs (naphthalene, Fluorene, Anthracene, Acenaphthene, Pyrene, and Fluoranthene), Macronet Hyper-Cross-Linked Polymers (MN200), Granular Activated Carbon, Sorption, Kinetics

? Mohan, D., Pittman, Jr., C.U., Bricka, M., Smith, F., Yancey, B., Mohammad, J., Steele, P.H., Alexandre-Franco, M.F., Gómez-Serrano, V. and Gong, H. (2007), Sorption of arsenic, cadmium, and lead by chars produced from fast pyrolysis of wood and bark during bio-oil production. *Journal of Colloid and Interface Science*, **310** (1), 57-73.

Full Text: [2007\J Col Int Sci310, 57.pdf](2007/J%20Col%20Int%20Sci310,%2057.pdf)

Abstract: Bio-char by-products from fast wood/bark pyrolyses, were investigated as adsorbents for the removal of the toxic metals (As3+, Cd2+, Pb2+) from water. Oak bark, pine bark, oak wood, and pine wood chars were obtained from fast pyrolysis at 400 and 450 °C in an auger-fed reactor and characterized. A commercial activated carbon was also investigated for comparison. Chars were sieved (>600, 600–250, 250–177, 177–149, and <149 μm) and the particle size fraction from 600 to 250 μm was used without further modification for all studies unless otherwise stated. Sorption studies were performed at different temperatures, pHs, and solid to liquid ratios in the batch mode. Maximum adsorption occurred over a pH range 3–4 for arsenic and 4–5 for lead and cadmium. Kinetic studies yielded an optimum equilibrium time of 24 h with an adsorbent dose of 10 g/L and concentration not, vert, similar100 mg/L for lead and cadmium. Sorption isotherms studies were conducted in broad concentration ranges (1–1000 ppb for arsenic, 1×10−5–5×10−3 M for lead and cadmium). Oak bark out-performed the other chars and nearly mimicked Calgon F-400 adsorption for lead and cadmium. In an aqueous lead solution with initial concentration of 4.8×10−4 M, both oak bark and Calgon F-400 (10 g/L) removed nearly 100% of the heavy metal. Oak bark (10 g/L) also removed about 70% of arsenic and 50% of cadmium from aqueous solutions. Varying temperatures (e.g., 5, 25, and 40 °C) were used to determine the effect of temperatures. The equilibrium data were modeled with the help of Langmuir and Freundlich equations. Overall, the data are well fitted with both the models, with a slight advantage for Langmuir model. The oak bark char’s ability to remove Pb(II) and Cd(II) is remarkable when considered in terms of the amount of metal adsorbed per unit surface area (0.5157 mg/m2 for Pb(II) and 0.213 mg/m2 for Cd(II) versus that of commercial activated carbon.

Keywords: Bio-Oil Char, Activated Carbon, Arsenic, Cadmium, Lead, Adsorption, Metals Removal, Bio-Oils, Bio Chars, Adsorption, Water Treatment

? Yuan, X., Zhuo, S.P., Xing, W., Cui, H.Y., Dai, X.D., Liu, X.M. and Yan, Z.F. (2007), Aqueous dye adsorption on ordered mesoporous carbons. *Journal of Colloid and Interface Science*, **310** (1), 83-89.

Full Text: [2007\J Col Int Sci310, 83.pdf](2007/J%20Col%20Int%20Sci310,%2083.pdf)

Abstract: Ordered mesoporous carbons (OMCs) with varying pore size, and microporous carbon, CFY, were synthesized using ordered mesoporous silica SBA-15 and NaY zeolite as hard templates, respectively. N-2 adsorption tests show that the synthesized OMCs possess abundant mesopores and centralized mesopore distribution. Methylene blue (MB) and neutral red (NR) were used as probe molecules to investigate their adsorption behaviors on OMCs and CFY. As evidenced by adsorption tests, the volume of mesopores of which the pore size is larger than 3.5 nm is a crucial factor for the adsorption capacity and adsorption rate of MB on OMCs. However, the most probable pore diameter of OMCs was found to be vital to the adsorption capacity and adsorption rate of NR. Theoretical studies show that the adsorption kinetics of MB and NR on OMCs can be well depicted by using pseudo-second-order kinetic model. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Ordered Mesoporous Carbon, N-2 Adsorption, Adsorption Isotherm, Adsorption Kinetics, Activated Carbons, Nanoporous Carbons, Pore Structure, Waste-Water, Silica, Copolymer, Triblock, Tires

? Bhattacharyya, K.G. and Sen Gupta, S. (2007), Adsorptive accumulation of Cd(II), Co(II), Cu(II), Pb(II), and Ni(II) from water on montmorillonite: Influence of acid activation. *Journal of Colloid and Interface Science*, **310** (2), 411-424.

Full Text: [2007\J Col Int Sci310, 411.pdf](2007/J%20Col%20Int%20Sci310,%20411.pdf)

Abstract: The present work investigates the influence of acid activation of montmorillonite on adsorption of Cd(II), Co(II), Cu(II), Ni(II), and Pb(II) from aqueous medium and comparison of the adsorption capacities with those on parent montmorillonite. The clay-metal interactions were studied under different conditions of pH, concentration of metal ions, amount of clay, interaction time, and temperature. The interactions were dependent on pH and the uptake was controlled by the amount of clay and the initial concentration of the metal ions. The adsorption capacity of acid-activated montmorillonite increases for all the metal ions. The interactions were adsorptive in nature and relatively fast and the rate processes more akin to the second-order kinetics. The adsorption data fitted both Langmuir and Freundlich isotherms, indicating that strong forces were responsible for the interactions at energetically nonuniform sites. The Langmuir monolayer capacity of the acid-activated montmoilllonite is more than that of the parent montmorillonite (Cd(II): 32.7 and 33.2 mg/g; Co(II): 28.6 and 29.7 mg/g; Cu(II): 31.8 and 32.3 mg/g; Pb(II): 33.0 and 34.0 mg/g; and Ni(Il): 28.4 and 29.5 mg/g for montmorillonite and acid-activated montmorillonite, respectively). The thermodynamics of the rate processes showed the adsorption of Co(II), Pb(II), and Ni(II) to be exothermic, accompanied by decreases in entropy and Gibbs free energy, while the adsorption of Cd(II) and Cu(II) was endothermic, with an increase in entropy and an appreciable decrease in Gibbs free energy. The results have established the potential use for montmorillonite and its acid-activated form as adsorbents for Cd(II), Co(II), Cu(II), Ni(II), and Pb(II) ions from aqueous media. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Accumulation, Acid, Acid Activation, Acid-Activated Montmorillonite, Activation, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Capacity, Adsorption Isotherm, Adsorption Kinetics, Aqueous Medium, Aqueous-Solutions, Bagasse Fly-Ash, Bed Sediments, Capacity, Cd(II), Clay, Co(II), Comparison, Concentration, Cone Biomass, Cu(II), Endothermic, Energy, Enthalpy, Entropy, Exothermic, Free Energy, Freundlich, Freundlich Isotherms, Gibbs Free Energy, Heavy-Metal Removal, Interaction, Interactions, Isotherms, Kinetics, Langmuir, Langmuir and Freundlich Isotherms, Langmuir Monolayer, Media, Metal, Metal Ions, Monolayer, Monolayer Capacity, Montmorillonite, Ni(II), Parent, Pb(II), Pb(II) Ions, pH, Pinus-Sylvestris, Rate Processes, Red Mud, Sawdust Adsorption, Second Order, Second Order Kinetics, Second-Order Kinetics, Sites, Sorption Kinetics, Sugar-Industry Waste, Temperature, Thermodynamics, Uptake, Water

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Full Text: [2007\J Col Int Sci311, 338.pdf](2007/J%20Col%20Int%20Sci311,%20338.pdf)

Abstract: This study evaluates the Cu2+ adsorption efficiency of as-produced carbon nanotubes (CNTs) and those modified by HNO3 and NaOCL The surface area, pH(pzc), pore volume, FTIR analyses, and average pore size of CNTs were determined to compare the differences between nanotubes before and after HNO3 and NaOCl modification. The HNO3 and NaOCl modifications increased the pore volume and the average pore size of CNTs; in contrast, the pHpzc was decreased. The modification processes produced some functional groups. The adsorption capacity of Cu2+ on as-produced and modified CNTs increased with the pH and temperature; however, the effects of the ionic strength on the adsorption of Cu2+ on as-produced and modified CNTs were negligible. The linear correlation coefficients of Langmuir and Freundlich isotherms were obtained and the results revealed that the Langmuir isotherm fitted the experimental results better than did the Freundlich isotherm. The adsorption capacity of Cu2+ followed the order NaOCl-modified CNTs > HNO3-modified CNTs > as-produced CNTs. Changes in the free energy of adsorption (Delta G degrees), enthalpy (Delta H degrees), and entropy (Delta S degrees) were determined. All AGO values were negative; the AHO values of as-produced, HNO3-modified, and NaOCI-modified CNTs were 10.84, 17.08, and 67.77 kJ/mol and the ASO values were 96.89, 122.88, and 319.76 J/mol K, respectively. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Carbon Nanotubes, Isotherm, Copper, Thermodynamics, Aqueous-Solutions, Competitive Adsorption, Cu(II) Adsorption, Copper(II) Ions, Waste-Water, Metal-Ions, Tree Fern, Removal, Acid-Blue-193, Parameters

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Full Text: [2007\J Col Int Sci311, 368.pdf](2007/J%20Col%20Int%20Sci311,%20368.pdf)

Abstract: The uptake rates of acids (hydrochloric acid, sulfuric acid, perchloric acid and acetic acid) by colloidal solid particles (mean diameter 0.35 μm) of DEAE (diethylaminoethyl Sephadex) resin was studied by the means of the stopped flow technique equipped with a conductivity detection. This original experimental approach allows to avoid hydrodynamics perturbations during data acquisition. For the sake of comparison NaOH uptake or K+/H+ exchange by suffonic Dowex resin particles experiments have also been performed. As stated in the literature we observed that the uptake rate limiting step is the solute diffusion in the solution layer surrounding the particles. To fit the experimental conductivity versus time curves on the basis of solutes diffusion concepts a simple mathematical equation fitting perfectly well the experimental data is proposed. The mathematical modeling of kinetic data obtained in non-stationary diffusion proposed here can substitute to the empiric pseudo-first- and -second-order models often used in environmental research. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Acetic Acid, Acid, Acids, Adsorption, Colloid Particles, Colloidal Particles, Comparison, Complexation, Conductivity, Data Acquisition, Deae, Diffusion, Environmental, Environmental Research, Equilibrium, Experimental, Experimental Data, Fitting, Flow, Hydrochloric Acid, Hydrodynamics, Ion Exchange, Ion-Exchange Kinetics, Kinetic, Kinetics, Mathematical Modeling, Metal-Ions, Micellar, Modeling, Models, Particles, Rate, Rate Limiting, Rate Limiting Step, Research, Resin, Resins, Second Order, Solutes, Stopped-Flow, Sulfuric Acid, Synthetic, Uptake

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Full Text: [2007\J Col Int Sci311, 382.pdf](2007/J%20Col%20Int%20Sci311,%20382.pdf)

Abstract: A hydrophilic hyper-cross- linked polymer resin (NDA-702) was synthesized, and the adsorption performance of dimethyl phthalate (DMP) on NDA-702 was compared with that on the commercial hydrophobic macroporous resin (Amberlite XAD-4) and granular activated carbon (AC750). The kinetic adsorption of DMP onto NDA-702 and AC-750 is limited mainly by intraparticle diffusion and obeys the pseudo-second-order rate model, while the uptake on XAD-4 is limited mainly by film diffusion and follows the pseudo- first-order rate model. All the associated adsorption isotherms are well described by the Freundlich equation, and the larger uptake and stronger affinity of NDA-702 than AC-750 and XAD-4 probably result from the microporous structure, phenyl rings, and polar groups on NDA-702 polymer matrix. An interesting observation is that in the aqueous phase all the adsorbents spontaneously adsorb DMP driven mainly by enthalpy change, but the hydrophilic nature of NDA-702 and AC-750 surfaces results in less entropy change compared to hydrophobic XAD-4. Dynamic adsorption studies show that the high breakthrough and the total adsorption capacities of NDA-702 are 388 and 559 mg per gram dry resin at 313 K. Nearly 100% regeneration efficiency for the resin was achieved by methanol at 313 K. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Acid Esters, Activated Carbon, Adsorbents, Adsorption, Adsorption, Adsorption Capacities, Adsorption Isotherms, Adsorption Performance, Affinity, Amberlite, Aqueous Phase, Breakthrough, Carbon, Degradation, Diffusion, Dimethyl Phthalate, DMP, Dynamics, Efficiency, Enthalpy, Entropy, Film, Film Diffusion, First Order, First-Order Rate Model, Freundlich, Freundlich Equation, Granular, Granular Activated Carbon, Groups, Hydrophilic, Hydrophobic, Intraparticle Diffusion, Isotherms, Kinetic, Kinetic Adsorption, Kinetics, Macroporous Resin, Methanol, Microporous, Model, Observation, Performance, Phthalate, Polar, Polymer, Polymer Resin, Porous Materials, Pseudo Second Order, Pseudo-Second-Order, Rate, Rate Model, Regeneration, Removal, Resin, Sorption, Structure, Surfaces, Uptake, Water, XAD-4

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Full Text: [2007\J Col Int Sci313, 423.pdf](2007/J%20Col%20Int%20Sci313,%20423.pdf)

Abstract: A mathematical model has been developed that could predict kinetic parameters for the adsorption of divalent cations (lead, copper and zinc) onto low-grade rock phosphate using experimental data. The experiments were conducted with the initial concentrations of metal ions ranging from 10 to 100 mg/L. The mathematical model is based on application of Freundlich isotherm to mass transfer across the film surrounding the adsorbent. A code in C programming is used to numerically integrate the model equation, and to obtain the best simulated values of Freundlich constants K, N, order of reaction n, and film transfer coefficient, a. It is observed that the adsorption of metal ions on rock phosphate is more sensitive to N, n, and a in comparison to K, and lead is adsorbed more favorably than copper and zinc. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Divalent Metal Ions, Low-Grade Rock Phosphate, Mathematical Model, Trapezoidal Method, Gradient Descent, Least Square Analysis, Freundlich Constant, Mass Transfer, Film Transfer Constant, Aqueous-Solution, Heavy-Metals, Adsorption, Lead, Zinc, Removal, Cadmium

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Full Text: [2007\J Col Int Sci313, 563.pdf](2007/J%20Col%20Int%20Sci313,%20563.pdf)

Abstract: Non-equilibrium molecular dynamic (NEMD) simulations have been used to study the kinetics of adsorption of n-butane molecules in a silicalite membrane. We have chosen this simple well-known process to demonstrate that the process is characterized by two stages, both non-isothermal. In the first stage the large chemical driving force leads to a rapid uptake of n-butane in all the membrane and a simultaneous increase in the membrane temperature, explained by the large enthalpy of adsorption, Delta H = -61.6 kJ/mol butane. A diffusion coefficient for transport across the external surface layer is calculated from the relaxation time; a value of 3.4×10-9 m2/s is found. During the adsorption, a significant thermal driving force develops across the external surface of the membrane, which leads to an energy flux out of the membrane during the second stage. In this stage a thermal conductivity of 3.4×10-4 W/Km is calculated from the corresponding relaxation time for the surface, confirming that the thermal conduction is the rate-limiting step. The aim of this paper is to demonstrate that a thermal driving force must be taken into account in addition to a chemical driving force in the description of transport in nano-porous materials. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Non-Equilibrium Molecular Dynamics Simulation, Nemd, Gas Phase Adsorption, Thermal Effects, Zeolite Adsorption, Mfi-Type Zeolites, Non-Isothermal Sorption, Monte-Carlo, Force-Field, PFG-NMR, Diffusion, Permeation, Simulation, Alkanes, Crystals

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Full Text: [2007\J Col Int Sci314, 367.pdf](2007/J%20Col%20Int%20Sci314,%20367.pdf)

Abstract: We propose a novel kinetic model for adsorption of aqueous benzene onto both granular activated carbon (GAC) and powdered activated carbon (PAC). The model is based on mass conservation of benzene coupled with three-stage adsorption: (1) the first portion for an instantaneous stage or external surface adsorption, (2) the second portion for a gradual stage with rate-limiting intraparticle diffusion, and (3) the third portion for a constant stage in which the aqueous phase no longer interacts with activated carbon. An analytical solution of the kinetic model was validated with the kinetic data obtained from aqueous benzene adsorption onto GAC and PAC in batch experiments with two different solution concentrations (C-0 = 300 mg L-1,600 mg L-1). Experimental results revealed that benzene adsorption for the two concentrations followed three distinct stages for PAC but two stages for GAC. The analytical solution could successfully describe the kinetic adsorption of aqueous benzene in the batch reaction system. showing a fast instantaneous adsorption followed by a slow rate-limiting adsorption and a final long constant adsorption. Use of the two-stage model gave incorrect values of adsorption coefficients in the analytical solution due to inability to describe the third stage. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aqueous Benzene, Granular Activated Carbon, Powdered Activated Carbon, Three-Stage Kinetic Model, Liquid-Phase Adsorption, Intraparticle Diffusion, Sorption, Phenols, Ions

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Full Text: 2007\J Col Int Sci315, 47.pdf

Abstract: Batch and column tests were performed utilizing natural siderite to remove As(V) and As(III) from water. One hundred milligrams of siderite was reacted at room temperature for up to 8 days with 50 rnL of 1000 μg/L As(V) or As(III) in 0.01 M NaCl. Arsenic concentration decreased exponentially with time, and pseudoequilibrium was attained in 3 days. The estimated adsorption capacities were 520 and 1040 μg/g for As(V) and As(III), respectively. Column studies show that effluent As was below 1.0 mu g/L after a throughput of 26,000 pore volumes of 500 mu g/L As water, corresponding to about 2000 mu g/g of As load in the filter. Results of scanning electron microscopy (SEM) and transmission electron microscopy (TEM) reveal that high As retention capacity of the filter arose from coprecipitation of Fe oxides with As and subsequently adsorption of As on the fresh Fe oxides/hydroxides. Arsenic adsorption in the filter from As-spiked tap water was relatively lower than that from artificial As Solution because high HCO3- concentration restrained siderite dissolution and thus suppressed production of the fresh Fe oxides on the siderite grains. The TCLP (toxicity characteristic leaching procedure) results suggest that these spent adsorbents were inert and could be landfilled. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aqueous-Solution, Arsenate, Arsenate, Arsenic, Arsenite, Drinking Water, Goethite, Kinetics, Lepidocrocite, Oxidation, Pore, Production, Red Mud, Removal, Removal, Retention, Sem, Tem, Toxicity, Water, Zerovalent Iron

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Full Text: [2007\J Col Int Sci315, 87.pdf](2007/J%20Col%20Int%20Sci315,%2087.pdf)

Abstract: Waste material (carbon slurry), from fuel oil-based generators, was used as adsorbent for the removal of two reactive dyes from synthetic textile wastewater. The study describes the results of batch experiments on removal of Vertigo Blue 49 and Orange DNA 13 from synthetic textile wastewater onto activated carbon slurry. The utility of waste material in adsorbing reactive dyes from aqueous solutions has been studied as a function of contact time, temperature, pH, and initial dye concentrations by batch experiments. pH 7.0 was found suitable for maximum removal of Vertigo Blue 49 and Orange DNA13. Dye adsorption capacities of carbon slurry for the Vertigo Blue 49 and the Orange DNA13 were 11.57 and 4.54 mg g-1 adsorbent, respectively. The adsorption isotherms for both dyes were better described by the Langmuir isotherm. Thermodynamic treatment of adsorption data showed an exothermic nature of adsorption with both dyes. The dye uptake process was found to follow second-order kinetics. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Acid Dyes, Activated Carbon, Activated Carbons, Adsorbent, Adsorption, Adsorption Capacities, Adsorption Isotherms, Agricultural Solid-Waste, Aqueous Solutions, Bagasse Pith, Basic-Dyes, Batch, Batch Experiments, Carbon, Carbon Slurry, Coir Pith, Color Removal, Color Removal, Concentrations, Contact Time, Dna, Dye, Dye Uptake, Dyes, Exothermic, Experiments, Function, Isotherm, Isotherms, Kinetics, Langmuir, Langmuir Isotherm, Langmuir-Isotherm, Low Cost Adsorbent, Methylene-Blue, Orange Dna 13, pH, Process, Reactive Dye, Reactive Dyes, Removal, Second Order, Second Order Kinetics, Second-Order Kinetics, Slurry, Solutions, Synthetic, Temperature, Textile, Textile Effluent, Textile Wastewater, Time, Treatment, Uptake, Utility, Vertigo Blue 49, Waste, Waste Material, Waste Treatment, Wastewater

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Full Text: 2007\J Col Int Sci315, 555.pdf

Abstract: An economical mesoporous alummosilicate was synthesized with microcline as starting material and the precursor 13X zeolite as seed for crystal structure on mesoporous walls. In this method, a mixture of microcline and Na2CO3 with a molar ratio of 1:1.05 was first calcined at 1093 K for 2.5 h. The calcined materials were mixed with 35 ml C(16)TMABr aqueous solution (containing 8.2g C(16)TMABr) and the precursors of 13X zeolite, resulting in mesoporous aluminosilicate after crystallization of the solution at 378 K for 48 h and calcination of the powder at 823 K for 5 h. The as-synthesized sample has a uniform pore diameter distribution centered at 3.7 nm. The as-synthesized sample had BET surface area of 725 m(2)/g and BJH mean pore diameter of 3.7 run. The FT-IR results revealed that the building units of 13X zeolite were inserted into the pore walls of the as-synthesized sample. The adsorption ratio of mercury(II) onto the as-synthesized adsorbent was about 95%. The adsorption process was found to be spontaneous and can be explained by particle diffusion and chemical ion-exchange mechanisms. The equilibrium concentration of mercury(II) using the as-synthesized sample as the adsorbent was under 1 mu g/L, making the concentration of mercury meet the limit for drinking water in China as recommended by the World Health Organization. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Mechanism, Aluminosilicate, Aqueous-Solutions, China, Coal Fly-Ash, Diffusion, Equilibrium, Heavy-Metals, Ion Exchange, MCM-41, Mercury(II) Adsorption, Mesoporous, Microcline, Molecular-Sieves, Pore, Precursors, Removal, Silica, Synthesis, Water, Zeolite, Zeolite-L

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Full Text: [2007\J Col Int Sci316, 224.pdf](2007/J%20Col%20Int%20Sci316,%20224.pdf)

Abstract: Using persulfate/ascorbic acid redox system, a series of Cassia grandis seed gum-graft-poly(methyl methacrylate) samples were synthesized. The copolymer samples were evaluated for lead(II) removal from the aqueous solutions where the sorption capacities were found proportional to the grafting extent. The conditions for the sorption were optimized using copolymer sample of highest percent grafting. The sorption was found pH and concentration dependent, pH 2.0 being the optimum value. Adsorption of lead by the grafted seed gum followed a pseudo-second-order kinetics with a rate constant of 4.64×10-5 g/mg/min. The equilibrium data followed the Langmuir isotherm model with maximum sorption capacity of 126.58 mg/g. The influence of electrolytes NaCl, Na2SO4 on lead uptake was also studied. Desorption with 2 N HCl could elute 76% of the lead ions from the lead-loaded copolymer. The regeneration experiments revealed that the copolymer could be successfully reused for at least four cycles though there was a successive loss in lead sorption capacity with every cycle. The adsorbent was also evaluated for Pb(II) removal from battery waste-water containing 2166 mg/L Pb(II). From 1000 times diluted waste water, 86.1% Pb(II) could be removed using 0.05 g/20 ml adsorbent dose, while 0.5 g/20 ml adsorbent dose was capable of removing 60.29% Pb from 10 times diluted waste water. Optimum Pb(II) binding under highly acidic conditions indicated that there was a significant contribution of nonelectrostatic interactions in the adsorption process. A possible mechanism for the adsorption has been discussed. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Acid, Acidic Conditions, Adsorbent, Adsorption, Adsorption Process, Aqueous Solutions, Binding, Capacity, Cassia Grandis Seed Gum, Complexes, Concentration, Copolymer, DEC, Desorption, Electrolytes, Equilibrium, Equilibrium Data, Experiments, Galactomannan, Graft-Copolymerization, Grafted, Grafting, Gum, HCl, Heavy-Metal Ions, Interactions, Ions, Isotherm, Isotherm Model, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Langmuir-Isotherm, Lead, Lead Adsorbent, Lead Ions, Lead Sorption, Lead(II), Lead(II) Removal, Maximum Sorption, Maximum Sorption Capacity, Mechanism, Methacrylate, Methyl Acrylate, Methylmethacrylate, Model, Nacl, Pb, Pb(II), Pb(II) Removal, pH, Polysaccharides, Process, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Rate, Rate Constant, Redox, Regeneration, Removal, Removing, Seed, Solutions, Sorption, Sorption Capacity, Uptake, Value, Waste, Waste Water, Waste-Water, Wastewater, Water

? Borah, J.M., Das, M.R. and Mahiuddin, S. (2007), Influence of anions on the adsorption kinetics of salicylate onto α-alumina in aqueous medium. *Journal of Colloid and Interface Science*, **316** (2), 260-267.

Full Text: [2007\J Col Int Sci316, 260.pdf](2007/J%20Col%20Int%20Sci316,%20260.pdf)

Abstract: The adsorption kinetics of salicylate on α-alumina surfaces were studied at 25 °C and pH 6 in the presence of 0.05 mM concentration of different anions (Cl−, Br−, I−, SCN−, HCOO−, CH3COO−, S2O2−3, CO2−3, and SO2−4) as a function of time. The experimental data were significantly better fitted to a pseudo-second-order kinetics equation of nonlinear form in the entire time duration and are in excellent agreement with corresponding estimated values. Considering adsorption data for salicylate in the presence of Cl− as the face value, all the monovalent anions (Br−, I−, SCN−, HCOO−, CH3COO−) promote the adsorption of salicylate onto α-alumina surfaces while the divalent anions (S2O2−3, CO2−3, and SO2−4) have the reverse effect under similar conditions. DRIFT spectra of α-alumina treated with salicylate reveal that the symmetric peak νs(COO−) is shifted by 40 cm−1 to a lower wavelength region, which implies that salicylate forms an inner-sphere complex with α-alumina surface in the presence of both mono- and divalent anions.

Keywords: Adsorption, Adsorption Kinetics, Alumina, And Ph, Anion Effect, Anions, Aqueous Medium, Behavior, Carbon, Cl-, Complex, Concentration, DEC, Drift, Experimental, Experimental Data, Function, Goethite, I-, Inner-Sphere Complex, Interface, Kinetics, Nonlinear, Organic-Acids, pH, Phthalate, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Salicylate, SCN-, Selenate, SO42-, Sorption, Spectra, Sulfate, Surface, Surfaces, Time, Value, Wavelength

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Full Text: [2007\J Col Int Sci316, 268.pdf](2007/J%20Col%20Int%20Sci316,%20268.pdf)

Abstract: This study concerns with the development of a new cation exchanger (SDGPMA-SP-COOH) carrying spacer (SP) group [-CONH-(CH2) 2-NHCO(CH2) 2-] and carboxylate functional group at the chain end. The preparation process was carried out through graft copolymerization of methacrylic acid onto sawdust, SD (a lignocellulosic residue) using ceric ammonium nitrate as an initiator. The poly(methacrylic, acid) grafted SD (SDGPMA) was subsequently treated with thionyl chloride followed by ethylenediamine (transmidation) and succinic anhydride (carboxy-functionalization) treatments. Infrared spectroscopy and potentiometric titrations were used to confirm graft copolymer formation and carboxylate functionalization. The effectiveness of the SDGPMA-SP-COOH in removing Cr(III) from water and wastewater was evaluated by the batch technique. The influence of different experimental parameters such as solution pH, contact time, absorbent dose, Cr(III) concentration and temperature on removal process was evaluated. The maximum Cr(III) removal was observed at the initial pH of 7.0. The Cr(III) was removed by SDGPMA-SP-COOH up to 99.3 and 92.6% from an initial concentration of 10 and 25 mg/L, respectively, at pH 7.0. Equilibrium time was reached within 4 h. Kinetic data were analyzed using the pseudo-first-order, pseudo-second-order and Elovich equations. The data fitted very well to the pseudo-second-order rate expression. The Langmuir, Freundlich and Temkin equations were applied to the experimental isotherm data and the Langmuir model was found to be in better correlation with the experimental data. The monolayer adsorption capacity for Cr(III) removal was found to be 36.63 mg/g. The adsorption efficiency towards Cr(III) removal was tested using simulated tannery wastewater. The adsorbed Cr(III) on SDGPMA-SP-COOH can be recovered by treating with 0.1 M HCl. Four adsorption/desorption cycles were performed without significant decrease in removal capacity. The results showed that SDGPMA-SP-COOH developed in this study exhibited considerable adsorption potential for application in removal of Cr(III) from water and wastewaters. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Absorbent, Acid, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Efficiency, Adsorption Potential, Adsorption, Desorption, Ammonium, Ammonium Nitrate, Application, Aqueous-Solutions, Batch, Capacity, Carboxylate, Cation, Cation Exchanger, Chain, Chloride, Chromium(III), Citric-Acid, Concentration, Contact Time, Copolymer, Copolymerization, Correlation, Cr(III), Cr(III) Adsorption, Dec, Desorption, Development, Effectiveness, Efficiency, Elovich, Equations, Ethylenediamine, Experimental, Experimental Data, Expression, Formation, Freundlich, Functional, Functional Group, Functionalization, Graft, Graft Copolymer, Graft Copolymerization, Grafted, Group, HCl, Hexavalent Chromium, Ion, Isotherm, Isotherm Data, Kinetics, Kinetics, Langmuir, Langmuir Model, Methacrylic Acid, Model, Monolayer, Monolayer Adsorption, Nitrate, Parameters, pH, Polyacrylamide-Grafted Sawdust, Potential, Potentiometric, Potentiometric Titrations, Preparation, Process, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Rate, Removal, Removal Process, Removing, Residue, Sawdust, Solution Ph, Sorption, Spacer, Spectroscopy, Succinic Anhydride, Tannery, Tannery Wastewater, Temperature, Thionyl Chloride, Time, Trivalent, Wastewater, Wastewaters, Water

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Full Text: [2007\J Col Int Sci316, 284.pdf](2007/J%20Col%20Int%20Sci316,%20284.pdf)

Abstract: Adsorption of a weak acid dye, methyl orange (MO) by calcined layered double hydroxides (LDO) with Zn/Al molar ratio of 3:1 was investigated. In the light of so called “memory effect,” LDO was found to recover their original layered structure in the presence of appropriate anions, after adsorption part of MO- and CO32- (come from air) intercalated into the interlayer of LDH which had been supported by XRD and ICP. The results of adsorption experiments indicate that the maximum capacity of MO at equilibrium (Q(e)) and percentage of adsorption (eta%) with a fixed adsorbent dose of 0.5 g L-1 were found to be 181.9 mg g-1 and 90.95%, respectively, when MO concentration, temperature, pH and equilibrium time were 100 mg L-1, 298 K, 6.0 and 120 min, respectively. The isotherms showed that the adsorption of MO by Zn/Al-LDO was both consistent with Langmuir and Freundlich equations. The adsorption process was spontaneous and endothermic in nature and followed pseudo-second-order kinetic model. The calculated value of E-a was found to be 77.1 kJ mol-1, which suggests that the process of adsorption of methyl orange is controlled by the rate of reaction rather than diffusion. The possible mechanism for MO adsorption has also been presumed. In addition, the competitive anions on adsorption and the regeneration of Zn/Al-LDO have also been investigated. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: 298 K, 298-K, Acid, Acid Dye, Activated Carbons, Adsorbent, Adsorption, Adsorption Process, Air, Anions, Aqueous Solution, Calcined, Calcined Layered Double Hydroxides, Capacity, Chromium(VI), Competitive Anions, Concentration, Dec, Diffusion, Dye, Dyes, Endothermic, Equations, Equilibrium, Equilibrium Time, Experiments, Freundlich, Hydrotalcite-Like Compounds, ICP, Interlayer, Isotherms, Kinetic, Kinetic Model, Kinetic Studies, Kinetics, Langmuir, Layered Double Hydroxides, LDH, Light, Mechanism, Methyl Orange, Mg-Al, Mg-Al-CO3 Hydrotalcite, Mo, Model, pH, Phosphate, Process, Pseudo Second Order, Pseudo Second Order Kinetic, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Rate, Reaction, Regeneration, Removal, Sorption, Spontaneous, Structure, Temperature, Thermodynamic Parameters, Time, Value, XRD

? Ferreiroa, E.A. and de Bussettib, S.G. (2007), Interaction of colloidal particles of NH4+-montmorillonite with activated carbon. *Journal of Colloid and Interface Science*, **316** (2), 467-475.

Full Text: [2007\J Col Int Sci316, 467.pdf](2007/J%20Col%20Int%20Sci316,%20467.pdf)

Abstract: The interaction between negative colloidal particles of NH4+-montmorillonite and particles of activated carbon was studied as a function of particle concentration, pH, and time of contact. The results show that carbon particles act as a support/bridge for clay particles, the type of resulting clay/carbon/clay associations depending on the pH and the clay/carbon ratio in the system. The relation between clay and carbon particles can be described by equations of the Langmuir type. For the same carbon particle concentration in the system, the relation varies from 6820 to 36,100 and is dependent on pH. The interaction coefficients at pH 6.5 correspond to reaction of pseudo-first (k1=4.14×10−3 to 1.93×10−3 s−1) and pseudo-second order (k2=9.36×10−14 to) for different clay/carbon ratios. By using the Dubinin–Radushkevich equation, the interaction energy (±22.42, ±685.0, and ±14.63 J mol−1) was obtained for three different pH values (5, 6.7, and 7.6), demonstrating that the reaction is mainly physical.

Keywords: 1,10-Phenanthroline, Acid, Activated Carbon, Adsorption, Adsorption Equilibrium, Aqueous-Solution, Carbon, Clay, Colloidal, Colloidal Particles, Concentration, DEC, Energy, Equations, Function, Interaction, Interaction Energy, Kinetic Calculations, Kinetics of Interaction, Langmuir, Langmuir Type, Montmorillonite, Montmorillonite, Negative Particles, Order, Particle, Particle Concentration, Particle Interaction, Particles, pH, pH Values, Physical, Positive Particles, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Reaction, Removal, Sorption, Time

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Full Text: [2007\J Col Int Sci316, 562.pdf](2007/J%20Col%20Int%20Sci316,%20562.pdf)

Abstract: Titanate nanotubes (TNT) were prepared via a hydrothermal treatment of TiO2 powders (P25) in a 10 M NaOH solution at 150°C for 24 h and subsequently washed with HCl aqueous solution of different concentrations (0.1, 0.01, and 0.001 N). Samples with different contents of remnant sodium in nanotubes were characterized, as synthesized and after heat-treatment, by transmission electron microscopy, X-ray diffraction, and nitrogen adsorption-desorption isotherms. The photocatalytic activity of TNT was evaluated by photocatalytic oxidation of basic dye (basic violet 10 (BV10)) in water solution. It was found that if the sodium was not completely exchanged with proton, the removal of sodium increased the specific surface area (and pore volume), while the thermal stability was reduced. When the sodium content of TNT was approximately 0 wt% (nearly complete proton exchange), the nanotubular structure of titanates might be destroyed. The effects of the alterations of microstructures induced by the exchange of sodium and heat-treatment on the photocatalytic activity of TNT were discussed with the variations of specific surface area, pore volume, and the amounts of anatase phase in TNT. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Air, Basic Dye, Calcination, Degradation, Dye, Dye, Films, Glass, Nanofibers, Oxidation, Photocatalytic Activity, Sodium, TiO2, Titanate Nanotubes, Titanium-Dioxide Photocatalysts, Water

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Full Text: [2008\J Col Int Sci317, 54.pdf](2008/J%20Col%20Int%20Sci317,%2054.pdf)

Abstract: The reduction of toxic Cr(VI) to the less or nontoxic Cr(III) may be an useful detoxification technique for the treatment of Cr(VI)-contaminated waters. Recently, the protonated biomass of brown seaweed, Ecklonia, was shown to completely reduce Cr(VI) to Cr(III) in the pH range 1-5. The reduction of Cr(VI) to Cr(III) appeared to occur at the surface of the biomass. In this study, abiotic Cr(VI) reduction by the biomass was performed with various contact times, pHs and initial Cr(VI) concentrations, and surface and bulk characteristics of the Cr-laden biomass was then investigated using X-ray photoelectron spectroscopy (XPS) and X-ray absorption spectroscopy (XAS). The XPS spectra indicated that the Cr(VI) bound to the biomass was completely reduced to Cr(III) at tested various conditions. XANES and EXAFS spectra of the Cr-laden biomass were very similar to those of Cr(Ill)-acetate, which means that the Cr bound to the biomass during Cr(VI) reduction had an octahedral geometrical arrangement. The bonding distance of the chromium oxygen atoms was approximately 1.97-1.99 angstrom. In conclusion, it was obvious that oxygen containing groups, such as carboxyl and phenolic groups, play a major role in the binding of the Cr(III) resulting from the abiotic reduction of Cr(VI) by the biomass. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Biosorption, Hexavalent Chromium, Ecklonia, Adsorption-Coupled Reduction, Hexavalent Chromium, Brown Seaweed, Activated Carbons, Ecklonia Biomass, Treated Biomass, Reduction, Removal, Mechanism, Trivalent, Chromate

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Full Text: [2008\J Col Int Sci317, 148.pdf](2008/J%20Col%20Int%20Sci317,%20148.pdf)

Abstract: Alumina precursors were prepared via a sol-gel process by refluxing aqueous solutions containing urea and 0.4 M Al3+ (the [urea]/[Al3+] ratio was 3.0). The obtained precursor precipitates were dried in supercritical ethanol. The resultant gamma-alumina nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), field emission scanning electron microscopy (FE-SEM), X-ray photoelectron spectroscopy (XPS), and Fourier transform infrared spectrometry (FTIR). Hexagonal sheet gamma-alumina (gamma-Al2O3) nanoparticles with a diameter of 8.48 nm were successfully prepared. The electrocatalytic properties of the nano-gamma-alumina/carbon paste electrode for oxidation of alizarin in 1.0 M H2SO4 solution have been investigated by cyclic voltammetry (CV), and excellent electrocatalytic activity was observed. (c) 2007 Published by Elsevier Inc.

Keywords: Adsorption, Aerogel Catalysts, Alizarin, Alumina, Aluminum Nitrate, Aqueous Solutions, Catalytic-Properties, Copper-Oxide, Cyclic Voltammetry, Electrocatalytic Property, Electron Microscopy, Emission, Ethanol, Field, FTIR, Gamma-Al2O3, Gamma-Alumina, Gel, Mesoporous Alumina, Nanoparticles, Oxidation, Particles, Precipitates, Preparation, Scanning Electron Microscopy, SEM, Sol-Gel, Sol-Gel Process, Solution, Solutions, Spectrometry, Spectroscopy, Supercritical Ethanol Drying, Surface, Voltammetry, Water, X-Ray, X-Ray Diffraction, X-Ray Photoelectron Spectroscopy, XPS, XRD

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Full Text: [2008\J Col Int Sci318, 35.pdf](2008/J%20Col%20Int%20Sci318,%2035.pdf)

Abstract: The objective of this paper is to get an insight into the chemical activation mechanism using KOH and NaOH as activated agents. Three coals have been selected as carbon precursors. It was found that KOH and NaOH develop a similar narrow microporosity, independently of the coal rank, whereas only KOH generates supermicroporosity. Temperature-programmed desorption experiments, carried out with impregnated anthracite, show differences on the gas evolved during the activated carbon preparation using the two activating agents. Thus, whereas hydrogen profiles are quite similar for both activated agents, the CO and H2O profiles are different. It is remarkable the high amount of H2O evolved at the maximum treatment temperature for both activating agents. The results obtained allow concluding that the chemical activation is due to a combination of different process driving the development of material porosity.

Keywords: Activated Carbon, Chemical Activation, Thermal Analysis, Microporosity, Potassium Carbonate, NaOH Activation, Methane Storage, KOH, Alkali, Gasification, Carbonization, Reactivity, Adsorption, Nanotubes

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Full Text: [2008\J Col Int Sci318, 309.pdf](2008/J%20Col%20Int%20Sci318,%20309.pdf)

Abstract: Mesoporous silica materials with a centered rectangular symmetry (cmm) have been synthesized through a facile direct-templating method using tetraethylorthosilicate (TEOS) and amphiphilic block co-polymers Pluronic P123 under acidic conditions. The amino groups have been grafted to as-synthesized mesoporous silica by [1-(2-amino-ethyl)-3-aminopropyl]trimethoxysilane (AAPTS). Thus obtained amino-functionalized mesoporous silica (denoted as NN-silica) was used for sequestration of Cr(VI) from aqueous solution. After sequestration of Cr(VI), the sample was denoted as Cr(VI)-silica. The parent mesoporous silica, NN-silica and Cr(VI)-silica were characterized by X-ray powder diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR) and N2 adsorption–desorption isotherms. XRD and TEM results confirm that the structure of these samples is centered rectangular symmetry (cmm). N2 adsorption–desorption isotherms show that there is a remarkable decrease in surface area and pore volume for NN-silica (SBET = 54.5 m2 g−1, VP = 0.09 cm3 g−1) and Cr(VI)-silica (SBET = 53.2 m2 g−1, VP = 0.07 cm3 g−1) compared to the parent mesoporous silica (SBET = 444.0 m2 g−1, VP = 0.71 cm3 g−1). The BJH desorption average diameter of NN-silica, Cr(VI)-silica and the parent mesoporous silica is 4.40 nm, 4.07 nm and 5.11 nm, respectively. The results reveal the channels of as-synthesized mesoporous silica are essentially grafted with abundant amino groups and loaded with Cr(VI). The adsorption experiment results show that the functionalized mesoporous silica materials possess an increased Cr(VI) adsorption capacity and the maximum Cr(VI) loadings at 25, 35 and 45°C can reach 2.28, 2.86 and 3.32 mmol/g, respectively.

Keywords: Mesoporous Silica, Amino Groups, Functionalization, Cr(VI) Adsorption

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Full Text: [2008\J Col Int Sci319, 30.pdf](2008/J%20Col%20Int%20Sci319,%2030.pdf)

Abstract: Basic fuchsin, a triaminotriphenyltnethane dye, was removed by adsorption utilizing two waste materials-”bottom ash,” a power plant waste material, and “deoiled soya,” an agriculture waste product. The adsorbents were characterized through IR spectroscopy and differential thermal analysis (DTA). Batch adsorption experiments were carried out by measuring effects of pH, adsorbate concentration, sieve size, amount of adsorbent, contact time, temperature, etc. The results have been verified on the basis of Langmuir and Freundlich adsorption isotherm models and data obtained have been applied to calculate thermodynamic parameters. Specific rate constants for the processes were calculated by kinetic measurements and a pseudo-second-order adsorption kinetics was observed in each case. To identify whether the ongoing process is particle diffusion or film diffusion, the treatment given by Boyd and Reichenberg was employed. To assess the practical utility of the adsorbent, the aqueous adsorbate samples were eluted through fixed-bed columns of respective adsorbents. Attempts were also made to recover the adsorbed dyes by passing suitable solvent through the columns. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Analysis, Basic Fuchsin, Bottom Ash, Deoiled Soya, Diffusion, Dye, IR, Isotherm, Kinetic, Kinetics, Kinetics, Langmuir, pH, Phenol, Pore, Removal, Size, Spectroscopy, Temperature, Thermodynamic Parameters, Violet, Water

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Full Text: [2008\J Col Int Sci319, 53.pdf](2008/J%20Col%20Int%20Sci319,%2053.pdf)

Abstract: This paper reports the results of the adsorption performance of As(V) removal by a commercial carbon black and its H2SO4-modified form in a single-ion situation. The influence of different process parameters and the physicochemical principles involved were studied in detail. Acid modification caused morphological changes in the virgin carbon black as evidenced by BET surface area measurements and SEM study. FTIR spectra showed the introduction of sulfonic acid group in the parent carbon due to H2SO4 treatment. TGA analysis revealed higher weight loss characteristics of the modified carbon, demonstrating the creation of functional groups. The point of zero charge (pH(pzc)) of the modified carbon black is highly acidic (3.5) compared to commercial carbon black (6.4). It directly infers the generation of acidic functional moieties in the carbon black. The adsorption experiments were carried out following batch equilibrium techniques. The kinetics and thermodynamics of adsorption were investigated to unveil the mechanism and nature of the adsorption process, respectively. The kinetic parameters of different models were calculated and discussed. The kinetics of adsorption can be expressed by a pseudo-second-order model and intraparticle diffusion was not the rate-determining step. Dependence of pH on adsorption showed maximum metal uptake in the range of 4-5 and inferred surface complexion as the principal mechanism of adsorption. The equilibrium adsorption data were modeled using Freundlich, Langmuir, and Dubinin-Kaganer-Radushkevich DKR) isotherm equations and the corresponding isotherm parameters were calculated and discussed in detail. (c) 2007 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption Performance, Analysis, Aqueous-Solutions, Arsenic Removal, As(V) Adsorption, Carbon, Carbon Black, Contaminated Water, Diffusion, Equilibrium, FTIR, Iron-Oxide, Isotherm, Isotherms, Kinetic, Kinetics, Kinetics, Langmuir, Mechanism, Metal, Metal Uptake, Modification, Natural Zeolites, pH, pH(pzc), Removal, SEM, Sorption, Thermodynamics

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Full Text: [2008\J Col Int Sci320, 22.pdf](2008/J%20Col%20Int%20Sci320,%2022.pdf)

Abstract: Banana pith was used as precursor material to prepare carbon with and without porogens. Characterization of the carbons showed higher BET surface area (1285 m2/g) for ZnCl2-treated carbon, comparatively. Adsorption experiments were conducted to study the removal of 2,4-dichlorophenol (DCP) from aqueous solutions using the carbons under varying experimental conditions. Decrease in pH increased the percentage removal. All the carbons studied showed greater percentage of DCP removal with decrease in the initial concentration of DCP. Kinetic studies showed that the adsorption of DCP on the carbons was a rapid process. Nonlinear forms of pseudo-first-order and pseudo-second-order models were used to fit the experimental data. Among these the pseudo-first-order model described the data with high correlation coefficients and low percentage error values. Four nonlinear isotherm models including the Langmuir, Freundlich, Toth, and Sips were used to analyze the experimental DCP isotherms under different pH (2-4) conditions. Adsorption capacities (Q(max)) from the Langmuir model were found to be 129.4, 67.7, and 49.9 mg/g for ZnCl2-treated, KOH-treated, and porogen-free carbon, respectively, at pH 2. From desorption studies it seemed that chemisorption played a major role in the adsorption process. The results indicated that ZnCl2-treated carbon could effectively remove phenols from wastewater. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: 2,4-Dichlorophenol, Activated Carbon, Adsorption, Adsorption, Aqueous Solutions, Aqueous-Solution, Banana Pith, BET, Biosorption, Carbon, Chlorophenols, Dcp, Desorption, Error, Experimental, Experiments, Freundlich, Isotherm, Isotherms, Kinetic, Kinetics, Langmuir, Model, Models, pH, Phenols, Porogen, Removal, Rights, Sorption, Surface Area, Waste, Wastewater, Water

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Full Text: [2008\J Col Int Sci320, 30.pdf](2008/J%20Col%20Int%20Sci320,%2030.pdf)

Abstract: Biodegradable and eco-friendly organic acid, benzene-1,3,5-tri-carboxylic acid (trimesic acid), coated on commercial basic alumina, was used as adsorbent to remove toxic Cu(II) ion from aqueous solution. Adsorbent preparation was optimized and was characterized by SEM, EDX, FT-IR, and powder XRD pattern. Effect of various regulating parameters like reaction pH, adsorbent dose and initial Cu(II) concentration was studied in detail. Adsorption isotherms followed the Langmuir isotherm model and adsorption was thermodynamically favourable. Maximum adsorption capacity (Q(m)) for Cu(II) ion has been achieved as 10.80 mg/g. Detail kinetic study revealed that it followed second-order rate. Desorption of Cu(II) ion and re-usability of the adsorbent was also studied. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Isotherm, Adsorption Isotherms, Adsorption Kinetics, Alumina, Aqueous Solution, Aqueous-Solutions, Basic Alumina, Capacity, Copper, Cu(II), Cu(II) Ion, Cu(II) Removal, Desorption, Desorption, FT-IR, FTIR, Heavy-Metals, Isotherm, Isotherms, Kinetic, Langmuir, Langmuir Isotherm, Model, Organic Acid, pH, Preparation, Removal, Rights, SEM, Silica-Gel, Solution, Sorption, Trimesic Acid, Waste-Water, XRD

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Full Text: [2008\J Col Int Sci321, 493.pdf](2008/J%20Col%20Int%20Sci321,%20493.pdf)

Abstract: We investigated arsenate and arsenite sorption onto laterite iron concretions (LIC) to test its suitability for use in the low-tech treatment of arsenic-bearing drinking water. Batch experiments on crushed LIC from Prestea, Ghana were conducted at a series of temperatures, ionic strengths, and pHs. The point of zero net charge on laterite iron concretion was determined by potentiometric titrations yielding an average PHpZNC around 8.64. Experiments show that sorption capacity for both arsenite and arsenate increase with temperature. The equilibrium sorption capacity for arsenite was larger than that for arsenate over the 25 to 60°C temperature range. A Langmuir model satisfactorily fits the arsenite and arsenate sorption isotherm data. Both arsenite and arsenate sorbed over the pH range of natural waters. Arsenite sorption increases with increasing solution pH to a maximum at pH 7, then decreases with further increase in solution pH. Arsenate sorption, on the other hand, shows little change with increasing solution pH. Increasing solution ionic strength 10-fold results in a slight increase in sorption. Ionic strength experiments show that an inner-sphere sorption mechanism is responsible for As(V) sorption on LIC, while As(III) sorption is by an outer-sphere mechanism. Gibbs free energy (ΔG°) for arsenite and arsenate sorption onto LIC was calculated from Langmuir isotherms; the negative values agree with reaction spontaneity. The positive values of the standard enthalpy (ΔH°) show the endothermic nature of arsenite and arsenate sorption onto LIC. Positive entropy (ΔS°) values suggest the affinity of LIC for the arsenic species in solution. Analysis of the arsenic sorption data suggests that LIC can be used for low-tech natural-materials arsenic water treatment. Laterite iron concretions have a number of advantages for this use over commercial materials, including the ability to remove arsenic from waters with a wide range in pH, the ability to sorb both common arsenic aqueous species equally well, and cost less. Laterite iron concretion’s positive sorption temperature dependence will enhance sorption in tropical climates, and more especially in areas where groundwater sources are related to geothermal springs. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Aqueous-Solutions, Arsenate, Arsenite, Bed Column Adsorption, Copper(Ii), Endothermic, Equilibrium, Ghana, Groundwater, Isotherm, Isotherms, Kinetics, Langmuir, Laterite, Laterite Iron Concretion, Low Surface, Red Mud, Removal, Silica Samples, Soil, Sorption, Sorption Isotherm, Temperature, Water

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Full Text: [2008\J Col Int Sci322, 6.pdf](2008/J%20Col%20Int%20Sci322,%206.pdf)

Abstract: Adsorption kinetics, adsorption isotherms and surface complexation of trimesic acid onto alpha-alumina surfaces were investigated. Adsorption kinetics of trimesic acid with an initial concentration of 0.5 mM onto alpha-alumina surfaces were carried out in batch method in presence of 0.05 mM NaCl(aq) at pH 6 and 298.15, 303.15 and 313.15 K. Adsorption isotherms were carried out at 298.15 K, pH 5-9, and 0.05 mM NaCl(aq) by varying trimesic acid concentration from 0.01 to 0.6 mM. Three kinetics equations such as pseudo-first-order, pseudo-second-order and Ho equations were used to estimate the kinetics parameters of the adsorption of trimesic acid on the alpha-alumina surfaces. Ho equation fits the experimental kinetics data significantly better and the estimated equilibrium concentration is in excellent agreement with the experimental value. The adsorption data were fitted to Freundlich and Langmuir adsorption model and the later best fits the adsorption isotherms. Comparison of adsorption density of trimesic acid with that of benzoic and phthalic acids follows the sequence: benzoic acid < trimesic acid < phthalic acid. The negative activation energy and the Gibbs free energy for adsorption indicate that the adsorption of trimesic acid onto alpha-alumina is spontaneous and facile. DRIFT spectroscopic studies reveal that trimesate forms outer-sphere complexes with the surface hydroxyl groups that are generated onto alpha-alumina surfaces in the pH range of the study. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Activation, Activation Energy, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Alpha-Alumina, Aqueous-Medium, Batch Method, Behavior, Complexation, Coordination, Drift, Equilibrium, Experimental, Freundlich, Functionality, Goethite, Isotherms, Kinetics, Kinetics, Langmuir, Model, O-Phthalate, Organic-Acids, pH, Rights, Sorption, Surface Complexation, Trimesic Acid

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Full Text: [2008\J Col Int Sci322, 375.pdf](2008/J%20Col%20Int%20Sci322,%20375.pdf)

Abstract: The carboxylated chitosan beads (CCB), which have a defluoridation capacity (DC) of 1385 mg F-/kg, have been further chemically modified by incorporating La3+ ion (La-CCB) and its DC was found to be 4711 mg F-/kg whereas the raw chitosan beads (CB) possess only 52 mg F-/kg. The fluoride removal by La-CCB is governed by both adsorption and complexation mechanism. The functional groups present in beads were identified by FTIR analysis. The surface condition and existence of fluoride on the beads was confirmed by SEM with EDAX analysis. The experimental data have been analyzed using Freundlich and Langmuir isotherm models. Thermodynamic parameters such as ΔG°, ΔH° and ΔS° were calculated to predict the nature of sorption. The kinetic studies were investigated with reaction-based and diffusion-based models. A field trial was carried out with fluoride water collected from a nearby fluoride-endemic village. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Chitosan Bead, Carboxylated Chitosan Bead, La-CCB, Defluoridation, Adsorption, Complexation, Freundlich, Langmuir, Reaction-Based Model, Diffusion-Based Model, Drinking-Water, Selective Removal, Metal-Ions, Equilibrium, Adsorption, Defluoridation, Kinetics, Mercury, Models, Gel

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Full Text: [2008\J Col Int Sci322, 384.pdf](2008/J%20Col%20Int%20Sci322,%20384.pdf)

Abstract: Multi-component Al-Fe hydr(oxides) are ubiquituous in soil and aquatic environments, where they exhibit biogeochemical controls on nutrients and contaminants. Although, sorption on single-component Al and Fe hydr(oxides) have been extensively studied, limited studies have been done on their multi-component counterparts. In this study, effects of Al/Fe content on the kinetics and energetics of phosphate sorption in a poorly-crystalline co-precipitated mixed Al-Fe hydr(oxide) system were investigated using a combination of traditional batch techniques and flow adsorption calorimetry. Differences in Al/Fe content was found to influence the structural development and anion exchange capacity of the hydr(oxides) and subsequently their phosphate sorption characteristics. Higher structural development decreased phosphate sorption, while higher AEC was associated with increased phosphate sorption, initial sorption rate, and smaller losses in sorption with increasing pH. Results from flow adsorption calorimetry indicated that at pH 4.8 phosphate sorption: (i) occurred irreversibly on anion exchange sites, with a loss of 1.9 moles of AEC per mole of phosphate sorbed, and (ii) was exothermic, with molar heats of adsorption between -25 and -39 kJ mol-1. Molar heats of adsorption were ten times that for anion exchange and independent of hydr(oxide) composition with the amount of energy evolved being directly proportional to the quantity of phosphate sorbed. Published by Elsevier Inc.

Keywords: Multi-Component Sorbents, Al/Fe Hydr(Oxides), Flow Adsorption Calorimetry, Kinetics, Energetics, Anion Exchange, Phosphate Sorption, Amorphous Aluminum Hydroxides, Flow Adsorption Calorimetry, Iron Hydroxides, Aquifer Sand, Acid Soils, Surface, Transformation, Ferrihydrite, Mechanism, Goethite

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Full Text: [2008\J Col Int Sci322, 394.pdf](2008/J%20Col%20Int%20Sci322,%20394.pdf)

Abstract: The inhibition effect of nitrobenzene adsorption by water clusters formed at the acidic groups on activated carbon was examined in aqueous and n-hexane solution. The activated carbon was oxidized with nitric acid to introduce C - O complexes and then outgassed in helium flow at 1273 K to remove them completely without changing the structural properties of the carbon as a reference adsorbent. The amounts of acidic functional groups were determined by applying Boehm titration. A relative humidity of 95% was used to adsorb water onto the carbon surface. Strong adsorption of water onto the oxidized carbon can be observed by thermogravimetric analysis. The adsorption kinetic rate was estimated to be controlled by diffusion from the kinetic analysis. Significant decline in both capacity and kinetic rate for nitrobenzene adsorption onto the oxidized carbon was also observed in n-hexane solution by preadsorption of water to the carbon surface, whereas it was not detected for the outgassed carbons. These results might reveal that water molecules forming clusters at the C-O complexes inhibited the entrance of nitrobenzene into the interparticles of the carbon. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Acidic Functional Groups, Water Adsorption, Hexane Solution, Nitrobenzene, Aqueous-Solutions, Molecular Simulation, Surface-Chemistry, Metal-Ions, Aromatics, Kinetics, Phenol, Equilibrium, Mechanism, Sorption

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Full Text: [2008\J Col Int Sci322, 558.pdf](2008/J%20Col%20Int%20Sci322,%20558.pdf)

Abstract: Ordered mesoporous carbons (OMCs) with varying pore sizes were prepared using ordered mesoporous silica SBA-15 as hard templates. The OMCs possess abundant mesopores with narrow pore size distribution, on which the adsorption behavior of bulky molecules of nonylphenol ethoxylate (NPE) were investigated. The isotherms of NPE on OMCs can be fitted by Langmuir adsorption model, evidenced by the adsorption data. The surface area of the pores larger than 1.5 nm is a crucial factor to the adsorption capacity of NPE, whereas the most probable pore diameter of OMCs is crucial to the adsorption rate of NPE. The adsorption temperature has more significant effects on adsorption rate than the adsorption capacity. Theoretical studies show that the adsorption kinetics of NPE on OMCs can be depicted with the pseudo-second-order kinetic model. In addition, thermodynamic parameters of adsorption were evaluated based on the equilibrium constants related to the equilibrium of adsorption at different temperatures. (C) 2008 Published by Elsevier Inc.

Keywords: Activated Carbon, Adsorption, Adsorption Behavior, Adsorption Isotherm, Adsorption Kinetics, Aqueous-Solutions, Behavior, Bulky Molecule, Capacity, Copolymer, Desorption, Equilibrium, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Mesoporous, Mesoporous Carbon, Mesoporous Silica, Model, Phenol, Pore Structure, Pseudo-Second-Order Kinetic Model, Removal, SBA-15, Silica, Size, Surface Area, Temperature, Templates, Thermodynamic, Thermodynamic Parameters, TiO2, Triblock

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Full Text: [2008\J Col Int Sci323, 26.pdf](2008/J%20Col%20Int%20Sci323,%2026.pdf)

Abstract: Benzene-1,3,5-tri-carboxylic acid (trimesic acid, TMA) coated on basic alumina has been shown to be an effective adsorbent for Fe(III) and Fe(II) from aqueous solution. A comparative study on the adsorption of Fe(III) and Fe(II) revealed that TMA coated alumina is more selective towards Fe(III) than Fe(II). The maximum adsorptions of Fe(III) and Fe(II) were 26.6 mg/g and 8.4 mg/g, respectively. Fe(III)/Fe(II) adsorption was also compared in some cases with adsorption of Co(II) and Ni(II). Maximum uptakes (Q(m)) for Co(II) and Ni(II) were found much lower (similar to 1 mg/g) than Fe(III)/Fe(II). pH dependent studies have revealed that Fe(III) was adsorbed efficiently at high acidic condition (pH similar to 1.5) compared to Fe(II), Co(II) and Ni(II), while temperature did not have significant effect on the adsorption processes. Adsorption of Fe(III) and Fe(II) was quite rapid and thermodynamically favourable. Adsorption processes fitted well in Langmuir isotherm model and followed second order rate kinetics in all cases. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Isotherm Kinetics, Adsorption Specificity, Alumina, Aqueous Solution, Basic Alumina, Co(II) and Ni(II), Competitive Iron Removal, Complexes, Fe(III), Isotherm, Isotherm Model, Kinetics, Langmuir, Langmuir Isotherm, Ligands, Metal, Model, Ni(II), pH, pH-Dependent, Removal, Rights, Solution, Sorption, Temperature, Trimesic Acid, Waste-Water

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Full Text: [2008\J Col Int Sci324, 1.pdf](2008/J%20Col%20Int%20Sci324,%201.pdf)

Abstract: The biosorption process for removal of cobalt(II) and zinc(II) by aerobic granules was characterized. Single component and binary equimolar systems were studied at different pH values. The equilibrium was well described by Redlch-Peterson adsorption isotherm. The maximal adsorption capacity of the granules, in single systems (55.25 mg g-1 Co; 62.50 mg g-1 Zn) compared with binary systems (54.05 mg g-1 Co; 56.50 mg g-1 Zn) showed reduction in the accumulation of these metals onto aerobic granules. The kinetic modelling of metal sorption by granules has been carried out using Lagergren equations. The regression analysis of pseudo second-order equation gave a higher R-2 value, indicating that chemisorption involving valent forces through the sharing or exchange of electrons between sorbent and sorbate may be the rate limiting step. The initial biosorption rate indicated that aerobic granules can adsorb Co(II) more rapidly than Zn(II) from aqueous solutions. Meanwhile, FTIR and XPS analyses revealed that chemical functional groups (e.g., alcoholic and carboxylate) on aerobic granules would be the active binding sites for biosorption of Co(II) and Zn(II). (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated-Sludge, Adsorption, Adsorption Capacity, Adsorption Isotherm, Aerobic Granule, Aerobic Granules, Algal Biomass, Analysis, Aqueous Solutions, Aqueous-Solutions, Biosorption, Capacity, Chemisorption, Co(II), Cobalt(II), Equilibrium, Equilibrium Isotherm, Ftir, Functional Groups, Ions, Isotherm, Kinetic, Kinetic Modelling, Kinetics, Kinetics, Mechanism, Metal, Metal Sorption, Metals, Modelling, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Rate Limiting Step, Reduction, Regression Analysis, Removal, Rights, Second Order, Second-Order, Second-Order Equation, Sequencing Batch Reactor, Single and Binary-Metal System, Sorbate, Sorbent, Sorption, Sphagnum Moss, XPS, Zinc(II), Zn(II)

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Full Text: [2008\J Col Int Sci327, 308.pdf](2008/J%20Col%20Int%20Sci327,%20308.pdf)

Abstract: This study examined the feasibility of removing direct dyes C.I. Direct Yellow 86 (DY86) and C.I. Direct Red 224 (DR224) from aqueous solutions using carbon nanotubes (CNTs). The effects of dye concentration, CNT dosage, ionic strength and temperature on adsorption of direct dyes by CNTs were also evaluated. Pseudo second-order, intraparticle diffusion and Bangham models were adopted to evaluate experimental data and thereby elucidate the kinetic adsorption process. Additionally, this study used the Langmuir, Freundlich, Dubinin and Radushkevich (D-R) and Temkin isotherms to describe equilibrium adsorption. The adsorption percentage of direct dyes increased as CNTs dosage, NaCl addition and temperature increased. Conversely, the adsorption percentage of direct dyes decreased as dye concentration increased. The pseudo second-order model best represented adsorption kinetics. Based on the regressions of intraparticle diffusion and Bangham models, experimental data suggest that the adsorption of direct dyes onto CNTs involved intraparticle diffusion, but that was not the only rate-controlling step. The equilibrium adsorption of DR86 is best fitted in the Freundlich isotherm and that of DR224 was best fitted in the D-R isotherm. The capacity of CNTs to adsorb DY86 and DR224 was 56.2 and 61.3 mg/g, respectively. For DY86, enthalpy (ΔH°) and entropy (Delta S-0) were 13.69 kj/mol and 139.51 J/molK, respectively, and those for DR224 were 24.29 kJ/mol and 172.06 J/lmol K, respectively. The values of ΔH°, ΔG° and E all indicate that the adsorption of direct dyes onto CNTs was a physisorption process. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Carbon Nanotubes, Direct Dyes, Isotherm, Kinetics, Thermodynamics, Direct-Red 12B, Waste-Water, Activated Carbon, Methylene-Blue, Solid-Waste, Coir Pith, Fly-Ash, Removal, Adsorbent, Sorbent

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Full Text: [2008\J Col Int Sci328, 243.pdf](2008/J%20Col%20Int%20Sci328,%20243.pdf)

Abstract: Adsorption of cationic methylene blue and anionic orange II onto unmodified and surfactant-modified zeolites was studied using a batch equilibration method. The effects of equilibrium time, solution pH, and sorption temperature were examined. The results suggested that 2% sodium dodecyl benzenesulfonate (SDBS)- and 3% sodium dodecyl sulfate (SDS)-modified zeolites had higher adsorption capacities for methylene blue than the unmodified zeolite, while 2% cetylpyridinium bromide hexadecyl (CPB)- and 2% hexadecylammonium bromide (HDTMA)-modified zeolites were the best adsorbents for orange II. The adsorption conditions were optimized, and the mechanisms of adsorption are briefly discussed. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Unmodified And Surfactant-Modified Zeolite, Adsorption, Methylene Blue, Orange II, Reactive Azo Dyes, Waste-Water, Natural Zeolite, Environmental Application, Aqueous-Solution, Red Mud, Removal, Clinoptilolite, Nitrophenol, Organoclays

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Full Text: [2009\J Col Int Sci331, 40.pdf](2009/J%20Col%20Int%20Sci331,%2040.pdf)

Abstract: Spherical carbon aerogels (SCAs) with controlled particle size and mesopore size were synthesized by an emulsified sol-gel polymerization of phenol, melamine and formaldehyde. The adsorption rate and capacity of biomolecules with different molecular dimensions, including L-phenylalanine (Phe), vitamin B-12 (VB), alpha-chymotrypsin (Chy) and bovine serum albumin (BSA) onto SCAs were investigated. The mesopore size can be easily tuned in the range from 5 to 10 nm by simply adjusting catalyst concentration in the initial solution and the spherical particle size can be controlled in 50-500 mu m by changing stirring speed. The as-prepared SCAs have high specific surface area (>600 m2/g) and large pore volume (>1 cm3/g). The hardness of SCAs is ca. 10 times as large as that of commercial spherical activated carbon particles. The adsorption rate of VB is strongly depended on the mesopore size and particle size, and show an increasing tread with the increase of mesopore size and the decrease of particle size. For small molecule Phe, the specific Surface area is key factor to determine the adsorption capacity, but the adsorption capacity of large molecules (VB, Chy and BSA) is dependent on the pore size of SCAs, which should be suitably larger than the molecule size of biomolecules. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated Carbons, Adsorption, Adsorption Isotherm, Adsorption Rate, Biocatalysis, Biomolecule, Cytochrome-C, Melamine, Mesopore, Molecular-Sieves, Nanocomposite, pH, Removal, Sol-Gel, Spherical Carbon Aerogel

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Full Text: [2009\J Col Int Sci331, 453.pdf](2009/J%20Col%20Int%20Sci331,%20453.pdf)

Abstract: Titanium phosphate (TiP) exhibits preferable sorption toward lead ion in the presence of competing calcium ions at high levels, however, it is present as fine or ultrafine particles and cannot be directly employed in fixed-bed or any flow-through systems due to the excessive pressure drop and poor mechanical strength. In the present study a new hybrid sorbent TiP-001 was fabricated by impregnating titanium phosphate (TiP) nanoparticles onto a strongly acidic cation exchanger D-001 for enhanced lead removal from waters. D-001 was selected as a host material mainly because of the Dorman membrane effect resulting from the immobilized sulfonic acid groups bound on the exchanger matrix, which would enhance permeation of the target metal cation prior to effective sequestration. TiP-001 was characterized by transmission electron micrograph (TEM), X-ray diffraction (XRD), and pH-titration. Batch and column sorption onto TiP-001 was assayed to evaluate its performance as compared to the host exchanger D-001. Lead sorption onto TiP-001 is a pH-dependent process due to the ion-exchange nature, and its sorption kinetics follows the pseudo-second-order model well. Compared to D-001, TiP-001 displays highly selective lead sorption in the presence of competing calcium cations at concentration of several orders higher than the target metal. Fixed-bed sorption of a synthetic feeding solution indicates that lead retention by TiP-001 results in a conspicuous decrease of this toxic metal from 0.50 to below 0.010 mg/L (drinking water standard recommended by WHO). Moreover, its feasible regeneration by dilute HCl solution also favors TiP-001 to be a feasible sorbent for enhanced lead removal from water. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Acidic, Adsorption, Arsenic Removal, Calcium, Cation, Cation Exchanger, Column, Concentration, Drinking, Drinking Water, Feeding, Fixed Bed, Heavy-Metals, Host, Hybrid, Hybrid Sorbent, Immobilized, Ion Exchange, Ion-Exchange, Ionexchange, Ions, Kinetics, Lead, Lead Ion, Lead Removal, Mar, Matrix, Mechanisms, Membrane, Metal, Model, Models, Nanocomposite, Nanomaterials, Nanoparticles, Oxide Nanoparticles, Particles, Performance, Ph-Dependent, Phosphate, Pressure, Pressure Drop, Process, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Regeneration, Removal, Retention, Rights, Sequestration, Solution, Sorbent, Sorption, Sorption Kinetics, Standard, Strength, Systems, Tem, Titanium, Titanium Phosphate, Toxic, Transmission, Ultrafine Particles, Water, Waters, X-Ray, X-Ray Diffraction, XRD, Zirconium-Phosphate

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Full Text: [2009\J Col Int Sci332, 39.pdf](2009/J%20Col%20Int%20Sci332,%2039.pdf)

Abstract: The adsorption of sodium dodecylbenzene sulfonate (SDBS) from its aqueous solution at different temperatures has been studied using three activated carbons prepared in our laboratory. Lignin was used as raw material for the preparation of activated carbons (ACs). The results of the adsorption equilibrium were analyzed and fitted to the Langmuir Model. Thermodynamic magnitudes were estimated as well, and their values indicated that the adsorption processes were spontaneous and exothermic. The kinetic study showed that the processes are of second apparent order related to the concentration of the vacant active centers on the surface of the activated carbons. The values of the effective internal diffusion coefficients have been calculated applying the equations developed by Crank and Vermeulen. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Anionic Surfactants, Aromatic-Compounds, Chemistry, Equilibrium, Eucalyptus Kraft Lignin, Kinetics, Lignin, Pollutants, Recovery, Removal, Sodium Dodecylbenzene Sulfonate, Sorption, Systems, Waste-Water

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Full Text: [2009\J Col Int Sci332, 46.pdf](2009/J%20Col%20Int%20Sci332,%2046.pdf)

Abstract: In this study, montmorillonite clay (MC) has been utilized as the adsorbent for the removal of a cationic dye, Methylene blue (MB), from aqueous solution by the batch adsorption technique under different conditions of initial dye concentration, adsorbent concentration, contact time, solution pH, and temperature. Attempts were made to fit the isothermal data using Langmuir and Freundlich equations. The experimental results have demonstrated that the equilibrium data are fitted well by a Langmuir isotherm equation. Thermodynamic parameters such as the changes in enthalpy, entropy, and Gibbs’ free energy were determined, showing adsorption to be an endothermic yet spontaneous process. Pseudo-first-order, pseudo-second-order, and intraparticle diffusion models were considered to evaluate the rate parameters. The experimental data fitted the pseudo-second-order kinetic model, with an activation energy of +28.5 kJ mol-1. The results indicate that MC adsorbs MB efficiently and could be employed as a low-cost alternative in wastewater treatment for the removal of cationic dyes. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Acid Red-57, Activated Carbon, Activation, Activation Energy, Adsorbent, Adsorption, Alternative, Aqueous Solution, Aqueous-Solution, Basic Dye, Batch, Batch Adsorption, Bottom Ash, Cationic Dye, Cationic Dyes, Changes, Clay, Concentration, Contact, Crystal Violet, Data, Diffusion, Dye, Dyes, Effluents, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Experimental, Fast Green, Freundlich, Intraparticle, Intraparticle Diffusion, Isotherm, Isothermal, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Low Cost, Mb, Methylene Blue, Model, Models, Montmorillonite, Montmorillonite Clay, pH, Process, Pseudo Second Order, Pseudo Second Order Kinetic, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Rice Husk, Rights, Solution, Spontaneous, Temperature, Thermodynamic, Thermodynamic Parameters, Treatment, Waste-Water, Wastewater, Wastewater Treatment

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Full Text: [2009\J Col Int Sci332, 60.pdf](2009/J%20Col%20Int%20Sci332,%2060.pdf)

Abstract: Chloromethylated styrene-divinylbenzene copolymers were post-crosslinked through Fredel-Crafts alkylation reaction and a water-compatible hypercrosslinked resin HJ-1 was developed successfully. It can be wetted directly by water and can be used without any wetting process. It was applied to remove p-nitrophenol in aqueous solution in comparison with the commercial Amberlite XAD-4 resin. Their adsorption behaviors for p-nitrophenol were conducted and it was found the adsorption dynamics obeyed the pseudo-second-order rate equation and the intra-particle diffusion was the rate-limiting step. The adsorption isotherms call be correlated to Freundlich isotherm and the adsorption capacity onto HJ-1 resin was much larger than XAD-4. The maximum adsorption capacity of p-nitrophenol for HJ-1 resin was measured to be 179.4 mg/g with the equilibrium concentration at 178.9 mg/l and the maximum removal percentage was predicted to be 98.3%. The adsorption thermodynamic parameters were calculated and the adsorption was mainly driven by enthalpy change. The micropore structure, the size matching between the pore diameter of HJ-1 resin and the molecular size of p-nitrophenol, and polarity matching between the formaldehyde carbonyl groups of HJ-1 resin and p-nitrophenol bring the larger adsorption capacity and higher adsorption affinity. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Adsorbents, Adsorption, Adsorption Capacity, Adsorption Dynamics, Adsorption Isotherms, Adsorption-Isotherms, Alkylation, Amberlite XAD-4, Amberlite XAD-4 Resin, Amide Group, Aqueous Solution, Behaviors, Biomolecules, Capacity, Change, Chlorophenols, Comparative Study, Comparison, Concentration, Cross-Linked Polymer, Diffusion, Dynamics, Enthalpy, Equilibrium, Formaldehyde, Freundlich, Freundlich Isotherm, Granular Activated Carbon, HJ-1 Resin, Hypercrosslinked, Intra-Particle Diffusion, Intraparticle, Intraparticle Diffusion, Isotherm, Isotherms, Molecular, P-Nitrophenol, Parameters, Phenolic-Compounds, Process, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Rate Limiting Step, Rate-Limiting Step, Removal, Resin, Rights, Size, Solution, Structure, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Water, Wetting, XAD-4, XAD-4 Resin

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Full Text: [2009\J Col Int Sci332, 151.pdf](2009/J%20Col%20Int%20Sci332,%20151.pdf)

Abstract: Hydrotalcite-supported Pd/Sn catalysts with different Mg/Al atomic ratios (2, 3, 4, and 5) for nitrate adsorption and hydrogenation reduction were successfully synthesized by a coprecipitation method. The results showed that different atomic ratios of Mg/Al resulted in different interlayer spacings and zeta-potentials of the catalysts, which thus influenced its adsorption capacity. With the increase of Mg/Al atomic ratio, the interlayer spacing rose and zeta-potential decreased. The adsorption properties of the catalysts were plainly affected by interlayer spacing when Mg/Al atomic ratios increased from 2 to 4. However, when Mg/Al atomic ratios further increased from 4 to 5, there was a negative impact on the adsorption properties of zeta-potential. Also, the adsorption capacity of the catalysts for nitrate followed the order: Mg/Al = 2 < Mg/Al = 3 < Mg/Al = 5 < Mg/Al = 4. In the catalytic reduction process, the adsorbed nitrates were further reduced to nitrites that remained in the same position in catalysts, but some of superabundant nitrites were released into water as primary and unstable products. The concentration of released nitrites was in the reverse order of the adsorption capacity. The catalytic selectivity and activity of the catalysts for nitrate reduction had the same sequence as its adsorption capacity. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aqueous-Solution, Chloride, Denitrification, Drinking-Water, Hydrogenation, Hydrotalcite, Ion, Layered Double Hydroxides, Mg, Al Atomic Ratio, Nitrate, Nitrite, Nitrite, Pd-Cu Catalyst, Purification, Reduction, Removal

? Sharma, P., Singh, G. and Tomar, R. (2009), Synthesis and characterization of an analogue of heulandite: Sorption applications for thorium(IV), europium(III), samarium(II) and iron(III) recovery from aqueous waste. *Journal of Colloid and Interface Science*, **332** (2), 298-308.

Full Text: [2009\J Col Int Sci332, 298.pdf](2009/J%20Col%20Int%20Sci332,%20298.pdf)

Abstract: The synthesis of needle/fibrous particles of analogue of heulandite with particle diameter of 0.08 pm, length 4-8 pm and high specific surface area (478 m2 g-1) with cation exchange capacity (3.27 mequiv g-1) have been achieved. The heulandite needles were obtained by using inorganic salts as a source for silicon and aluminum in the hydrothermal synthesis of the material. Alkalinity of the medium played an important role in the formation of heulandite fibers, as it affects the nucleation rate of zeolite synthesis. The analogue of heulandite was characterized using spectroscopic, thermal analysis, scanning and adsorption techniques. After mechanical grinding of crystals of heulandite, obtained powder was used for the study of radionuclide recovery from aqueous waste. The adsorption experiments were carried out under batch process with, pH of medium, amount of sorbent, time of contact between sorbate and sorbent, metal ion concentration and temperature as the variables. The adsorption was strongly dependent on pH of the medium and the uptake of all the metal ions increased from pH 1.0 to 9.0 and the maximum sorption was noticed in the pH range of 5.0-7.0. The optimum condition for these metal ions (Th(IV), Eu(III), Sm(II), and Fe(III)) sorption on self synthesized analogue of heulandite was; 0.001 N metal ion concentration, equilibration time of 4 h, 100 mg sorbent dose and 313-323 K temperature. This sorption process is fit to both Langmuir and Freundlich sorption isotherm. Thermodynamic studies predict the endothermic and spontaneous nature of the same. (c) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Analogue, Crystal-Structure, Ion-Exchange, Isotherm, Morphology, Natural Clinoptilolite, Removal, Silver-Exchanged Heulandite, Sorption, Temperature, Thermal-Stability, Transition-Elements, Zeolite, Heulandite

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Full Text: [2009\J Col Int Sci333, 14.pdf](2009/J%20Col%20Int%20Sci333,%2014.pdf)

Abstract: The ability of activated alumina as synthetic adsorbent was investigated for adsorptive removal of Cd(II) and Pb(II) ions from aqueous solutions. Various physico-chemical parameters such as pH, initial metal ion concentration, and adsorbent dosage level and equilibrium contact time were studied. The optimum solution pH for adsorption of Cd(II) and Pb(II) from aqueous solutions was found to be 5. Kinetics data were best described by pseudo-second order model. The effective particle diffusion coefficient of Cd(II) and Pb(II) are of the order of 10(-10) m(2)/s. values of mass transfer coefficient were estimated as 4.868 x 10(-6) cm/s and 6.85 x 10(-6) cm/s for Cd(II) and Pb(II) adsorption respectively. The equilibrium adsorption data for Cd(II) and Pb(II) were better fitted to Langmuir adsorption isotherm model. The thermodynamic studies indicated that the adsorption was spontaneous and exothermic for Cd(II) adsorption and endothermic for Pb(II). The sorption energy calculated from Dubinin-Radushkevich isotherm were 11.85 kJ/mol and 11.8 kJ/mol for the adsorption of Cd(II) and Pb(II) respectively which indicated that both the adsorption processes were chemical in nature. Desorption studies were carried out using dilute mineral acids. Application studies carried out using industrial waste water samples containing Cd(II) and Pb(II) showed the suitability of activated alumina in waste water treatment plant operation. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Alumina, Adsorption, Adsorption Isotherm, Application Studies, Biosorption, Cadmium(II), Carbon, Chromium Removal, Coconut Shell, Desorption, Effective Diffusivity, Equilibrium, Heavy-Metal Ions, Kinetic-Models, Kinetics, Langmuir, Lead(II), Pseudo Second Order, Pseudo-Second Order, Removal, Waste-Water

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Full Text: [2009\J Col Int Sci333, 40.pdf](2009/J%20Col%20Int%20Sci333,%2040.pdf)

Abstract: The polymeric adsorbents were synthesized from 2-dimethylaminoethyl methacrylate (DMA) and [2(methacryloyloxy)ethyl]dimethylhexadecylammonium bromide (DMAC(16)) monomers in the presence of ethylene glycol dimethacrylate (EDMA) cross-linking monomer using suspension polymerization technique and their adsorption efficiencies in the removal of p-nitrophenol from aqueous solutions were investigated. DMAC16 monomer was prepared by means of modification of DMA monomer with 1-bromohexadecane. Adsorption experiments were carried out in a batch system and the experimental parameters were evaluated with respect to pH, agitation time, temperature and initial p-nitrophenol concentration. It was observed that the adsorbent poly[2-(methacryloyloxy)ethyl]methy]hexadecylamonium bromide (p-DMAC(16)) prepared from DMAC16 monomer was more effective in the removal of p-nitrophenol than the adsorbent poly(2-dimethylaminoethyl methacrylate) (p-PMA) prepared from DMA monomer. The effective pH ranges for the adsorption of p-nitrophenol onto p-DMAC(16) and p-DMA were 2-12 and 3-9, respectively. Langmuir and Freundlich adsorption models were used to describe the isotherms and find isotherm constants. The Langmuir model was well agreed with experimental data for both adsorbents. The pseudo-first-order, pseudo-second-order, and intraparticle diffusion kinetic models were used to understand the mechanism of the adsorption process and it fitted very well the pseudo-second-order kinetic model for each adsorbent. Thermodynamic parameters such as activation energy and changes of free energy, enthalpy, and entropy were also evaluated for the adsorption of p-nitrophenol onto each adsorbent. Additionally, reusability of the adsorbents was investigated and the results showed that both adsorbents can be employed many times without a significant loss in their adsorption capacities for the removal of p-nitrophenol from water. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: 2-Dimethylaminoethyl Methacrylate, 4-Nitrophenol, Adsorption, Adsorption Characteristics, Bromide, Copolymers, Derivatives, Hypercrosslinked Polymeric Adsorbent, Isotherms, Langmuir, P-Nitrophenol, Phenolic-Compounds, Pseudo Second Order, Removal, Resin, Separation, Waste-Water, [2-(Methacryloyloxy)Ethyl]Dimethylhexadecylammonium

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Full Text: [2009\J Col Int Sci333, 58.pdf](2009/J%20Col%20Int%20Sci333,%2058.pdf)

Abstract: Research in defluoridation of drinking water has thrown more technologies, with adsorption as more popular alternative among the fluoride endemic habitations across the globe. This paper describes the fluoride removal potential of novel sorbent, synthetic hybrid type ion exchangers from drinking water. Synthesized hybrids were characterized using FTIR studies. Batch adsorption studies were performed as a function of contact time, pH and influence of other interfering anions. The values of defluoridation capacities (DCs) of synthesized polyacrylamide Al(III) phosphate (Al-Ex), polyacrylamide Ce(IV) phosphate (Ce-Ex) and polyacrylamide Zr(IV) phosphate (Zr-Ex) were found to be 2144, 2290 and 2166 mg F-/kg, respectively. Ce-Ex has slightly higher DC than Al-Ex and Zr-Ex. The equilibrium data were fitted with isotherm models. Thermodynamic parameters viz., ΔG°, ΔH° and ΔS° were calculated to understand the nature of sorption. Field Studies were carried out to find the suitability of these sorbents at field condition. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Chitosan Beads, Defluoridation, Hybrid Ion Exchangers, Isotherms, Phosphate, Removal, Resin, Thermodynamics, Water

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Full Text: [2009\J Col Int Sci333, 71.pdf](2009/J%20Col%20Int%20Sci333,%2071.pdf)

Abstract: The hyperaccumulative plant species Leersia hexandra Swartz, particularly, has been considered for its detoxification mechanism for phytoremediation of chromium-contaminated water environments. This study investigates the role of the adsorption mechanism of the L. hexandra Sw biomass on the removal of chromium ions Cr(VI) and Cr(III) from an aqueous solution. The interaction between chromium ions and the L. hexandra Sw. biomass was characterized by using infrared spectroscopy. The results indicate that the binding process of the chromium ions involves the active participation of ligands present in the biomass, such as acylamide, carbonyl, amino, carboxyl, and hydroxyl groups, to immobilize the chromium ions. Equilibrium biosorption experiments were carried out to investigate the effects of pH values and contact time. Adsorption isotherms were modeled with the Langmuir and Freundlich equations and isotherm constants were calculated. Kinetic experiments showed the rapid process of biosorption and the pseudo-second-order model Was Successfully applied to predict the rate constant of biosorption. This study firstly discovered the kinetics equilibrium modelling of L. hexandra Sw. biomass on biosorption Cr(VI) and Cr(III). (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption, Aqueous-Solutions, Biosorption, Cadmium, Chromium Ions, Cr(VI), Cu(II), Equilibrium, Hexavalent Chromium, Isotherms, Kinetics, Langmuir, Leersia Hexandra Swartz, Mechanisms, Pseudo Second Order, Removal, Seaweed, Trivalent Chromium, Waste-Water

? Ho, Y.S. (2009), Comments on “Adsorption of direct dyes from aqueous solutions by carbon nanotubes: Determination of equilibrium, kinetics and thermodynamics parameters”. *Journal of Colloid and Interface Science*, **333** (1), 412.

Full Text: [2009\J Col Int Sci333, 412.pdf](2009/J%20Col%20Int%20Sci333,%20412.pdf)

Abstract: Two most suggested papers for pseudo-second-order kinetic model were published in 1984 and 1995 by Blanchard et al. and Ho, respectively. Blanchard et al. noted the overall exchange reaction of NH4+ ions fixed in zeolite by divalent metallic ions in the solution using a second-order kinetic model. Ho used the pseudo-second-order kinetic model to the copper ion, peat adsorption system. The adsorption involved chemical bonding and cation exchange. In this comment citation error and quotation error were pointed. (c) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Initial Adsorption Rate, Intraparticle Diffusion Model, Kinetics, Peat, Pseudo Second Order, Pseudo-Second-Order Kinetic Model, Quotation Error, Sorption

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Full Text: [2009\J Col Int Sci333, 413.pdf](2009/J%20Col%20Int%20Sci333,%20413.pdf)

Abstract: This letter is a response to the comment of Dr. Ho on “Adsorption of direct dyes from aqueous solutions by carbon nanotubes: Determination of equilibrium, kinetics and thermodynamics parameters.” First, we would like to thank Dr. Ho for his interest in, and kind comments on, our recent article [C.Y. Kuo, C.H. Wu, J.Y. Wu, J. Colloid Interface Sci. 327 (2008) 308]. This reply responds to the issues raised by Dr. He. We will indicate the miscitation of the intraparticle diffusion model and clarify the correct citation of the pseudo-second-order model. (c) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Biosorption, Chitosan, Citation, Composite Membrane, Ho, Y.S., Ho,Yuh-Shan, Intraparticle Diffusion Model, Kinetics, Metal-Complex Dyes, Mucor-Hiemalis, Nitrate Removal, Pine Sawdust, Pseudo Second Order, Pseudo-Second-Order Model, Sorption

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Full Text: [2009\J Col Int Sci333, 448.pdf](2009/J%20Col%20Int%20Sci333,%20448.pdf)

Abstract: The main propose of this work was to describe the basic parameters of electrical double layer structures of the ion exchanger/NaCl before and after the sorption process of Pb(II) and Cd(II) ions from aqueous solutions in the presence of the complexing agent EDTA (ethylenediaminetetraacetic acid). In the studies the following ion exchangers were used: cation exchangers Micro-ionex (in the H+ and NH4+ forms), Dowex 50W🞨4 (in the H+ form), and Dowex 50W🞨12 (in the H+ form): anion exchangers Dowex 1x4 (in the Cl- form) and Dowex 1x8 (in the Cl- form). Study of the physicochemical properties of the sample Surface was carried out. The influence of ionic strength, pH, and solution interface was investigated. Electrophoretic mobility, Surface charge density, and parameters for different concentrations of the electrolytes under question were presented. pH was changed from 3 to 10. The studies were carried out for the M(II)-EDTA = 1:1 system, The effects of the concentration of the solution containing the above-noted complexes and of the ion exchange/solution phase contact time on sorption capacities of the ion exchangers under consideration were studied. Kinetic parameters of the sorption process were also determined. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Chelating-Agent, Electrical Double Layer, Electrophoretic Mobility, Heavy Metal, Heavy-Metal Ions, Ion Exchanger, Removal, Soils, Sorption

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Full Text: [2009\J Col Int Sci335, 24.pdf](2009/J%20Col%20Int%20Sci335,%2024.pdf)

Abstract: The present study deals with the application of bottom ash, a power plant waste, and deoiled soya, an agricultural waste, for the adsorptive removal of carmoisine A dye from its aqueous solutions. This paper incorporates a comparative study of the adsorption characteristics of the dye on these effective adsorbents along with effects of time, temperature, concentration, and pH. Analytical techniques have been employed to find pore properties and characteristics of adsorbent materials. Batch adsorption studies, kinetic studies, and column operations have also been performed to understand the dye extraction ability of the adsorbents. The adsorption behavior of the dye has been studied using Freundlich, Langmuir, Tempkin, and Dubinin-Radushkevich adsorption isotherm models. The monolayer adsorption capacity determined from the Langmuir adsorption equation has been found as 1.78 x 10-5 and 5.62 x 10-5 mol g-1 at 323 K for bottom ash and deoiled soya, respectively. Kinetic measurements suggest the involvement of pseudo-second-order kinetics in both adsorptions and each case is controlled by a particle diffusion process. Column experiments demonstrated that both adsorbents could be practically utilized in elimination of hazardous dye from effluent and dye material can be recovered by eluting NaOH through the exhausted columns. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Aqueous-Solution, Azo-Dye, Basic-Dyes, Bottom Ash, Carmoisine A, De-Oiled-Soya, Deoiled Soya, Dye Removal, Fly-Ash, Isotherms, Kinetics, Metal-Ions, Sorption, Wastewater

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Full Text: [2009\J Col Int Sci335, 168.pdf](2009/J%20Col%20Int%20Sci335,%20168.pdf)

Abstract: Phosphate removal is important in the control of eutrophication of water bodies and adsorption is one of the promising approaches for this purpose. A Fe-Mn binary oxide adsorbent with a Fe/Mn molar ratio of 6:1 for phosphate removal was synthesized by a simultaneous oxidation and coprecipitation process. Laboratory experiments were carried out to investigate adsorption kinetics and equilibrium, in batch mode. The effects of different experimental parameters, namely contact time, initial phosphate concentration, solution pH, and ionic strength on the phosphate adsorption were investigated. The adsorption data were analyzed by both Freundlich and Langmuir isotherm models and the data were well fit by the Freundlich isotherm model. Kinetic data correlated well with the pseudo-second-order kinetic model, suggesting that the adsorption process might be chemical sorption. The maximal adsorption capacity was 36 mg/g at pH 5.6. The phosphate adsorption was highly pH dependent. The effects of anions such as Cl-, SO42-, and CO32- on phosphate removal were also investigated. The results suggest that the presence of these ions had no significant effect on phosphate removal. The phosphate removal was mainly achieved by the replacement of surface hydroxyl groups by the phosphate species and formation of inner-sphere surface complexes at the water/oxide interface. In addition, the adsorbed phosphate ions can be effectively desorbed by dilute NaOH solutions. This adsorbent, with large adsorption capacity and high selectivity, is therefore a very promising adsorbent for the removal of phosphate ions from aqueous solutions. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Kinetics, Fe-Mn Binary Oxide, Fly-Ash, Goethite, Iron, Mechanism, Mechanisms, Phosphate Removal, Phosphorus Removal, Pseudo-Second-Order Kinetic Model, Red Mud, Soils, Sorbents, Specific Adsorption, Waste-Water

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Full Text: [2009\J Col Int Sci336, 398.pdf](2009/J%20Col%20Int%20Sci336,%20398.pdf)

Abstract: Crystalline layered sodium kenyaite was exchanged to proton kenyaite when reacted with hydrochloric acid solution, providing a new surface with available silanol groups that are able to couple with N-3-tri-methoxysilylpropylethylenediamine silylating agent, after prior expansion of the basal distance with the polar organic solvent dimethyl sulfoxide. The resulting organofunctionalized nanomaterial (2N-Ken) was characterized by elemental analysis, infrared spectroscopy, X-ray diffraction, carbon and silicon nuclear magnetic resonances in the solid state, surface analysis, porosity, thermogravimetry, and electron scanning microscopy. The quantity of silylating agent incorporated into the nanospace, calculated from the nitrogen elemental analysis, was determined as 0.48 mmol g-1, after expanding of the acidic precursor basal distance from 1.62 to 1.99 nm. The presence of a covalent silicon-carbon bond of the organosilyl moiety on the inorganic layered structure was confirmed through nuclear magnetic resonance. This new nanomaterial has the ability to extract the Sumifix Brilliant Orange 3R textile dye from aqueous solution, using a batchwise process. The effects of stirring time, adsorbent dosage, and pH on the adsorption capacity demonstrated that 4 h is enough to reach equilibrium at 298 +/- K under pH 4.0. Based on error function values (F-error) the data were best fitted to fractional-order and chemisorption kinetic models when compared to pseudo-first-order and pseudo-second-order kinetic models. The equilibrium data were better fitted to the Sips isotherm model. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: 3R, Adsorbent, Adsorbent Dosage, Adsorption, Adsorption Capacity, Analysis, Aqueous Solution, Araucaria-Angustifolia Wastes, Batch Conditions, Biosorbent, Capacity, Carbon, Chemisorption, Couple, Crystal-Structure, Data, Dye, Dye Removal, Equilibrium, Error, Function, Infrared Spectroscopy, Isotherm, Isotherm Model, Kenyaite, Kinetic, Kinetic Models, Layered Material, Magadiite, Magnetic, Magnetic Resonance, Methylene-Blue Biosorption, Model, Models, Nanomaterial, Nitrogen, Organic, Pecan Nutshell, pH, Porosity, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Removal, Rights, Silicon, Sodium, Solution, Spectroscopy, State, Statistical Design, Structure, Sumifix Brilliant Orange 3R, Surface, Textile Dye, Thermogravimetry, Unburned Carbon, X-Ray, X-Ray Diffraction, Yellow Passion-Fruit

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Full Text: [2009\J Col Int Sci337, 19.pdf](2009/J%20Col%20Int%20Sci337,%2019.pdf)

Abstract: A kind of phenolic hydroxyl group modified hyper-cross-linked polymeric adsorbent HJ-02 Was prepared from macroporous crosslinked chloromethylated styrene-divinylbenzene copolymers by Friedel-Crafts post-cross-linked reaction and esterified reaction. Its chemical structure and pore structure were characterized by chemical analysis, infrared spectroscopy, and N2 adsorption-desorption experiments. It was thereafter applied to adsorb *p*-aminobenzoic acid in aqueous solution for its potential application in separation and purification. The *p*-aminobenzoic acid aqueous solution, pH unadjusted, was the optmum for the adsorption and the salinity posed a positive effect. The adsorption dynamic curves obeyed the pseudo-second-order rate equation and the adsorption was controlled by an intraparticle diffusion model. The adsorption enthalpy was calculated to be negative and decreased with the increase of the *p*-aminobenzoic acid uptake. The surface character of HJ-02 resin was described with function of the adsorption enthalpy by Do’s model and the result indicated that it exhibited surface energy heterogeneity. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Enthalpy, Adsorption Properties, Adsorption-Desorption, Analysis, Application, Aqueous Solution, Aqueous-Solution, Characterization, Chemical, Chemical Analysis, Diffusion, Diffusion Model, Dye, Dynamic, Energy, Enthalpy, Experiments, Function, Heterogeneity, Hypercrosslinked Polystyrene, Infrared Spectroscopy, Intraparticle Diffusion, Intraparticle Diffusion Model, Macroporous, Model, Modified, N-2, N2, *p*-aminobenzoic acid, pH, Polymeric, Polymeric Adsorbent, Potential, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Purification, Removal, Resin, Rights, Salinity, Separation, Solution, Sorbents, Sorption, Spectroscopy, Structure, Surface, Surface Energy, Surface Heterogeneity, Synthesis, Thermodynamics, Uptake, Water

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Full Text: [2009\J Col Int Sci337, 32.pdf](2009/J%20Col%20Int%20Sci337,%2032.pdf)

Abstract: The adsorption of a large reactive dye, Reactive Black 5 dye, onto two bamboo based active carbons using phosphoric acid in a two stage activation process and three conventional adsorbents, carbon F400, bone char and peat, has been studied. The monolayer saturation adsorption capacities for Reactive Black 5 were determined by the Langmuir isotherm analysis and are: 176, 157, 7, 447 and 545 mg dye, g adsorbent for active carbon F400, bone char, peat, bamboo carbon (2123 m(2), g) and bamboo carbon (1400 m(2), g), respectively. The equilibrium experiments were analysed using three isotherms, Langmuir, Freundlich and Redlich-Peterson and the based on the lowest SSE values, the Redlich-Peterson was the best fit correlation. The effect of adding salt, in the form of sodium phosphate, on the adsorption capacities has been studied and was found to increase the adsorption capacities of both bamboo carbons to over 900 mg, g. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Activation, Active Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption, Adsorption Capacities, Adsorption, Desorption, Analysis, Aqueous-Solutions, Bamboo, Bamboo Activated Carbon, Bone, Bone Char, Bone Char, Carbon, Char, Chemistry, Conventional, Correlation, Desorption, Dye, Effluents, Equilibrium, Experiments, Freundlich, Ionic Strength, Ionic-Strength, Isotherm, Isotherms, Kinetics, Langmuir, Langmuir Isotherm, Monolayer, Peat, Phosphate, Phosphoric Acid, Reactive Black 5, Reactive Dye, Redlich-Peterson, Removal, Rights, Salt, Saturation, Size, Sodium, Solution Ph, Surface, Surface Area, Surface Chemistry

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Full Text: [2009\J Col Int Sci337, 122.pdf](2009/J%20Col%20Int%20Sci337,%20122.pdf)

Abstract: An analogue of heulandite was synthesized by using inorganic salts as a source for silicon and aluminum in the hydrothermal synthesis of the material. The resulting solid was modified by organofunctionalization with 1,4-bis(3-aminopropyl)piperazine and subsequent reaction with methylacrylate in a heterogeneous route. The original (HEU) and modified silicate (HEUAPPMA) samples were characterized by textural analysis, SEM, and nuclear magnetic nuclei of Si-29 and C-13. The chemically modified silicate sample showed modification of its physical-chemical properties including specific area 459.0-978.8 m2 g-1. The ability of this material to remove nickel(II), cobalt(II), and copper(II) from aqueous solutions was followed by a series of adsorption isotherms adjusted to a Sips equation. The quick adsorption process reached the equilibrium before 10, 15, and 20 min for Cu(II), Ni(II), and Co(II), respectively, with maximum adsorptions at pH 4.0. Based on the capacity of adsorption of HEUAPPMA to interact with metal ions, the following results were obtained 12.9, 9.8, and 7.5 mmol g-1 for Cu(II), Ni(II), and Co(II), respectively, reflecting a maximum adsorption order of Cu(II) > Ni(II) > Co(II). The energetic effects caused by metal cation adsorption were determined through calorimetric titrations. (C) 2009 Published by Elsevier Inc.

Keywords: Adsorption, Adsorption, Adsorption Isotherms, Aluminum, Analysis, Aqueous Solution, Aqueous Solutions, C-13, Calorimetry, Capacity, Cation, Cation Removal, Co(II), Cobalt(II), Copper(II), Cu(II), Equilibrium, Europium(III), Heulandite, Hydrothermal Synthesis, Intercalation, Ions, Isotherms, Magadiite, Magnetic, Mesoporous Silica, Metal, Metal Ions, Metals, Modification, Modified, Ni(II), Nickel(II), pH, Removal, Route, Salts, Sem, Silica-Gel, Silicate, Silicon, Solution, Solutions, Sorption, Source, Synthesis, Temperature, Thermodynamic, Thorium(IV), Toxic, Toxic Metals

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Full Text: [2009\J Col Int Sci337, 345.pdf](2009/J%20Col%20Int%20Sci337,%20345.pdf)

Abstract: Bottom ash, a waste of thermal power plants, and deoiled soya, an agricultural waste material, were employed for successful removal and recovery of hazardous phenol red dye from wastewaters. The adsorption characteristics and operational parameters were determined by monitoring different parameters such as effect of pH, effect of concentration of the dye, amount of aclsorbents, contact time, and temperature. The equilibrium data were analyzed on the basis of various adsorption isotherm models, namely Langmuir, Freundlich, Tempkin, and Dubinin-Radushkevich. The highest monolayer adsorption capacity has been obtained for the phenol red-bottom ash system (2.6×10-5 mol/g) at 50°C. Different thermodynamic parameters such as free energy, enthalpy, and entropy have been calculated and it was concluded that with the increase in temperature adsorption increases, indicating the endothermic nature of the process for both adsorbent materials. Kinetic parameters were derived from pseudo-first-order and pseudo-second-order kinetics. Differentiation between particle and film diffusion mechanisms operative in the present study has been carried out. The column regeneration characteristic has been also investigated and recovery percentage greater than 90% was obtained for both adsorbents by utilizing acidic eluent. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbons, Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Isotherm Models, Agricultural, Agricultural Waste, Aqueous-Solutions, Basic Dye, Bottom Ash, Capacity, Characteristics, Column, Column Regeneration, Component Systems, Concentration, Crystal-Violet, Data, De-Oiled-Soya, Deoiled Soya, Diffusion, Dye, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Film Diffusion, Freundlich, Hazardous Dye, Isotherm, Isotherm Models, Kinetic, Kinetic Parameters, Kinetics, Langmuir, Malachite-Green, Materials-Bottom Ash, Mechanisms, Models, Monitoring, Monolayer, Operative, pH, Phenol, Phenol Red, Plants, Power, Pseudo First Order, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Recovery, Regeneration, Removal, Rights, Temperature, Thermodynamic, Thermodynamic Parameters, Waste, Waste Materials, Wastewater, Wastewaters

? Guerra, D.L., Carvalho, M.A., Leidens, V.L., Pinto, A.A., Viana, R.R. and Airoldi, C. (2009), Immobilization of 5-amino-1,3,4-thiadiazole-thiol onto kanemite for thorium(IV) removal: Thermodynamics and equilibrium study. *Journal of Colloid and Interface Science*, **338** (1), 30-39.

Full Text: [2009\J Col Int Sci338, 30.pdf](2009/J%20Col%20Int%20Sci338,%2030.pdf)

Abstract: The compound 5-amino-1,3,4-thiadiazole-thiol (ATT) was anchored onto an Amazon kanemite surface (K) by homogeneous and heterogeneous routes. Both kanemite modification methodologies resulted in similar products, named K-CTT and K-ATT, respectively. The modified and natural kanemite samples were characterized by textural analysis. FT-Raman, and nuclear magnetic nuclei of Si-29 and C-13. Elemental analysis proved that the matrix K-ATT presented a higher ATT immobilization than K-CTT, with values 1.42 and 1.38 mmol g-1, respectively. NMR and FT-Raman confirmed the immobilization of ATT on both surfaces. The ability of these materials to remove thorium(IV) from aqueous solution was followed by a series of adsorption isotherms adjusted to a Sips equation at room temperature and pH 4.0. The maximum number of moles adsorbed was determined to be 7.48×10-3, 9.82×10-3, and 12.94×10-3 mmol g-1 for K, K-CTT, and K-ATT, respectively. The energetic effects (ΔH-int degrees, ΔG degrees, and ΔS-int degrees) caused by metal cation adsorption were determined through calorimetric titrations. (C) 2009 Published by Elsevier Inc.

Keywords: Adsorption, Adsorption Isotherms, Adsorption Process, Amazon, Analysis, Aqueous Solution, Aqueous-Solutions, C-13, Calorimetry, Cation, Contact Time, Equilibrium, Immobilization, Ionic-Strength, Isotherms, Kanemite, Magnetic, Matrix, Mesoporous Silica, Metal, Metals Uptake, Methodologies, Modification, Modified, Natural, NMR, pH, Removal, Room Temperature, Silica-Gel Surface, Solid-State NMR, Solution, Sorption, Surface, Surfaces, Temperature, Thermochemical Data, Thermodynamic, Thermodynamics, Thorium

? Kraus, A., Jainae, K., Unob, F. and Sukpirom, N. (2009), Synthesis of MPTS-modified cobalt ferrite nanoparticles and their adsorption properties in relation to Au(III). *Journal of Colloid and Interface Science*, **338** (2), 359-365.

Full Text: [2009\J Col Int Sci338, 359.pdf](2009/J%20Col%20Int%20Sci338,%20359.pdf)

Abstract: Cobalt ferrite magnetic nanoparticles (Co-MNP) were prepared by a co-precipitation method and subsequently coated with (3-mercaptopropyl) trimethoxysilane (MPTS) for the extraction and recovery of Au(III) from aqueous chloride solutions. Physical characterization of the MPTS-modified particles (Co-MPTS) was performed using FT-IR, TGA, and SEM. Results from FT-IR confirmed that MPTS was present on the surface of the magnetic nanoparticles. The amount of MPTS was 0.36 mmol g(-1) of Co-MPTS, obtained by elemental analysis. SEM images revealed aggregates composed of nanocrystalline Co-MPTS particles. The extraction efficiency as a function of the pH, contact time, and initial Au(III) concentration was evaluated. The modified particles showed maximum adsorption in the pH range from 1.0 to 4.0. The adsorption behavior of Co-MPTS toward Au(III) followed a Langmuir isotherm and the maximum adsorption capacity was found to be 120.5 mg g-1. The stability of the modified materials was improved as compared to that of bare Co-MNP. The subsequent desorption of gold could be achieved by using acidified thiourea solution; the highest gold recovery reached 85%. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Behavior, Adsorption Capacity, Adsorption Properties, Aggregates, Analysis, Aqueous-Solutions, Au(III), Behavior, Capacity, Characterization, Chitosan, Chloride, Chloride Solutions, Coated, Cobalt, Concentration, Coprecipitation, Desorption, Efficiency, Extraction, Fe3O4 Nanoparticles, Ferrite, FT-IR, FTIR, Function, Gold, Gold Adsorption, Gold(III), Isotherm, Langmuir, Langmuir Isotherm, Magnetic, Magnetic Nanoparticles, Magnetite Nanoparticles, Metal-Ions, Modified, MPTS, Nanoparticles, Particles, Ph, Recovery, Rights, Sem, Silica, Solution, Solutions, Sorption, Stability, Surface, Synthesis, TGA, Water Treatment

? Borrmann, T., Johnston, J.H., McFarlane, A.J., Richardson, M.J. and O’Connor, S.J. (2009), Nano-structured calcium silicate hydrate functionalised with iodine. *Journal of Colloid and Interface Science*, **339** (1), 175-182.

Full Text: [2009\J Col Int Sci339, 175.pdf](2009/J%20Col%20Int%20Sci339,%20175.pdf)

Abstract: Nano-structured calcium silicate hydrate can physisorb or chemisorb iodine, making it interesting for medical or materials science applications, where a slow, controlled release of iodine is desired. It was found that iodine can be sorbed and released by applying the elemental halogen in solution, either as a gas or as a solid. At ambient temperatures the sorption and desorption process is quantitative and physical, meaning that the same amount of iodine is taken up and released. At temperatures above 32.5 degrees C (305.7 K) iodine reacts with the calcium silicate hydrate forming a complex, which is stable above the sublimation temperature of iodine. The formation energy for the iodine calcium silicate hydrate complex was established to be 41.8±0.8 kJ mol (1) by calorimetry and the nature of the complex was investigated using X-ray photoelectron spectroscopy. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Calcium, Calorimetry, Controlled Release, Controlled-Release, Desorption, Energy, Immersion Ion-Implantation, Iodine, Iodine Release, Iodine Sorption, Medical, Metal, Model, Molecular-Iodine, Nano-Structured Calcium Silicate Hydrate, Nov, Physical, Release, Rights, Science, Silicate, Solution, Sorption, Spectroscopy, Starch, Temperature, Vapor, X-Ray, X-Ray Photoelectron, X-Ray Photoelectron Spectroscopy

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Full Text: [2009\J Col Int Sci339, 275.pdf](2009/J%20Col%20Int%20Sci339,%20275.pdf)

Abstract: The adsorption of two anionic dyes, Remazol Black B (RB5) and Acidol Red 2BE-NW (AR42), onto a microporous activated carbon felt was investigated. The characterization of carbon Surface chemistry by X-ray microanalysis, Boehm titrations, and pH-PZC measurements indicates that the surface oxygenated groups are mainly acidic. The rate of adsorption depends on the pH and the experimental data fit the intraparticle diffusion model. The pore size distribution obtained by DFT analysis shows that the mean pore size is close to 1 nm, which indicates that a slow intraparticle diffusion process control the adsorption. The adsorption isotherms were measured for different pH values. The Khan and the Langmuir-Freundlich models lead to the best agreement with experimental data for RB5 and AR42, respectively. These isotherm Simulations and the pH dependence of adsorption show that the adsorption capacity is mainly controlled by nondispersive electrostatic interactions for pH values below 4. The adsorption kinetics, the irreversibility of the process, and the influence of the pH indicate that the rate of adsorption in this microporous felt proceeds through two steps. The first one is fast and results from direct interaction of dye molecules with the external surface of the carbon material (which account for 10% of the whole surface area); in the second, slow step, the adsorption rate is controlled by the slow diffusion of dye molecules into the narrow micropores. The influence of temperature on the adsorption isotherms was studied and the thermodynamic parameters were obtained. They show that the process is spontaneous and exothermic. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Acidol Red 2be-Nw, Activated Carbon, Activated Carbon Felt, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Isotherms, Adsorption Kinetics, Adsorption Rate, Analysis, Anionic Dyes, Aqueous-Solutions, Azo-Dye, Capacity, Carbon, Characterization, Chemistry, Control, Data, Degradation, DFT, Diffusion, Diffusion Model, Distribution, Dye, Dyes, Electrochemical Regeneration, Exothermic, Experimental, Fibers, First, Interaction, Intraparticle Diffusion, Intraparticle Diffusion Model, Irreversibility, Isotherm, Isotherms, Kinetics, Langmuir-Freundlich, Lead, Model, Models, NOV, pH, pHPZC, Pore-Size Distribution, Remazol Black B, Removal, Rights, Size, Surface, Surface Area, Surface Chemistry, Temperature, Thermodynamic, Thermodynamic Parameters, Waste-Water, Water Treatment, X-Ray

? Huang, J.H. (2009), Adsorption properties of a microporous and mesoporous hyper-crosslinked polymeric adsorbent functionalized with phenoxy groups for phenol in aqueous solution. *Journal of Colloid and Interface Science*, **339** (2), 296-301.

Full Text: [2009\J Col Int Sci339, 296.pdf](2009/J%20Col%20Int%20Sci339,%20296.pdf)

Abstract: A microporous and mesoporous hyper-crosslinked polymeric adsorbent modified with phenoxy group HJ-01 was prepared and its adsorption properties for phenol were carefully investigated in this study. Its chemical structure and pore structure were characterized by chemical analysis, infrared spectroscopy, elemental analysis, and N-2 adsorption and desorption experiments. The acidic and neutral solution pH was suitable for the adsorption of phenol onto HJ-01 resin in aqueous solution and NaCl posed a positive effect on the adsorption. The adsorption dynamic curves obeyed the pseudo-second-order rate equation and the adsorption isotherms can be characterized by a Freundlich isotherm model. The adsorption thermodynamic parameters can be quantitatively correlated with the fractional loading and its surface energetic heterogeneity can be described with a function of adsorption enthalpy. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Enthalpy, Adsorption Isotherms, Adsorption Properties, Adsorption Property, Analysis, Aqueous Solution, Chemical, Chemical Analysis, Copolymers, Desorption, Dynamic, Enthalpy, Equilibrium, Experiments, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Function, Heterogeneity, Hypercrosslinked Polystyrene, Infrared Spectroscopy, Isotherm, Isotherm Model, Isotherms, Kinetics, Linking, Loading, Mesoporous, Mn200, Model, Modified, N-2, N2, N2 Adsorption, NaCl, Nov, PH, Phenol, Poly(Styrene-Co-Divinylbenzene), Polymeric, Polymeric Adsorbent, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Removal, Resin, Rights, Solution, Sorption, Spectroscopy, Structure, Surface, Surface Heterogeneity, Thermodynamic, Thermodynamic Parameters

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Full Text: [2009\J Col Int Sci340, 16.pdf](2009/J%20Col%20Int%20Sci340,%2016.pdf)

Abstract: The present investigation assesses the applicability of waste materials-bottom ash and deoiled soya-for the removal of the colorant Congo red from wastewaters. The adsorption characteristics and dye removal efficiency of adsorbents have been determined by investigating factors such as effect of pH, effect of concentration of the dye, amount of adsorbents, contact time, and temperature. Langmuir, Freundlich, Tempkin, and Dubinin-Radushkevich isotherm models have been used to evaluate the ongoing adsorption. With the help of adsorption isotherm data different thermodynamic parameters such as free energy; enthalpy, and entropy have been calculated. The estimated free energy has been obtained as -21.52 kJ mol-1 for bottom ash and -16.88 kJ mol-1 for deoiled soya. On the basis of pseudo-first-order and pseudo-second-Older kinetic equations different kinetic parameters have been obtained. Column operations depicted good adsorptive tendencies for Congo red with 96.95% and 97.14% saturation of dye on bottom ash and deoiled soya, respectively. Regeneration of the saturated columns has been made by eluting NaOH solution and more than 90% dye has been recovered in both cases. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorbents, Adsorption, Adsorption Isotherm, Aqueous-Solutions, Azo-Dye, Batch, Bottom Ash, Bulk Removal, Characteristics, Column, Column Operations, Concentration, Congo Red, Data, De-Oiled-Soya, Deoiled Soya, Desorption, Dye, Dye Removal, Dyes, Efficiency, Energy, Enthalpy, Entropy, Freundlich, Hen Feathers, Investigation, Isotherm, Isotherm Models, Kinetic, Kinetic Equations, Kinetic Parameters, Kinetics, Langmuir, Materials-Bottom Ash, Models, NaOH, PH, Pseudo First Order, Pseudo-First-Order, Recovery, Regeneration, Removal, Removal Efficiency, Rights, Saturation, Solution, Temperature, Thermodynamic, Thermodynamic Parameters, Waste, Waste Materials, Wastewater, Wastewaters

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Full Text: [2009\J Col Int Sci340, 131.pdf](2009/J%20Col%20Int%20Sci340,%20131.pdf)

Abstract: The adsorption of humic acid on bentonite from Milos Island (Greece) acid-treated with dilute H2SO4 Solutions over a concentration range between 0.25 and 13 M has been Studied. Bentonite activated with 3 M Sulfuric acid (AAS) showed a higher efficiency in removing humic acid from aqueous solutions and was selected for further investigation. The specific surface area of acid-activated bentonite was estimated using the methylene blue adsorption method. The Morphology of untreated, activated, and HA-sorbed bentonite was studied Under scanning electron microscope (SEM). The effects of contact time, adsorbate concentration, adsorbent dose, and temperature on the adsorption Of humic acid onto bentonite activated with 3 M H2SO4 were Studied using a batch adsorption technique. Acidic pH and high ionic strength proved to be favorable for the adsorption efficiency. Pseudo-first-order, pseudo-second-order, and intraparticle diffusion models were used to describe the kinetic data and the rate constants were evaluated. The experimental isotherm data were analyzed using Langmuir, Freundlich, and Temkin equations and the isotherm constants were determined. Thermodynamic parameters (ΔH°, ΔS°, and ΔG°) of adsorption of humic acid onto acid-activated bentonite with 3 M Sulfuric acid were also evaluated. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Acid-Activated Bentonite, Adsorbent, Adsorbent Dose, Adsorbents, Adsorption, Aqueous Solutions, Aqueous-Solutions, Batch, Batch Adsorption, Bentonite, Capacity, Carbon, Clay, Concentration, Data, Diffusion, Efficiency, Experimental, Freundlich, Greece, Humic Acid, Intraparticle Diffusion, Investigation, Ionic Strength, Isotherm, Kinetic, Kinetics, Kinetics, Langmuir, Methylene Blue, Methylene Blue Adsorption, Methylene-Blue, Models, Montmorillonite, pH, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Range, Rate Constants, Removal, Rights, SEM, Solutions, Specific Surface, Specific Surface Area, Strength, Surface, Surface Area, Surfactant-Modified Bentonite, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics

? Caroni, A.L.P.F., de Lima, C.R.M., Pereira, M.R. and Fonseca, J.L.C. (2009), The kinetics of adsorption of tetracycline on chitosan particles. *Journal of Colloid and Interface Science*, **340** (2), 182-191.

Full Text: [2009\J Col Int Sci340, 182.pdf](2009/J%20Col%20Int%20Sci340,%20182.pdf)

Abstract: Experiments to monitor and characterize the kinetics of adsorption of tetracycline on chitosan particles are reported in this work. The same pseudo-order kinetics that has been widely used for describing the adsorption in systems related to wastewater purification and drug loading was used to treat the present data. As some unexpected results came out from the experiments, it was necessary a detailed deduction for this sort of kinetics to be carried out, so that approximations related to short and long times were obtained. Firstly it was shown that an apparently linear t/q(t) versus t relationship did not imply a pseudo-second-order sorption kinetics, differently of what has been repeatedly reported in the literature. It was found that this misinterpretation could be avoided by using non-linear regression. Finally, the adsorption of tetracycline on chitosan particles was analyzed, using the insights obtained from theoretical analysis, and the parameters generated were used to analyze to adsorption kinetics and to propose an adsorption mechanism. © 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Kinetics, Adsorption Mechanism, Analysis, Aqueous-Solutions, Chitosan, Cross-Linked Chitosan, Data, Drug, Drug-Delivery, Dye, Experiments, H-Pylori Therapy, Kinetics, Kinetics of Adsorption, Literature, Loading, Malachite Green, Mechanism, Microspheres, Non-Linear Regression, Nonlinear Regression, Oral Sustained Delivery, Particles, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Purification, Regression, Rights, Sorption, Sorption Kinetics, Sphagnum Moss Peat, Systems, T, Tetracycline, Tetracycline Adsorption Kinetics, Wastewater, Work

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Full Text: [2010\J Col Int Sci341, 311.pdf](2010/J%20Col%20Int%20Sci341,%20311.pdf)

Abstract: The fate and transport of commonly used antibiotics in soil and groundwater have attracted renewed Studies due to increased sensitivities of analytical instruments and thus frequent detections of these compounds even in treated wastewater. Smectite, an important soil component, has large surface area and high cation exchange capacity, while tetracycline (TC) can exist in different forms and charges under different pH conditions. Thus, the interaction between smectite and TC in aqueous systems is of great importance. This research focused on elucidating the mechanisms of TC uptake by smectite, in terms of TC adsorption, cation desorption, and pH changes associated with TC adsorption by smectite and intercalation in smectite. TC adsorption onto smectite was a relatively fast process even though most of the adsorption sites were in the interlayer position involved in intercalation as confirmed by the expansion of d(001) spacing. The TC adsorption capacity was equivalent to 0.74-1.11 times the cation exchange capacity for three of the four smectite minerals studied. Accompanying TC adsorption was simultaneous adsorption of H+, resulting in protonation of TC on the dimethylamine group. At higher TC input concentrations further adsorption of H+ resulted in the ratio of H+ adsorbed to TC adsorbed greater than one, suggesting that additionally adsorbed H+ could serve as counterions to partially offset the negative charges on the tricarbonyl or phenolic diketone functional groups. The positive correlations between cations desorbed and TC adsorbed, as well as TC adsorbed and H+ adsorbed, provided a first time evidence to confirm cation exchange as the main mechanism of TC uptake, even under neutral pH conditions. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption, Adsorption Capacity, Antibiotics, Aqueous Solution, Base-Line, Capacity, Cation, Cation Exchange, Cation-Exchange, Changes, Correlations, Desorption, Evidence, Fate, Fate and Transport, First, Forms, Functional Groups, Groundwater, Interaction, Intercalation, Mechanism, Mechanisms, Minerals, Montmorillonite, pH, Protonation, Research, Rights, Smectite, Society Source Clays, Soil, Solution, Sorption, Surface, Surface Area, Systems, Tautomers, Tetracycline, Transport, Treated Wastewater, Uptake, Wastewater

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Full Text: [2010\J Col Int Sci342, 135.pdf](2010/J%20Col%20Int%20Sci342,%20135.pdf)

Abstract: Low cost fertilizer industry waste material called carbon slurry, produced in generators of fuel oil-based industrial generators, was converted into an effective and efficient adsorbent for the removal of hexavalent chromium(VI) from aqueous solutions. The waste was chemically treated, activated, characterized, and used for the adsorption of chromium. The work involves batch experiments to investigate the effect of contact time, pH, temperature, concentration, and adsorbent dose on the extent of adsorption by carbon Slurry. The maximum adsorption was found at 70 min, 2.0 pH, 4.0 g/L dose, and 303 K temperature. Maximum adsorption capacity (15.24 mg/g) of Cr(VI) on carbon slurry was observed at 100 mg/L initial Cr(VI) concentration. Langmuir and Freundlich adsorption isotherm models were applied to analyze adsorption data, and both were found to be applicable to this adsorption system, in terms of relatively high regression values. Thermodynamic parameters showed that the adsorption of Cr(VI) onto carbon slurry was feasible, spontaneous, and exothermic under the studied conditions. Kinetics of adsorption was found to follow the pseudo-second-order rate equation. Column studies have been carried out to compare these with the batch capacities. The recovery of Cr(VI) and chemical regeneration of the spent column have also been tried. In all, the results indicated that the adsorbent used in this work proved to be effective material for the treatment of chromium-bearing aqueous solutions. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Isotherm Models, Agricultural Waste, Aqueous Solution, Aqueous Solutions, Bagasse Fly-Ash, Batch, Batch Experiments, Biomass, Capacity, Carbon, Carbon Slurry, Chemical, Chromium, Chromium(VI), Column, Concentration, Cost, Cr(VI), Data, Exothermic, Experiments, Fertilizer, Fertilizer Industry Waste, Freundlich, Freundlich Adsorption Isotherm, Hexavalent Chromium, Isotherm, Kinetics, Kinetics, Langmuir, Low Cost, Models, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Recovery, Red Mud, Reduction, Regeneration, Regression, Removal, Rights, Solution, Solutions, Temperature, Thermodynamic, Thermodynamic Parameters, Treatment, Waste, Water, Work

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Full Text: [2010\J Col Int Sci342, 437.pdf](2010/J%20Col%20Int%20Sci342,%20437.pdf)

Abstract: We have investigated the effect of solution parameters on the adsorption of phosphate ions and on charges and structures, i.e., on the nature of species, at the alpha-Al2O3 colloid/solution interface by using the batch method, potential measurements, and in situ ATR-FTIR spectroscopy. The uptake of phosphate decreases with the extent of surface deprotonation (i.e., pH), imparts negative charges to the colloid surface, and induces IEP shifts showing chemical sorption. Use of complementary techniques provides evidence that phosphate is sorbed at low pH (3.3) by a combination of surface reactions of complexation and precipitation, whose relative contributions depend on phosphate loading. Surface complexation includes fast reactions of ligand exchange with single coordinated hydroxyls, and electrostatic attraction of H2PO4 ions at positively charged surface sites. This is supported by experiments at low coverage showing sharp and linear decrease of potential (i.e., surface charge) with amount of phosphate sorbed. At high coverage, potential values are low and independent of phosphate loading. Formation of surface precipitates of AI-phosphate is inferred from the assignment of the ATR-FTIR absorption band at 1137 cm-1, whose intensity increases with phosphate solution content and reaction time, to the P-O-stretching vibration mode for phosphate sorbed at high concentrations on alpha-Al2O3. In situ ATR-FTIR spectroscopy reveals also structural reorganizations of surface hydroxyls with time, due to surface hydration and to surface precipitation continuing over extended periods along alumina dissolution. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Absorption, Adsorption, Adsorption, Alumina, Alumina-Solution Interface, Aluminum (OXO)Hydroxides, ATR-FTIR, Batch, Batch Method, Boehmite, Charge, Chemical, Colloid, Complementary, Complexation, Coverage, Dehydroxylation, Dissolution, Evidence, Experiments, Gibbsite, Goethite, Hydration, IEP, In Situ, In Situ Spectroscopy, Interface, Ions, Kinetics, Ligand, Ligand Exchange, Loading, Mechanisms, Mode, pH, Phosphate, Phosphate Ions, Phosphate-Loading, Potential, Precipitates, Precipitation, Rights, Solution, Sorption, Species, Spectroscopy, Surface, Surface Charge, Surface Precipitation, Techniques, Uptake, Vibration, Zeta Potential

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Full Text: [2010\J Col Int Sci342, 462.pdf](2010/J%20Col%20Int%20Sci342,%20462.pdf)

Abstract: A hyper-cross-linked polymeric adsorbent functionalized with multiple phenolic hydroxyl groups HJ-03 was prepared in this study and its adsorptive characteristics for p-nitroaniline from aqueous solution were studied as compared with Amberlite XAD-4. The adsorption of p-nitroaniline was sensitive to the solution pH and the maximum adsorption capacity was observed at pH of 3.5. The adsorption kinetics obeyed the pseudo-second-order rate equation and the adsorption isotherms could be correlated to Langmuir isotherm model. The adsorption enthalpy, adsorption free energy, and adsorption entropy were calculated to be negative and the adsorption was mainly driven by enthalpy change. The polarity matching between HJ-03 resin and p-nitroaniline, the pore structure of HJ-03, and the size matching between the pore diameter of HJ-03 and the molecular size of p-nitroaniline brought the larger adsorption capacity and higher adsorption affinity. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: 4-Nitroaniline, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Enthalpy, Adsorption Isotherms, Adsorption Kinetics, Amberlite XAD-4, Aqueous Solution, Aromatic Sulfonates, Behavior, Capacity, Characteristics, Energy, Enthalpy, Entropy, Equilibrium, Isotherm, Isotherm Model, Isotherms, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Mn200, Model, Modification, Nitrophenol, P-Nitroaniline, pH, Polymeric, Polymeric Adsorbent, Polystyrene, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Removal, Resin, Rights, Size, Solution, Structure, Thermodynamics, Thermodynamics, Water, XAD-4

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Full Text: [2010\J Col Int Sci342, 518.pdf](2010/J%20Col%20Int%20Sci342,%20518.pdf)

Abstract: An agricultural industry waste, deoiled soya, and a waste of thermal power plants, bottom ash, have been tested for their adsorption ability to remove Light Green SF (Yellowish) dye from wastewaters. The effects of various essential experimental parameters (dye concentration, mesh size, temperature, and pH) have been investigated. A study of four isothermal models, Langmuir, Freundlich, Tempkin, and Dubinin-Radushkevich, has been made and important thermodynamic parameters have been calculated. The decreasing values of enthalpy show that the adsorption process is endothermic. Mechanistic studies reveal the involvement of a pseudo-second-order mechanism to drive the adsorption process in dye-bottom ash and dye-deoiled soya systems. It has been observed that a particle diffusion mechanism was prominent in the case of adsorption of the dye on bottom ash and deoiled soya. Column adsorption and desorption experiments further confirmed the practical application of the present research. The percentage adsorption has been obtained as 88.74% and 89.65% with percentage recovery of 99.82% and 99.08% for bottom ash and deoiled soya, respectively. The experimental results confirmed that triarylmethane dye Light Green SF (Yellowish) can be successfully removed and recovered from aqueous Solutions economically and efficiently. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorbents, Adsorption, Adsorption-Isotherms, Agricultural, Application, Aqueous-Solutions, Azo-Dye, Bagasse Fly-Ash, Biomass Oedogonium Sp, Bottom Ash, Brilliant-Blue FCF, Column, Concentration, De-Oiled-Soya, Deoiled Soya, Desorption, Diffusion, Drive, Dye, Dyes, Endothermic, Enthalpy, Experimental, Experiments, Freundlich, Hen Feathers, Isothermal, Kinetics, Langmuir, Light Green SF (Yellowish), Materials-Bottom Ash, Mechanism, Models, Particle Diffusion, pH, Plants, Power, Pseudo Second Order, Pseudo-Second-Order, Recovery, Research, Rights, Size, Sugar-Industry Waste, Systems, Temperature, Thermodynamic, Thermodynamic Parameters, Treatment, Waste, Wastewaters

? Ruckenstein, E. and Berim, G.O. (2010), Effect of solute-solute and solute-solvent interactions on the kinetics of nucleation in liquids. *Journal of Colloid and Interface Science*, **342** (2), 528-539.

Full Text: [2010\J Col Int Sci342, 528.pdf](2010/J%20Col%20Int%20Sci342,%20528.pdf)

Abstract: One of the assumptions of the theory of nucleation developed by Ruckenstein et al. [1,2] is that the main contribution to the nucleation rate of a solid phase from a solution comes from the interaction of a solute molecule with those in a cluster (nucleus) of the solid phase. This assumption is avoided in this paper by including the interactions of the Solute molecule with those outside the cluster and with the molecules of the solvent. For each of the above interactions the rate of nucleation changes when compared to the original theory by several orders of magnitudes when calculated at a fixed density of the solute, but changes less than one order of magnitude when calculated as a function of supersaturation. Such changes are usually small compared with the absolute magnitude of the nucleation rate. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Slag, Algal Biomass, Aqueous-Solution, Assumptions, Bagasse Fly-Ash, Biomass oedogonium sp, Biosorption, Blast-Furnace Waste, Changes, Cluster, Cr(VI) Ions, Function, Interaction, Kinetics, Marine-Algae, Mean Passage Time, Nucleation, Nucleation Rate, Rights, Small, Solute-Solute Interaction, Solute-Solvent Interaction, Solution, Sugar-Industry Waste, Theory

? Shi, Q.Q., Zhang, J., Zhang, C.L., Nie, W., Zhang, B. and Zhang, H.Y. (2010), Adsorption of Basic Violet 14 in aqueous solutions using KMnO4-modified activated carbon. *Journal of Colloid and Interface Science*, **343** (1), 188-193.

Full Text: [2010\J Col Int Sci343, 188.pdf](2010/J%20Col%20Int%20Sci343,%20188.pdf)

Abstract: In this paper, an activated carbon was prepared from Typha orientalis and then treated with KMnO4 and used for the removal of Basic Violet 14 from aqueous solutions. KMnO4 treatment influenced the physicochemical properties of the carbon and improved its adsorption capacity. Adsorption experiments were then conducted with KMnO4-modified activated carbon to study the effects of carbon dosage (250-1500 mg/L), pH (2-10), ion strength (0-0.5 mol/L), temperature, and contact time on the adsorption of Basic Violet 14 from aqueous Solutions. The equilibrium data were analyzed by the Langmuir and Freundlich isotherms and fitted well with the Langmuir model. The pseudo-first-order, pseudo-second-order, and intraparticle diffusion models were used to evaluate the kinetic data and the pseudo-second-order kinetics was the best with good correlation. (c) 2009 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Adsorption Kinetics, Aqueous Solutions, Basic Violet 14, Capacity, Carbon, Correlation, Data, Diffusion, Dye, Equilibrium, Experiments, Freundlich, Intraparticle Diffusion, Ion Strength, Isotherms, Kinetic, Kinetics, Kmno4-Modified Activated Carbon, Langmuir, Langmuir and Freundlich Isotherms, Langmuir Model, Malachite Green, Mar, Methylene-Blue, Model, Models, pH, Pilot-Scale, Pseudo First Order, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Removal, Rights, Sawdust, Solutions, Strength, Temperature, Time, Treatment, Typha, Typha Orientalis, Waste, Wetland

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Full Text: [2010\J Col Int Sci343, 463.pdf](2010/J%20Col%20Int%20Sci343,%20463.pdf)

Abstract: The adsorption performance of the materials bottom ash (BA), a power plant waste, and de-oiled soya (DOS), a soya bean industry waste for removal of crystal violet dye, has been investigated through batch and column experiments. Batch studies have been performed to describe the impact of parameters such as pH, amount of adsorbent, dye concentration, temperature, and contact time on the removal of the dye. Experimental data have been modeled by using Langmuir, Freundlich, Tempkin, and Dubinin-Radushkevich (D-R) isotherms. Thermodynamic parameters (Δ*G*º, Δ*H*º, and Δ*S*º) were evaluated for the dye-adsorbent systems, which revealed that the adsorption process is endothermic in nature. Pseudo-first- and second-order kinetic models have been applied to the experimental data and pseudo-second-order kinetics was found to describe the adsorption of the dye (crystal violet) on the adsorbents. In order to achieve bulk removal of the dye, column operations were made. Recovery of the dye was made by eluting HCl solution through the exhausted columns and almost 95% and 78% of the dye was recovered from BA and DOS columns, respectively. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Performance, Aqueous-Solutions, Bagasse Fly-Ash, Batch, Bottom Ash, Column, Column Experiments, Concentration, Crystal Violet, Data, De-Oiled Soya, Deoiled Soya, DO, Dye, Dyes, Endothermic, Experimental, Experiments, Fixed-Bed Column, Freundlich, Gentian-Violet, Impact, Isotherms, Kinetic, Kinetic Models, Kinetics, Langmuir, Mar, Materials-Bottom Ash, Methylene-Blue, Models, Performance, pH, Plant, Power, Power Plant, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Reactive Dyes, Recovery, Red Mud, Removal, Rights, Second Order, Second-Order, Solution, Sugar-Industry Waste, Systems, Temperature, Thermodynamic, Thermodynamic Parameters, Time, Waste, Waste Materials, Wastewater, Wheat Bran

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Full Text: [2010\J Col Int Sci344, 482.pdf](2010/J%20Col%20Int%20Sci344,%20482.pdf)

Abstract: The influence of inorganic anions (NO3, I-, Br-, Cl-, SO42-, and S2O32-) and of divalent canons (Ca2+ and Mg2+) on the zeta potential and on the isoelectric point of a-alumina in aqueous medium has been studied. The effect of the anions is highly ion specific even at salt concentrations as low as 5×10-4 M. This unexpected finding is in line with a recent report [Bostrom et al., J. Chem. Phys. 128 (2008) 135104]. It is also in agreement with an earlier theoretical prediction [B.W. Ninham, V.V. Yaminsky, Langmuir 13 (1997) 2097]. The results are consistent with the classical Hofmeister series, except for the case of NO3-. Divalent anions (SO42- and S2O32-) decrease the magnitude of the zeta potential of alpha-alumina in aqueous medium, more precisely; S2O3 produced large negative zeta potential (similar to-12 to -47 mV) within the pH range of the study without the isoelectric point (IEP) of alpha-alumina. However, the SO42- decreased the zeta potential of alpha-alumina of different magnitudes (maximum similar to 25 mV at both ends of the experimental acidic and basic pH scale) with a minor shift of the IEP (similar to 0.5 unit) toward lower pH. Ca2+ and Mg2+ produce zeta potentials of alpha-alumina roughly equal to that of neat alpha-alumina but slightly higher than that of Na+ at both sides of the IEP. We have shown further that the same ion specificity or equivalently competitive ion effects occur with the adsorption density of p-hydroxybenz oate onto alpha-alumina surfaces. The sequence of anions (with common cation) for the adsorption density of p-hydroxybenzoate on the alpha-alumina surfaces follows the Hofmeister series sequence: S2O32- < SO42- < Cl- > Br- > l- > NO3-. The divalent cations (Ca2+ and Mg2+) exhibit a roughly equivalent effect on the adsorption of p-hydroxybenzoate onto a-alumina surfaces. Using the frequency shifts of v(as)(-COO-) and v(s)(-COO-) in the DRIFT spectra of p-hydroxybenzoate after adsorption and other characteristic peaks, we have demonstrated that p-hydroxybenzoate forms outer-sphere complexes onto alpha-alumina surfaces at pH 5 and 6 and inner-sphere complexes at pH 7, 8, and 9 in the presence of 5×10-4 M NaCl(aq). (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Alpha-Alumina, Alumina, Anions, Aqueous Medium, Aqueous-Solution Interface, Cation, Competitive, Divalent Cations, Drift, Electrolyte Interface, Experimental, Forms, Hofmeister Effect, Hofmeister Series, Humic Substances, IEP, Interface, Ion Specificity, Langmuir, Mineral, Water Interfaces, Minor, Na+, Natural Organic-Matter, P-Hydroxybenzoate, pH, Potential, Prediction, Range, Rights, Salt, Scale, Situ ATR-FTIR, Solid, Liquid Interface, Specificity, Surface Complexation, Surfaces, Transform Infrared-Spectroscopy, Zero Charge, Zeta Potential

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Full Text: [2010\J Col Int Sci344, 497.pdf](2010/J%20Col%20Int%20Sci344,%20497.pdf)

Abstract: This article describes the use of bottom ash [a power plant waste] and de-oiled soya [an agricultural waste] as effective adsorbents for the removal of a hazardous azo dye [Chrysoidine Y] from its aqueous solutions. This paper presents an experimental study and discussion of the adsorption characteristics of this dye on the two adsorbents. The adsorbents have been characterized, and also the effects of time, temperature, concentration, pH, and sieve size on the extent of adsorption have been evaluated. Batch adsorption measurements, kinetic studies, and column operations have been performed to elucidate the dye uptake capacity of the adsorbents. The monolayer adsorption capacities at 30 degrees C have been found from Langmuir analysis to be 7.27×10-5 mol g-1 and 3.35×10-5 mol g-1 for bottom ash and de-oiled soya, respectively. Adsorption kinetics experimental data are indicative of pseudo-second order kinetics during these processes. Column experiments indicate practical utility of the adsorbents for eradicating hazardous dyes from effluents. The recovery of the adsorbed dye from bottom ash and de-oiled soya, have been found to be 85% and 99%, respectively. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Kinetics, Agricultural, Analysis, Aqueous Solutions, Azo Dye, Azo-Dye, Bagasse Fly-Ash, Basic Dye, Batch Adsorption, Bottom Ash, Capacity, Characteristics, Chrysoidine Y, Column, Concentration, Data, De-Oiled Soya, Deoiled Soya, Dye, Dyes, Effluents, Experimental, Experiments, Kinetic, Kinetic Studies, Kinetics, Langmuir, Langmuir Isotherm, Low-Cost Adsorbents, Materials-Bottom Ash, Monolayer, pH, Plant, Power, Power Plant, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second Order, Pseudo-Second Order Kinetics, Pseudo-Second-Order, Reactive Dye, Recovery, Red Mud, Removal, Rhodamine-B, Rights, Size, Solutions, Sugar-Industry Waste, Temperature, Time, Uptake, Utility, Waste, Waste Materials

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Full Text: [2010\J Col Int Sci345, 154.pdf](2010/J%20Col%20Int%20Sci345,%20154.pdf)

Abstract: The adsorption of antimony acetate (Sb(OAc)3) on sodium montmorillonite (Na-MMT) was studied at five different initial concentrations, and data from the adsorption isotherm were modeled using the Langmuir, Freundlich and D-R isotherm equations. The kinetics of adsorption was also discussed using three kinetic models: the pseudo-first-order, the pseudo-second-order and the intraparticle diffusion model. The rate constants of pseudo-first-order, pseudo-second-order and intraparticle diffusion kinetics, and the amount of Sb(OAc)3 adsorbed at equilibrium were determined. Moreover, the desorption of Sb(OAc)3 from several kinds of Sb-MMT (Na-MMT was intercalated by antimony acetate) was investigated at room temperature and 180º C. The results show that according to the maximum amounts of adsorbate and correlation coefficients calculated from the three isotherm equations mentioned above, the corresponding data from adsorption experiments fit fairly well to the Langmuir isotherm. The adsorption data show a good compliance with the pseudo-second-order kinetic model and also follow the intraparticle diffusion model up to 30 min. The equilibrium adsorption capacity of Sb(OAc)3 on MMT is close to the cation exchange capacity (CEC) of the montmorillonite. The desorption amount of Sb(OAc)3 is correlated with both the temperature of desorption and the drying temperature of Sb-MMT. (c) 2010 Elsevier Inc. All rights reserved.

Keywords: Acetate, Activated Carbon, Adsorption, Adsorption Capacity, Adsorption Isotherm, Antimony, Antimony Acetate, Capacity, Cation, Cation Exchange, CEC, Clay, Compliance, Correlation, D-R Isotherm, Data, Desorption, Diffusion, Diffusion Kinetics, Diffusion Model, Dye, Equilibrium, Experiments, Freundlich, Intraparticle Diffusion, Intraparticle Diffusion Model, Isotherm, Isotherm Equations, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Kinetics of Adsorption, Langmuir, Langmuir Isotherm, Methylene-Blue, Model, Models, Montmorillonite, Na+-Montmorillonite, Nanocomposites, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Rate Constants, Removal, Rights, Room Temperature, Sodium, Sodium Montmorillonite, Sorption, Temperature

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Full Text: [2010\J Col Int Sci345, 481.pdf](2010/J%20Col%20Int%20Sci345,%20481.pdf)

Abstract: The adsorption kinetics of four nitroimidazoles, Dimetridazole (DMZ), Metronidazole (MNZ), Ronidazole (RNZ) and Tinidazole (TNZ), were studied on three activated carbons: two commercial carbons from Sorbo-Norit (S) and Merck (M) and a third prepared by chemical activation of petroleum coke (C). Experimental data of the corresponding adsorption kinetics were analyzed by applying pseudo-first and pseudo-second-order models and a general diffusion model. Application of pseudo-first and pseudo-second-order kinetic models verified the following: (i) The kinetic model used that better predicts the adsorption rates depends of both the adsorbent and adsorbate studied. (ii) Nitroimidazole adsorption rate decreases in the order MNZ > DMZ > RNZ > TNZ; therefore, in the case of MNZ, molecular size does not appear to be a determining factor in the process. (iii) Nitroimidazole adsorption rate on carbons increases in the order C < S < M, which is related to the increase in carbon hydrophobicity. Hence, in general, hydrophobic interactions appear to govern the kinetics of the adsorption process. Finally, a general diffusion model was applied that combines external mass transport and intraparticle diffusion, achieving an adequate fit to the experimental data. There are notable differences among the diffusivity values for the different nitroimidazoles that do not appear to be exclusively related to carbon textural parameters or adsorbate size. Therefore, adsorbent and adsorbate chemical characteristics are highly important to establish the adsorption mechanism of nitroimidazoles on activated carbons. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Activated Carbons, Activation, Adsorbent, Adsorption, Adsorption Kinetics, Adsorption Mechanism, Adsorption Rate, Antibiotics, Aqueous Phase, Biodegradability, Carbon, Characteristics, Chemical, Chemical Activation, Data, Diffusion, Diffusion Model, Environment, Experimental, General, Intraparticle Diffusion, Kinetic, Kinetic Model, Kinetic Models, Kinetic Study, Kinetics, Liquid-Filled Pores, Mass Transport, Mechanism, Metronidazole, Model, Models, Naphthalenesulphonic Acid, Nitroimidazoles, Petroleum Coke, Pharmaceuticals, Pseudo Second Order, Pseudo-First and, Pseudo-Second-Order, Rates, Rights, Sewage Water, Size, Substances, Transport, Waste-Water Bacteria

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Full Text: [2010\J Col Int Sci346, 494.pdf](2010/J%20Col%20Int%20Sci346,%20494.pdf)

Abstract: Charcoals that contain calcium compounds have been synthesized by impregnating wood with calcium chloride followed by carbonization at 500ºC, 650ºC or 900ºC. The charcoals were characterized by SEM, EDAX, XRD and chemical titrations. These adsorbents were porous with the wood microstructure. XRD revealed the presence of crystallized CaCO3 and CaO. Despite this content, all the charcoals showed acidic surface properties and pH of point of zero charge (pHpzc) values were around 7.4-7.7. Their performance for fluoride removal from aqueous solution was evaluated by batch experiments. Fluoride adsorption kinetic followed a pseudo-second order model. Charcoal prepared at 650º C exhibited the best efficiency with a fluoride sorption capacity of 19.05 mg g-1 calculated from the Langmuir model. A fluoride residual concentration of 0.67 mg L-1 was achieved within 24 h from a 10 mg L-1 solution at neutral pH. The fluoride removal was not modified by the presence of NO3-, SO42- and PO43- in the fluoride solution, while HCO3 and Cl- slightly affected the defluoridation capacity. The charcoals were chemically stable in solution and the amount of dissolved Ca was found to be 3.23 mg L-1 at neutral pH. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Activated Alumina, Adsorbents, Adsorption, Adsorption, Adsorption Kinetic, Aqueous Solution, Batch, Batch Experiments, Calcium, Calcium Chloride, Capacity, Carbon Nanotubes, Carbonization, Charge, Chemical, Chloride, Concentration, Defluoridation, Defluoridation, Dissolved, Drinking-Water, EDAX, Efficiency, Experiments, Fluoride, Fluoride Removal, Ions, Kinetic, Kinetics, L1, Langmuir, Langmuir Model, Microstructure, Mixed-Oxide, Model, Modified, Oxide Adsorbent, Performance, pH, Point of Zero Charge, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second Order Model, Pseudo-Second-Order, Removal, Removal Efficiency, Rights, SEM, Solution, Sorption, Sorption Capacity, Surface, Surface Properties, Wood, XRD

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Full Text: [2010\J All Com347, 277.pdf](2010/J%20All%20Com347,%20277.pdf)

Abstract: Goethite and hematite nanomaterials (nano-goethite and nano-hematite) can be synthesized using a coprecipitation method. Nano-hematite is synthesized via the reaction of HCl and FeCl3 solution at 100°C for 2 days, while nano-goethite is prepared by adding Fe-2(SO4)3 into the 2.5 M NaOH solution for 4 h, and then heated at 40 degrees C for 2 days. Afterward the photocatalytic decomposition of methylene blue solution is performed by UV-light irradiation, and the adsorption procedure is carried out by batch experiments. It is observed that both nano-hematite and nano-goethite exhibit some photocatalytic activity and possess a high adsorption capacity for copper ions. The maximum Cu(II) adsorption capacity is 149.25 and 84.46 mg/g for nano-goethite and nano-hematite, respectively. Further, the experimental data are well fitted to the pseudo-second-order equation. It also suggests that the Langmuir isotherm is more adequate than the Freundlich isotherm in simulating the adsorption isotherm of Cu2+, and the Cu2+ adsorption onto nanomaterials is a spontaneous process. Therefore, these findings indicate that nano-goethite and nano-hematite are effective materials for Cu2+ removal and, together with its photocatalytic activity, may be applied in the removal of heavy metal ions from aqueous streams. Crown Copyright (C) 2010 Published by Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Isotherm, Aqueous-Solution, Copper, Cu2+ Adsorption, Degradation, Freundlich Isotherm, Isotherm, Kinetic, Langmuir, Langmuir Isotherm, Nano-Goethite, Nano-Hematite, Nanocrystals, Nanoparticles, Phosphate, Photocatalyst, Single, Size, Sorption, Zeolite

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Full Text: [2010\J Col Int Sci348, 537.pdf](2010/J%20Col%20Int%20Sci348,%20537.pdf); [2010\J Col Int Sci348, 537-1.pdf](2010/J%20Col%20Int%20Sci348,%20537-1.pdf)

Abstract: Phosphate rock (PR) is an abundant ore and represents the basic raw material for the phosphatic fertilizer industry. Prior to industrial processing, PR is concentrated by grinding-and-screening to separate a fine fraction that is very poor in P2O5. This fine fraction is a solid waste and represents a disposal problem. The present study shows that the fine fraction of ground-and-screened Abu-Tartour PR can be used as an adsorbent for the removal of methylene blue dye from aqueous solutions. The amount of dye adsorbed was found to vary with initial methylene blue concentration and contact time. Raising the temperature enhances the rate of adsorption but has no effect on the adsorption capacity at equilibrium. The adsorption equilibrium data were found to fit the Langmuir isotherm, indicating monolayer adsorption on a homogeneous surface. The Elovich model can be used to predict the adsorption kinetics at ambient temperatures especially when the initial concentration of MB is relatively high, while Ho’s model deviates from the data as the initial concentration increases. However, as the temperature increases and MB concentration decreases, Ho’s model fits the data better than the Elovich model. On studying the mechanism of adsorption, the results showed that the overall rate of dye uptake is controlled by intraparticle diffusion. The multilinear plots of intraparticle diffusion were modeled by piecewise linear regression and related to pore-size distribution of the adsorbent. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Adsorption Kinetics, Aqueous Solutions, Aqueous-Solutions, Capacity, Carbon, Concentration, Data, Diffusion, Diffusion-Models, Disposal, Distribution, Dye, Elovich, Elovich Model, Equations, Equilibrium, Fertilizer, Intraparticle Diffusion, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Linear Regression, MB, Mechanism, Mechanism of Adsorption, Methylene Blue, Model, Monolayer, Phosphate, Phosphate Rock, Regression, Removal, Rights, Solid Waste, Solutions, Surface, Temperature, Uptake, Waste

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Full Text: [2010\J Col Int Sci348, 579.pdf](2010/J%20Col%20Int%20Sci348,%20579.pdf)

Abstract: A new medium, granular ceramic, has been developed for fluoride removal from water. Granular ceramic is a solid-phase medium that produces a stable Al-Fe surface complex for fluoride adsorption. BET, SEM, and EDS were used to characterize the physical attributes (particle size, pore size and distribution, surface roughness) of the granular ceramic. Fluoride adsorption characteristics were studied in a batch system with respect to changes in initial concentration of fluoride, pH of solution, and coexisting ions. Fluoride adsorption was found to be pH dependent and the maximum removal of fluoride was obtained at pH 5.0-8.0. equilibrium adsorption data were obtained at 293, 303, and 323 K, and interpreted in terms of the Langmuir and Freundlich isotherm equations. The experimental data revealed that the Freundlich isotherm equation gives a more satisfactory fit for fluoride removal. The adsorption process was observed to follow a pseudo-second-order kinetic model and intraparticle diffusion was indicated to play a major role in fluoride uptake. Fluoride adsorption was reduced in the presence of phosphate and sulfate ions and increased slightly in the presence of chloride and nitrate ions. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Isotherms, Adsorption Kinetics, Aqueous-Solution, Batch, Batch System, Bet, Changes, Characteristics, Chitosan Beads, Chloride, Concentration, Data, Defluoridation, Diffusion, Distribution, Drinking-Water, Earth, Eds, Effluent, Equilibrium, Experimental, Fluoride, Fluoride Adsorption, Fluoride Removal, Freundlich, Freundlich Isotherm, Granular Ceramic, Intraparticle Diffusion, Ions, Isotherm, Isotherm Equations, Kinetic, Kinetic Model, Kinetics, Langmuir, Model, Nitrate, Oxide, Particle Size, pH, pH-Dependent, Phosphate, Physical, Physical Attributes, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Rights, Role, SEM, Silica, Size, Solution, Sorption, Sulfate, Surface, Surface Roughness, Uptake, Water

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Full Text: [2010\J Col Int Sci349, 256.pdf](2010/J%20Col%20Int%20Sci349,%20256.pdf)

Abstract: A new adsorbent modified from wheat residue was synthesized after reaction with epichlorohydrin and triethylamine by using the modifying agents of diethylenetriamine in the presence of organic medium of N,N-dimethylformamide. The performance of the modified wheat straw (MWS) was characterized by Fourier transform infrared spectroscopy and point of zero charge analysis. The adsorption was investigated in a batch adsorption system, including both equilibrium adsorption isotherms and kinetics. Results showed that MWR had great anion-adsorbing capacity, due to the existence of a large number of introduced amino groups, and the value of pH(PZC) was around 5.0. Equilibrium data were analyzed using the Langmuir. Freundlich, and Temkin isotherm models and were found to be best represented by the Freundlich isotherm model. Evaluation of the adsorption process identified its endothermic nature. The maximum adsorption capacity of MWS for the removal of Cr(VI) was 322.58 mg/g at 328 K, indicating that MWS has high chromium removal efficiency, compared to other adsorbents reported. The kinetics of adsorption followed the pseudo-second-order kinetic equation. The mechanism of adsorption was investigated using the intraparticle diffusion model. Thermodynamic parameters (free energy change, enthalpy change, and entropy change) revealed that the adsorption of Cr(VI) onto MWS was endothermic and spontaneous; additionally, the adsorption can be characterized as an ion-exchange process. The results suggest that MWS is an inexpensive and efficient adsorbent for removing Cr(VI) ions from aqueous solution. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Isotherms, Analysis, Anion-Exchange, Aqueous Solution, Aqueous-Solutions, Atomic-Absorption-Spectrometry, Batch, Batch Adsorption, Bentonite, Capacity, Carbon Nanotubes, Charge, Chromium, Chromium Removal, Cr(VI), Data, Diffusion, Diffusion Model, Efficiency, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Equilibrium Isotherms, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Hexavalent Chromium, Infrared Spectroscopy, Intraparticle Diffusion, Intraparticle Diffusion Model, Ion Exchange, Ion-Exchange, Ionexchange, Ions, Isotherm, Isotherm Model, Isotherms, Kinetic, Kinetic Adsorption, Kinetic Equation, Kinetics, Kinetics of Adsorption, Langmuir, Mechanism, Mechanism of Adsorption, Model, Models, Modified, Modified Wheat Straw, Organic, Performance, Point of Zero Charge, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Equation, Reduction, Removal, Removal Efficiency, Rights, Solution, Spectroscopy, Straw, Temkin Isotherm, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Value, Visible Spectrophotometric Methods, Waste-Water

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Full Text: [2010\J Col Int Sci349, 307.pdf](2010/J%20Col%20Int%20Sci349,%20307.pdf)

Abstract: Adsorption equilibrium and kinetics of fluoride on a sol-gel-derived activated alumina and its modifications with calcium oxide or manganese oxide were studied to explore the feasibility of applying these adsorbents for fluoride removal from drinking water. The activated alumina adsorbents were characterized with SEM/EDS and N-2-adsorption for their chemical and pore textural properties. The adsorption isotherms were correlated with the Langmuir and Freundlich adsorption equations. The fluoride adsorption isotherms on the sol-gel-derived activated alumina followed the Freundlich model while the fluoride adsorption isotherms on the calcium oxide- or manganese oxide-modified activated alumina adsorbents followed the Langmuir model. The calcium oxide-modified alumina adsorbent showed the highest fluoride adsorption capacities of 0.99 and 96.23 mg/g at fluoride concentrations of 0.99 and 432 mg/L, respectively. A pseudo-second-order model and an intraparticle kinetic model fitted well the adsorption kinetic data. It was found that both external and intraparticle diffusions contribute to the rate of removal of fluoride from the activated alumina-based adsorbents produced in our laboratory. The adsorption kinetic models evaluated in this work fitted well the adsorption uptake of fluoride from a Mexican groundwater on both calcium oxide- and manganese oxide-modified alumina adsorbents. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Activated Alumina, Adsorbent, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Equilibrium, Adsorption Isotherms, Adsorption Kinetic, Alumina, Aqueous-Solution, Calcium, Calcium Oxide, Carbon, Chemical, Data, Defluoridation, Drinking Water, Drinking-Water, Equilibrium, Feasibility, Fluoride, Fluoride Adsorption, Fluoride Removal, Freundlich, Freundlich Model, Groundwater, Isotherms, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir, Langmuir Model, Manganese, Manganese Oxide, Model, Models, Oxide, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Removal, Rights, Uptake, Water, Work

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Full Text: [2010\J Col Int Sci349, 583.pdf](2010/J%20Col%20Int%20Sci349,%20583.pdf)

Abstract: The adsorption of Cu(II) ions from aqueous solutions onto poly(acrylic acid-co-acrylamide) hydrogels was investigated. The hydrogels were prepared via free-radical solution polymerization using lrgacure 754 as a photoinitiator and ethylene glycol dimethacrylate as a cross-linking agent Loading of acrylamide/acrylic acid moieties on the surfaces of hydrogels and the amount of cross-linking agent were varied to determine the maximum metal uptake. Polymerization kinetics was investigated by H-1 NMR. The physicochemical properties of hydrogels were investigated by nitrogen sorption measurements, elemental analysis, Fourier transform infrared spectroscopy (FTIR), and X-ray photoelectron spectroscopy (XPS). The 1H NMR results demonstrated that the polymerization reaction was carried out almost to completion and confirmed the absence of residual monomers. Swelling results indicated that, by appropriate selection of cross-linking agent amount and monomer ratio, hydrogels can be swollen up to 70,000%. Further characterization of the hydrogels showed rapid adsorption kinetics and equilibrium Cu(II) adsorption capacities of 121 mg g-1. Cu(II) adsorption kinetic data followed pseudo-first-order kinetics. Adsorption equilibrium data were better fitted by a Langmuir isotherm. FTIR and XPS results indicated the presence of a tetradentate copper complex on the surfaces of hydrogels. The copper uptake achieved suggests the potential use of hydrogels to extract toxic metals from industrial aqueous streams. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Acid, Activated Carbon, Adsorption, Adsorption, Adsorption Capacities, Adsorption Equilibrium, Adsorption Kinetic, Adsorption Kinetics, Analysis, Aqueous Solutions, Characterization, Complexation, Copper, Crosslinking, Cu(II), Cu(II) Ions, Data, Equilibrium, Ethylene Glycol, Free Radical, FTIR, H-1-NMR, Heavy-Metal Ions, Hydrogels, Infrared Spectroscopy, Ions, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Mesoporous Silica, Metal, Metal Uptake, Metals, Modified Polyacrylamide Hydrogels, Nitrogen, NMR, Polymerization, Potential, Pseudo First Order, Pseudo-First-Order, Pseudo-First-Order Kinetics, Removal, Rights, Solution, Solutions, Sorption, Spectroscopy, Streams, Surfaces, Swelling, Swelling Properties, Toxic, Toxic Metals, Uptake, Waste-Water, X-Ray, X-Ray Photoelectron Spectroscopy, XPS

? Zeng, X.W., Yao, H.J., Ma, N., Fan, Y.G., Wang, C.H. and Shi, R.F. (2011), Synthesis, characterization and adsorption performance of a novel post-crosslinked adsorbent. *Journal of Colloid and Interface Science*, **354** (1), 353-358.

Full Text: [2011\J Col Int Sci354, 353.pdf](2011/J%20Col%20Int%20Sci354,%20353.pdf)

Abstract: In this paper a post-crosslinked polymeric adsorbent PDHT-2 with high specific surface area was prepared by Friedel-Crafts reaction of the pendant vinyl groups without an externally added crosslinking agent. It was obvious that both the specific surface area and the pore volume of starting copolymer PDHT-1 increased significantly after post-crosslinking. Batch adsorption runs of phenol from aqueous solution onto adsorbent PDHT-1 and PDHT-2 were researched, and commercial macroporous resin XAD-4 was chosen for comparison purpose. Experimental results showed that the adsorption isotherms could be fitted by Langmuir model and Freundlich model and the adsorption capacity onto PDHT-2 was much larger than that onto PDHT-1 and XAD-4 with respect to phenol and phenolic compound, which possibly resulted from its larger specific surface area. The adsorption process for phenol onto the three adsorbents was proved to be exothermic and spontaneous in nature. The thermodynamic parameters such as Gibbs free energy (ΔG), change in enthalpy (ΔH) and change in entropy (ΔS) had been calculated. The adsorption kinetic curves obeyed the pseudo-second order model and the intraparticle diffusion process was the rate-controlling step. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Amberlite XAD-4, Aqueous-Solution, Kinetics, Langmuir, Macroporous Polymeric Adsorbent, Mechanism, Pendant Vinyl Groups, Phenol, Phenolic-Compounds, Polymeric Adsorbents, Post-Crosslinking, Removal, Resins, Solute Adsorption, Styrene-Divinylbenzene Copolymers, Thermodynamics

? Wu, T., Sun, D.J., Li, Y.J., Zhang, H. and Lu, F.J. (2011), Thiocyanate removal from aqueous solution by a synthetic hydrotalcite sol. *Journal of Colloid and Interface Science*, **355** (1), 198-203.

Full Text: [2011\J Col Int Sci355, 198.pdf](2011/J%20Col%20Int%20Sci355,%20198.pdf)

Abstract: The use of a chloride-containing synthetic hydrotalcite sol (LDHC) as adsorbent to remove thiocyanate from aqueous solution was investigated. LDHC was prepared by coprecipitation and was characterized by HRTEM, particle size, XRD, and FTIR. The experiments showed that LDHC was particularly effective in removing thiocyanate due to its small particle size and high zeta potential. The adsorption of thiocyanate on LDHC was favored when the initial solution pH was in the range 3-10, though the most effective pH range was between 4.0 and 8.0. The adsorption reached equilibrium within 150 min. The interaction between the surface sites of LDHC and thiocyanate ions may be a combination of both anion exchange and surface complexation. The pseudo-second-order model best described the adsorption kinetics of thiocyanate onto LDHC. The equilibrium isotherm showed that the adsorption of thiocyanate on LDHC was consistent with the Langmuir equation and the saturated adsorption capacity of LDHC for thiocyanate was 98.3 mg/g at 20ºC. The regenerated LDHC in FeCl3 solution can be used repeatedly in adsorption-regeneration cycles. The results showed that LDHC can be used as a new adsorbent for thiocyanate removal from aqueous solution because of its high adsorption capacity and rapid adsorption rate. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Capacity, Adsorption Kinetics, Adsorption Rate, Aqueous Solution, Arsenate, Calcined Hydrotalcite, Capacity, Charge, Chromate, Coir Pith, Complexation, Coprecipitation, Equilibrium, Equilibrium Isotherm, Experiments, FeCl3, FTIR, Hrtem, Hydrotalcite, Interaction, Ions, Isotherm, Kinetics, Kinetics, Langmuir, Langmuir Equation, Layered Double Hydroxides, Mar, Model, Oxidation, Particle Size, pH, Potential, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Removal, Rights, Size, Small, Solution, Surface, Surface Complexation, Synthetic Hydrotalcite Sol, Thiocyanate, Waste, XRD, Zeta Potential

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Full Text: [2011\J Col Int Sci357, 466.pdf](2011/J%20Col%20Int%20Sci357,%20466.pdf)

Abstract: A novel procedure was developed for the synthesis of a periodic mesoporous organosilica (PMO), which was used to remove polycyclic aromatic hydrocarbons (PAHs) from aqueous solutions. Adsorption equilibrium isotherms and adsorption kinetics experiments were carried out in solutions of PAHs (2-60 mg L-1), using the PMO as adsorbent. Adsorption models were used to predict the mechanisms involved. The adsorption kinetics data best fitted the pseudo-first-order kinetic model for naphthalene, and to the pseudo-second-order model for fluorene, fluoranthene, pyrene, and acenaphtene. The intraparticle model was also tested and pointed to the occurrence of such processes in all cases. The isotherm models which best represented the data obtained were the Freundlich model for fluoranthene, pyrene, and fluorene, the Temkin model for naphthalene, and the Redlich-Peterson model for acenaphtene. PAHs showed similar behavior regarding kinetics after 24 h of contact between adsorbent and PAHs. FTIR, XRD, BET, and SEM techniques were used for the characterization of the adsorbent material. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Activated Carbons, Adsorption, Adsorption Kinetics, Adsorption Models, Biosorbent, Dye Sorption, Equilibrium, Equilibrium Isotherms, Extraction, Freundlich, FTIR, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetics, Models, Naphthalene, PAHs, PAHs, PMO, Removal

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Full Text: [2011\J Col Int Sci357, 474.pdf](2011/J%20Col%20Int%20Sci357,%20474.pdf)

Abstract: In this study, granular activated carbon (GAC) coated with cetyltrimethyl ammonium bromide (CTAB) (GAC-CTAB) was synthesized to remove perchlorate from water via adsorption. Laboratory-scale batch experiments were performed to study the factors affecting the perchlorate adsorption by GAC-CTAB, including the CTAB content and solution pH, and explore the mechanisms behind the adsorption phenomenon. The novel GAC-CTAB material was characterized by scanning electron microscopy (SEM), zeta potential measurement and Brunauer-Emmett-Teller (BET) analysis. The characterization tests showed that CTAB was deposited on the GAC surface, pHpzc of the material was between 2.0 and 3.0, and the BET specific surface area was reduced from 925 to 729 m2/g with the increasing CTAB content from 0 to 0.034 mmol CTAB/g GAC. The adsorption process was better described by a pseudo-second-order kinetics model and the Freundlich adsorption model. The CTAB content and solution pH significantly influenced the kinetics and chemical equilibrium of the adsorption. When the CTAB content was increased from 0.0.023 to 0.135 mmol CTAB/g GAC, the K in the Freundlich adsorption isotherm increased from 0.071 to 0.19 mmol/g. The optimal adsorption typically occurred at pH 2-3, close to the pHpzc of the solution. Finally, the mechanisms for the adsorption of perchlorate on GAC-CTAB were associated with surface complexation, electrostatic interaction and ion exchange. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption, Adsorption Isotherm, Aluminum, Ammonium, Cetyltrimethyl Ammonium Bromide, Contaminated Groundwater, Electron Microscopy, Equilibrium, Freundlich, Ion Exchange, Iron Hydrous Oxides, Isotherm, Kinetics, Nanoparticles, Perchlorate, pH, Reactor, Surfactant, Water

? Boschi, C., Maldonado, H., Ly, M. and Guibal, E. (2011), Cd(II) biosorption using *Lessonia* kelps. *Journal of Colloid and Interface Science*, **357** (2), 487-496.

Full Text: [2011\J Col Int Sci357, 487.pdf](2011/J%20Col%20Int%20Sci357,%20487.pdf)

Abstract: Lessonia kelps (L. trabeculata and L. nigrescens) have been successfully used for the recovery of Cd(II) from near neutral solutions. The biomass was pre-treated with calcium chloride for stabilization of alginate-based compounds. SEM-EDAX analysis and FT-IR spectrometry analysis were used for identifying the modifications of the biomass. Sorption isotherms were performed at the optimum pH (i.e., pH 6) and the maximum sorption capacity reached up to 1 and 1.5 mmol Cd g-1 for L. nigrescens (L.n.) and *L. trabeculata* (L.t.), respectively. The Langmuir equation fits well experimental data. The temperature (in the range 20-40ºC) had a more marked effect on affinity coefficient than on maximum sorption capacity. The influence of particle size, sorbent dosage, metal concentration and temperature was evaluated on uptake kinetics. The kinetic profiles that were modeled using the Crank equation (i.e., the resistance to intraparticle diffusion) were hardly affected by the temperature and the particle size contrary to the sorbent dosage and the metal concentration, which show greater impact. The pseudo-second order rate equation was also tested for the modeling of uptake kinetics. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Algal Biomass, Aqueous-Solution, Biosorption, Cadmium, Cadmium Biosorption, Calcium Alginate Beads, Cd(II), Chloride, FT-IR, FTIR, Heavy-Metals, Intraparticle Diffusion, Intraparticle Mass-Transport, Isotherms, Kinetic, Kinetics, Laminaria-Digitata, Langmuir, Lessonia Kelp, Marine Macroalgae, Modeling, pH, pH Effect, Pretreated Biomass, Recovery, Sorption, Sorption Isotherm, Uptake Kinetics

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Full Text: [2011\J Col Int Sci358, 230.pdf](2011/J%20Col%20Int%20Sci358,%20230.pdf)

Abstract: Arsenate and arsenite may exist simultaneously in groundwater and have led to a greater risk to human health. In this study, an iron-zirconium (Fe-Zr) binary oxide adsorbent for both arsenate and arsenite removal was prepared by a coprecipitation method. The adsorbent was amorphous with a specific surface area of 339 m(2)/g. It was effective for both As(V) and As(III) removal; the maximum adsorption capacities were 46.1 and 120.0 mg/g at pH 7.0, respectively, much higher than for many reported adsorbents. Both As(V) and As(III) adsorption occurred rapidly and achieved equilibrium within 25 h, which were well fitted by the pseudo-second-order equation. Competitive anions hindered the sorption according to the sequence PO43- > SiO32- > CO > SO42-. The ionic strength effect experiment, measurement of zeta potential, and FTIR study indicate that As(V) forms inner-sphere surface complexes, while As(III) forms both inner- and outer-sphere surface complexes at the water/Fe-Zr binary oxide interface. The high uptake capability and good stability of the Fe-Zr binary oxide make it a potentially attractive adsorbent for the removal of both As(V) and As(III) from water. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aqueous-Solution, Arsenate, Arsenic, Arsenite, As(III), Envelopes, Equilibrium, Fe-Zr Binary Oxide, FTIR, Hydroxide, Kinetics, Mixed-Oxide, pH, Phosphate, Removal, Sorption, Surface-Properties

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Full Text: [2011\J Col Int Sci359, 505.pdf](2011/J%20Col%20Int%20Sci359,%20505.pdf)

Abstract: Polyrhodanine-coated gamma-Fe2O3 nanoparticles, synthesized by one-step chemical oxidation polymerization, were applied to the process of removal of heavy metal ions from aqueous solution. Factors influencing the uptake of heavy metal ions such as solution pH, initial metal ion concentration, contact time, and species of metal ions were investigated systematically by batch experiments. The adsorption equilibrium study exhibited that the Hg(II) ion adsorption of polyrhodanine-coated magnetic nanoparticles followed a Freundlich isotherm model than a Langmuir model. The kinetic data of adsorption of Hg(II) ion on the synthesized adsorbents were best described by a pseudo-second-order equation, indicating their chemical adsorption. In addition, the synthesized nano-adsorbents can be repeatedly used with help of an external magnetic field due to their magnetic properties. This work demonstrates that the magnetic poly-rhodanine nanoparticles can be considered as a potential recyclable adsorbent for hazardous metal ions from wastewater. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Acid, Adsorption, Aqueous Solution, Chelating Polymers, Chitosan Beads, Equilibrium, Equilibrium Study, Freundlich, Freundlich Isotherm, Heavy Metal Adsorption, Heavy Metal Ion, Infrared NIR Spectroscopy, Isotherm, Kinetic, Langmuir, Maghemite, Magnetic Nanoparticles, Mesoporous Silica, pH, Polyrhodanine, Preconcentration, Recovery, Removal, Sorption, Uptake, Waste-Water, Wastewater

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Full Text: 2011\J Col Int Sci360, 716.pdf

Abstract: Intercalated halloysites with sodium acetate at various contact time were prepared. The resulting materials were characterised by X-ray powder diffraction. Fourier transformed infrared spectroscopy, scanning electronic microscopy, and specific surface area evaluation. The modified halloysites were employed as Cu(II) adsorbents from aqueous solutions. Various parameters were studied through the batch method. Kinetic data, equilibrium isotherms, and thermodynamic parameters were evaluated by considering several models. The fraction of halloysite intercalated with sodium acetate remained low, up to 7 days, then linearly increased with contact time. Thirty days were required to achieve a ratio of 91%. For this sample, a proliferation of small tubes (nanotubes) was evidenced. The best results were achieved with the pseudo-second-order kinetic model associated with intraparticle diffusion and with the Redlich-Peterson isotherm, for the equilibrium data. The thermodynamic data show that adsorption would be spontaneous at low temperatures, of exothermic nature, resulting in an adsorbate-adsorbent system much more ordered. The insertion of CH(3)COONa into halloysite significantly affects the Cu(II) adsorption. The magnitude in enhancement of copper adsorption on solid phase thus depends on the content of the carboxylic functional groups, which increases with the insertion of CH3COONa into the halloysitic matrix. The involved mechanism is quite complex. It implies electrostatic considerations and a cationic exchange process. The most intercalated sample was found to be very effective as adsorbent of copper(II) from aqueous solutions. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorption, Aqueous-Solutions, Batch Method, Characterisation, Copper, Copper Ions, Cu(II), Diffusion, Equilibrium, Evaluation, Halloysite, Heavy-Metals, Humic-Acid, Intercalation, Isotherm, Kaolinite, Kinetic, Model, Montmorillonite, Pseudo-Second-Order, Removal, Sodium Acetate, Sorption, Thermodynamic Parameters

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Full Text: 2011\J Col Int Sci360, 760.pdf

Abstract: Multi-walled carbon nanotubes (MWCNTs) were used in the adsorptive removal of aniline, an organic pollutant, from an aqueous solution. It was found that carbon nanotubes with a higher specific surface area adsorbed and removed more aniline from an aqueous solution. The adsorption was dependent on factors, such as MWCNTs dosage, contact time, aniline concentration, solution pH and temperature. The adsorption study was analyzed kinetically, and the results revealed that the adsorption followed pseudo-second order kinetics with good correlation coefficients. In addition, it was found that the adsorption of aniline occurred in two consecutive steps, including the slow intra-particle diffusion of aniline molecules through the nanotubes. Various thermodynamic parameters, including the Gibbs free energy change (Delta G degrees), enthalpy change (Delta H degrees) and entropy change (Delta S degrees), were calculated. The results indicated that the spontaneity of the adsorption, exothermic nature of the adsorption and the decrease in the randomness reported as Delta G degrees, Delta H degrees and Delta S degrees, respectively, were all negative. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbents, Adsorption, Aniline, Aromatic-Compounds, Carbon Nanotubes, Diffusion, Gas-Chromatography, Gibbs Free Energy, Heavy-Metal Ions, Kinetics, Mass-Spectrometry, Pentachlorophenol Adsorption, Performance Liquid-Chromatography, Pseudo-Second Order, Pseudo-Second-Order, Solid-Phase Extraction, Thermodynamic Parameters, Thermodynamics, Water Samples

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Full Text: [2011\J Col Int Sci361, 509.pdf](2011/J%20Col%20Int%20Sci361,%20509.pdf)

Abstract: Organic-inorganic hybrid of chitosan and nanoclay (Cloisite 10A) was chosen to develop a nanomaterial with combine properties of hydrophilicity of an organic polycation and adsorption capacity of inorganic polyanion. The chitosan/clay nanocomposite (CCN) was prepared by solvent casting method. The material synthesis was found most efficient in adsorbent behavior was studied in detail taking Cr(VI) as representative ion. The chemical, structural and textural characteristics of the material were determined by FTIR, XRD, TEM, SEM and EDAX analysis. XRD and TEM results indicated that an exfoliated structure was formed with addition of small amounts of MMT-Na+(montmorillonite-N(+)) to the chitosan matrix. These composite material were used for the removal of chromium(VI) from aqueous solution. The conditions for the adsorption by the composite have been optimized and kinetics and thermodynamic studies were performed. Though the adsorption takes place in wide pH range, pH 3 was found most suitable and at this pH the adsorption data were modeled using the Langmuir and Freundlich isotherms at 15 degrees C and 35 degrees C, where the data fitted satisfactorily to Langmuir isotherms, the R2 values being 0.998 and 0.999 respectively indicating unilayer adsorption. Based on Langmuir model, Q(o) was calculated to be 357.14 mg/g. The adsorption showed pseudo second order kinetics with a rate constant of 8.0763 x 10-4 g mg-1 min-1 at 100 ppm Cr(VI) concentration. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Behavior, Aqueous Solution, Aqueous-Solution, Chitosan, Clay Nanocomposite, Chromium, Clay Nanocomposites, Composite, Cr(VI), Cr(VI) Adsorption, Epoxy Nanocomposites, Freundlich, Freundlich Isotherms, FTIR, Isotherms, Kinetics, Langmuir, Langmuir Isotherms, Layered Silicate, Layered Silicate Nanocomposites, Mechanical-Properties, Nanoclay, pH, Removal, SEM, Situ Intercalative Polymerization, Smectic Clay, Poly(Methyl Methacrylate), Thermodynamic, Uptake, Waste-Water, X-Ray Diffraction

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Full Text: [2011\J Col Int Sci362, 172.pdf](2011/J%20Col%20Int%20Sci362,%20172.pdf)

Abstract: Surface grafting of beta-cyclodextrin onto aminopropylsilica has been carried out under mild conditions using 1,1’-carbonyldiimidazole as an activator. The obtained beta-cyclodextrin-silica has been characterized by means of chemical and IR spectral analysis. Adsorption of para-aminobenzoic and para-aminosalicylic acids onto the surface of hydroxylated silica, aminopropylsilica, and silica with chemically attached beta-cyclodextrin moieties has been studied in relation to duration of contact, equilibrium concentration, and solution pH. Chemical immobilization of beta-cyclodextrin onto silica surface improves adsorption parameters for aromatic amino acids. The well-known mathematical models for the kinetic and equilibrium adsorption processes have been used, and the main adsorption parameters have been calculated. Kinetic curves of aromatic amino acids adsorption correspond to the model of pseudo-second order reaction. The major contribution to the equilibrium adsorption of para-aminobenzoic and para-aminosalicylic acids onto beta-cyclodextrin-containing silica is due to the formation of surface inclusion complexes between grafted oligosaccharide molecules and aromatic amino acids. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Aromatic Amino Acid, Behavior, Beta-Cyclodextrin, Beta-Cyclodextrin, Chiral Stationary-Phase, Equilibrium, Gel, Immobilization, IR Spectroscopy, Kinetic, Liquid-Chromatography, pH, Separation, Silica, Sorption, UV Spectroscopy

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Full Text: [2011\J Col Int Sci362, 486.pdf](2011/J%20Col%20Int%20Sci362,%20486.pdf)

Abstract: A magnetic adsorbent (called magsorbent) was developed by encapsulation of magnetic functionalized nanoparticles in calcium-alginate beads. The adsorption of Pb(II) ions by these magnetic beads was studied and the effect of different parameters, such as initial concentration, contact time and solution pH value on the adsorption of Pb(II) ions was investigated. Our magsorbent was found to be efficient to adsorb Pb(II) ions and maximal adsorption capacity occurred at pH 2.3-6. The classical Langmuir model used to fit the experimental adsorption data showed a maximum sorption capacity close to 100 mg g-1. The experimental kinetic data were well correlated with a pseudo second-order model, 50% of the Pb(II) ions were removed within 20 min and the equilibrium was attained around 100 min. Moreover our magsorbent was easily collected from aqueous media by using an external magnetic field. These results permitted to conclude that magnetic alginate beads could be efficiently used to remove heavy metals in a water treatment process. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Acid, Adsorbent, Adsorption, Adsorption, Alginate, Aqueous-Solution, Chitosan Beads, Co(II), Equilibrium, Ferrofluid, Heavy Metals, Kinetic, Langmuir, Liquids, Maghemite Nanoparticles, Magnetic, Magnetic Alginate Beads, Magsorbent, Metal Removal, Pb(II), pH, Recovery, Removal, Sorption, Wastewater, Water

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Full Text: [2011\J Col Int Sci362, 457.pdf](2011/J%20Col%20Int%20Sci362,%20457.pdf)

Abstract: The mesoporous carbon CMK-3 adsorbent was prepared, characterized, and used for the removal of anionic methyl orange dye from aqueous solution. Adsorption experiments were carried out as batch studies at different contact time, pH, initial dye concentration, and salt concentration. The dye adsorption equilibrium was rapidly attained after 60 min of contact time. Removal of dye in acidic solutions was better than in basic solutions. The adsorption of dye increased with increasing initial dye concentration and salt concentration. The equilibrium data were analyzed by the Langmuir and Freundlich models, which revealed that Langmuir model was more suitable to describe the methyl orange adsorption than Freundlich model. Experimental data were analyzed using pseudo-first-order and pseudo-second-order kinetic models. It was found that kinetics followed a pseudo-second-order equation. Thermodynamic study showed that the adsorption was a spontaneous and exothermic process. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Adsorbent, Adsorption, Aqueous Solution, Aqueous-Solutions, Bottom Ash, CMK-3, De-Oiled Soya, Dye, Dye Adsorption, Equilibrium, Freundlich, Kinetic, Kinetic Models, Kinetics, Langmuir, Langmuir And Freundlich Models, Low-Cost Adsorbents, Malachite Green, Membrane Sensor, Mesoporous Carbon, Methyl Orange, pH, Removal, Selective Adsorption, Sorption, Thermodynamic, Thermodynamics, Waste Materials

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Full Text: [2011\J Col Int Sci362, 477.pdf](2011/J%20Col%20Int%20Sci362,%20477.pdf)

Abstract: Three dimensions (3D) porous NiFe2O4 is synthesized by a sol-gel method using egg white. The obtained NiFe2O4 shows both good ferromagnetic properties and high adsorption capacity. The porous NiFe2O4 shows good adsorption properties for organic dyes (Methylene Blue (138.50 mg/g), Fuchsine Red (14.61 mg/g), Methyl Violet (19.06 mg/g)) and heavy metal ions (Cu(II) (55.83 mg/g), Cr (VI) (36.95 mg/g) and Ni (II) (37.02 mg/g)) due to its 3D interconnected porous structure. The maximum adsorption of Methylene Blue (MB) fit the pseudo-second-order model and Langmuir isotherm equation well. More interestingly, the ferromagnetic NiFe2O4 can be separated under a magnetic field conveniently and keeps high removal efficiency (>97%) during seven reusable cycles. These results suggest that the porous NiFe2O4 is a promising favorable and reusable adsorbent. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: 3D Pore, Adsorbent, Adsorption, Adsorption, Aqueous-Solution, Azo-Dye, Cr, Dyes, Fabrication, Ferromagnetism, Isotherm, Langmuir, Langmuir Isotherm, Magnetic Separation, Methylene Blue, Nanoparticles, Nanospheres, Nanostructures, NiFe2O4, Removal, Sol-Gel, Sol-Gel Method, Synthesis, Template, Vi, Wastewater

? Chaparadza, A. and Hossenlopp, J.M. (2011), Removal of 2,4-dichlorophenoxyacetic acid by calcined Zn-Al-Zr layered double hydroxide. *Journal of Colloid and Interface Science*, **363** (1), 92-97.

Full Text: [2011\J Col Int Sci363, 92.pdf](2011/J%20Col%20Int%20Sci363,%2092.pdf)

Abstract: The adsorption equilibrium, kinetics, and thermodynamics of removal of 2,4-dichlorophenoxy-acetic acid (2,4-D) from aqueous solutions by a calcined Zn-Al layered double hydroxide incorporated with Zr4+ were studied with respect to time, temperature, pH, and initial 2,4-D concentration. Zr4+ incorporation into the LDH was used to enhance 2,4-D uptake by creating higher positive charges and surface/layer modification of the adsorbent. The LDH was capable of removing up to 98% of 2,4-D from 5 to 400 ppm aqueous at adsorbent dosages of 500 and 5000 mg L-1. The adsorption was described by a Langmuir-type isotherm. The percentage 2,4-D removed was directly proportional to the adsorbent dosage and was optimized with 8% Zr4+. ion content, relative to the total metals (Zr4+ + Al3+ + Zn2+). Selected mass transfer and kinetic models were applied to the experimental data to examine uptake mechanism. The boundary layer and intra-particle diffusion played important roles in the adsorption mechanisms of 2,4-D, and the kinetics followed a pseudo-second order kinetic model with an enthalpy, ΔH(ads) of -27.7±0.9 kJ mol-1. Regeneration studies showed a 6% reduction in 2,4-D uptake capacity over six adsorption-desorption cycles when exposed to an analyte concentration of 100 ppm. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: 2,4-D, 2,4-Dichlorophenoxyacetic Acid, Acetic-Acid, Adsorbent, Adsorption, Adsorption, Aqueous-Solutions, Carbon, Clays, Complex, Diffusion, Equilibrium, Isotherm, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir Isotherm, Layered Double Hydroxides, Mechanism, pH, Regeneration, Removal, Sol-Gel Synthesis, Temperature, Thermodynamics, Uptake, Water, Zirconium

? D’Arcy, M., Weiss, D., Bluck, M. and Vilar, R. (2011), Adsorption kinetics, capacity and mechanism of arsenate and phosphate on a bifunctional TiO2-Fe2O3 bi-composite. *Journal of Colloid and Interface Science*, **364** (1), 205-212.

Full Text: [2011\J Col Int Sci364, 205.pdf](2011/J%20Col%20Int%20Sci364,%20205.pdf)

Abstract: Mixed oxide TiO2-Fe2O3 bi-composites have been recognised as efficient and economical sorbents with great promise for arsenic removal from groundwater. In this study, we use a fast, simple and inexpensive synthesis method for this type of bi-composite and assess its adsorption performance. The kinetics of arsenate and phosphate adsorption onto the bi-composite are determined, demonstrating rapid and stable uptake of both oxy-anions over several days and with improved performance compared to the widely used TiO2 sorbent. A modified pseudo-second order rate equation is introduced, which allows the adsorption kinetics to be modelled as two simultaneous, parallel reaction pathways with separate kinetic parameters. This equation reproduces the experimental observations accurately across a wide range of timescales from minutes to days. Our experimental data agrees with previous interpretations of the adsorption mechanism including the formation of mono-dentate and bi-dentate inner-sphere surface complexes. The arsenate and phosphate uptake capacities of the bi-composite are reported. Equilibrium studies were conducted between pH 5 and 9 and interpreted within the Langmuir, Freundlich and Dubinin-Radushkevich isotherm models. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Adsorption, Adsorption Kinetics, Aqueous-Solutions, Arsenate, Arsenite, As(III), Dubinin-Radushkevich, Equilibrium, Feooh, Freundlich, Iron Titanium Oxide, Isotherm, Kinetics, Langmuir, Oxides, pH, Phosphate, Pseudo-Second Order Rate Law, Removal, Sb(III), Spectroscopy, Surface, Titanium-Dioxide

# Title: Journal of Colloid Science

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Full Journal Title: [Journal of Colloid Science](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=12953&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=2bc0d534f24c2a42e380c4efd21276fb)

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Posner, A.M. and Alexander, A.E. (1953), The kinetics of adsorption from solution to the air water interface. Part II. Anionic and cationic soaps. *Journal of Colloid Science*, **8** (6), 585-592.

Full Text: [J\J Col Sci8, 585.pdf](J/J%20Col%20Sci8,%20585.pdf)

Abstract: The same technique as in Part I has been used to measure the kinetics of adsorption of a typical cationic and a typical anionic soap. The effect of soap concentration in both the molecular and micellar ranges was first studied, followed by the effect of added salts, both as regards concentration and type.

Posner, A.M. and Alexander, A.E. (1953), The kinetics of adsorption from solution to the air water interface. Part I. normal aliphatic alcohols. *Journal of Colloid Science*, **8** (6), 575-584.

Full Text: [J\J Col Sci8, 575.pdf](J/J%20Col%20Sci8,%20575.pdf)

Abstract: The surface potential technique has been used to study the kinetics of adsorption of a series of *n*-aliphatic alcohols (butyl, hexyl, heptyl, octyl) at the air/water interface, mostly over the time interval 1–15 milliseconds. The effect of concentration and of temperature was determined, and the results are discussed in the light of current theories of the adsorption process

Hansen, R.S. (1961), Diffusion and kinetics of adsorption of aliphatic acids and alcohols at water-air interface. *Journal of Colloid Science*, **16** (6), 549-560.

Full Text: [J\J Col Sci16, 549.pdf](J/J%20Col%20Sci16,%20549.pdf)

Abstract: Hansen and Wallace (1) and Defay and Hommelen (2) have recently published independent studies of the time-dependent surface tensions of aqueous solutions of aliphatic acids and alcohols. Whereas experimental results in systems studied by both sets of workers appear to be in reasonably close agreement, Hansen and Wallace interpreted their results in terms of a barrier-limited adsorption process, Defay and Hommelen in terms of a diffusion-limited process.

A treatment of adsorption kinetics is presented which takes explicit account of the diffusion process without presupposing the absence of an adsorption barrier, a new equation suitable for the treatment of experimental data is derived, and its utility is discussed. It is shown that available data point to a substantial depletion of the subsurface concentration at intermediate times and that the treatment of Hansen and Wallace, presupposing exclusive barrier limitation, cannot be correct. On the other hand, the initial proportionality of spreading pressure to time cannot be explained by an adsorption process limited exclusively by diffusion if it is supposed that the spreading pressure depends on the number of solute molecules in the surface layer in the same manner in the dynamic process and at equilibrium. Two hypotheses are advanced to account for the apparent barrier limitation at low times and diffusional limitation at intermediate times. First, the mechanism of transfer from subsurface to surface may be fast but not infinitely so (small barrier hypothesis). For the linear isotherm it is shown that this hypothesis leads to an adsorption proportional to time at low times, and to that given by diffusion theory with a time lag at long times. Reasons for expecting this behavior to be fairly general are given. Second, adsorption may be exclusively diffusion-controlled, but the concentration depletion near the surface contributes in the initial period of adsorption an effective spreading pressure — *nRT*, where *n* is the number of moles of solute per square centimeter in the surface layer. A model giving rise to this correction term is suggested and its plausibility discussed.

Macritchie, F. and Alexander, A.E. (1963), Kinetics of adsorption of proteins at interfaces. Part I. Role of bulk diffusion in adsorption. *Journal of Colloid Science*, **18** (5), 453-457.

Full Text: [J\J Col Sci18, 453.pdf](J/J%20Col%20Sci18,%20453.pdf)

Abstract: Owing to their low diffusion constants and the (in general) irreversibility of their adsorption, proteins can be used with advantage in elucidating the general mechanism of adsorption at interfaces.

In the present study of adsorption at the air/water interface this has been followed firstly, in the absence of an appreciable film pressure, that is in the very initial stages, and secondly, in the later stages when an appreciable film pressure exists, due either to the protein itself or to a spread monolayer.

In the former case bulk diffusion accounts very reasonably for the observed rates, in the latter the observed rates are much slower than calculated, suggesting the building up of a barrier associated with the film pressure.

Macritchie, F. and Alexander, A.E. (1963), Kinetics of adsorption of proteins at interfaces. Part II. Role of pressure barriers in adsorption. *Journal of Colloid Science*, **18** (5), 458-463.

Full Text: [J\J Col Sci18, 458.pdf](J/J%20Col%20Sci18,%20458.pdf)

Abstract: The role of pressure barriers in the adsorption process (see Part I) has been examined using a number of proteins over a range of surface pressures.

It was found that the rate of adsorption was directly proportional to the bulk concentration and that log (rate of adsorption) varied linearly with surface pressure, in agreement with the Ward-Tordai theory.

From this theory the value of Δ*A*, the area of clean surface required to permit adsorption of a molecule, was calculated for a variety of proteins differing in size and shape. All values fell within a comparatively small range (100–175 A.2), leading to the conclusion that only a small portion of the molecule needs to penetrate the surface before complete unfolding of the molecule begins.

Macritchie, F. and Alexander, A.E. (1963), Kinetics of adsorption of proteins at interfaces. Part III. Role of electrical barriers in adsorption. *Journal of Colloid Science*, **18** (5), 464-469.

Full Text: [J\J Col Sci18, 464.pdf](J/J%20Col%20Sci18,%20464.pdf)

Abstract: The influence of the electrokinetic (zeta) potential at the surface upon the rate of protein adsorption has been measured quantitatively.

In the system bovine serum albumin at pH 6.9, the zeta potential was varied by addition of NaCl, and the rate was found to increase as the zeta potential was decreased.

In the second system studied, namely, lysozyme at pH 6.5, the initial zeta potential at the surface was varied over a wide range (positive and negative) by spreading different monolayers. Rates of protein adsorption were found from the initial rate of change of area and the rates compared with the initial zeta potentials measured independently. Adsorption rates were found to be closely related to the corresponding zeta potentials in accordance with the Hartley-Roe theory.

Bering, B.P., Dubinin, M.M. and Serpinsky, V.V. (1966), Theory of volume filling for vapor adsorption. *Journal of Colloid Science*, **21** (4), 378-393.

Full Text: [J\J Col Sci18, 378.pdf](J/J%20Col%20Sci18,%20378.pdf)

Abstract: A rational classification of adsorbent pores by size is suggested. It is shown that for the finest pores (micropores, radii *r* 15 A) adsorption follows the mechanism of volume filling of the adsorption space rather than the mechanism of surface coverage, i.e., formation of successive layers. In larger pores (intermediate pores, 15 *r* 1000 A), when the relative pressures are sufficiently high, adsorption in layers on the surface turns into volume filling by the capillary condensation mechanism. Thermodynamic equations for differential entropy and heat are derived which are valid for both cases of volume filling of pores. The fundamental principles of the theory of physical adsorption of vapors in micropores, which consist in the concept of volume filling of these pores and the zero value of the derivative [∂*RT* ln (*ps*/*p*)/∂*T*]*a*υ*P*, are discussed. These concepts make it possible to regard adsorption in micropores as a limiting case of volume filling corresponding to negligible, practically zero, values of *P*. Arguments are adduced in favor of the fact that the value of *P* in micropores should actually tend to zero. In volume filling of both intermediate pores and micropores, differential entropy of adsorption, Δ*S* = [∂*RT* ln (*ps*/*p*)/∂*T*]*a* is negative. The thermodynamic difference of these two phenomena consists in the fact that for capillary condensation *P* < 0, whereas for adsorption filling of micropores *P* = 0.

The case of the theory of volume filling of micropores were the characteristic curve is given by the equation *av* = *W*0 exp [−*D*(*RT* ln *ps*/*p*)2] is considered.