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By

Prof. Yuh-Shan Ho

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# Title: Taehan Kanho Hakhoe Chi

Full Journal Title: [Taehan Kanho Hakhoe Chi](http://www.kan.or.kr/new/kor/sub3/sub3_1.php)

ISO Abbreviated Title:

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Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shin, S.R. (2006), Analysis of smoking and smoking cessation related nursing research in Korea and its future direction. *Taehan Kanho Hakhoe Chi*, **36** (2), 415-425.

Full Text: [2006\Tae Kan Hak Chi36, 415.pdf](2006/Tae%20Kan%20Hak%20Chi36,%20415.pdf)

Abstract: PURPOSE: The purpose of this study was to analyze the contents and trend of smoking and smoking cessation related nursing research in Korea and to suggest the directions for future research. METHOD: Eight nursing professional Journals published by the Korean Academic Nursing Society and by 7--adult, community, psychiatric, fundamental, obstetrics, pediatrics, administrative--nursing societies from beginning edition to October 2005 were selected. They were examined for the proportion of published research, participants, research designs, key words, measurement tools, and the intervention outcomes in the case of the experimental research. RESULT: Of the research analyzed, 87 studies were smoking and smoking cessation related research. The Journals, which had published the most number of smoking and smoking cessation research were J of Korean Academic Society, J of Korean Adult Nursing Society, J of Korean Community Nursing Society. The most popular research design was an descriptive design. The major concepts studied were related psychosocial variables. Among 87 studies, only 11 were experimental research. CONCLUSION: Research on smoking and smoking cessation in the nursing discipline are increasing. However more research to test the effectiveness of nursing intervention programs are needed.

Keywords: Community, Design, Effectiveness, Experimental, Intervention, Korea, Measurement, Nursing, Obstetrics, Outcomes, Pediatrics, Psychosocial, Purpose, Research, Research Design, Smoking, Trend

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Chemistry, Analytical: Impact Factor

Brainina, Kh.Z. and Tchernyshova, A.B. (1974), Inverse voltammetry of antimony with triphenylmethane dyes. *Talanta*, **21** (4), 287-293.

Full Text: [1960-80\Talanta21, 287.pdf](1960-80/Talanta21,%20287.pdf)

Abstract: A method is suggested for the determination of traces of antimony by inverse voltammetry of the solid phases formed with triphenylmethane dyes (Crystal Violet, Methyl Violet and Malachite Green) as the precipitants. The authors have studied the effect of concentration, adsorption and oxidation of the triphenylmethane dyes, potential and time of pre-electrolysis, and concentration of antimony(III) and some other elements on the polarogram shape and stripping current. A method for determining antimony traces in chromic salts is described as an example.

López-Cueto, G., Casado-Riobó, J.A. and Lucena-Conde, F. (1974), Catalytic effect of copper on the hexacyanoferrate(III)-cyanide redox reaction. *Talanta*, **21** (6), 669-670.

Full Text: [1960-80\Talanta21, 669.pdf](1960-80/Talanta21,%20669.pdf)

Abstract: The oxidation of cyanide with hexacyanoferrate(III) is a thermodynamically possible but kinetically slow reaction, which is catalysed by copper(II). The catalysed reaction has a second-order dependence on hexacyanoferrate(III) concentration, and the pseudo second-order rate constant increases linearly with the copper concentration, at least in the range from 10-7 to 10-3M.

Robberecht, H. and Van Grieken, R. (1982), Selenium in environmental waters: Determination, speciation and concentration levels. *Talanta*, **29** (10), 823-844.

Full Text: [1982\Talanta29, 823.pdf](1982/Talanta29,%20823.pdf)

Abstract: This article reviews the different methods used for the determination of selenium species in all types of environmental waters. Basic difficulties are discussed and the efficiency of the methods is explained in view of the sub-µg/1. concentration levels. Special attention is paid to preconcentration steps. Published data on speciation and concentration levels in various water samples are critically reviewed.

? Myasoedova, G.V., Antokolskaya, I.I. and Savvin, S.B. (1985), New chelating sorbents for noble metals. *Talanta*, **32** (12), 1105-1112.

Full Text: [1985\Talanta32, 1105.pdf](1985/Talanta32,%201105.pdf)

Abstract: properties of the new chelate-forming “POLYORGS” sorbents for concentration of noble metals are discussed. POLYORGS are made from different polymeric matrices (polystyrene, copolymers of styrene with divinylbenzene, fibrous materials). They contain heterocyclic amine and amidoxime groups, and are selective for noble metals. Some methods of noble metal determination after preliminary concentration of POLYORGS sorbents are given.

Tsezos, M. and Mattar, S. (1986), A further insight into the mechanism of biosorption of metals, by examining chitin EPR spectra. *Talanta*, **33** (3), 225-232.

Full Text: [1986\Talanta33, 225.pdf](1986/Talanta33,%20225.pdf)

Abstract: Experimental chitin-uranium-copper EPR spectra have been simulated by computer. The simulation suggests that the chitin-copper-uranium EPR spectra are primarily due to a chitin-copper interaction, with insignificant contribution from other paramagnetic species. The simulation suggests two possible complex configurations, both involving one ligand nitrogen atom.

El-Shahawi, M.S. (1994), Retention and separation of some organic water pollutions with unloaded and tri-n-octylamine loaded polyester-based polyurethane foams. *Talanta*, **41** (9), 1481-1488.

Full Text: [1994\Talanta41, 1481.pdf](1994/Talanta41,%201481.pdf)

Abstract: The analytical utility of unloaded and polyester-based polyurethane loaded foams with tri-n-octylamine (TOA) in the removal of some phenols from water were carried out. In static mode, the TOA-loaded foams showed a good affinity of extraction towards the tested compounds as compared to the untreated foams. The various parameters affecting the retention efficiency of the tested compounds from aqueous media by the foam were examined via batch technique. The TOA-loaded foams were employed in column modes for the extraction and recovery of the tested phenols. The retention efficiency and the recovery of the tested compounds from the loaded foam column were up to 98.5%. Sorption of the compounds by the foam were brought by solvent extraction mechanism. The molecular weight and the p*K*a of the compounds play an important role in the extraction process. The height equivalent to a theoretical plate (HETP) of the TOA-foam column was found in the range 1.8–2.05 ± 0.1 mm at flow-rates up to 10 cm3/min. Separation of some of the tested phenols was also carried out by the TOA-foam columns. The membrane properties of the polyester foam sorbents give unique advantages over conventional granular sorbents in rapid, versatile and effective separations and preconcentrations of the tested compounds.

Notes: highly cited

? Fang, Z.L., Xu, S.K., Dong, L.P. and Li, W.Q. (1994), Determination of cadmium in biological-materials by flame atomic-absorption spectrometry with flow-injection online sorption preconcentration. *Talanta*, **41** (12), 2165-2172.

Full Text: [1994\Talanta41, 2165.pdf](1994/Talanta41,%202165.pdf)

Abstract: A new on-line preconcentration flame atomic absorption spectrometry (FAAS) system for trace element determination was developed based on sorption of soluble metal complexes on the walls of a PTFE knotted reactor using flow injection techniques. The system was applied to the determination of cadmium in biological materials. Cadmium complexed with sodium diethyldithiocarbamate was sorbed on the inner walls of the reactor and eluted on-line by isobutyl methyl ketone. The retention efficiency was 81% at a sampling loading rate of 5.2 ml/min. The enhancement factor was 66 and the concentration efficiency was 61/min with a 50 sec preconcentration period, consuming 4.2 ml sample. A detection limit of 0.1 mu g/l. Cd (3 sigma) was obtained with a sampling frequency of 55/hr. The precisions were 1.2% RSD for 20 mu g/l. Cd (N = 11). Thiourea and ascorbic acid/phenanthroline were used to overcome interferences from copper and iron, respectively. The analytical results obtained for powdered rice and human hair standard reference materials were in good agreement with the certified values.

Keywords: Online Sorbent Extraction, Samples, Copper

? Katragadda, S., Gesser, H.D. and Chow, A. (1995), Evaluation of a β-diketone-imbedded polyurethane foam. *Talanta*, **42** (5), 725-731.

Full Text: [1995\Talanta42, 725.pdf](1995/Talanta42,%20725.pdf)

Abstract: A beta-diketone-imbedded polyurethane foam was made for the sorption of uranium from aqueous solutions. The incorporation of the beta-diketone functional group into the polyurethane foam was simple, and relatively inexpensive. The beta-diketone foam was ground to facilitate the evaluation of its ability to extract uranium from aqueous solutions with a wide range of temperature and pH values. The beta-diketone material showed superior extractability of uranium from solutions with pH 7±3. In general, the beta-diketone material showed greater extractability of uranium at all temperatures and pH values tested when compared to a blank polyurethane foam without the beta-diketone functional group.

Keywords: Group-Containing Adsorbent, Spectrophotometric Determination, Uranium, Extraction, Seawater, Amidoxime, Recovery, Preconcentration, Separation, Mercury

Sarkar, A.R., Datta, P.K. and Sarkar, M. (1996), Sorption recovery of metal ions using silica gel modified with salicylaldoxime. *Talanta*, **43** (11), 1857-1862.

Full Text: [1996\Talanta43, 1857.pdf](1996/Talanta43,%201857.pdf)

Abstract: Trace metals in water were preconcentrated with silica gel modified with salicylaldoxime and determined by AAS. Optimum conditions for the maximum recovery of metal ions, viz. Cu(II), Ni(II), Co(II), Zn(II) and Fe(III), for both batch and column methods were developed. The efficiency of the adsorbent with respect to different experimental conditions was established. (C) 1996 Elsevier Science B.V. All rights reserved.

Keywords: Atomic Absorption Spectrometry, Metal Ions, Salicylaldoxime, Silica Gel, Sorption Recovery

Ahuja, M., Rai, A.K. and Mathur, N. (1996), Adsorption behaviour of metal ions on hydroximate resins. *Talanta*, **43** (11), 1955-1963.

Full Text: [1996\Talanta43, 1955.pdf](1996/Talanta43,%201955.pdf)

Abstract: Some new chelating ion-exchange resins containing a hydroxamic acid moiety attached to a divinylbenzene styrene (DVBS) copolymer, i.e., glycine hydroximate in DVBS (GH-DVBS), anthranilic acid hydroximate in DVBS (AAH-DVBS), malonic acid dihydroximate in DVBS (MAH-DVBS) and iminodiacetic acid dihydroximate in DVBS (IDAAH-DVBS), have been synthesized and their various physicochemical characteristics studied. The degree of retention of metal ions by the resins at equilibrium has been determined in terms of the molar distribution coefficient (Kd). In general, the resins having a dihydroximate moiety are found to be more efficient compared to monohydroximate resins. However, it is of interest to note that the monohydroximate derivative of amino acid (GH-DVBS) showed better metal retention capability than the dihydroximate of carboxylic acid (MAH-DVBS). The selectivity of the resins for transition and highly charged metal ions is quite high compared to that for alkaline earth metals. All the synthesized resins can be utilized for the separation of a mixture of metal ions because the differences in the distribution coefficient values are large enough to permit good separations on columns. However, the GH-DVBS resin was tried for the separation of copper-cobalt and copper-nickel mixtures at pH 5.5 using the column mode of operation.

? Katragadda, S., Gesser, H.D. and Chow, A. (1997), Extraction of uranium from aqueous solution by phosphonic acid imbedded polymethane foam. *Talanta*, **44** (10), 1865-1871.

Full Text: [1997\Talanta44, 1865.pdf](1997/Talanta44,%201865.pdf)

Abstract: Phenylphosphonic acid was imbedded into the matrix of the polyurethane foam during the fabrication process of the polymer. The extraction of uranium by phosphonic acid-imbedded polyurethane foam and blank polyurethane (i.e., foam without phosphonic acid functional groups) was investigated. Phosphonic acid-imbedded foam showed superior extractability of uranium from solutions with pH = 7.0 +/- 1.5 over a wide range of temperature. (C) 1997 Elsevier Science B.V.

Keywords: Aqueous, Phosphonic, Polyurethane, Uranium, Treated Polyurethane Foam, Spectrophotometric Determination, Preconcentration, Separation, Mercury, Resins

Denizli, A., Kesenci, K., Arıca, M.Y., Salih, B., Hasırcı, V. and Pişkin, E. (1998), Novel dye-attached macroporous films for cadmium, zinc and lead sorption: Alkali Blue 6B-attached macroporous poly(2-hydroxyethyl methacrylate). *Talanta*, **46** (4), 551-558.

Full Text: [1998\Talanta46, 551.pdf](1998/Talanta46,%20551.pdf)

Abstract: Alkali Blue 6B-attached poly(2-hydroxyethyl methacrylate) (poly(HEMA)) microporous films were investigated as chelate forming sorbents for heavy metal removal. Poly(HEMA) microporous films were prepared by UV-initiated photo-polymerization of HEMA in the presence of an initiator (azobisisobutyronitrile (AIBN)). Alkali Blue 6B was attached covalently. These films with a swelling ratio of 58%, and carrying 14.8 mmol Alkali Blue 6B m−2 which were then used in the removal of Cd(II), Zn(II) and Pb(II) from aqueous media. Adsorption rates were very high, equilibrium was achieved in about 30 min. The maximum adsorption of heavy metal ions onto the Alkali Blue 6B-attached films were 41.4 mmol m−2 for Cd(II), 52.4 mmol m−2 for Zn(II), and 64.5 mmol m−2 for Pb(II). When the heavy metal ions competed during the adsorption from a mixture the adsorption values for Cd(II), Zn(II) and Pb(II) were quite close. Heavy metal ions were desorbed by using 0.1 M HNO3. A significant amount of the adsorbed heavy metal ions (up to 95%) could be desorbed in 30 min. Repeated adsorption/desorption cycles showed the feasibility of these novel dye-attached microporous films for heavy metal removal. (C) 1998 Elsevier Science B.V. All rights reserved.

Keywords: Alkali Blue 6B, Poly(HEMA) Films, Heavy Metal Removal, Cadmium(II), Zinc(II), Lead(II)

Salih, B., Denizli, A., Kavakli, C., Say, R. and Pişkin, E. (1998), Adsorption of heavy metal ions onto dithizone-anchored poly (EGDMA-HEMA) microbeads. *Talanta*, **46** (5), 1205-1213.

Full Text: [1998\Talanta46, 1205.pdf](1998/Talanta46,%201205.pdf)

Abstract: The dithizone-anchored poly (EGDMA-HEMA) microbeads were prepared for the removal of heavy metal ions (i.e., cadmium, mercury, chromium and lead) from aqueous media containing different amounts of these ions (25-500 ppm) and at different pH values (2.0-8.0). The maximum adsorptions of heavy metal ions onto the dithizone-anchored microbeads from their solutions was 18.3, Cd(II); 43.1, Hg(II); 62.2, Cr(III) and 155.2 mgg-1 for Pb(II). Competition between heavy metal ions (in the case of adsorption from mixture) yielded adsorption capacities of 9.7, Cd(II); 28.7, Hg(II); 17.6, Cr(III) and 38.3 mgg-1 for Pb(II). The same affinity order was observed under non-competitive and competitive adsorption, i.e., Cr(III)> Pb(II)> Hg(II) > Cd(II). The adsorption of heavy metal ions increased with increasing pH and reached a plateaue value at around pH 5.0. Heavy metal ion adsorption from artificial wastewater was also studied. The adsorption capacities are 4.3, Cd(II); 13.2, Hg(II); 7.2, Cr(III) and 16.4 mgg-1 for Pb(II). Desorption of heavy metal ions was achieved using 0.1 M HNO3. The dithizone-anchored microbeads are suitable for repeated use (for more than five cycles) without noticeable loss of capacity.

Keywords: Attached Poly (Egdma-Hema) Microspheres, Biosorption Characteristics, Removal, Preconcentration, Ligands, Dithizone, Poly (Egdma-Hema) Microbeads, Heavy Metal Removal, Cadmium, Mercury, Chromium and Lead

Brandariz, I., Vilariño, T., Alonso, P., Herrero, R., Fiol, S. and Sastre de Vicente, M.E. (1998), Effect of ionic strength on the formal potential of the glass electrode in various saline media. *Talanta*, **46** (6), 1469-1477.

Full Text: [1998\Talanta46, 1469.pdf](1998/Talanta46,%201469.pdf)

Abstract: We examined the variation with ionic strength (*I*, adjusted with KCl, KNO3, KBr, NaCl or NaClO4) of the formal potential (*E*const) for glass electrodes exhibiting a Nernstian response (i.e. *E*cell=*E*const-*s* log [H+]). For this purpose, we investigated the different factors included in the formal potential, so we obtained reported values for the liquid junction potential as a function of ionic strength and determined the logarithm of the activity coefficient for the proton in various saline media, using Pitzer equations.

Keywords: Ionic Strength, Formal Potential, Glass Electrode, Potentiometry

Lubal, P., Široky, D., Fetsch, D. and Havel, J. (1998), The acidobasic and complexation properties of humic acids: Study of complexation of Czech humic acids with metal ions. *Talanta*, **47** (2), 401-412.

Full Text: [1998\Talanta47, 401.pdf](1998/Talanta47,%20401.pdf)

Abstract: The acid-base and complexation properties of humic acids (HAs) extracted from bohemian brown coals were studied. The acid-base behavior corresponds with the model of KA as a mixture of mono- and diprotic acids. This model was also verified on commercial HA substances (Aldrich and Fluka). HA binds strongly with heavy metal ions and the highest stability constant of HA-metal ion complexes was observed for copper(IT). Stability constant values were found to decrease in the order: Cu2+ > Ba2+ > Pb2+ > Cd2+ > Ca2+. Both acidobasic models for HA alone and those for HA-metal ion interactions were proposed and the computational methodology for polyelectrolyte equilibria studies demonstrated. (C) 1998 Elsevier Science B.V. All rights reserved.

Keywords: Complexation, Humic Acids, Metal Ions, Modeling, Carboxyl-Group Structures, Base Properties, Suwannee River, Fulvic-Acid, Electrophoresis, Substances, Georgia

Nifant’eva, T.I., Shkinev, V.M., Spivakov, B.Y. and Burba, P. (1999), Membrane filtration studies of aquatic humic substances and their metal species: A concise overview. Part 2. Evaluation of conditional stability constants by using ultrafiltration. *Talanta*, **48** (2), 257-267.

Full Text: [1999\Talanta48, 257.pdf](1999/Talanta48,%20257.pdf)

Abstract: The assessment of conditional stability constants of aquatic humic substance (HS) metal complexes is overviewed with special emphasis on the application of ultrafiltration methods. Fundamentals and limitations of stability functions in the case of macromolecular and polydisperse metal-HS species in aquatic environments are critically discussed. The review summarizes the advantages and application of ultrafiltration for metal-HS complexation studies, discusses the comparibility and reliability of stability constants. The potential of ultrafiltration procedures for characterizing the lability of metal-HS species is also stressed. (C) 1999 Elsevier Science B.V. All rights reserved.

Keywords: Humic Substances, Metal Complexes, Stability Constants, Ultrafiltration, Ion-Selective Electrode, Natural Organic-Acids, Anodic-Stripping Voltammetry, Fulvic-Acid, Complexation Properties, Copper Complexation, Physicochemical Description, Protonation Equilibria, Northeast Pacific, Surface Waters

Saeed, M.M., Hasany, S.M. and Ahmed, M. (1999), Adsorption and thermodynamic characteristics of Hg(II)-SCN complex onto polyurethane foam. *Talanta*, **50** (3), 625-634.

Full Text: [1999\Talanta50, 625.pdf](1999/Talanta50,%20625.pdf)

Abstract: The sorption of Hg(II) in the presence of sodium thiocyanate solution onto polyurethane (PUR) foam, an excellent sorbent, has been investigated in detail. Maximum sorption of Hg(II) is achieved from 0.1 M hydrochloric acid solution containing 7.5×10-2 M sodium thiocyanate in 5 min. The sorption data followed both Freundlich and Langmuir adsorption isotherms. The Freundlich constants 1/n and sorption capacity, C-m, are evaluated to be 0.44±0.02 and (3.86±0.89)×10-5 mol g-1. The saturation capacity and adsorption constant derived from Langmuir isotherm are (6.88±0.28)×10-5 mol g-1 and (5.6±0.37)×104 dm3 mol-1) respectively. The mean free energy (E) of Hg(II)-SCN sorption onto PUR foam computed from D-R isotherm is 12.4±0.3 kJ mol-1 indicating ion-exchange type mechanism of chemisorption. The variation of sorption with temperature yields thermodynamic parameters of Delta H = -30.7±1.2 kJ mol-1, Delta S = -70.1±4.1 J mol-1 K-1 and Delta G = -9.86±0.77 kJ mol-1 at 298 It. The negative value of enthalpy and free energy reflects the exothermic and spontaneous nature of sorption. On the basis of the sorption data, sorption mechanism has been proposed. (C) 1999 Elsevier Science B.V. All rights reserved.

Keywords: Hg(II)-SCN, Adsorption, Thermodynamic Characteristics, Polyurethane Foam, Atomic-Absorption Spectrometry, Aqueous-Solution, Thiocyanate Complexes, Extraction, Preconcentration, Separation, Water, Mercury, Palladium, Sorption

Alam, T., Tarannum, H., Kumar, M.N.V.R. and Kamaluddin. (2000), Adsorption and oxidation of aromatic amines by metal hexacyanoferrates(II). *Talanta*, **51** (6), 1097-1105.

Full Text: [2000\Talanta51, 1097.pdf](2000/Talanta51,%201097.pdf)

Abstract: Interaction of aniline, p-toluidine and p-chloroaniline with nickel, cadmium and manganese hexacyanoferrates(II) has been studied. Nickel and cadmium hexacyanoferrates(II) showed maximum adsorption at neutral pH, whereas, manganese hexacyanoferrate(II) reacts with aniline, p-toluidine and p-chloroaniline forming the colored oligomers on its surface. The adsorption data obtained at neutral pH is fitted in Langmuir adsorption isotherm. The adsorption behavior of the studied aromatic amines followed the order: p-toluidine > aniline > p-chloroaniline, which is related to the basicities of the amines. Results of the present study suggest the importance of metal hexacyanoferrates(II) and metal ions in stabilization of aromatic amines during the processes of prebiotic condensation reactions. (C) 2000 Elsevier Science B.V. All rights reserved.

Keywords: Aromatic Amines, Metal Hexacyanoferrates(II), Adsorption, Montmorillonite, Nucleotides, Adenine

? Ohta, K., Tanahasi, H., Suzuki, T. and Kaneco, S. (2001), Preconcentration of trace copper with yeast for river water analysis. *Talanta*, **53** (4), 715-720.

Full Text: [2001\Talanta53, 715.pdf](2001/Talanta53,%20715.pdf)

Abstract: A new preconcentration method with yeast is presented. The method was evaluated for the determination of trace copper in river water by graphite furnace atomic absorption spectrometry (GFAAS). A suitable cultivation bed for preconcentration of copper was 3.5 mg ml-1 2-ammonium hydrogen phosphate. The optimal cultivation time and temperature were 2 h and 40 degreesC. Under optimal conditions, copper in aqueous sample was concentrated about seven-fold by yeast. The detection limit was 85 pg ml-1 (3S/N) for copper in river waters. The yeast preconcentration method was applied to the determination of copper in river waters. The recovery of spiked copper was in the range of 93-100%. By the preconcentration, it was found that ultra trace copper in river waters could be determined without interferences of matrix elements, after only the cultivation and no chemical treatment. (C) 2001 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Furnace Atomic Absorption Spectrometry, Copper, River Water, Biological Preconcentration, Yeast, Atomic-Absorption Spectrometry

Hasany, S.M., Saeed, M.M. and Ahmed, M. (2001), Sorption of traces of silver ions onto polyurethane foam from acidic solution. *Talanta*, **54** (1), 89-98.

Full Text: [2001\Talanta54, 89.pdf](2001/Talanta54,%2089.pdf)

Abstract: The sorption of traces of silver ions onto polyurethane foam (PUF) has been investigated in detail. Maximum sorption of silver (Kd = 6109 cm3g-1, %sorption > 97.5%) has been achieved from 1 M nitric acid solution after equilibrating silver ions with similar to 29 mg PUF for 20 min. The kinetics and thermodynamics of the sorption of silver ions onto PUF have also been studied. The sorption of silver ions onto PUF follows a first-order rate equation, which results as 0.177 min-1. The variation of sorption with temperature yields the values of DeltaH =-56.1±3.2 kJ mol-1 DeltaS =-159.7±10.5 J mol-1 K-1 and ΔG =-8.68±0.09 kJ mol-1 at 298 K with a correlation factor γ = 0.9919. The sorption data were subjected to different sorption isotherms. The sorption follows Langmuir, Freundlich and Dubinin-Radushkevich (D-R) isotherms. The values of Langmuir isotherms Q = 65.3±1.5 µmol g-1 and b = (4.79±1.16)×104 dm3mol-1 have been evaluated for Langmuir sorption constants, whereas the Freundlich sorption isotherm gives the value lin = 0.12±0.02 and A = 0.15±0.03 mmol g-1. The D-R parameters computed were beta =-0.000817±0.000206 mol2 kJ-2, Xm = 76.8±8.7 µmol g-1 and E = 24.7±3.2 kJ mol-1. The influence of common ions on the sorption was also examined. It is observed that Hg(II), thioura, Al(III), thiocyanate and thiosulphate reduce the sorption, whereas Cu(II), citrate and acetate ions enhance the sorption significantly. It can be concluded that PUF may be used to remove traces of silver ions from its very dilute solutions or for its preconcentration from aqueous acidic solutions. (C) 2001 Elsevier Science B.V. All rights reserved.

Keywords: Sorption, Silver Ions, Polyurethane Foam, Nitric Acid, Kinetics, Thermodynamics, Adsorption, Extraction, Complex

? Mandal, B.K. and Suzuki, K.T. (2002), Arsenic round the world: A review. *Talanta*, **58** (1), 201-235.

Full Text: [2002\Talanta58, 201.pdf](2002/Talanta58,%20201.pdf)

Abstract: This review deals with environmental origin, occurrence, episodes, and impact on human health of arsenic. Arsenic, a metalloid occurs naturally, being the 20th most abundant element in the earth’s crust, and is a component of more than 245 minerals. These are mostly ores containing sulfide, along with copper, nickel, lead, cobalt, or other metals. Arsenic and its compounds are mobile in the environment. Weathering of rocks converts arsenic sulfides to arsenic trioxide, which enters the arsenic cycle as dust or by dissolution in rain, rivers, or groundwater. So, groundwater contamination by arsenic is a serious threat to mankind all over the world. It can also enter food chain causing wide spread distribution throughout the plant and animal kingdoms. However, fish, fruits, and vegetables primarily contain organic arsenic, less than 10% of the arsenic in these foods exists in the inorganic form, although the arsenic content of many foods (i.e. milk and dairy products, beef and pork, poultry, and cereals) is mainly inorganic, typically 65-75%. A few recent studies report 85-95% inorganic arsenic in rice and vegetables, which suggest more studies for standardisation. Humans are exposed to this toxic arsenic primarily from air, food, and water. Thousands and thousands of people are suffering from the toxic effects of arsenicals in many countries all over the world due to natural groundwater contamination as well as industrial effluent and drainage problems. Arsenic, being a normal component of human body is transported by the blood to different organs in the body, mainly in the form of MMA after ingestion. It causes a variety of adverse health effects to humans after acute and chronic exposures such as dermal changes (pigmentation, hyperkeratoses, and ulceration), respiratory, pulmonary, cardiovascular, gastrointestinal, hematological, hepatic, renal, neurological, developmental, reproductive, immunologic, genotoxic, mutagenetic, and carcinogenic effects. Key research studies are needed for improving arsenic risk assessment at low exposure levels urgently among all the arsenic research groups. (C) 2002 Elsevier Science B.V. All rights reserved.

Keywords: Arsenic, Chronic Arsenic Toxicity, Carcinogenic Effects, Monomethylarsonous Acid Mma(Iii), Chinese-Hamster Cells, Drinking-Water, West-Bengal, Ground-Water, Well-Water, Blackfoot-Disease, Cancer Mortality, Copper Smelter, Skin-Lesions

Abate, G., Lichtig, J. and Masini, J.C. (2002), Construction and evaluation of a flow-through cell adapted to a commercial static mercury drop electrode (SMDE) to study the adsorption of Cd(II) and Pb(II) on vermiculite. *Talanta*, **58** (3), 433-443.

Full Text: [2002\Talanta58, 433.pdf](2002/Talanta58,%20433.pdf)

Abstract: This paper describes the construction and application of a robust flow-through cell for use with the capillary of a commercial static mercury drop electrode. Linearity of peak current was observed up to 0.50 mumol l-1 for Cd(II) or Pb(II) in anodic stripping voltammetry experiments performed under continuous flow during the deposition step, using 120 s of deposition time and flow rate of 4.0 ml min-1. Under these conditions the limits of detection for Cd(II) and Pb(II) were 13 and 17 nmol l-1, respectively. An analytical throughput of 20 analyses per h was possible using 10 s for cleaning the cell between two samples and including the time needed for the potential scan, which was performed with the flow stopped, using the differential pulse mode for current sampling. The linear dynamic range can be extended up to 5 mumol l-1 for both cations if the deposition time is decreased to 30 s, a condition in which the sampling throughput is 35 analyses per h. The proposed manifold was used to study the adsorption rates of Cd(II) and Pb(II) onto vermiculite at different pHs, allowing one to perform high sensitivity measurements at high sampling frequency, using low cost instrumentation. (C) 2002 Elsevier Science B.V. All rights reserved.

Keywords: Continuous Flow Analysis, Voltammetry, Heavy Metals, Adsorption, Clays, Anodic-Stripping Voltammetry, Injection-Analysis, Heavy-Metals, Clay-Minerals, Trace-Metals, System, Cadmium, Lead

Ensafi, A.A., Khayamian, T. and Atabati, M. (2003), Differential pulse cathodic stripping adsorption voltammetric determination of trace amounts of lead using factorial design for optimization. *Talanta*, **59** (4), 727-733.

Full Text: [2003\Talanta59, 727.pdf](2003/Talanta59,%20727.pdf)

Abstract: A sensitive cathodic stripping voltammetric method is developed for determination of lead(II), with adsorptive collection of complexes with Pyrogallol red (PGR) on to a hanging mercury drop electrode. After accumulation of the complex at -0.80 V vs. Ag/AgCl reference electrode, the potential is scanned in a negative direction from -0.20 to -0.50 V with differential pulse method. Then the reduction peak current for the lead(II)-PGR complex is measured at 0.39 V. The influence of reagent and instrumental variables was completely studied by factorial design analysis. The optimum analytical conditions for the determination of lead(II) were established. Under optimum conditions, lead(II) determined in the range of 0.1-30.0 ng ml-1 with a limit of detection of 0.06 ng ml-1. The method is successfully applied to determination of lead(II) in water sample. (C) 2002 Elsevier Science B.V. All rights reserved.

Keywords: Lead(II), Pyrogallol Red, Voltammetry, Copper, Cadmium, Complex

? Mapolelo, M. and Torto, N. (2004), Trace enrichment of metal ions in aquatic environments by *Saccharomyces cerevisiae*. *Talanta*, **64** (1), 39-47.

Full Text: [2004\Talanta64, 39.pdf](2004/Talanta64,%2039.pdf)

Abstract: Sorption properties of baker’s yeast cells, characterised as Saccharomyces cervisiae were evaluated for trace enrichment of metal ions: Cd2+, Cr3+, Cr6+, Cu2+, Pb2+ and Zn2+ from aqueous environments. Metal concentration was determined by flame atomic absorption spectrometry (FAAS). Parameters affecting metal uptake such as solution pH, incubation time, amount of yeast biomass and effect of glucose concentration (energy source) were optimised. Further studies were carried out to evaluate the effects on metal uptake after treating yeast with glucose as well as with an organic solvent. The results showed that trace enrichment of the metals under study with yeast, depends upon the amount of yeast biomass, pH and incubation time. Treatment of yeast cells with 10-20 mM glucose concentration enhanced metal uptake with exception to Cr6+, whose metal enrichment capacity decreased at glucose concentration of 60 mM. Of the investigated organic solvents THF and DMSO showed the highest and lowest capacity, respectively, to enhance metal uptake by yeast cells. Trace enrichment of metal ions from stream water, dam water, treated wastewater from a sewage plant and wastewater from an electroplating plant achieved enrichment factors (EF) varying from 1 to 98, without pre-treatment of the sample. pH adjustment further enhanced the EF for all samples. The results from these studies demonstrate that yeast is a viable trace metal enrichment media that can be used freely suspended in solution to achieve very high EF in aquatic environments. (C) 2004 Published by Elsevier B.V.

Keywords: Aquatic Environments, Baker’s Yeast Cells, Biomass, Biosorption, Cadmium, Chromium, Copper, Flame Atomic Absorption Spectrometry, Heavy-Metals, Mechanisms, Pb2+ Accumulation, *Saccharomyces cerevisiae*, Speciation, Trace Metal Enrichment, Yeast-Cells

? Mapolelo, M., Torto, N. and Prior, B. (2005), Evaluation of yeast strains as possible agents for trace enrichment of metal ions in aquatic environments. *Talanta*, **65** (4), 930-937.

Full Text: [2005\Talanta65, 930.pdf](2005/Talanta65,%20930.pdf)

Abstract: Sorption properties of six yeast strains were evaluated for trace enrichment of metal ions; Cd2+, Cr3+, Cr6+, Cu2+, Pb2+, and Zn2+, from aqueous environments. Metal concentration was determined by flame atomic absorption spectrometry (FAAS). The results showed that trace enrichment of the metals under study with yeast, was dependent on the pH and available metal ions. Enrichment time of 30 min gave an optimum metal uptake. The presence of Na+, K+, and Ca2+ suppressed the uptake of Pb by less than 5%, but suppressed the uptake of Zn by between 15 and 25%. Mg2+ Cu+, Cu2+, Cr3+, Cr6+, Cd2+, and Zn2+ suppressed the uptake of Pb by between 25 and 35%, and that of Zn by between 15 and 25%. For both Pb and Zn, Cd had the highest suppression of 35 and 30%, respectively for baker’s yeast (Saccharomyces cerevisiae). Baker’s yeast achieved enrichment factors (EF) of 23, 4, 100, and I for dam water, stream water, treated wastewater, and industrial effluent samples for Cu, Pb, Zn, and Cr, respectively. The recoveries of optimised Cd and Cr samples spiked with 2 mug ml-1 of the metal could reach up to 90%, but never exceeded 66% for 10 mug ml-1 samples. For Cu and Pb, the recoveries generally increased independent of concentration, however they were not as high as those for Zn, which exceeded 90% for all the samples spiked with 10 mug ml-1 of the metal. S. cerevisiae PR 61/3 had the highest EF for Cr as compared to the other yeast strains. S. cerevisiae PRI 60/78 was the only yeast strain which was able to enrich Cd in all the samples. Baker’s yeast had the highest EFs for Cu and Zn as compared to the other yeast strains without pH adjustment of the water samples. Candida tropicalis attained the highest EFs for Pb as compared to the other yeast strains. The results indicate that all the yeast strains used had a high affinity for Zn based on the EF values achieved. The results from these studies demonstrate that yeast is a viable trace metal enrichment agent that can be used freely suspended in solution to enrich metal ions at relatively low concentrations. This has ramifications on the traditional methods of sampling, sample collection, and transportation from remote sampling sites. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Aquatic Environment, Atomic-Absorption Spectrometry, Biosorption, Dilute Aqueous-Solutions, Heavy-Metals, Pb2+ Accumulation, Preconcentration, R-Arrhizus, Saccharomyces Cerevisiae, Saccharomyces-Cerevisiae, Silica-Gel, Trace Metal Enrichment, Yeast Strains

? Malik, U.R., Hasany, S.M. and Subhani, M.S. (2005), Sorptive potential of sunflower stem for Cr(III) ions from aqueous solutions and its kinetic and thermodynamic profile. *Talanta*, **66** (1), 166-173.

Full Text: [2005\Talanta66, 166.pdf](2005/Talanta66,%20166.pdf)

Abstract: The sorptive potential of sunflower stem (180-300 μm) for Cr(III) ions has been investigated in detail. The maximum sorption (>= 85%) of Cr(III) ions (70.2 μM) has been accomplished using 30 mg of high density sunflower stem in 10min from 0.001M nitric and 0.0001 M hydrochloric acid solutions. The accumulation of Cr(III) ions on the sorbent follows Dubinin-Radushkevich (D-R), Freundlich and Langmuir isotherms. The isotherm yields D-R saturation capacity X-m = 1.60±0.23 mmol g-1, beta = -0.00654±0.00017 kj2 mol-2, mean free energy E=8.74±0.12 kJ mol-1, Freundlich sorption capacity K-F=0.24±0.11 mol g-1, 1/n=0.90±0.04 and of Langmuir constant K-L=6800±600 dm3 mol-1 and C-m= 120±18 μmolg-1. The variation of sorption with temperature (283-323K) gives ΔH=-23.3±0.8 kJmol-1, ΔS=-64.0±2.7 Jmol-1 K-1 and ΔG(298k)=-4.04±0.09 kJ mol-1. The negative enthalpy and free energy envisage exothermic and spontaneous nature of sorption, respectively. Bisulphate, Fe(III), molybdate, citrate, Fe(II), Y(III) suppress the sorption significantly. The selectivity studies indicate that Cr(III), Eu(III) and Tb(III) ions can be separated from Tc(VII) and I(I). Sunflower stem can be used for the preconcentration and removal of Cr(III) ions from aqueous medium. This cheaper and novel sorbent has potential applications in analytical and environmental chemistry, in water decontamination, industrial waste treatment and in pollution abatement. A possible mechanism of biosorption of Cr(III) ions onto the sunflower stem has been proposed. (c) 2004 Elsevier B.V. All rights reserved.

Keywords: Sorption, Cr(III) Ions, Sunflower (Helianthus Annus) Stem, Sorption Isotherms, Kinetics, Thermodynamics, Biosorptive Behavior, Metal Sorption, Binding-Sites, Heavy-Metals, Hg(II) Ions, Removal, Radiotracer, Biomass, Lead, Luminescence

? Parsons, J.G., Peralta-Videa, J.R., Tiemann, K.J., Saupe, G.B. and Gardea-Torresdey, J.L. (2005), Use of chemical modification and spectroscopic techniques to determine the binding and coordination of gadolinium(III) and neodymium(III) ions by alfalfa biomass. *Talanta*, **67** (1), 34-45.

Full Text: [2005\Talanta67, 34.pdf](2005/Talanta67,%2034.pdf)

Abstract: Metal pollution in the aqueous environment has become an important issue in the past few decades leading to extensive research in the area of pollution remediation. Most of the recent research in this area has been in bioremediation including phytofiltration and phytoextraction. Although there has been a lot of research done in the field of metal interactions with plants, the actual mechanism(s) and ligands involved are not well understood. Through a series of batch experiments, including pH profiles, time dependency studies, and capacity experiments, we have investigated the binding of Gd(III) and Nd(III) to alfalfa biomass. Batch pH studies showed that the optimum binding was at pH 5.0 for both elements. The time dependency experiments showed that the binding occurs within the first 5 min of contact and remains constant for up to 60 min. In addition, chemical modifications to the alfalfa biomass were performed to indirectly determine the ligands on the biomass responsible for metal binding. For Gd(III) binding, it was shown that the carboxyl groups on the biomass play the most important role in metal ion binding. However, for Nd(III), not only was it found that the carboxyl groups play an important role in the binding, but in addition, the amino groups on the biomass also play an important role in the binding of the metal ions. Further studies using X-ray absorption spectroscopy (XAS) showed that the Gd(III) and Nd(III) ions were bound to the alfalfa biomass through oxygen (or nitrogen ligands), which were coordinated to carbon atoms. The lanthanide complexes within the biomass included some coordinated water molecules. (C) 2005 Elsevier B.V. All rights reserved.

Keywords: Alfalfa, XAS, lanthanides, ICP-OES, X-Ray-Absorption, Medicago-Sativa Alfalfa, Near-Edge Structure, Saccharomyces-Cerevisiae, Au(III) Binding, Metal-Binding, Brown Seaweed, Heavy-Metals, Biosorption, XAS

? Sun, C.M., Qu, R.J., Ji, C.N., Wang, C.H., Sun, Y.Z., Yue, Z.W. and Cheng, G.X. (2006), Preparation and adsorption properties of crosslinked polystyrene-supported low-generation diethanolamine-typed dendrimer for metal ions. *Talanta*, **70** (1), 14-19.

Full Text: [2006\Talanta70, 14.pdf](2006/Talanta70,%2014.pdf)

Abstract: Two novel chelating resins, polystyrene supported G1.0 diethanolamine-typed dendrimer (PS-DEA) and G2.0 diethanolamine-typed dendrimer (PS-(DEA)2), were prepared by anchoring low-generations diethanolamine-typed dendrimer into crosslinked polystyrene in this paper. Fourier transform-infrared spectra (FTIR), scanning electron microscopy (SEM) and elemental analysis were employed to character their structures. The results of adsorption for metal ions showed that the resins had good adsorption capacities for Cu2+, Ag+ and Hg2+, especially PS-DEA for Cu2+. The adsorption kinetics and adsorption isotherms of PS-DEA for Cu2+ and PS-(DEA)2 for Hg2+ were studied. The results showed that the adsorption kinetics of the two resins can be modeled by pseudo second-order rate equation wonderfully and Langmuir and Freundlich equations could well interpret the adsorption of PS-(DEA)2 for Hg2+ and PS-DEA for Cu2+, respectively. The adsorption mechanism of the resins for Cu2+ was confirmed by X-ray photoelectron spectroscopy (XPS).

Keywords: Adsorption, Adsorption Kinetics, Isotherms, Kinetics, Mercury, Metal Ions, Pamam Dendrimer, Polymer-Supported Low-Generation Dendrimer, Preparation, Pseudo-Second-Order, Removal, Second-Order, SEM, Spectroscopy

? Liu, X.J., Qi, C., Bing, T., Cheng, X.H. and Shangguan, D. (2009), Specific mercury(II) adsorption by thymine-based sorbent. *Talanta*, **78** (1), 253-258.

Full Text: [2009\Talanta78, 253.pdf](2009/Talanta78,%20253.pdf)

Abstract: A new kind of polymer sorbent based on the specific interaction of Hg(II) with nucleic acid base, thymine, is described for the selective adsorption of Hg(II) from aqueous solution. Two types of sorbents immobilized with thymine were prepared by one-step swelling and polymerization and graft polymerization, respectively. The maximum static adsorption capacity of the new polymer sorbents for Hg(II) is proportional to the density of thymine on their surface, up to 200 mg/g. Moreover, the new kind polymer sorbent shows excellent selectivity for Hg(II) over other interfering ions, such as Cu(II), Cd(II), Zn(II), Co(II), Ca(II) and Mg(II), exhibits very fast kinetics for Hg(II) adsorption from aqueous solution, and can be easily regenerated by 1.0 M HCl. It also has been successfully used for the selective adsorption of spiked Hg(II) from real tap water samples. This new thymine polymer sorbent holds a great promise in laboratory and industrial applications such as separation, on-line enrichment, solid-phase extraction, and removal of Hg(II) from pharmaceutical, food and environmental samples. (c) 2008 Elsevier B.V. All rights reserved.

Keywords: Selective Adsorption, Thymine, Polymer Sorbent, Mercury(II), Hg-II, Ion, Preconcentration, Removal, Water, Spectrometry, Sensor, Pairs

? Kim, M.L. and Tudino, M.B. (2009), Non-chromatographic determination of ultratraces of V(V) and V(IV) based on a double column solid phase extraction flow injection system coupled to electrothermal atomic absorption spectrometry. *Talanta*, **79** (3), 940-946.

Full Text: [2009\Talanta79, 940.pdf](2009/Talanta79,%20940.pdf)

Abstract: In this work, a non-chromatographic procedure for the on-line determination of ultratraces of V(V) and V(IV) is presented. The method involves a solid phase extraction-flow injection system coupled to electrothermal atomic absorption spectrometry (SPE-FI-ErAAS). The system holds two microcolumns (MC) set in parallel and filled with lab-made mesoporous silica functionalized with 3-aminopropyltriethoxy silane (APS) and mesoporous silica MCM-41, respectively. The pre-concentration of V(V) is performed by sorption onto the first MIC (C1) filled with APS at pH 3, whilst that of V(IV) is performed by sorption onto the second column (C2) filled with mesoporous silica MCM-41 at pH 5. Aqueous samples containing both analytes are loaded and, after pre-concentration (pre-concentration factor PCF = 10, sorption flow rate = 1 mL min-1, sorption time = 10 min), they are eluted in separate vessels with hydroxylammonium chloride(HC)0.1 mol L-1 in HCl 0.5 mol L-1 (elution volume = 1 mL elution flow rate = 0.5 mL min-1). Afterwards, both analytes are determined through ETAAS with graphite furnace. Under optimized conditions, the main analytical figures of merit for V(V) and V(IV) are, respectively: detection limits (3s): 0.5 and 0.6 μg L-1, linear range: 2-100 μg L-1 (both analytes), sensitivity: 0.015 and 0.013 μg-1 L and sample throughput: 6 h-1 (both analytes). Recoveries of both species were assayed in different water samples. Validation was performed through certified reference materials for ultratraces of total vanadium in river water. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: Absorption, Adsorption, Atomic Absorption Spectrometry, C1, Column, Cr(VI), Electrothermal Atomic Absorption, Electrothermal Atomic Absorption Spectrometry, Elution, Emission-Spectrometry, Extraction, First, Flow, Flow Rate, Graphite, Hybrid, Hybrid Mesoporous Silica, L1, MCM-41, Mesoporous, Mesoporous Silica, Online Preconcentration, pH, Pre-Concentration, Preconcentration, Procedure, Reference, Rights, River, River Water, Sensitivity, Silica, Solid Phase Extraction, Sorbent, Sorption, Speciation, Species, Spectrometry, V(IV), V(V), Vanadium, Volume, Water, Water Samples, Waters, Work

? Ling, P.P., Liu, F.Q., Li, L.J., Jing, X.S., Yin, B.R., Chen, K.B. and Li, A.M. (2010), Adsorption of divalent heavy metal ions onto IDA-chelating resins: Simulation of physicochemical structures and elucidation of interaction mechanisms. *Talanta*, **81** (1-2), 424-432.

Full Text: [2010\Talanta81, 424.pdf](2010/Talanta81,%20424.pdf)

Abstract: The adsorption performances, under static as well as dynamic conditions, for such metal ions as Cu(II), Pb(II) and Cd(II) toward chelating resins (IRC748 and NDC702) similarly containing iminodiacetic acid group but diverse pore structures, are systematically performed and deeply exploited. The physicochemical characteristics of both IDA-chelating resins are thoroughly explored by EA, FT-IR, SEM-EDX and PSD. Langmuir isotherm and pseudo-second-order equation could satisfactorily describe the batch experimental data, based on which the equilibrium and kinetic parameters are calculated and compared. The adsorption capacities follow the order of Cu(II) > Pb(II) > Cd(II), due to the complicated impacts of metal ion electronegativity as well as resin pore textures. In the contrast of single and binary adsorption performances, more reduction of Cd(II) than Cu(II) is expectably investigated with the coexistence of competitive ion since the less affinity and hence weak competition of the former onto solid-phase. Using aqueous solution of 15 wt% HCl, nearly 100% recovery of Cu(II) and Cd(II) from IDA-resins could be strictly achieved in the column-tests. Furthermore, a schematic illustration of possible pore structure has been proposed and simulated. Meanwhile, the interaction mechanisms are thereby deduced and evidently confirmed by FT-IR as well as SEM analysis. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacities, Adsorption Mechanism, Analysis, Aqueous Solution, Batch, Cadmium, Cd(II), Characteristics, Chelating Resin, Column Tests, Competition, Competitive, Competitive Adsorption, Cu(II), Data, Dynamic, Equilibrium, Exchanger, Experimental, FT-IR, FTIR, Heavy Metal, Heavy Metal Ion, Heavy Metal Ions, Iminodiacetic Acid Group, Impacts, Interaction, Ions, Isotherm, Kinetic, Kinetic Parameters, Langmuir, Langmuir Isotherm, Mechanisms, Metal, Metal Ion, Metal Ions, Pb(II), Physicochemical Structure, Pore-Size, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Equation, Recovery, Reduction, Removal, Resin, Resins, Rights, Selectivity, SEM, SEM-EDX, Solution, Sorption, Structure, Waste-Water

? Kim, M.L. and Tudino, M.B. (2010), Evaluation of performance of three different hybrid mesoporous solids based on silica for preconcentration purposes in analytical chemistry: From the study of sorption features to the determination of elements of group IB. *Talanta*, **82** (3), 923-930.

Full Text: [2010\Talanta82, 923.pdf](2010/Talanta82,%20923.pdf)

Abstract: Several studies involving the physicochemical interaction of three silica based hybrid mesoporous materials with metal ions of the group IB have been performed in order to employ them for preconcentration purposes in the determination of traces of Cu(II), Ag(I) and Au(III). The three solids were obtained from mesoporous silica functionalized with 3-aminopropyl (APS), 3-mercaptopropyl (MPS) and N-[2-aminoethyl]-3-aminopropyl (NN) groups, respectively. Adsorption capacities for Au, Cu and Ag were calculated using Langmuir’s isotherm model and then, the optimal values for the retention of each element onto each one of the solids were found. Physicochemical data obtained under thermodynamic equilibrium and under kinetic conditions - imposed by flow through experiments - allowed the design of simple analytical methodologies where the solids were employed as fillings of microcolumns held in continuous systems coupled on-line to an atomic absorption spectrometry. In order to control the interaction between the filling and the analyte at short times (flow through conditions) and thus, its effect on the analytical signal and the presence of interferences, the initial adsorption velocities were calculated using the pseudo second order model. All these experiments allowed the comparison of the solids in terms of their analytical behaviour at the moment of facing the determination of the three elements. Under optimized conditions mainly given by the features of the filling, the analytical methodologies developed in this work showed excellent performances with limits of detection of 0.14, 0.02 and 0.025 μg L-1 and RSD % values of 3.4, 2.7 and 3.1 for Au, Cu and Ag, respectively. A full discussion of the main findings on the interaction metal ions/fillings will be provided. The analytical results for the determination of the three metals will be also presented. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Absorption, Adsorption, Aqueous-Solution, Atomic Absorption Spectrometry, Atomic-Absorption-Spectrometry, Au(III), Behaviour, Chemistry, Comparison, Control, Cu, Cu(II), Data, Design, Equilibrium, Experiments, Flow, Flow Through Systems, Gold, Group IB Metals, Hybrid, Hybrid Mesoporous Materials, IB, Interaction, Interferences, Ions, Isotherm, Isotherm Model, Kinetic, L1, Mesoporous, Mesoporous Materials, Mesoporous Silica, Metal, Metal Ions, Metals, Methodologies, Model, Online Preconcentration, Performance, Phase Extraction, Physicochemical Information, Preconcentration, Pseudo Second Order, Pseudo-Second-Order, Retention, Rights, Second Order, Second-Order, Separation, Silica, Soft Acids, Solid Phase Extraction, Sorption, Spectrometry, Systems, Thermodynamic, Trace-Elements, Water Samples, Work

? Hazer, O. and Kartal, Ş. (2010), Use of amidoximated hydrogel for removal and recovery of U(VI) ion from water samples. *Talanta*, **82** (5), 1974-1979.

Full Text: [2010\Talanta82, 1974.pdf](2010/Talanta82,%201974.pdf)

Abstract: Poly(acrylamidoxime-co-2-acrylamido-2-methylpropane sulfonic acid) (PAMSA) hydrogel was prepared by copolymerization of acrylonitrile and 2-acrylamido-2-methylpropane sulfonic acid as monomer, N,N'-methylenebis(acrylamide) as crosslinking agent and potassium peroxodisulfate as initiator. Amidoximated copolymer network was prepared by the reaction of copolymer network with hydroxylamine hydrochloride. A batch procedure was used for the determination of the characteristics of the U(VI) solid phase extraction from the amidoximated hydrogel. The determination of U(VI) was performed by spectrophotometric method using arsenazo-III as complexing agent. Optimal pH value for the quantitative preconcentration was 3, and full desorption was achieved with 3 mol L-1 HClO4. The adsorption process can be well described by the pseudo-second-order kinetic model, and the equilibrium adsorption isotherm was closely fitted with the Langmuir model. A preconcentration factor of 20 and the three sigma detection limit of 2.8 mu g L-1 (n = 20) were achieved for uranium(VI) ions. The PAMSA hydrogel was used for separating and preconcentrating the uranyl ion existing in sea water samples, thermal spring water samples and the certified reference materials (TMDA 64; fortified lake water sample). (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Adsorption Isotherm, Amidoxime, Arsenazo-Iii, Batch, Controlled-Release, Delivery, Desorption, Determination, Equilibrium, Extraction, Heavy-Metal Ions, Hydrogel, Isotherm, Kinetic, Kinetic Model, Langmuir, Langmuir Model, Model, Network, pH, Preconcentration, Process, Pseudo Second Order, Pseudo-Second-Order, Radiation, Recovery, Removal, Sea Water, Solid Phase Extraction, Spectrophotometric Determination, Sulfonic Acid, System, Thermal Spring Water, U(VI), Uranium, Uranium(VI), Water, Water Samples

? Chen, C.Y., Wang, C.H. and Chen, A.H. (2011), Recognition of molecularly imprinted polymers for a quaternary alkaloid of berberine. *Talanta*, **84** (4), 1038-1046.

Full Text: [2011\Talanta84, 1038.pdf](2011/Talanta84,%201038.pdf)

Abstract: Selective and affinitive imprinted polymers incorporating a quaternary alkaloid of berberine (BER) were prepared using a non-covalent imprinting method. The results showed that, compared to other imprinted polymers, the polymer AD-10 had not only a higher of the ratio of Q(MIP)/Q(BP) for BER adsorption, and but also a larger of the ratio of Q(MIP,B)/Q(MIP,P) for BER and palmatine (PAL) adsorptions. Spectrophotometric analysis demonstrated that a 1:1 cooperative hydrogen-bonding complex might be predominating in the pre-polymerization between the BER template and AA monomer. Adsorption experiments of BER on the polymer AD-10 were in accordance with the second-order and Langmuir adsorption models. The E value (5.70 kJ/mol) calculated from the Dubinin-Radushkevich model indicated that the adsorption followed a physisorption process. In addition, a Scatchard plot showed a single straight line with an equilibrium dissociation constant (K(D)) of 65.80 mu mol/L SPE analyses of a mixture of BER and PAL and the methanol extract from the cortices of Phellodendron wilsonii showed that AD-10 had more efficiency, and higher specificity and selectivity for SPE in the concentration and determination of BER and its extraction from natural products. (C) 2011 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Adsorption Equilibrium, Analysis, Antimicrobial Activity, BER, Binding, Catalysis, Chiral Stationary Phases, Equilibrium, In-Vitro, Langmuir, Langmuir Adsorption, Model, Molecular Recognition, Molecularly Imprinted Polymer, Natural, Polymer, Quaternary Alkaloid, Ratio, Scatchard Plot, Selective, Solid-Phase Extraction, Solid-Phase Extraction, Specificity

? Zhu, G.F., Fan, J., Gao, Y.B., Gao, X. and Wang, J.J. (2011), Synthesis of surface molecularly imprinted polymer and the selective solid phase extraction of imidazole from its structural analogs. *Talanta*, **84** (4), 1124-1132.

Full Text: [2011\Talanta84, 1124.pdf](2011/Talanta84,%201124.pdf)

Abstract: A surface molecularly imprinted polymer (MIP) was synthesized by using imidazole as the template and modified silica particles as the support material. The static adsorption, solid phase extraction (SPE) and high-performance liquid chromatography (HPLC) experiments were performed to investigate the adsorption properties and selective recognition characteristics of the polymer for imidazole and its structural analogs. It was shown that the maximum binding capacities of imidazole on the MIP and the non-imprinted polymer (NIP) were 312 and 169 mu mol g(-1), respectively. The adsorption was fast and the adsorption equilibrium was achieved in 30 min. The binding process could be described by pseudo-second order kinetics. Compared with the corresponding non-imprinted polymer, the molecularly imprinted polymer exhibited much higher adsorption performance and selectivity for imidazole. The selective separation of imidazole from a mixture of 1-hexyl-3-methylimidazolium bromide ([C-6 mim][Br]) and 2,4-dichlorophenol could be achieved on the MIP-SPE column. The recoveries of imidazole and [C-6 mim][Br] were 97.6-102.7% and 12.2-17.3%, respectively, but 2,4-dichlorophenol could not be retained on the column. The surface molecularly imprinted polymer presented here may find useful application as a solid phase absorbent to separate trace imidazole in environmental water samples. This may also form the basis for our research program on the preparation and application of alkyl-imidazolium imprinted polymers. (C) 2011 Elsevier B.V. All rights reserved.

Keywords: 2,4-Dichlorophenol, Adsorption, Assays, Equilibrium, Imidazole, Ionic Liquids, Kinetics, Microspheres, Molecularly Imprinted Polymer, Nanoparticles, Organic-Solvents, Precipitation Polymerization, Proteins, Recognition, Selective, Selectivity, Separation, Silica, Solid Phase Extraction, Synthesis, Toxicity, Water

? de Oliveira, F.M., Somera, B.F., Corazza, M.Z., Yabe, M.J.S., Segatelli, M.G., Ribeiro, E.S., Lima, É.C., Dias, S.L.P. and Tarley, C.R.T. (2011), Cellulose microfiber functionalized with N,N’-bis (2-aminoethyl)-1,2-ethanediamine as a solid sorbent for the fast preconcentration of Cd(II) in flow system analysis. *Talanta*, **85** (5), 2417-2424.

Full Text: [2011\Talanta85, 2417.pdf](2011/Talanta85,%202417.pdf)

Abstract: The present paper describes the synthesis of a new chemically modified cellulose microfiber through oxidation with sodium periodate and functionalization with N,N’-bis (2-aminoethyl)-1,2-ethanediamine for the fast and selective preconcentration of Cd(II) ions in flow system analysis. The new sorbentsorbent was characterized by FTIR, SEM, and surface area values. The uptake behavior of Cd(II) ions onto this sorbent was evaluated from kinetic data, pseudo-first-order and pseudo-second-order models, as well as from Langmuir, Freundlich and Langmuir-Freundlich adsorption isotherms. The maximum sorption capacity of 4.59 mg g-1 was estimated by the Langmuir-Freundlich model with fast kinetics for the sorption of Cd(II) described by the pseudo-second-order kinetic model. After characterization, the sorbent was packed in a mini-column, and a fast flow injection preconcentration system for Cd(II) determination by FAAS was developed. The best Cd(II) preconcentration condition, obtained by means of factorial design and response surface methodology, was achieved at pH 9.36 and a flow rate of 10 mL min-1 followed by elution with 1.0 mol L-1 nitric acid. By using 78s preconcentration time, fast and highly sensitive determination of Cd(II) ions could be achieved with a limit of quantification of 0.2014 L-1, preconcentration factor of 26, consumption index of 0.5 mL, concentration efficiency of 20 min-1, and sample throughput of 39 h-1. The repeatability for 10 replicate determinations was found to be 7.8 and 2.5% for Cd(II) ion concentrations of 5.0 and 100.0 mu g L-1, respectively. The new sorbent efficiency for the interferencefree preconcentration of Cd(II) ions was assessed by analysis of tap, mineral and lake waters, as well as synthetic seawater and normal saline waters. Furthermore, complex samples, such as biological samples, could be analysed by the proposed method in accordance with the accuracy attested by analysis of certified reference materials, TORT-2 (lobster hepatopancreas), and DOLT-4 (dogfish liver). (C) 2011 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Aqueous-Solutions, Atomic-Absorption-Spectrometry, Cadmium, Carbon Nanotubes, Cd(II), Dialdehyde Cellulose, Emission-Spectrometry, Environmental-Samples, Factorial Design, FTIR, Kinetics, Langmuir, Metal-Ions, Modified Cellulose Microfiber, pH, Phase Extraction, Preconcentration, Silica-Gel, Titanium-Dioxide

? Zhang, L., Guo, X.J., Li, H.M., Yuan, Z., Liu, X.Y. and Xu, T.C. (2011), Separation of trace amounts of Ga and Ge in aqueous solution using nano-particles micro-column. *Talanta*, **85** (5), 2463-2469.

Full Text: [2011\Talanta85, 2463.pdf](2011/Talanta85,%202463.pdf)

Abstract: A simple and rapid analytical method for the separation of trace amounts of gallium and germanium from aqueous solution by solid-phase extraction with nano-particles was developed. It was found that only Ga(III) could be quantitatively retained on nano-SiO2 in the pH range of 3-4 and 8-12 while Ge(IV) was not adsorbed, but both Ga(III) and Ge(IV) ions could be adsorbed quantitatively on nano-TiO2 within the pH range of 4-11. These two ions adsorbed by nano-particles could be desorbed quantitatively. Effects of acidity, concentration of elution solution and interfering ions on the recovery of the analytes were systematically investigated. The sorption data could be well interpreted by the Langmuir model. Based on the Langmuir model equation, the monolayer adsorption capacity of nano-SiO2/nano-TiO2 was calculated to be 4.26 mg g-1 /19.68 mgg-1 for Ga(III)/Ge(IV). Moreover, thermodynamic functions, the change of free energy (ΔG0), enthalpy (ΔH0) and entropy (ΔS0) of the adsorption reaction were estimated for each metal ion. Experimental data were also evaluated in terms of kinetic characteristics of adsorption and the adsorption process for both metal ions followed well pseudo-second-order kinetics. Finally, the proposed method was applied to the determination of trace Ga(III) and Ge(IV) in some water samples using loaded nano-particles columns, and it is found that the recoveries of Ga(III) and Ge(IV) were obtained to be in the range of 96.4-105.0%. And the method was validated with certified reference material (GBW07311, GBW 07406) and the values obtained for Ga(III) and Ge(IV) were in good agreement with the certified values. (C) 2011 Elsevier B.V. All rights reserved.

Keywords: Adsorption, Behavior, Extraction, Gallium, Gallium, Gasification Fly-Ash, Germanium, Germanium, Kinetics, Langmuir, Nano-Particles, pH, Recovery, Removal, Separation, Sodium Di-(N-Octyl) Phosphinate, Solid-Phase Extraction, Sorption

? Ho, Y.S. (2011), Comments on “Recognition of molecularly imprinted polymers for a quaternary alkaloid of berberine”. *Talanta*, **87** (15), 311.

Full Text: [2011\Talanta87, 311.pdf](2011/Talanta87,%20311.pdf); [2011\Talanta-Ho.pdf](2011/Talanta-Ho.pdf); [2011\Talanta-Ho1.pdf](2011/Talanta-Ho1.pdf); [2011\Talanta-Ho2.pdf](2011/Talanta-Ho2.pdf); [2011\Talanta-Ho3.pdf](2011/Talanta-Ho3.pdf)

# Title: TAPPI Journal

Full Journal Title: TAPPI Journal

ISO Abbreviated Title: TAPPI J.

JCR Abbreviated Title: TAPPI J

ISSN: 0734-1415

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Tech Assn Pulp Paper Ind Inc

Publisher Address: 15 Technology Park South, Norcross, GA 30092

Subject Categories:

Materials Science, Paper & Wood: Impact Factor

? Beamesderfer, J.W., Thode, E.F., Chase, A.J., Hubbard, R.E. (1952), Dye adsorption on wood pulp. 1. Adsorption of direct dye on unbeaten sulphite pulp. *TAPPI Journal*, **35** (8), 374-379.

? Thode, E.F., Beamesderfer, J.W. and Chase, A.J. (1952), Dye adsorption on wood pulp. 2. Relation of dye adsorption to physical properties of beaten sulphite pulp. *TAPPI Journal*, **35** (8), 379-384.

? Thode, E.F., Chase, A.J., Majmudar, S.S. and Mackinnon, D.R. (1953), Dye adsorption on wood pulp. 3. Effect of pulp processing on specific adsorption. *TAPPI Journal*, **36** (11), 498-504.

? Nickull, O., Lehtonen, O. and Mullen, J. (1991), Burning mill sludge in a fluidized-bed incinerator and waste-heat-recovery system: 10 years of successful operation. *TAPPI Journal*, **74** (3), 119-122.

? Sierra, A.C., Salvador, A.R. and Soria, F.G.O. (1991), Kinetics of wood extraction with solvents. *TAPPI Journal*, **74** (5), 191-196.

Abstract: Wood extraction was studied with diethylether, dimethylbenzene, ethanol, methylbenzene, propanone, and trichloromethane used as solvents. Based on the observations at both laboratory and pilot plant scale, a kinetic model is proposed for the extraction process. The model consists of three steps: (a) solubilization of rosin at easily accessible surface sites, (b) solubilization of less accessible sites following diffusion of the solute into the wood pores, and (c) solubilization of intracellular rosin accessed via osmosis or rupture of cell membranes. The model is used to explain experimental differences between strong and weak solvents.

Keywords: Ethanol, Extraction, Extractives, Pulping, Rosin, Solvents, Wood

# Title: Taxon

Full Journal Title: Taxon

ISO Abbreviated Title: Taxon

JCR Abbreviated Title: Taxon

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Anderson, G.J., Johnson, S.D., Neal, P.R. and Bernardello, G. (2002), Reproductive biology and plant systematics: The growth of a symbiotic association. *Taxon*, **51** (4), 637-653.

Abstract: Systematics and reproductive biology have been closely intertwined through botanical history because both rely on reproductive characters. We consider interconnections between systematics and reproductive biology from notable papers and reviews. In addition, a review of over 6,000 journals and millions of articles using the ISI Web of Science(R) demonstrates a steady growth in publication of papers on reproductive biology from 1975 to 2001. Furthermore, the rate of publications that link systematics with reproductive biology shows a steep increase from 1991 to the present. This increase is evident even when the overall increased rate of publica-tion is considered. We identify several current research themes, including the increasing use of phylogenetic data for interpreting the evolution of reproductive systems. Though studies of reproductive biology and of systematics have the potential for “reciprocal illumination”, few have used reproductive biological data for understanding the functional significance of morphology. Other fundamental areas where the combination of reproductive biology and systematics has proven valuable include studies of the nature of species, adaptation, speciation and hybridization. These elements of reproductive biology, especially in the context of systematic studies, will benefit from more comprehensive analyses within genera, and of taxa within communities through time and space.

Keywords: Adaptation, Biology, Breeding System, Breeding System, Cladistics, Evolution, Evolution, Floral Traits, Flowering Plants, Functional, History, Hypotheses, ISI, Journals, Mating Systems, Papers, Phylogenetic Analysis, Phylogeny, Plant, Pollination, Pollination Systems, Publication, Publications, Reproductive Biology, Research, Review, Solanum, Systematic, Systematics, Tests

# Title: Teaching of Psychology

Full Journal Title: Teaching of Psychology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gorenflo, D.W. and Mcconnell, J.V. (1991), The most frequently cited journal articles and authors in introductory psychology textbooks. *Teaching of Psychology*, **18** (1), 8-12.

Full Text: [1991\Tea Psy18, 8.pdf](1991/Tea%20Psy18,%208.pdf)

Keywords: Articles, Citations, Journal, Productivity, Psychology

? Griggs, R.A., Proctor, D.L. and Cook, S.M. (2004), The most frequently cited books in introductory texts. *Teaching of Psychology*, **31** (2), 113-116.

Full Text: [2004\Tea Psy31, 113.pdf](2004/Tea%20Psy31,%20113.pdf)

Abstract: Gorenflo and McConnell (1991) found little commonality among introductory textbooks with respect to journal article citation. Using a stratified random sample of 15 current texts, we extended this research by checking for commonality in book citations. We found little commonality. Of 3,608 unique book citations, 70% were in only 1 text, 91% in 3 or fewer texts, and only 17 met the commonality criterion of citation in at least 80% of the texts. No book was cited in all of the texts, and there was a strong currency citation bias with 70% published since 1980. We discuss these findings in terms of the nonhomogeneity of introductory texts and the larger fractionation problem in contemporary psychology.

Keywords: Authors, Bias, Citation, Citation Bias, Citations, Eminent Psychologists, Fractionation, Journal, Journal Article, Research, Textbooks

? Johnson, D.E., Schroder, S.I. and Kirkbride, A.L. (2004), Annotated bibliography on the *Teaching of Psychology*: 2003. *Teaching of Psychology*, **31** (4), 296-303.

Full Text: [2004\Tea Psy31, 296.pdf](2004/Tea%20Psy31,%20296.pdf)

Abstract: This bibliography is a continuation of those previously published in Teaching of Psychology (e.g., Berry Daniel, 1984; Fulkerson Wise, 198 7; Johnson Schroder, 1997; Wise & Fulkerson, 1996). We maintained similar search methods and criteria for inclusion that were used in previous bibliographies. We also continued the cumulative numbering of the items. To help the reader locate relevant articles, we arranged items into a small number of subject categories. Generally, if fewer than three items fell into a specific subject category, they were relegated to a category labeled miscellaneous.

Keywords: Author, Bibliography, Psychology, Subject Category

# Title: Teaching Sociology

Full Journal Title: Teaching Sociology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Backman, C.B. (1992), Life after death - An empirical project in the classical-theory course. *Teaching Sociology*, **20** (2), 104-113.

Full Text: [1992\Tea Soc20, 104.pdf](1992/Tea%20Soc20,%20104.pdf)

Abstract: Students uncover evidence of the importance of Marx, Weber, and Durkheim in recent sociology by counting citations to these authors in the Social Sciences Citation Index. They evaluate the substantive impact of one of these early giants through content analysis of a sample of articles referencing his work, drawn from the Social Sciences Citation Index.

Keywords: Analysis, Citations, Content Analysis, Evidence, Impact, Referencing, Sociology, Work

# Title: Technical Communication

Full Journal Title: Technical Communication

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Rife, M.C. (2010), Copyright law as mediational means: Report on a mixed methods study of US professional writers. *Technical Communication*, **57** (1), 44-67.

Abstract: Purpose: This article reports on 12 select findings from a sequential mixed-methods, empirical study of U. S. educational-context professional writers composing for the Web. The study explores the status of knowledge and understanding of U. S. copyright law, levels of chilled speech, and the use of rhetorical invention in such digital writing contexts. Method: Research methods include a digital survey receiving 334 responses from randomly selected students/teachers and discourse-based interviews with seven of these participants. Results: With respect to authorship, Web writers sometimes occupy conflicting positions. Empirical evidence challenges traditional ideas of authorship, i.e., a single author working alone in a garret, producing texts from his or her sole creative genius. The study finds digital writers’ speech is not as “chilled” as one might expect, and while knowledge of copyright law is important to digital writers, they are fairly confident in the knowledge they have. Copyright law is not the primary concern of digital writers. As it turns out, ethics trumps the law in importance when considering digital composing choices. In the area of copyright knowledge, key misunderstandings appeared among writers. For example: confusion on (1) the difference between copyright and plagiarism, (2) unauthorized use and authorized use, (3) the government exception to copyright, and (4) the fact that U. S. copyright law protects “creative” work to a higher extent than it protects “factual” work. Conclusion: The study hopes to provide a methodology for further research, and a baseline in the area of knowledge and understanding of copyright law as it intersects with invention, among the professional writing population.

Keywords: Authorship, Chilled Speech, Copyright, Ethics, Invention, Law, Methodology, Mixed-Methods, Plagiarism, Primary, Professional, Research, Rhetorical Invention, Survey, Technical Communicators, US, Writing

# Title: Technical Physics Letters

Full Journal Title: Technical Physics Letters

ISO Abbreviated Title: Tech. Phys. Lett.

JCR Abbreviated Title: Tech Phys Lett

ISSN: 1063-7850

Issues/Year: 12

Journal Country/Territory: Russia

Language: English

Publisher: Amer Inst Physics

Publisher Address: Circulation Fulfillment Div, 500 Sunnyside Blvd, Woodbury, NY 11797-2999

Subject Categories:

Physics, Applied: Impact Factor

Yakovlev, V.M. and Krestelev, A.I. (1998), Allowance for the contribution of self-adsorption in estimates of the interphase energy in a solid-metal-own-melt system. *Technical Physics Letters*, **24** (3), 201-202.

Full Text: [T\Tec Phy Let24, 201.pdf](T/Tec%20Phy%20Let24,%20201.pdf)

Abstract: An expression is verified to allow for the contribution of self-adsorption in the Young equation for the interface between a polycrystalline metal and its own melt using only two properties, the heat of fusion and the gram-atomic volume. The adequacy of this relation is established for precious and nontransition polyvalent metals.

Davydov, S.Yu. (1998), Estimate of the potential relief (rippling) of a surface associated with adsorption of d-metal atoms on d-substrates. *Technical Physics Letters*, **24** (12), 937-938.

Full Text: [T\Tec Phy Let24, 937.pdf](T/Tec%20Phy%20Let24,%20937.pdf)

Abstract: A cohesion approach developed previously by Davydov and Tikhonov to describe adsorption properties [Surf. Sci. 371, 157 (1997)] is used to calculate the ripple parameter Omega = E-dif/E-des (where E-dif and E-des are the activation energy of surface diffusion and the adsorption energy) for atoms of d-metals adsorbed on a W (110) surface. The results of the calculations show good agreement with the experimental data. (C) 1998 American Institute of Physics. [S1063-7850 (98)01312-3].

Keywords: Interionic Interactions, Transition-Metals, Diffusion, Adatoms

# Title: Technical Report-Water Research Centre T

Emission standards in relation to water quality objectives. (1976), *Technical Report-Water Research Centre T*, **TR17**.

# Title: Technological Forecasting and Social Change

Full Journal Title: [Technological Forecasting and Social Change](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=00401625); [Technological Forecasting and Social Change](http://www.sciencedirect.com/science/journal/00401625)

ISO Abbrev. Title: Technol. Forecast. Soc. Chang.

JCR Abbrev. Title: Technol Forecast Soc

ISSN: 0040-1625

Issues/Year: 9

Language: English

Journal Country/Territory: United States

Publisher: Elsevier Science Inc

Publisher Address: 360 Park Ave South, New York, NY 10010-1710

Subject Categories:

Business: Impact Factor 1.761, 20/77 (2008) SSCI

Planning & Development: Impact Factor 1.761, 4/43 (2008) SSCI

? Brusilovsky, B.Y. (1978), Partial and system forecasts in scientometrics. *Technological Forecasting and Social Change*, **12** (2-3), 193-200.

Full Text: [1960-80\Tec For Soc Cha12, 193.pdf](1960-80/Tec%20For%20Soc%20Cha12,%20193.pdf)

Abstract: Science itself can be considered as a ‘fuzzy system.’ In attempting to deal with possible laws of scientific development we formulate a simple, partial model and illustrate its use as a means to control the strategy of investments in science.

? Kostoff, R.N. (1994), Quantitative/qualitative federal research impact evaluation practices. *Technological Forecasting and Social Change*, **45** (2), 189-205.

Full Text: [1994\Tec For Soc Cha45, 189.pdf](1994/Tec%20For%20Soc%20Cha45,%20189.pdf)

Abstract: This paper describes the quantitative and qualitative practice of federal research impact evaluation. 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. Qualitative methods (such as peer review) and quantitative methods (such as cost-benefit analysis and bibliometrics) are described. Although 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 that provides a complete impact evaluation.

Keywords: Analysis, Assessment, Bibliometrics, Evaluation, Impact, Methods, Peer Review, Peer-Review, Quantitative Methods, Research, Research Assessment, Research Impact Evaluation

Porter, A.L. and Detampel, M.J. (1995), Technology opportunities analysis. *Technological Forecasting and Social Change*, **49** (3), 237-255.

Full Text: [T\Tec For Soc Cha68, 237.pdf](T/Tec%20For%20Soc%20Cha68,%20237.pdf)

Abstract: We present an approach to efficiently generate effective intelligence on emerging technologies. This approach draws on monitoring and bibliometrics to mine the wealth of information available in major public electronic databases. The approach uses new software to expedite secondary analyses of database searches on topics of interest. We illustrate the range of information profiles possible by examining research and development (R&D) publications and patents pertaining to electronics assembly and, more specifically, to multichip module development.

Watts, R.J. and Porter, A.L. (1997), Innovation forecasting. *Technological Forecasting and Social Change*, **56** (1), 25-47.

Full Text: [1997\Tec For Soc Cha56, 25.pdf](1997/Tec%20For%20Soc%20Cha56,%2025.pdf)

Abstract: Technological forecasting is premised on a certain orderliness of the innovation process. Myriad studies of technological substitution, diffusion, and transfer processes have yielded conceptual models of what matters for successful innovation, but most technological forecasts key on limited empirical measures quite divorced from those innovation process models. We glean a number of concepts from various innovation models, then present an array of bibliometric measures that offer the promise of operationalizing these concepts. Judicious combination of such bibliometrics with other forms of evidence offers an enriched form of technological forecasting we call ‘innovation forecasting.’ This provides a good means to combine technological trends, mapping of technological interdependencies, and competitive intelligence to produce a viable forecast. We illustrate by assessing prospects for ceramic engine technologies.

Mitchell, G.R. (1999), Global technology policies for economic growth. *Technological Forecasting and Social Change*, **60** (3), 205-214.

Full Text: [T\Tec For Soc Cha60, 205.pdf](T/Tec%20For%20Soc%20Cha60,%20205.pdf)

Abstract: With the end of the Cold War, nations throughout the world are placing ever greater emphasis on economic growth. Over the last 50 years, advances in technology have been the single most important factor in creating growth in many economies, and thus policies to promote technological innovation rank high on the list of priorities for both developed and developing countries. In general, as countries progress up the economic ladder, national R&D intensity, (i.e., R&D/GDP), tends to increase along with per capita income. In addition, nations move through a discernible sequence of technology policies from an initial focus on infrastructure, through a set of actions designed to encourage technology acquisition from more advanced economies, to comprehensive education and research agendas targeted to the creation and development of new technology. In the United States, national technology policy for economic growth focuses on education, building a 21st century infrastructure, and creating a business climate that encourages growth, technological innovation, and risk taking.

Throughout the last 50 years there have been significant changes in the competitive position of nations. In recent years, U.S. corporations have regained some of the competitive leadership they lost in the 1980s. This has been accompanied by significantly increased R&D spending by U.S. industry, particularly in the information and health care related sectors. U.S. industry funding of R&D overtook that from the government in the early 1980s and accounts for almost two-thirds of the national total. (C) 1999 Elsevier Science Inc.

? Coates, V., Farooque, M., Klavans, R., Lapid, K., Linstone, H.A., Pistorius, C. and Porter, A.L. (2001), On the Future of Technological Forecasting. *Technological Forecasting and Social Change*, **67** (1), 1-17.

Full Text: [2001\Tec For Soc Cha67, 1.pdf](2001/Tec%20For%20Soc%20Cha67,%201.pdf)

Abstract: Technological forecasting is now poised to respond to the emerging needs of private and public sector organizations in the highly competitive global environment. The history of the subject and its variant forms, including impact assessment, national foresight studies, roadmapping, and competitive technological intelligence, shows how it has responded to changing institutional motivations. Renewed focus on innovation, attention to science-based opportunities, and broad social and political factors will bring renewed attention to technological forecasting in industry, government, and academia. Promising new tools are anticipated, borrowing variously from fields such as political science, computer science, scientometrics, innovation management, and complexity science.

Keywords: Assessment, Forecasting, Foresight, Foresight Activities, Future, History, Impact, Impact Assessment, Innovation, Innovation Management, Intelligence, Management, Roadmapping, Science, Scientometrics, Tools

Kostoff, R.N., Toothman, D.R., Eberhart, H.J. and Humenik, J.A. (2001), Text mining using database tomography and bibliometrics: A review. *Technological Forecasting and Social Change*, **68** (3), 223-253.

Full Text: [T\Tec For Soc Cha68, 223.pdf](T/Tec%20For%20Soc%20Cha68,%20223.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 has been used to derive technical intelligence from a variety of textual database sources, most recently the published technical literature as exemplified by the Science Citation Index (SCI) and the Engineering Compendex (EC). Phrase frequency analysis (the occurrence frequency of multiword technical phrases) provides the pervasive technical themes of the topical databases of interest, and phrase proximity analysis provides the relationships among the pervasive technical themes. In the structured published literature databases, bibliometric analysis of the database records supplements the DT results by identifying: the recent most prolific topical area authors; the journals that contain numerous topical area papers; the institutions that produce numerous topical area papers; the keywords specified most frequently by the topical area authors; the authors whose works are cited most frequently in the topical area papers; and the particular papers and journals cited most frequently in the topical area papers. This review paper summarizes: (1) the theory and background development of DT; (2) past published and unpublished literature study results; (3) present application activities; (4) potential expansion to new DT applications. In addition, application of DT to technology forecasting is addressed.

Keywords: Bibliometric, Bibliometric Analysis, Bibliometrics, Citation Analysis, Cluster, Database Tomography, Databases, Information Extraction, Information Retrieval, Innovation, Journals, SCI, Science, System, Taxonomies, Technical Intelligence, Technology, Technology Forecasting, Text Mining

? Kostoff, R.N., Antonio del Río, J., Cortés, H.D., Smith, C., Smith, A., Wagner, C., Leydesdorff, L., Karypis, G., Malpohl, G. and Tshiteya, R. (2005), The structure and infrastructure of Mexico’s science and technology. *Technological Forecasting and Social Change*, **72** (7), 798-814.

Full Text: [2005\Tec For Soc Cha72, 798.pdf](2005/Tec%20For%20Soc%20Cha72,%20798.pdf)

Abstract: The structure and infrastructure of the Mexican technical literature was determined. A representative database of technical articles was extracted from the Science Citation Index for the year 2002, with each article containing at least one author with a Mexican address. Many different manual and statistical clustering methods were used to identify the structure of the technical literature (especially the science and technology core competencies). One of the pervasive technical topics identified from the clustering, thin films research, was analyzed further using bibliometrics, in order to identify the infrastructure of this technology.

Keywords: Bibliometrics, Bibliometrics, Citation, Cluto, Computational Linguistics, Concept Clustering, Core Competencies, Data Compression, Database Tomography, Document Clustering, Factor Analysis, Greedy String Tiling, Leximancer, Mexico, Network Analysis, Programs, Research, Research Evaluation, Roadmaps, Science and Technology, Science Citation Index, Technical Intelligence, Trends

? Porter, A.L. (2005), QTIP: Quick technology intelligence processes. *Technological Forecasting and Social Change*, **72** (9), 1070-1081.

Full Text: [2005\Tec For Soc Cha72, 1070.pdf](2005/Tec%20For%20Soc%20Cha72,%201070.pdf)

Abstract: Empirical technology analyses need not take months; they can be done in minutes. One can thereby take advantage of wide availability of rich science and technology publication and patent abstract databases to better inform technology management. To do so requires developing templates of innovation indicators to answer standard questions. Then, one can automate routines to generate composite information representations (‘one-pagers’) that address the issues at hand, the way that the target users want. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Bibliometrics, Innovation, Knowledge Discovery in Databases, Publication, Rapid Technology Analyses, Tech Mining, Technical Intelligence, Technology Foresight, Technology Management, Text Mining

? Bengisu, M. and Nekhili, R. (2006), Forecasting emerging technologies with the aid of science and technology databases. *Technological Forecasting and Social Change*, **73** (7), 835-844.

Full Text: [2006\Tec For Soc Cha73, 835.pdf](2006/Tec%20For%20Soc%20Cha73,%20835.pdf)

Abstract: Short term forecasting was applied to 20 emerging technologies under the ‘Machine and Materials’ category based on the Vision 2023 foresight study previously conducted for Turkey. This scientometric approach uses the most suitable keywords linked to the technology in question and determines the number of publications and patents in those fields for a given year. Database analysis of publications and patents in the previous 11 years indicates that while the majority of the top 20 technologies identified by the experts are indeed emerging (i.e. the number of research and/or patenting in these technologies is increasing), some of them have not actually attracted too much interest in the science and technology (S&T) community. Forecasts based on *S*-curves indicate steady growth in some of the selected technologies. There is a high correlation between the number of scientific publications and patents in most of the technologies investigated. The method is proposed as a simple and efficient tool to link national foresight efforts to international S&T activities and to obtain quantitative information for prioritized technologies that could be used for technology management and decision making for research funding and technology investment.

Keywords: Forecasting, *S*-Curves, Foresight, Emerging Technologies

? Kostoff, R.N. (2006), Systematic acceleration of radical discovery and innovation in science and technology. *Technological Forecasting and Social Change*, **73** (8), 923-936.

Full Text: [2006\Tec For Soc Cha73, 923.pdf](2006/Tec%20For%20Soc%20Cha73,%20923.pdf)

Abstract: A systematic two-component approach (front-end component, back-end component) to bridging unconnected disciplines and accelerating potentially radical discovery and innovation (based wholly or partially on text mining procedures) is presented. The front-end component has similar objectives to those in the classical literature-based discovery (LBD) approach, although it is different mechanistically and operationally. The front-end component will systematically identify technical disciplines (and their associated leading experts) that are directly or indirectly-related to solving technical problems of high interest. The back-end component is actually a family of back-end techniques, only one of which shares the strictly literature-based analysis of the classical LBD approach. The non-LBD back-end techniques (literature-assisted discovery) make use of the human experts associated with the disparate literatures (disciplines) uncovered in the front-end to generate radical discovery and innovation. Specifically, in the literature-assisted discovery operational mode, these disparate discipline experts could be used as: 1. Recipients of solicitation announcements (BAA, SBIR, MURI, journal Special Issue calls for papers, etc.), 2. Participants in Workshops, Advisory Panels, Review Panels, Roadmaps, and War Games, 3. Points of Contact for Field Science Advisors, Foreign Field Offices, Program Officer site visits, and potential transitions. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Advisory Panels, Analysis, Bibliometrics, Connections, Database Tomography, Discovery, Disparate Disciplines, Family, Fish-Oil, Information, Information Retrieval, Innovation, Interdisciplinary, Journal, Literature-Assisted Discovery, Literature-Based Discovery, Literatures, Magnesium, Migraine, Multidisciplinary, Papers, Radical Discovery, Radical Innovation, Raynauds, Review Panels, Roadmaps, Roadmaps, Science, Science And Technology, Solicitations, Special Issues, Technology, Text Mining, Text-Mining, Unconnected Disciplines, War Games, Workshops

? Shapira, P. and Youtie, J. (2006), Measures for knowledge-based economic development: Introducing data mining techniques to economic developers in the state of Georgia and the US South. *Technological Forecasting and Social Change*, **73** (8), 950-965.

Full Text: [2006\Tec For Soc Cha73, 950.pdf](2006/Tec%20For%20Soc%20Cha73,%20950.pdf)

Abstract: The contribution of knowledge to economic growth and competitiveness has attracted increased attention. Publications with a topical focus on areas related to innovation have risen dramatically from 1963 to 2005, but more slowly in local and regional development journals. In contrast to the wide use of aggregate measures of innovation, this paper presents four cases presenting disaggregated knowledge-based approaches into the policy- and decision-making processes of economic developers in the state of Georgia and the US South. The first case uses information obtained from patents and publications to inform traditional out-of-area economic development recruitment strategies in a more knowledge-oriented direction. The second case exemplifies the use of data mining to identify top researchers as part of a strategic state economic development effort. The third case illustrates how local knowledge-based capabilities can be identified in cities not traditionally viewed as innovative. Nanotechnology-related knowledge assets in the southern United States are mapped and assessed in the fourth case. Disaggregated methods used in traditional strategies were most intuitively understood and used, but new knowledge measures were found to encourage local and state economic developers to begin to embrace new paradigms.

Keywords: Economic Development, Innovation, Knowledge Measurement, Data Mining, Bibliometrics

? Daim, T.U., Rueda, G., Martin, H. and Gerdsri, P. (2006), Forecasting emerging technologies: Use of bibliometrics and patent analysis. *Technological Forecasting and Social Change*, **73** (8), 981-1012.

Full Text: [2006\Tec For Soc Cha73, 981.pdf](2006/Tec%20For%20Soc%20Cha73,%20981.pdf)

Abstract: It is rather difficult to forecast emerging technologies as there is no historical data available. In such cases, the use of bibliometrics and patent analysis have provided useful data. This paper presents the forecasts for three emerging technology areas by integrating the use of bibliometrics and patent analysis into well-known technology forecasting tools such as scenario planning, growth curves and analogies. System dynamics is also used to be able to model the dynamic ecosystem of the technologies and their diffusion. Technologies being forecasted are fuel cell, food safety and optical storage technologies. Results from these three applications help us to validate the proposed methods as appropriate tools to forecast emerging technologies.

? Will, N. (2006), Data-mining: Improvement of university library services. *Technological Forecasting and Social Change*, **73** (8), 1045-1050.

Full Text: [2006\Tec For Soc Cha73, 1045.pdf](2006/Tec%20For%20Soc%20Cha73,%201045.pdf)

Abstract: Delft University Press has been contacted by the International Water History Association (client) in order to study the relevancy of starting a new journal on a particular topic of interest to its members. This periodical would publish most of the articles relating to this field. Before starting, the client and the publisher want to know if such a journal would find enough authors for the articles and a sufficient audience. How many potential authors exist? What amount of articles in that field exists in other journals? In order to get an answer, the Delft University of Technology Library performed basic bibliometric analyses.

A study of all articles published in 6 relevant existing periodicals, selected by the client, shows that most of the authors were unknown to the client. An analysis of the publications of the members of the association revealed that only one-third has published in the past 10 years, and very few publications were in the client’s field of interest. This would imply that a future periodical could not be supported only by contributions of the members. These preliminary analyses allowed the publisher and the client to get a clearer idea of the possible contribution of its members for a future periodical. The main contributors will have to be recruited from a larger population.

Keywords: Analysis, Bibliometric, Journal, Management, New Journal, Periodicals, Population, Publications

? Kostoff, R.N., Bhattacharya, S. and Pecht, M. (2007), Assessment of China’s and India’s science and technology literature - introduction, background, and approach. *Technological Forecasting and Social Change*, **74** (9), 1519-1538.

Full Text: [2007\Tec For Soc Cha74, 1519.pdf](2007/Tec%20For%20Soc%20Cha74,%201519.pdf)

Abstract: Science and technology (S&T) allows (1) automation to replace human labor, (2) enhanced human labor capabilities, (3) quicker and cheaper production of goods, and (4) more complex products and processes. In order to maintain competitive advantages, it is critical for any country to understand what other countries are producing in S&T, and what intrinsic S&T capabilities are being developed. India and China are the two most populous countries in the world. These two dynamic economies are advancing rapidly in S&T, and it is prudent to assess the quantity and quality of their research output as well as to examine trends in their S&T capabilities. This paper, the first of four in a Special Section on China’s and India’s S&T, introduces the remaining three papers. Specifically, this paper describes the motivation for the studies, the background for understanding national S&T assessments, an overview of text mining, a brief picture of the Indian and Chinese S&T establishments, and a summary of the analytical techniques used in the assessments. Published by Elsevier Inc.

Keywords: Analytical Techniques, Approach, Assessments, Automation, China, Chinese, Country, Dynamic, First, Human, India, Labor, Literature, Mining, Papers, Quality, Quality of, Research, Science, Science and Technology, Techniques, Technology, Text Mining, Trends, Understanding, World

? Kostoff, R.N., Briggs, M.B., Rushenberg, R.L., Bowles, C.A., Icenhour, A.S., Nikodym, K.F., Barth, R.B. and Pecht, M. (2007), Chinese science and technology - Structure and infrastructure. *Technological Forecasting and Social Change*, **74** (9), 1539-1573.

Full Text: [2007\Tec For Soc Cha74, 1539.pdf](2007/Tec%20For%20Soc%20Cha74,%201539.pdf)

Abstract: This paper identifies and analyzes the science and technology core competencies of China, based on a sampling of approximately half of the total Chinese publication output in the Science Citation Index/Social Science Citation Index (SCI/SSCI) [SCI. Certain data included herein are derived from the Science Citation Index/Social Science Citation Index prepared by the Thomson Scientific((R)), Inc. (Thomson((R))), Philadelphia, Pennsylvania, USA: (c) Copyright Thomson Scientific((R)) 2006. All rights reserved. [1]] for 2005. Aggregate China publication and citation bibliometrics were obtained and a hierarchical research taxonomy, based on document clustering, was generated. Additionally, bibliometrics and thematic trends were tracked over the past two decades. The key findings were that China’s output of research articles has significantly expanded in the last decade. In terms of sheer numbers of research articles, especially in cuting-edge technologies, such as nanotechnology and energetic materials, it is among the leaders. Compared to the USA, the bulk of China’s articles focus on the physical and engineering sciences, while the USA articles (compared to China) focus on medical, social, and psychological sciences. Published by Elsevier Inc.

Keywords: Bibliometrics, China, Chinese, Citation, Clustering, Competencies, Core Competencies, Data, Document Clustering, Engineering, Infrastructure, Medical, Nanotechnology, Physical, Publication, Research, Rights, Sampling, Science, Science and Technology, Science Citation Index, Sciences, Social, Taxonomy, Technologies, Technology, Trends, USA

? Kostoff, R.N., Johnson, D., Bowles, C.A., Bhattacharya, S., Icenhour, A.S., Nikodym, K., Barth, R.B. and Dodbele, S. (2007), Assessment of India’s research literature. *Technological Forecasting and Social Change*, **74** (9), 1574-1608.

Full Text: [2007\Tec For Soc Cha74, 1574.pdf](2007/Tec%20For%20Soc%20Cha74,%201574.pdf)

Abstract: The structure and infrastructure of the Indian research literature were determined. A representative database of technical articles was extracted from the Science Citation Index/Social Science Citation Index (SCI/SSCI) [SCI. Certain data included herein are derived from the Science Citation Index/Social Science Citation Index prepared by the THOMSON SCIENTIFIC (R), Inc. (Thomson((R))), Philadelphia, Pennsylvania, USA: (c) Copyright THOMSON SCIENTIFIC (R) 2006. All rightsreserved. [1]] for 2005, with each article containing at least one author with an India address. Document clustering was used to identify the main technical themes (core competencies) of Indian research. Aggregate India bibliometrics were also performed, emphasizing the value of collaborative research to India. A unique mapping approach was used to identify networks of organizations that published together, networks of organizations with common technical interests, and especially those organizations with common technical interests that did not co-publish extensively. Finally, trend analyses were performed using other year data from the SCI/SSCI to place the 2005 results in their proper historical context. Published by Elsevier Inc.

Keywords: Analyses, Approach, Bibliometrics, Clustering, Collaborative Research, Competencies, Context, Core Competencies, Data, Database, India, Infrastructure, Literature, Mapping, Networks, Research, Science Citation Index, Structure, Trend, USA, Value

? Kostoff, R.N., Briggs, M.B., Rushenberg, R.L., Bowles, C.A., Pecht, M., Johnson, D., Bhattacharya, S., Icenhour, A.S., Nikodym, K., Barth, R.B. and Dodbele, S. (2007), Comparisons of the structure and infrastructure of Chinese and Indian Science and Technology. *Technological Forecasting and Social Change*, **74** (9), 1609-1630.

Full Text: [2007\Tec For Soc Cha74, 1609.pdf](2007/Tec%20For%20Soc%20Cha74,%201609.pdf)

Abstract: A comparison was made of the research output literatures of India and China. Both bibliometric and computational linguistics approaches were used in the comparison. China has rapidly outpaced India in both volume and citation performance of publications. China’s rapid publication growth rate over the past two decades is continuing, while India’s is re-starting after a relatively dormant period of almost two decades. Published by Elsevier Inc.

Keywords: Bibliometric, Bibliometrics, China, Citation, Clustering, Computational Linguistics, Growth, India, Metrics, Publication, Publications, Research, Research Evaluation, Research Output, Science, Science and Technology, Technology, Technology Assessment, Text Mining

? Kostoff, R.N., Koytcheff, R.G. and Lau, C.G.Y. (2007), Global nanotechnology research literature overview. *Technological Forecasting and Social Change*, **74** (9), 1733-1747.

Full Text: [2007\Tec For Soc Cha74, 1733.pdf](2007/Tec%20For%20Soc%20Cha74,%201733.pdf)

Abstract: Text mining was used to extract technical intelligence from the open source global nanotechnology and nanoscience research literature (SCI, SSCI databases). Identified were: (1) the nanotechnology, nanoscience research literature infrastructure (prolific authors, key journals, institutions, countries, most cited authors, journals, documents); (2) the technical structure (pervasive technical thrusts and their inter-relationships); (3) nanotechnology instruments and their relationships; (4) potential nanotechnology applications, (5) potential health impacts and applications; and (6) seminal nanotechnology literature. Our results are summarized in this paper. Published by Elsevier Inc.

Keywords: Applications, Authors, Bibliometrics, Databases, Disruptive Technology, Document Clustering, Health, Intelligence, Literature, Nanoparticle, Nanoscience, Nanotechnology, Nanotube, Open Source, Research, Roadmaps, Technical Intelligence, Text Mining

? Kajikawa, Y., Yoshikawa, J., Takeda, Y. and Matsushima, K. (2008), Tracking emerging technologies in energy research: Toward a roadmap for sustainable energy. *Technological Forecasting and Social Change*, **75** (6), 771-782.

Full Text: [2008\Tec For Soc Cha75, 771.pdf](2008/Tec%20For%20Soc%20Cha75,%20771.pdf)

Abstract: Science and technology for renewable and sustainable energy are indispensable for our future society and economics. To meet the goal of sustainable energy development, there is a growing body of research efforts world wide. The planner of energy research has to grasp the broader coverage of scientific and technological research, and make decisions on effective investment in promising and emerging technologies especially under circumstances of limited resources. In this paper, we track emerging research domains in energy research by using citation network analysis. Our analysis confirms that the fuel cell and solar cell are rapidly growing domains in energy research. We further investigate the detailed structure of these two domains by clustering publications in these domains. Each citation cluster has characteristic research topics, and there is a variety of growth trends among the clusters. By using citation network analysis, we can track emerging research domains among a pile of publications efficiently and effectively. (C) 2007 Elsevier Inc. All rights reserved.

Keywords: Analysis, Citation, Citation Network, Cluster, Clustering, Coverage, Development, Economics, Emerging Technologies, Energy, Fuel Cell, Growth, Network, Network Analysis, Publications, Research, Rights, Society, Solar Cell, Structure, Sustainable, Technologies, Technology, Trends, World

? Kajikawa, Y. and Takeda, Y. (2008), Structure of research on biomass and bio-fuels: A citation-based approach. *Technological Forecasting and Social Change*, **75** (9), 1349-1359.

Full Text: [2008\Tec For Soc Cha75, 1349.pdf](2008/Tec%20For%20Soc%20Cha75,%201349.pdf)

Abstract: Biomass and bio-fuels have gained a growing interest as sustainable and renewable energy. In this paper, we perform a citation network analysis of scientific publications to know the current structure of biomass and bio-fuel research. By clustering and visualizing the network, we revealed their taxonomic structure. Emerging technologies are detected by analyzing the average publication year of clusters. According to the results, bio-diesel and hydrogen production are the most rapidly developing domains among biomass bio-fuel researches. We also analyzed the position of each cluster in the global structure of research. By using citation counts within and out of the cluster, we categorized each cluster into the following four categories: (I) topic specific; (II) domain specific; (III) global link; and (IV) specific & global. For research domains of category (III) or (IV), it is difficult that single technology overcomes the current limitation of bio-energy productions. Research on lignocellulose feedstock is a typical case where knowledge from other scientific disciplines is necessary. (c) 2008 Elsevier Inc. All rights reserved.

Keywords: Analysis, Approach, Bibliometrics, Bibliometrics, Bio-Fuel, Biodiesel Production, Bioenergy, Biofuel, Biofuels, Biomass, Citation, Citation Counts, Citation Network, Cluster, Clustering, Database Tomography, Developing, Disciplines, Energy, Energy Crops, Ethanol-Production, Future, Global Structure, Hydrogen, Hydrogen Production, IV, Knowledge, Lignocellulose, Limitation, Network, Network Analysis, NOV, Production, Publication, Publications, Renewable Energy, Research, Rights, Roadmaps, Science, Scientific Publications, Structure, Sustainable, Sustainable Energy, Technologies, Technology

? Pilkington, A., Lee, L.L., Chan, C.K. and Ramakrishna, S. (2009), Defining key inventors: A comparison of fuel cell and nanotechnology industries. *Technological Forecasting and Social Change*, **76** (1), 118-127.

Full Text: [2009\Tec For Soc Cha76, 118.pdf](2009/Tec%20For%20Soc%20Cha76,%20118.pdf)

Abstract: This paper defines the notion of key inventors - those whose patenting is simultaneously highly productive and also widely cited. By implication. key inventors should be the leaders in any developing new field and we investigate the validity of the notion through an exploration of two emerging technological fields: fuel cell and nanotechnology. The nature of the two groups is compared to discuss the differences between the technological groups. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Adoption, Bibliometrics, Comparison, Developing, Emerging, Emerging Technologies, Entry, Field, Firms, Fuel Cell, Groups, Hydrogen, Indicators, Innovative Activities, Key Inventor, Nanotechnology, Notion, Patent Analysis, Patent Statistics, Policy, Rights, Science, SI, Validity

? Islam, N. and Miyazaki, K. (2009), Nanotechnology innovation system: Understanding hidden dynamics of nanoscience fusion trajectories. *Technological Forecasting and Social Change*, **76** (1), 128-140.

Full Text: [2009\Tec For Soc Cha76, 128.pdf](2009/Tec%20For%20Soc%20Cha76,%20128.pdf)

Abstract: Nanoscience and technology has introduced a new dimension to basic sciences and a range of technologies. Researchers from various scientific disciplines are aggressively getting involved in the relevant research as a parallel way to boost nanoscience competitiveness through academic research. and corporations are directing their R&D activities towards the exploration and exploitation of nanotech opportunities. For years, it has been said that innovation is achieved by breaking through the boundaries of existing technologies. This paper has argued how nanotechnology is driven by scientific research and in what way traditional disciplines are fused into this emerging area. We attempt to provide an empirical analysis of the dynamics of nanoscience fusion trajectories, which is typically a focused area in innovation studies. In this paper, we seek to understand the attributes that are likely to enable scientific disciplines to fuse into nanoscience through a combination of quantitative and qualitative search within nanotechnology systems of innovation (NanoSI). An insight of the similarity and disparity of fusion between Europe and Japan is also provided. Finally, we develop an integrative framework to explore the co-evolutionary nature of nanotech. The paper then tries to derive some implications that would be useful for science and technology policy makers as well as for researchers in traditional scientific disciplines. (C) 2008 Elsevier Inc. All rights reserved.

Keywords: Academic, Analysis, Biotechnology, Boundaries, Competitiveness, Cycle, Disciplines, Disparity, Dynamics, Emerging, Empirical, Empirical Analysis, Europe, Exploitation, Exploration and Exploitation, Framework, Fusion, Hybrid Research Approach, Industries, Innovation, Innovation System, Insight, Integrative, Issues, Japan, Nanoscience, Nanoscience Fusion Model, Nanotechnology, Nanotechnology Innovation System (NANOSI), Policy, Qualitative, R&D, Research, Rights, Science, Science and Technology, Science and Technology Policy, Sciences, Scientific Research, Scientometrics, Search, SI, Similarity, Systems, Technologies, Technology, Trajectories

? Kajikawa, Y. and Takeda, Y. (2009), Citation network analysis of organic LEDs. *Technological Forecasting and Social Change*, **76** (8), 1115-1123.

Full Text: [2009\Tec For Soc Cha76, 1115.pdf](2009/Tec%20For%20Soc%20Cha76,%201115.pdf)

Abstract: The field of organic light-emitting diodes (OLEDs) is an emergent research domain because of both scientific interest in chemistry and condensed matter physics and industrial importance as flat panel displays. In this paper, we analyzed a citation network of OLED papers and used a topological clustering method to investigate the structure of research and to detect emerging research domains. We found that most papers belong to two main clusters: organics and polymers. These two clusters have distinctive differences in subcluster structures and journals where papers are published. Supposing this discrepancy to indicate research progress, organics are in the applied research stage, while polymers are in the basic research stage. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Basic Research, Bibliometrics, Chemistry, Citation, Citation Network, Citation Network Analysis, Clustering, Cocitation Analysis, Condensed Matter Physics, Electroluminescent Devices, Elsevier, Emission, Journals, Light-Emitting-Diodes, Map, Network Analysis, Organic Light-Emitting Diodes, Polymers, Research, Research Area, Research Domains, Research Evaluation, Research Front, Science, Semiconductor Literature, Tracking

? Cuhls, K., Beyer-Kutzner, A., Ganz, W. and Warnke, P. (2009), The methodology combination of a national foresight process in Germany. *Technological Forecasting and Social Change*, **76** (9), 1187-1197.

Full Text: [2009\Tec For Soc Cha76, 1187.pdf](2009/Tec%20For%20Soc%20Cha76,%201187.pdf)

Abstract: In September 2007, the Federal German Ministry for Education and Research (BMBF) launched a new foresight process which aimed at four specific targets. To achieve them, a tailor-made combination of methods was applied. This paper focuses on the concept design of the process and explains one of the methods - the future online survey - in more detail. The German Foresight Process of the BMBF delivers results on different levels: broader future fields as well as single future topics. Both kinds are relevant and selected according to a set of criteria. Some of the results of this foresight process will be directly integrated into national policy activities, others are just more indirectly filtered into the innovation system of the specific sectors in the country. The future fields are all cross-cutting issues based on science and technology. All of them are specifically knowledge dynamic fields. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Bibliometrics, Elsevier, Foresight Process, Fully-Fledged Foresight, Research, Research Alliances, Science and Technology, Strategic Partnerships

? No, H.J. and Park, Y. (2010), Trajectory patterns of technology fusion: Trend analysis and taxonomical grouping in nanobiotechnology. *Technological Forecasting and Social Change*, **77** (1), 63-75.

Full Text: [2010\Tec For Soc Cha77, 63.pdf](2010/Tec%20For%20Soc%20Cha77,%2063.pdf)

Abstract: The potential of technology fusion has been advanced as a promising breakthrough function to create hybrid technologies. Despite its importance, however, the evolutionary path of technology fusion is yet unexplored. In this paper, by employing the case of nanobiotechnology, we attempt to deepen understanding of the development trajectories of technology fusion in three important aspects. The first aspect is the development of an index that measures the degree of fusion of cross-disciplinary technology at the meso level. The second aspect is to classify the trajectory patterns of technology fusion in terms of fusion degree. We analyze fusion mechanism by utilizing citation network analysis. The third aspect is to visualize the relationship between patents and their backward and forward patent citations, at the patent class level, with their direction on a citation map. This facilitates understanding of the overview as well as fusion patterns. The changes in fusion patterns are analyzed using time series comparisons. An empirical analysis in the nanobiotechnology field shows no positive relationship between the inflow and outflow degree of fusion. We also observe changes in the trajectory patterns of fusion over time. Analysis demonstrates that each fusion pattern has evolved in such a way that technologies focus more on their niche technologies, and that those technologies which cannot incorporate the technology fusion have been eliminated during the development process.

Keywords: Technology Fusion, Taxonomical Grouping, Fusion Degree, Cross-Disciplinarity, Patent Citation Networks

? Curran, C.S., Bröring, S. and Leker, J. (2010), Anticipating converging industries using publicly available data. *Technological Forecasting and Social Change*, **77** (3), 385-395.

Full Text: [2010\Tec For Soc Cha77, 385.pdf](2010/Tec%20For%20Soc%20Cha77,%20385.pdf)

Abstract: Industry convergence, described as the blurring of boundaries between industries, plays an increasingly pivotal role in shaping markets and industries. Traditionally, this phenomenon has been discussed in respect to telecommunications, information technologies and electronics, but more recently also the chemical and its related industries find themselves affected by a larger convergence process. With the primary example of phytosterols in the two converging industries of Cosmeceuticals and of Nutraceuticals and Functional Foods, we analyze 7455 scientific and patent references in respect to first indicators for signs of convergence. Furthermore, we present and discuss a multiple indicator concept for monitoring convergence in an R&D-intensive field on the basis of publicly available data. (C) 2009 Elsevier Inc. All rights reserved.

Keywords: Bibliometric Indicators, Bibliometrics, Biotechnology, Chemical Industry, Convergence, Converging Industries, Cosmeceuticals, Electronics, Elsevier, Indicators, Information, Innovation, Knowledge Transfer, Nutraceuticals and Functional Foods, Patent, Patent Analysis, Patents, Patterns, Performance, Phytosterols, Primary, Science, Technology

? Lee, P.C., Su, H.N. and Wu, F.S. (2010), Quantitative mapping of patented technology: The case of electrical conducting polymer nanocomposite. *Technological Forecasting and Social Change*, **77** (3), 466-478.

Full Text: [2010\Tec For Soc Cha77, 466.pdf](2010/Tec%20For%20Soc%20Cha77,%20466.pdf)

Abstract: This study aims to obtain global technology evolution by constructing and analyzing patent citation network and patent citation map for the field of electrical conducting polymer nanocomposite. A total of 1421 patents are retrieved from USPTO patent database and patent citation network is established by combing both patent citation and social network analysis. Network properties, e.g. Degree Centrality, Betweenness Centrality, and Closeness Centrality, are calculated for representing several technology evolution mechanisms that first proposed in this study. Also, a distance-based patent citation map is constructed by calculating relative distances and positions of patents in the patent citation network. Quantitative ways of exploring technology evolution are investigated in this study to unveil important or emerging techniques as well as to demonstrate dynamics and visualization of technology evolutions.

Keywords: Bibliometric Analysis, Centrality, Citation, Citation Network, Co-Word Analysis, Database, Database Tomography, Discovery Lrd, Elsevier, Emerging Technologies, Evolution, Global, Mapping, Mechanisms, Network Analysis, Neural-Network Research, Parkinsons-Disease, Patent, Patent Citation, Patents, Polymer, Potential Treatments, Quantitative Analysis, Science-and-Technology, Social Network Analysis, Techniques, Technology, Technology Evolution, USPTO, Visualization

? Shibata, N., Kajikawa, Y. and Sakata, I. (2010), Extracting the commercialization gap between science and technology - Case study of a solar cell. *Technological Forecasting and Social Change*, **77** (7), 1147-1155.

Full Text: [2010\Tec For Soc Cha77, 1147.pdf](2010/Tec%20For%20Soc%20Cha77,%201147.pdf)

Abstract: In this paper, we compared structures of the citation network of scientific publications with those of patents, and discussed the differences between them. A case study was performed in a solar cell to develop a method of detecting gaps between science and technology. Scientific research has tended to be more basic, especially in terms of cell design, whereas patents have focused on more applied technology used in solar cell modules. Of the major citation clusters of scientific publications, only two, namely silicon and compound solar cells, corresponded semantically with patent clusters. Conversely, there were no patent clusters corresponding to the other two scientific research fronts, namely dye-sensitized and polymer solar cells. These research areas could be regarded as opportunities for industrial commercialization because scientific activities exist but not technological applications. Our results could offer an intellectual basis for discovering potential opportunities for industrial commercialization. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Bibliometrics, Citation, Citation Analysis, Citation Network, Model, Networks, Patent Analysis, Personnel, Projects, R&D Management, Research, Research Front, Technology, Technology Roadmap

? Beyhan, B. and Cetindamar, D. (2011), No escape from the dominant theories: The analysis of intellectual pillars of technology management in developing countries. *Technological Forecasting and Social Change*, **78** (1), 103-115.

Full Text: [2011\Tec For Soc Cha78, 103.pdf](2011/Tec%20For%20Soc%20Cha78,%20103.pdf)

Abstract: This paper aims to identify the intellectual bases of the technology management (TM) literature generated in developing countries using citation and co-citation analyses and answer the question of whether the intellectual bases of the TM literature created by authors in developing countries diverge from those of the global TM literature. Based on a comprehensive bibliometric analysis of ten technology-innovation management (TIM) specialty journals through the period of 1998-2007, this study produces three important findings. First, the TM literature generated in developing countries is dominated by the knowledge and theories created in developed countries. Second, among these knowledge sources some authors from developing countries and focusing on the specialties of developing countries, such as Kim and Lall, come into prominence; however these authors are not even mentioned in the previous bibliometric studies covering overall TM research. Finally the researchers in developing countries tackle with the issues or topics specific to their own context through combining three major bulks of literature. These are (i) resource-based view (RBV)/core competencies and organizational learning related research; (ii) literature dealing with the evolutionary theorizing on economic change and growth and (iii) literature related to technological capabilities, technology transfer and industrialization in developing countries. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Absorptive-Capacity, Analyses, Analysis, Author Cocitation Analysis, Authors, Bibliometric, Bibliometric Analysis, Bibliometric Studies, Capabilities, Citation, Citation Analysis, Co-Citation, Cocitation, Competencies, Context, Developing, Developing Countries, Economic, Firm, Growth, Innovation-Management, Intellectual Pillars, Journals, Keywords, Knowledge, Knowledge Sources, Learning, Literature, Management, Organizational, Perspective, Research, Rights, Sources, Specialty, Strategic-Management, Technology, Technology Management, Tm Literature

? Lee, P.C. and Su, H.N. (2011), Quantitative mapping of scientific research: The case of electrical conducting polymer nanocomposite. *Technological Forecasting and Social Change*, **78** (1), 132-151.

Full Text: [2011\Tec For Soc Cha78, 132.pdf](2011/Tec%20For%20Soc%20Cha78,%20132.pdf)

Abstract: This study aims to understand knowledge structure both quantitatively and visually by integrating keyword analysis and social network analysis of scientific papers. The methodology proposed in this study is capable of creating a three-dimensional “Research focus parallelship network” and a “Keyword Co-occurrence Network”, together with a two-dimensional knowledge map. The network and knowledge map can be depicted differently by choosing different information for the network actor, i.e. country, institute, paper and keyword, to reflect knowledge structures from macro, to meso, to micro-levels. A total of 223 highly cited papers published by 142 institutes and 26 countries are analyzed in this study. China and the US are the two countries located at the core of knowledge structure and China is ranked no. 1. This quantitative exploration provides a way to unveil important or emerging components in scientific development and also to visualize knowledge: thus an objective evaluation of scientific research is possible for quantitative technology management. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Analysis, Bibliometric Analysis, China, Co-Word Analysis, Conducting Polymer, Country, Database Tomography, Development, Discovery LRD, Electrical Conduction, Evaluation, Information, Keyword, Knowledge, Knowledge Structure, Management, Mapping, Methodology, Nanocomposite, Nanotechnology Research, Network, Network Analysis, Network Theory, Neural-Network Research, Papers, Parkinsons-Disease, Polymer, Polymer Nanocomposite, Potential Treatments, Research, Rights, SCI Database, Science-and-Technology, Scientific Research, Social, Social Network Analysis, Structure, Technology, Technology Management, Three-Dimensional, US

? Järvenpää, H.M., Mäkinen, S.J. and Seppänen, M. (2011), Patent and publishing activity sequence over a technology’s life cycle. *Technological Forecasting and Social Change*, **78** (2), 283-293.

Full Text: [2011\Tec For Soc Cha78, 283.pdf](2011/Tec%20For%20Soc%20Cha78,%20283.pdf)

Abstract: The use of multiple indicators in analyzing technological developments and exploiting the increasing availability of information has been recommended widely in order to decrease systematic biases between single measures. One of the few frameworks that take multiple sources into account is the Technology Life Cycle indicators that provide a measure for the totality of sources available for analysis and take their timeliness into account, although the linear model that the framework represents is often questioned. The aim of this paper is to provide bibliometric studies with insight into the timely relevance of using different databases. To assess the reporting sequence between different databases, this paper measures the reporting activity of three case technologies in different databases and analyzes the yearly reporting volumes of a number of items that mention the technology in the databases as suggested by the TLC indicators. The results of this paper suggest that, when science is the source of new ideas and the driver for technological development and innovations, communication can happen in the order suggested by the TLC indicators. However, this model does not seem to be a general model for detecting and forecasting a technological life cycle. In addition, the results of the paper point to the possibility of studying non-linear models of innovation and contexts where this type of dynamics might take place. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Analysis, Availability, Bibliometric, Bibliometric Studies, Bibliometrics, Communication, Databases, Development, Diffusion, Dynamics, Emerging Technologies, Emerging Technology, Forecasting, Framework, General, Indicators, Information, Infrastructure, Innovation, Life, Life Cycle, Measure, Media, Model, Models, Patents, Publication, Publishing, Relevance, Reporting, Rights, Science, Science-and-Technology, Sequence, SI, Source, Sources, Statistics, Technologies, Technology, Technology Life Cycle

? Wu, F.S., Hsu, C.C., Lee, P.C. and Su, H.N. (2011), A systematic approach for integrated trend analysis-The case of etching. *Technological Forecasting and Social Change*, **78** (3), 386-407.

Full Text: [2011\Tec For Soc Cha78, 386.pdf](2011/Tec%20For%20Soc%20Cha78,%20386.pdf)

Abstract: Understanding technology development trends is of critical importance to countries, industries and enterprises to be sustainable in global competition. Attempts have been made to establish trend analysis by bibliometric and patent analyses. Also text-mining uncovers hidden and important information from structured or unstructured documents which serve as knowledge carriers. This study aims to provide a systematic approach for integrated trend analysis that takes into account bibliometric analysis, patent analysis and text-mining analysis. Etching is selected as the case study for integrating trend analysis method proposed in this study. Also, validity and applicability of the integrated analysis are evaluated. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: Analyses, Analysis, Approach, Bibliometric, Bibliometric Analysis, Bibliometric Analysis, Case Study, Competition, Development, Enterprises, Etching, Global, Information, Innovation, Knowledge, Mar, Patent, Patent Analysis, Patent Analysis, Rights, Sustainable, Technology, Text Mining, Text-Mining, Trend, Trend Analysis, Trends, Validity

? Woon, W.L., Zeineldin, H. and Madnick, S. (2011), Bibliometric analysis of distributed generation. *Technological Forecasting and Social Change*, **78** (3), 408-420.

Full Text: [2011\Tec For Soc Cha78, 408.pdf](2011/Tec%20For%20Soc%20Cha78,%20408.pdf)

Abstract: This paper presents an application of term frequency (TF) as a means of identifying useful trends from text documents. Of particular interest is the relationship between publication patterns, as characterized by TF, and the underlying technological developments. To demonstrate the usefulness of our approach, a case study on distributed generation (DG) was conducted. Important sub-domains of DG research were identified and the associated TF values were extracted using relevant keywords. The evolution of these values through time helps to highlight key trends in the development of DG-related technologies. (C) 2010 Elsevier Inc. All rights reserved.

Keywords: AID, Analysis, Application, Approach, Bibliometric, Bibliometric Analysis, Bibliometrics, Case Study, Database Tomography, Development, Distributed, Distributed Generation, Evolution, Forecasting Emerging Technologies, Generation, Growth, Management, Mar, Publication, Research, Rights, Science, Technologies, Technology Mining, Term, Tracking, Trends

? Pillania, R.K. (2011), The state of research on technological uncertainties, social uncertainties and emerging markets: A multidisciplinary literature review. *Technological Forecasting and Social Change*, **78** (7), 1158-1163.

Full Text: [2011\Tec For Soc Cha78, 1158.pdf](2011/Tec%20For%20Soc%20Cha78,%201158.pdf)

Abstract: The objective of this research work is to study the progress of research on technological uncertainties, social uncertainties and emerging markets and outline and identify the key disciplines, journals, articles and authors. For this the author studied the existing literature from the various fields in which technological uncertainties, social uncertainties and emerging markets research work have been published using ISI Web of Knowledge database. The paper finds that there is increasing research work on technological uncertainties, social uncertainties and emerging markets and the bibliographical search resulted in ninety-one documents written by one-hundred-sixty-one authors in eighty-four journals in seventy-two disciplines. The five major disciplines and their underlying journals are business and economics, agriculture, psychology, public administration, and environmental sciences and ecology accounting for majority of publications. In journals the most prolific, measured by number of articles published are Harvard Business Review, Social Science and Medicine, World Development, and Higher Education; and most influential, measured by the global citation received, are Harvard Business Review, Social Science and Medicine and Sociological Review. The top 10% of the journals are responsible for 23% of all publications but 85% of all global citations received. This highlights that despite the high, diverse and increasing number of journals; only few are dominating and shaping the research arena of technological uncertainties, social uncertainties and emerging markets. Further, in the ten most cited articles, no author appears more than once. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Author, Authors, Bibliometric Analysis, Citation, Citations, Economics, Education, Emerging Markets, Employment, Environmental, Environmental Sciences, ISI, Journals, Knowledge, Literature, Literature Review, Perspective, Publications, Research, Research Work, Review, Science, Sciences, Social, Social Uncertainties, Technological Uncertainties, Web of Knowledge

# Title: Technology Analysis & Strategic Management

Full Journal Title: [Technology Analysis & Strategic Management](http://proquest.umi.com/pqdweb?RQT=318&pmid=11856)

ISO Abbreviated Title: Technol. Anal. Strateg. Manage.

JCR Abbreviated Title: Technol Anal Strateg

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Language: English

Publisher: Carfax Publishing

Publisher Address: Rankine Rd, Basingstoke RG24 8PR, Hants, England

Subject Categories:

Multidisciplinary Sciences: Impact Factor 0.617, 16/45 (2001)

? Anderson, J., Williams, N., Seemungal, D., Narin, F. and Olivastro, D. (1996), Human genetic technology: Exploring the links between science and innovation. *Technology Analysis & Strategic Management*, **8** (2), 135-156.

Full Text: [T\Tec Ana Str Man8, 135.pdf](T/Tec%20Ana%20Str%20Man8,%20135.pdf)

Abstract: This paper reports on a study of the extremely strong linkage between human genetic technology (HGT) ar represented by patents in the field of human molecular and cell technology and the underlying research science bare, as represented by the references cited on these patents. The study procedures provide a useful demonstration for tracking how specific funding agencies’ support for fundamental research wends its way into the intellectual property system, and leads to the development of economically and industrially important technologies. Specifically, a set of 1105 US patents in the field of human molecular and cell technology granted between 1988 and 1992 war identified, and the references cited on the front page of these patents traced through to the specific cited research papers and patents. The study used a novel scheme to classify, the patents, and to capture the links between patents and papers, including the nationality of the patent inventors, and the institutional origin and funding acknowledgement in the cited papers HGT was shown to be the most heavily science-linked area of patented technology; HGT patents cited scientific papers as prior art six times as often as they cited US patents as prior art. Furthermore, the scientific papers cited as prior art were of a fundamental nature (i.e. not applied science), providing new evidence of the role of curiosity-driven research in feeding the innovation process In addition, the local science base, particularly in the UK, war shown to be of significant importance in national patenting activities, although the UK share of world HGT patents war not as high as would have been expected, given the intensity of scientific research on this topic in the UK.

Keywords: Genome Project

? Dodgson, M. (1999),What role for management in science? *Technology Analysis & Strategic Management*, **11** (2), 133-141.

Full Text: [T\Tec Ana Str Man11, 133.pdf](T/Tec%20Ana%20Str%20Man11,%20133.pdf)

? Verspagen, B. (1999),Large firms and knowledge flows in the dutch r&d system: A case study of philips electronics. *Technology Analysis & Strategic Management*, **11** (2), 211-233.

Full Text: [T\Tec Ana Str Man11, 211.pdf](T/Tec%20Ana%20Str%20Man11,%20211.pdf)

Abstract: This paper uses data on patent-to-patent citations and patent-to-science-literature citations to study the spillover network of companies and research institutes around Philips Electronics. The theoretical section of the paper surveys the literature on innovation regimes and regional systems of innovation, and uses this to derive a number of testable hypotheses on the Philips network. The main findings of the paper are that the importance of local firms in the technology network around Philips is small, but the impact of local (semi-)public institutes is larger. Also, it is found that large firms generate a large part of the scientific literature that is referred to in Philips patents.

Kostoff, R.N. and Geisler, E. (1999),Strategic management and implementation of textual data mining in government organizations. *Technology Analysis & Strategic Management*, **11** (4), 493-525.

Full Text: [T\Tec Ana Str Man11, 493.pdf](T/Tec%20Ana%20Str%20Man11,%20493.pdf)

Abstract: This paper focuses on the strategic role and the implementation of textual data mining (TDM) in government organizations, with special emphasis on TDM to support the management of science and technology (S&T). It begins by defining TDM, and discussing the strategic management process in federal government organizations and the role of TDM as an integral part of this process. The paper then proceeds to describe some of the uses and applications of TDM. The results of a demonstration program by the US Office of Naval Research show some potential benefits from TDM: (1) integration of national and multi-national S&T databases; (2) supporting strategic decisions on the direction and funding of government S&T; and (3) creation of usable S&T databases to support strategic decisions in other areas of government. Implications of the demonstration program relative to larger scale implementation of TDM are discussed. The paper ends with a description of the principles and requirements of higher quality TDM studies.

? Laestadius, S. (2000),Biotechnology and the potential for a radical shift of technology in forest industry. *Technology Analysis & Strategic Management*, **12** (2), 193-2125.

Full Text: [2000\Tec Ana Str Man12, 193.pdf](2000/Tec%20Ana%20Str%20Man12,%20193.pdf)

Abstract: Is biotechnology a revolutionary technology that will dramatically transform present technological systems, industries and society or will the entrance of biotechnology into industry rather take the shape of incremental innovations without any deeper impact on dominating technological paradigms? The vast science and technology research in this area has focused on pharmaceuticals and neglected the potential role for large scale biomass handling activities like the forest industry in general and pulp and paper industry in particular. In addition the industry itself has not focused its R&D activities towards utilization of biotechnology on inputs, processes or products. This is a study on the technological system for pulp and paper facing the challenge of a radical shift of technology. The confrontation between the genuinely science based biotechnology and its community on the one hand, and the pulp and paper community (highly scientific within the framework of a low-technology industry) on the other, is analyzed as are the industrial and economic potentials and limitations of biotechnology in this area.

McMillan, G.S. and Hamilton III, R.D. (2000),Using bibliometrics to measure firm knowledge: An analysis of the US pharmaceutical industry. *Technology Analysis & Strategic Management*, **12** (4), 465-475.

Full Text: [2000\Tec Ana Str Man12, 465.pdf](2000/Tec%20Ana%20Str%20Man12,%20465.pdf)

Abstract: A recent literature review highlighted the knowledge-based view as an important current theory in the strategic management area. The current paper utilizes that theory as the context for employing bibliometrics to uncover the publishing and patenting citation patterns in a group of twelve US pharmaceutical companies over a 13-year period. Our initial findings suggest that firms self-cite a great deal, and that they rely heavily on public science. In addition, we found that Merck and Co. is the most frequently cited company in both the science and technology areas, though somewhat less so in technology. The managerial implications, particularly from a knowledge perspective, are discussed as well as some suggestions for future research.

McMillan, G.S. and Hicks, D. (2001), Science and corporate strategy: A bibliometric update of Hounshell and Smith. *Technology Analysis & Strategic Management*, **13** (4), 497-505.

Full Text: [T\Tec Ana Str Man13, 497.pdf](T/Tec%20Ana%20Str%20Man13,%20497.pdf)

Abstract: Hounshell and Smith’s Science and Corporate Strategy: DuPont R&D, 1902- 1980 is one of the most comprehensive business history books ever written. In addition, it highlights the important relationship between corporate strategy and R&D activities. The purpose of this current paper is to update the information on DuPont’s R&D activities using secondary data and bibliometrics. Our findings are that DuPont underwent a series of dramatic shifts in their R&D efforts during the 1980s and into the 1990s. For example, there was a focus on life sciences, a concerted attempt to reduce R&D, and an endeavour to align R&D more with core businesses. Beyond the bibliometrics, we found that corporate performance and changes in the top management team may have precipitated these changes in R&D. The implications of such relationships are also discussed.

? Sakakibara, M. and Dodgson, M. (2003), Strategic research partnerships: Empirical evidence from Asia. *Technology Analysis & Strategic Management*, **15** (2), 227-245.

Full Text: [2003\Tec Ana Str Man15, 227.pdf](2003/Tec%20Ana%20Str%20Man15,%20227.pdf)

Abstract: This paper evaluates the role Strategic Research Partnerships (SRPs) play in Asia. Specific Asian institutional settings influence the roles of SRPs. Japan is regarded as a forerunner in the practice of SRPs. In Japan, lack of spillover channels, limited opportunities for mergers and acquisitions, weak university research and pressure for internal diversification motivate firms to form SRPs. In Korea, SRPs are regarded as a means to promote large-scale research projects. In Taiwan, SRPs are formed to facilitate technological diffusion. Empirical findings on SRPs, focusing on government-sponsored R&D consortia in Japan, are summarized. Issues regarding SRP formation, their effect on R&D spending of participating firms, and productivity, are examined. Reference is made to alternative forms of measurement of SRPs and their potential application to Asian countries is assessed. Enhancing the capacity of policy-makers to assess the extent and contribution of SRPs is considered to be a priority.

? Brockhoff, K. (2003), Exploring strategic R&D success factors. *Technology Analysis & Strategic Management*, **15** (3), 333-348.

Full Text: [T\Tec Ana Str Man15, 333.pdf](T/Tec%20Ana%20Str%20Man15,%20333.pdf)

Abstract: This paper identifies strategic R&D success factors for organizations that produce R&D results for proprietary use. First, six types of R&D organizations are identified by using the criteria of profit orientation and external or internal use of R&D results. Following this, success criteria are identified by studying sample organizations that match the classification criteria. In the concluding section it is shown that important success criteria can be derived, many of which are independent of the organizational arrangement chosen for the generation of R& D results. Among them are: embedment into the scientific system, development of core competencies, securing appropriability, choosing appropriate organizational structures and processes.

? Kostoff, R.N., Tshiteya, R., Bowles, C.A. and Tuunanen, T. (2006), The structure and infrastructure of Finnish research literature. *Technology Analysis & Strategic Management*, **18** (2), 187-220.

Full Text: [2006\Tec Ana Str Man18, 187.pdf](2006/Tec%20Ana%20Str%20Man18,%20187.pdf)

Abstract: The structure and infrastructure of the Finnish research literature is determined. A representative database of technical articles was extracted from the Science Citation Index for the years 2003-2004, with each article containing at least one author with a Finnish address. Document clustering was used to identify the main technical themes (core competencies) of Finnish research. Four of the pervasive technical topics identified from the clustering (Wireless Networks and Mobile Communication, Signal Processing, Materials Science and Engineering, Chemistry) were analyzed further using bibliometrics, in order to identify the infrastructure of these research areas. Finally, the citation performance of Finnish research in the four pervasive technical topics above, and in other technical topics obtained by analysis of Abstract phrases, was compared to that of two Scandanavian countries with similar population and GDP, Norway and Denmark.

Keywords: Bibliometrics, Citation, Database Tomography, Impact, Roadmaps, Science-and-Technology, Technical Intelligence, Trends

? Tijssen, R.J.W. (2009), Internationalisation of pharmaceutical R&D: How globalised are Europe’s largest multinational companies? *Technology Analysis & Strategic Management*, **21** (7), 859-879.

Full Text: [2009\Tec Ana Str Man21, 859.pdf](2009/Tec%20Ana%20Str%20Man21,%20859.pdf)

Abstract: The internationalisation of corporate research is an issue with a large impact on strategic decision-making within the research-intensive pharmaceutical industry. However, sector-wide comparative statistics on the whereabouts of corporate research activities and the geographic distribution of their research partners is scarce. This paper describes the international research profiles of Europe’s top 10 largest multinational pharmaceutical companies based on publication counts and author address information drawn from the thousands of pharmaceutical research articles published in 2005-2006. The results provide relevant aggregate-level background intelligence for strategic analysis of the industry’s internationalisation processes and research cooperation patterns. The overall statistics indicate that international research activity of European industry is significantly more oriented towards the US science base than vice versa. Company-level statistical data on the research cooperation involving each company’s central research centres based in country of corporate headquarters, reveal quite distinctive geographical characteristics alongside differential preferences for in-house or external research partners.

Keywords: Articles, Bibliometric Analysis, Bibliometrics, Biotechnology, Business and Management Studies, Characteristics, Europe, Firms, Impact, Industry, Innovation, Intelligence, Knowledge, Networks, Pharmaceutical, Pharmaceutical Industry, Publication, Publication Counts, Quantitative, R&D, Research, Research Activity, Science, Statistics, Technology, Technology and Innovation Studies, Trends, US

? Cozzens, S., Gatchair, S., Kang, J., Kim, K.S., Lee, H.J., Ordonez, G. and Porter, A. (2010), Emerging technologies: Quantitative identification and measurement. *Technology Analysis & Strategic Management*, **22** (3), 361-376.

Full Text: [2010\Tec Ana Str Man22, 361.pdf](2010/Tec%20Ana%20Str%20Man22,%20361.pdf)

Abstract: Emerging technologies present both challenges and opportunities for national technology strategies. National governments may therefore want to monitor the technological horizon on a systematic basis. This article outlines the quantitative approaches available for such monitoring. Among the standard types of bibliometric data, proposals and publications are most likely to be useful for this purpose since they capture information earlier in the cycle of technology development. Patents, in contrast, trail behind. Analysis can proceed with keywords or citations, and algorithms are available to use the information structure inherent in these kinds of data to identify and measure emerging areas. There are limitations, however, in all the available approaches and the authors therefore recommend using them in conjunction with expert methods by focusing the qualitative assessment in particular areas.

Keywords: Assessment, Bibliometric, Bibliometric Data, Bibliometrics, Challenges, Citations, Emerging Technologies, Innovation, Measurement, Methods, Publications, Quantitative, Quantitative Analysis, Science, Technology

? Duan, C.H. (2011), Mapping the intellectual structure of modern technology management. *Technology Analysis & Strategic Management*, **23** (5), 583-600.

Full Text: [2011\Tec Ana Str Man23, 583.pdf](2011/Tec%20Ana%20Str%20Man23,%20583.pdf)

Abstract: The paper explores and maps the intellectual structure of technology management studies from 1987 to 2006 by analysing 22,336 cited references of 1328 articles in the SSCI and SCI databases. Bibliometrics and social network analysis techniques are used to research the intellectual structure of the technology management literature. Six threads emerged in this study: (1) core competence and competitive advantage, (2) information system planning and changes, (3) the management of innovation and organisations, (4) technology management approaches, (5) technology strategy and (6) organisational learning and knowledge management. This study provides a systematic and objective means of determining the knowledge nodes in the development of technology management research.

Keywords: Analysis, Author Cocitation Analysis, Bibliometrics, Business, Changes, Competence, Competitive, Competitive Advantage, Databases, Development, Electronic Commerce Research, Information, Innovation, Intellectual Structure, Knowledge, Knowledge Management, Learning, Literature, Macroeconomics, Management, Mapping, Network, Network Analysis, Paradigms, Perspective, Planning, References, Research, SCI, Social, Social Network Analysis, SSCI, Strategic-Management, Strategy, Structure, Techniques, Technology, Technology Management

? Heimeriks, G. and Leydesdorff, L. (2012), Emerging search regimes: Measuring co-evolutions among research, science, and society. *Technology Analysis & Strategic Management*, **24** (1), 51-67.

Full Text: [2012\Tec Ana Str Man24, 51.pdf](2012/Tec%20Ana%20Str%20Man24,%2051.pdf)

Abstract: Scientometric data is used to investigate empirically the emergence of search regimes in biotechnology, genomics and nanotechnology. Complex regimes can emerge when three independent sources of variance interact. In our model, researchers can be considered as the nodes that carry the science system. Research is geographically situated with site-specific skills, tacit knowledge and infrastructures. Second, the emergent science level refers to the formal communication of codified knowledge published in journals. Third, the socio-economic dynamics indicate the ways in which knowledge production relates to society. Although biotechnology, genomics and nanotechnology can all be characterised by rapid growth and divergent dynamics, the regimes differ in terms of self-organisation among these three sources of variance. The scope of opportunities for researchers to contribute within the constraints of the existing body of knowledge are different in each field. Furthermore, the relevance of the context of application contributes to the knowledge dynamics to various degrees.

Keywords: Biotechnology, Communication, Dynamics, Dynamics of Knowledge, Genomics, Growth, Indicators, Innovation, Journals, Knowledge, Model, Nanotechnology, Policy, Research, Researchers, Science, Search Regime

? Pei, R.M., Youtie, J. and Porter, A.L. (2012), Nanobiomedical science in China: A research field on the rise. *Technology Analysis & Strategic Management*, **24** (1), 69-88.

Full Text: [2012\Tec Ana Str Man24, 69.pdf](2012/Tec%20Ana%20Str%20Man24,%2069.pdf)

Abstract: Medical and health care applications of nanotechnology have increasingly attracted research and innovation attention. Nano-biomedical science (NBMS) is a term we use to define this emerging domain. As China is one of the leading countries in nanotechnology, but lacks a long history as a biosciences leader, this paper explores the competitive positioning of China in the development of NBMS. Specifically, this paper profiles the research patterns of ChineseNBMS in comparison with the four other largest countries in NBMS, using bibliometric techniques. The results indicate that China is a leader in NBMS, leveraging its strengths in chemistry and physics in the broader nanotechnology domain. However, China’s relative weakness in traditional biomedical disciplines, and its lack of presence in highly influential global journals, could prove to be limiting factors.

Keywords: As, Attention, Bibliometric, Bibliometric Analysis, Biomedical, Care, China, Countries, Development, Health, Health Care, History, Innovation, Journals, Nanobiotechnology, Nanoscale, Nanotechnology, Nanotechnology Literature, Research, Science, Traditional

# Title: Technology and the Environment

Department of Industry (1975), *Technology and the Environment*. No. 9, Reports from Scientific Counsellors Overseas.

# Title: Technology Ireland

McKay, G. (1978), The use of naphtha in Northern Ireland. *Technology Ireland*, **10**, 29-32.

? McKay, G. (1980), Peat as a mateial for wastewater treatment. *Technology Ireland*, **March**, 25-28.

? McKay, G. (1981), Finding other uses for peat. *Technology Ireland*, **13**, 43-46.

? Allen, S.J., McKay, G. and Montan, G. (1987), Wax from county antrim lignite. *Technology Ireland*, **19**, 47-49.

? Grant, S., McKay, G. and Blair, H.S. (1990), Chemicals from prawn shells. *Technology Ireland*, **6??**, 15-18.

# Title: PICMET 2010: Technology Management for Global Economic Growth

Full Journal Title: [PICMET 2010: Technology Management for Global Economic Growth](http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=5594059)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Su, H.N. and Lee, P.C. (2010), Network perspective of science and technology policy research community in Taiwan. *PICMET 2010: Technology Management for Global Economic Growth*, 1-11.

Full Text: [2010\Tec Man Glo Eco Gro, 1-11.pdf](2010/Tec%20Man%20Glo%20Eco%20Gro,%201-11.pdf)

Abstract: This study proposes a way of mapping Sci-Tech policy research community by quantitatively analyzing Sci-Tech policy research projects funded by Taiwan government in recent thirty years. Taiwans Sci-Tech policy rsearch networks composed by research community and knowledge distribution are quantitatively investigated by the use of network theory and Taiwans Sci-Tech policy research map is created to obtain the purpose of two-dimensional visualization. The 3-dimensional networks and two-dimensional knowledge maps on the basis of the Taiwans Sci-Tech policy research projects can be depicted differently by choosing different information as network actor, e.g. institute, project investigator or keyword, to reflect Sci-Tech policy research structures in micro, meso, and macro-levels, respectively. Sci-Tech policy research projects are retrieved from GRB (Government Research Bulletin) database which archives research projects sponsored by Taiwan government. A total of 143 projects are retrieved in this study, most of research projects (59%) belong to the field of management, economics, and other (social). It can be observed that more Sci-Tech policy research projects in the field of technology management have been funded, and also the coverage of fields has been increased since 2000. This indicates not only the emergence but also the interdisciplinary phenomenon of Sci-Tech policy research in Taiwan.

Keywords: Bibliometric Analysis, Cartography, Co-Word Analysis, Community, Coverage, Database, Database Tomography, Directions, Discovery Lrd, Distribution, Economics, Field, Information, Infrastructure, Interdisciplinary, Knowledge, Management, Mapping, Network, Networks, Parkinsons-Disease, Policy, Potential Treatments, Purpose, Recent, Research, Science, Scientometrics, Social, Taiwan, Technology, Technology Management, Theory, Visualization

? Chen, J.K.C., Ho, Y.S., Wang, M.H. and Chen, Y.Y. (2010), Evaluation innovation research performance and trend of the worldwide. *PICMET 2010: Technology Management for Global Economic Growth*, 1-13.

Full Text: [2010\Tec Man Glo Eco Gro, 1.pdf](2010/Tec%20Man%20Glo%20Eco%20Gro,%201.pdf)

Abstract: Innovation is one of the most important fields in research and development of new knowledge or service today, making research innovation trend is an important issue. This study evaluates the worldwide innovation development trend of research for the past sixteen years and provides insights into the characteristics of innovation research activities to identify an innovation development map, tendencies, or regularities that may exist in papers. Data are based on the online version of SSCI, Web of Science from 1993 to 2008. Articles referring to innovation were assessed according to many aspects including exponentially fitting publication outputs during 2002-2008, distribution of source title, author keywords, and keyword plus analysis. The exponential fitting of the yearly publications of the last decade can also calculate that, in 2014, the number of scientific papers on innovation will be twice the number of publications in 2008. Synthetically analyzing four kinds of keywords, this work analysis concludes that innovation application relates to issues based on knowledge, technology, R&D and entrepreneurship. The result displays that the USA is number one in innovation research totaling 6,317 papers, followed by UK totaling 2,354 papers. Other leading countries in innovation research include Canada, the Netherlands, Germany, France, Australia and Italy.

Keywords: Organizational Knowledge Creation, Information-Technology, Absorptive-Capacity, Corporate Entrepreneurship, Development Spillovers, Bibliometric Analysis, Strategic Alliances, Product Development, Joint Ventures, Industry

# Title: Technology Management: A Unifying Discipline for Melting the Boundaries

Full Journal Title: Technology Management: A Unifying Discipline for Melting the Boundaries

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Daim, T.U., Rueda, G.R. and Martin, H.T. (2005), Technology forecasting using bibliometric analysis and system dynamics. *Technology Management: A Unifying Discipline for Melting the Boundaries*, 112-122.

Abstract: This paper is presenting models integrating multiple forecasting methodologies in an attempt for a more comprehensive analysis of the technology systems. System dynamics modeling is integrated with trend analysis, scenario planning, historical analogies, bibliometrics and patent analysis for two different technologies: fuel cell and food safety technologies. Results from the two case studies help us validate bibliometric analysis and system dynamics as appropriate tools for technology forecasting where non-linear and feedback structures play an important role.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Bibliometrics, Case Studies, Dynamics, Feedback, Food, Forecasting, Fuel Cell, Integrated, Methodologies, Modeling, Models, Patent, Patent Analysis, Planning, Play, Role, Safety, Scenario, System Dynamics, Systems, Technologies, Technology, Technology Forecasting, Trend, Trend Analysis

# Title: Technology in Society

Full Journal Title: [Technology in Society](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5856&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=de6f0a5a532a2ca6d7061ad0ab1a5b46)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Mayor, F. (1992), Science and government. *Technology in Society*, **14** (1), 29-36.

Full Text: [T\Tec Soc14, 29.pdf](T/Tec%20Soc14,%2029.pdf)

Abstract: The Second World War marked a critical threshold in the relationship between Science and Government, leading to the elaboration of new science policy mechanisms. The postwar years saw a parallel strengthening of the links between science and industry. The consequent complication of the science-society relationship rendered outmoded prevailing policy-making models, already vitiated by sectoral division of responsibilities and ‘short-termism.’ The need today is for policy making that takes into account the views of many interest groups, with government arriving at decisions through a process of conciliation and synthesis. A parallel requirement is to create new instruments to aid decision making and to extend scientific literacy. The question cannot, however, be viewed in solely national terms: Many national problems have global ramifications, and the scientific and technological gap between the industrial and the developing world continues to widen. Unesco is endeavouring through the promotion of international cooperation to address these problems. Nationally and internationally, the aim should be to achieve a greater ‘scientification’ of the decision-making process and an expansion of the advisory framework consistent with a recognition of the complexity of science policy issues and of the need for holistic approaches to their solution.

? Hugunin, P.A., Thomas, S. and Wilemon, D. (1992), Science and Technology Information and Corporate Planning Processes: A synthesis. *Technology in Society*, **14** (2), 245-270.

Full Text: [1992\Tec Soc14, 245.pdf](1992/Tec%20Soc14,%20245.pdf)

Abstract: Corporate underutilization of science and technology information is disturbing, given both the enormous impact on long-term profitability which this information possesses and the strong conceptual foundations about specific individual technologies generally accessible to corporations. This paper creates a synthesis between instruments of science and technology information management, available from product, patent, and bibliometric analyses, and general approaches in corporate planning. Syntheses such as these, with the potential for better integration of R&D information into corporate, product, and market planning processes, can help managers “speed” commercialization processes, improve resource allocation, and effect “technology transfer” across product lines and business units.

Keywords: Bibliometric, Bibliometric Analyses, Impact, Information Management, Innovation, Integration, Management, Patent, R&D, Resource Allocation, Science, Science and Technology, Strategic Management, Technologies, Technology

de la Mothe, J. (1992), The revision of international science indicators: The frascati manual. *Technology in Society*, **14** (4), 427-440.

Full Text: [T\Tec Soc14, 427.pdf](T/Tec%20Soc14,%20427.pdf)

Abstract: Science indicators have become an important tool in the development of science, technology, and innovation policy in the industrialized world. Indeed, the advent of these indicators is closely tied to the rise of science and technology policy studies generally since the early 1960s. Although it is not a comprehensive guide to the full range of measurement techniques available –– such as bibliometrics or citation analysis, the OECD’s *Frascati Manual* has become the preeminent document for the internationally standardized definitions of scientific and technological activity for statistical purposes. It is through this Manual that policy makers, policy analysts, economists, and statisticians in the OECD countries are able to discuss the relative performance of countries in terms of R&D expenditures and personnel. This paper discusses, in very general terms, the genesis and development of *The Frascati Manual*, from pre-1963 to the most recent Frascati meetings in October, 1991, in Rome. It shows the creation and maintenance of the manual as a case of international diplomacy and negotiation. cooperation, and perseverance on the part of individuals. It places the manual within the dynamic context of the new world industrial and political order. Most specifically, it offers but a brief summary of the author’s observations of the major outcomes from that meeting.

Schreiber, V. (1993), The medical sciences in Czechoslovakia. *Technology in Society*, **15** (1), 131-136.

Full Text: [T\Tec Soc15, 131.pdf](T/Tec%20Soc15,%20131.pdf)

Abstract: According to Science Citation Index, the Czechoslovak medical sciences contributed about 1.2% of the world medical knowledge pool in the 1960s. This contribution decreased to about 0.6% in the 1980s. The reasons for this decline are many and varied, such as the suppression of certain fields of scientific research by the Communist government and the degradation of the position of scientists in society, four major waves of emigration since 1938, and the compartmentalization of science into three separate branches (universities, ministerial research institutes, and Academy of Science institutes). Contemporary efforts to ameliorate the situation include setting up grant-giving agencies to distribute research funds on a competitive basis and the coordination of agencies promoting medical research in the Czech and Slovak Republics. The future of Czech and Slovak Medical sciences requires international collaboration, slimming the number of ‘scientists’, increased sending of young scientists abroad while waiting for greater economic prosperity, privatization of medical care, and efforts to minimize ‘brain drain.’ Correcting the consequences of 40 years of a totalitarian communist regime will be painful and difficult.

# Title: Technology of Water Treatment

Full Journal Title: Technology of Water Treatment

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? 王文华, 冯咏梅, 常秀莲, 孙彦(2004), Removal of lead from aqueous solution by corncobs. *Technology of Water Treatment*, **30** (2), 276-278.

摘要: 研究了玉米芯对废水中的重金属离子Pb2+的吸附性能和吸附机理.玉米芯吸附Pb2+的容量为3～10 mg/g.在较低的溶液pH值、较高的初始Pb2+浓度时,有较高的吸附容量;Mg2+、Ca2+对吸附有影响,而Na+则影响较弱;吸附容量随玉米芯的粒度增大而减小.在吸附过程中pH值有所降低,这说明有H+与Pb2+发生了离子交换作用.Langmuir方程可用来对吸附进行拟合.已吸附Pb2+的玉米芯可以用盐酸解吸,解吸后的玉米芯具有与新鲜玉米芯基本相同的吸附容量.

关键词: 生物吸附, 玉米芯, Pb2+, 重金属

? 冯咏梅, 王文华, 常秀莲, 刘雪梅(2004), Investigation of nickel biosorption on undaria pinnatifida. *Technology of Water Treatment*, **30** (5), 276-278.

摘要: 采用多细胞藻类裙带菜对重金属镍离子进行吸附,研究溶液的pH值,初始Ni2+浓度,裙带菜的粒度、处理温度及不同生长时期等因素对Ni2+的吸附特性的影响.得到最佳pH值4-6及最大吸附量0.7591 mmol/g,并用Langmuir和Freundlich方程对裙带菜的吸附等温线进行了拟合.

关键词: 裙带菜, 镍离子, 生物吸附, 吸附等温线

# Title: Technometrics

Full Journal Title: Technometrics

ISO Abbreviated Title: Technometrics

JCR Abbreviated Title: Technometrics

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Hartley, H.O. (1961), Modified Gauss-Newton method for fitting of non-linear regression functions by least squares. *Technometrics*, **3** (2), 269-280.

Full Text: [1960-80\Technometrics3, 269.pdf](1960-80/Technometrics3,%20269.pdf)

# Title: Tecnologia y Ciencias del Agua

Full Journal Title: Tecnologia y Ciencias del Agua

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Rojas-Sola, J.I. and Jorda-Albinana, B. (2011), Bibliometric analysis of Mexican scientific production in hydraulic engineering based on journals in the Science Citation Index-Expanded database (1997-2008). *Tecnologia y Ciencias del Agua*, **2** (4), 195-213.

Full Text: [2011\Tec Cie Agu2, 195.pdf](2011/Tec%20Cie%20Agu2,%20195.pdf)

Abstract: Rojas-sola, j.I. & Jorda-albinana, b. Bibliometric analysis of mexican scientific production in hydraulic engineering based on journals in the science citation index-expanded database (1997-2008). Water technology and sciences (In spanish). Vol. Ii, no. 4, October-december, 2011, pp. 195-213. The objective of this work was, first, to identify hydraulic engineering journals published throughout latin america. To this end, the initial focus was to review the science citation index-expanded (Sci-e) Database for journals associated with two categories water resources and civil engineering. This resulted in a total of 20. Second, a bibliometric analysis zoos performed of papers published in those journals between 1997 and 2008 by mexican research institutions. This analysis found 373 papers in the 20 journals, of which 298 were in spanish, 73 in english and 2 in french. Mexico has become the second most published country in latin american in terms of scientific articles and has the third greatest sum of mean impact for the journals in which they are published. Furthermore, the journal ingenieria hidraulica en mexico (Hydraulic engineering in mexico) Represents 81% of all mexican and 33.51% Of all latin american scientific production. International collaborations were also identified, mainly with the united states, france and spain.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Bibliometrics, Category, Citation, Collaborations, Database, Hydraulic Engineering, Impact, Impact Factors, Indicators, International, Journal, Journals, Mexico, Papers, Publications, Research, Research Institutions, Review, Science, Science Citation Index Expanded, Science Citation Index-Expanded, Sciences, Scientific Production, Water

# Title: Tectonics

Full Journal Title: Tectonics

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0278-7407

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Plafker, G. and Ward, S.N. (1992), Backarc thrust faulting and tectonic uplift along the Caribbean Sea Coast during the April 22, 1991 Costa-Rica earthquake. *Tectonics*, **11** (4), 709-718.

Abstract: Surface deformation and a tsunami accompanied the destructive April 22, 1991, Costa Rica-Panama earthquake (Ms=7.5). Along a 135 km stretch of Caribbean coast, coseismic uplift was measured between the lower and upper limits of sessile intertidal organisms stranded on coral reefs, the preearthquake and postearthquake high tide levels located from driftwood lines on beaches, and the preearthquake and postearthquake tide levels as pointed out by local residents, The nature and distribution of offshore vertical displacements were further constrained from analysis of measured run-up heights and reported arrival times of the tsunami. Uplift detected along the coast jumped, within 4 km, from zero to 157 cm near Limon and generally decreased over a distance of 70 km southward to the border with Panama. These data map an axis of uplift that intersects the coastal beach ridge just north of the port of Moin and runs offshore to the east and south roughly parallel to the coast. No surface faulting was found. The earthquake and tsunami were generated by backarc thrusting along faults that bound the north Panama deformed belt and dip from the Caribbean Sea beneath Costa Rica and northern Panama. Combined geodetic and seismological data indicate that the main rupture dips landward at an angle of about 30-degrees and is approximately 40 km wide and 80 km long. Dislocation models suggest 2.2 m of slip on a causative thrust fault striking between 105-degrees and 120-degrees. We estimate that the repeat time for this type of earthquake is 200 to 1100 years. The historical record and new isotopic data favor the middle of the range.

Keywords: Panama

# Title: Tectonophysics

Full Journal Title: [Tectonophysics](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5830&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=a096e7e44270ff85383e4c02d6741e28)

ISO Abbreviated Title: Tectonophysics

JCR Abbreviated Title: Tectonophysics

ISSN: 0040-1951

Issues/Year: 24

Journal Country/Territory: Netherlands

Language: Multi-Language

Publisher: Elsevier Science BV

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

Subject Categories:

Geochemistry & Geophysics: Impact Factor 1.393, 17/45 (2000)

Pinar, A. (1998), Source inversion of the October 1, 1995, Dinar earthquake (*M*s = 6.1): A rupture model with implications for seismotectonics in SW Turkey. *Tectonophysics*, **292** (3-4), 255-266.

Full Text: [T\Tectonophysics292, 255.pdf](T/Tectonophysics292,%20255.pdf)

Abstract: An earthquake of Ms = 6.1 devastated the town of Dinar (SW Turkey, population 35,000) on October 1, 1995, killing 90 people and destroying 30% of the town. The earthquake generated complex body-waveforms varying with azimuth at teleseismic distances. The method of complex body-waveform inversion developed by Kikuchi and Kanamori (1991) was used to infer a source process for the earthquake. Two subevents were necessary to explain the observed seismic records. The inversion result suggests that the Dinar earthquake initiated at the SE end of the Dinar fault with a subevent of seismic moment Mo = 0.5×1018 Nm. Six seconds later, the second subevent took place about 10 km to the northwest of the first subevent with a seismic moment a few times larger than the first. The CMT depths of the first and second subevents were found to be 10 and 15 km, respectively. Both subevents had a predominantly normal faulting mechanism with slip-vectors oriented NE-SW, showing good agreement with the velocity-vectors obtained from the recent SLR and GPS studies as well as with the regional stress orientation obtained from geological data. The main shock was preceded by foreshock activity concentrated at the SE end of the Dinar fault where the first subevent took place, while the aftershock activity was concentrated in the vicinity of the second subevent. The spatial distribution of the foreshock and the aftershock activities and the locations of the subevents suggest that the first subevent broke an asperity and the second subevent broke a barrier on the fault, following the definition by Aki (1984) of an asperity and barrier earthquake model. About 10 km of surface ruptures were associated with the earthquake while the estimates yield a rupture length of 25 km. The calculated source parameters of the subevents and their locations suggest that the surface ruptures were probably associated with the first subevent. The estimates also show that the rupture zones of the two subevents overlapped where the maximum vertical displacement was observed.

Haslinger, F., Kissling, E., Ansorge, J., Hatzfeld, D., Papadimitriou, E., Karakostas, V., Makropoulos, K., Kahle, H.G. and Peter, Y. (1999), 3D crustal structure from local earthquake tomography around the Gulf of Arta (Ionian region, NW Greece). *Tectonophysics*, **304** (3), 201-218.

Full Text: [T\Tectonophysics304, 201.pdf](T/Tectonophysics304,%20201.pdf)

Abstract: During summer of 1995 local seismicity was recorded in the area around the Gulf of Arta in northwestern Greece by a dense temporary seismic network. of the 441 local events observed at 37 stations, 232 well locatable events with a total of 2776 P-phase readings were selected applying the criteria of a minimum of 6 P-observations and an azimuthal gap less than 180 degrees. This data set is used to compute a minimum 1D velocity model for the region. Several tests are conducted to estimate model stability and hypocenter uncertainties, leading to the conclusion that relative hypocenter location accuracy is about 500 m in latitude and longitude and 1 km in depth. The minimum 1D velocity model serves as initial model in the non-linear inversion for three-dimensional P-velocity crustal structure by iteratively solving the coupled hypocenter-velocity problem in a least-squares sense. Careful analysis of the resolution capability of our data set outlines the well resolved features for interpretation. The resulting 3D velocity model shows generally higher average crustal velocities in the east, and the well resolved area of the eastern Gulf of Arta exhibits a homogeneous velocity around 6 km/s for the whole upper crust, A pronounced north-south trending zone of low velocities in the upper 5-10 km is observed in the area of the Katouna fault zone (KFZ), At greater depths (below 10 km) the KFZ is underlain by high-velocity material. E-W profiles suggest a horst-graben structure associated with the KFZ.

# Title: Tellus Series B-Chemical and Physical Meteorology

Full Journal Title: Tellus Series B-Chemical and Physical Meteorology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited (> 1000)

? Raich, J.W. and Schlesinger, W.H. (1992), The global carbon dioxide flux in soil respiration and its relationship to vegetation and climate. *Tellus Series B-Chemical and Physical Meteorology*, **44** (2), 81-99.

Full Text: [1992\Tel Ser B-Che Phy Met44, 81.pdf](1992/Tel%20Ser%20B-Che%20Phy%20Met44,%2081.pdf)

Abstract: We review measured rates of soil respiration from terrestrial and wetland ecosystems to define the annual global CO2 flux from soils, to identify uncertainties in the global flux estimate, and to investigate the influences of temperature, precipitation, and vegetation on soil respiration rates. The annual global CO2 flux from soils is estimated to average (+/- S.D.) 68 +/- 4 PgC/yr, based on extrapolations from biome land areas. Relatively few measurements of soil respiration exist from arid, semi-arid, and tropical regions; these regions should be priorities for additional research. On a global scale, soil respiration rates are positively correlated with mean annual air temperatures and mean annual precipitation. There is a close correlation between mean annual net primary productivity (NPP) of different vegetation biomes and their mean annual soil respiration rates. with soil respiration averaging 24% higher than mean annual NPP. This difference represents a minimum estimate of the contribution of root respiration to the total soil CO2 efflux. Estimates of soil C turnover rates range from 500 years in tundra and peaty wetlands to 10 years in tropical savannas. We also evaluate the potential impacts of human activities on soil respiration rates, with particular focus on land use changes, soil fertilization, irrigation and drainage, and climate changes. The impacts of human activities on soil respiration rates are poorly documented, and vary among sites. Of particular importance are potential changes in temperatures and precipitation. Based on a review of in situ measurements, the Q10 value for total soil respiration has a median value of 2.4. Increased soil respiration with global warming is likely to provide a positive feedback to the greenhouse effect.

# Title: Telma (Hannover)

Ludwig, G. and Zörkenörfer, E. (1988), Traveling-bed filtration plant for purification of heavy metal-bearing process water using dark peat granulate. *Telma* (Hannover), **18**, 285-300.

# Title: Tenside Surfactants Detergents

Full Journal Title: [Tenside Surfactants Detergents](http://www.tsd-journal.com/web/o_archiv.asp?navid=200911101436595&task=05&o_id=25921173837-114)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Selim, K.A., El-Rahiem, F.H.A. and El-Midany, A.A. (2009), Kinetic modelling and equilibrium of amphoteric collector adsorption on silica and hematite. *Tenside Surfactants Detergents*, **46** (2), 85-91.

Full Text: Ten Sur Det46, 85.pdf

Abstract: Most of the world iron ores are associated with siliceous impurities. Upgrading schemes depend mostly on the removal of these impurities by flotation and/or selective flocculation techniques, which mainly influenced by the adsorption of collectors on both valuable and gangue minerals. In this study, the adsorption of amphoteric collector (dodecyl-N-carboxyethyl-N-hydroxyethyl-imidazoline) on silica and hematite was studied. The collector adsorption exhibits the preferential adsorption on silica at acidic pH range. While in case of hematite, the adsorption was the same over entire the studied pH range. The temperature was kept constant at 298 K and contact time of 60 min was found, from kinetic study, to be adequate to achieve equilibrium. In addition, two simplified kinetic models including a pseudo first-order equation and pseudo second-order equation were used to determine kinetic parameters, rate constants, and equilibrium sorption capacities. It was shown that the pseudo first-order equation perfectly describes the adsorption of collector. Moreover, the analysis of experimental isotherm data using the Langmuir, Freundlich, Temkin and Dubinin-Radushkevich equations showed that the Freundlich model reasonably fits the experimental data in the studied concentration range.

Keywords: Activated Carbon, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Amphoteric Collector, Aqueous-Solution, Equilibrium, Hematite, Kinetic, Phosphate Adsorption, Removal, Silica, Sorption

? Ishaq, M., Saeed, K., Ahmad, I., Shakirullah, M. and Nadeem, S. (2010), Removal of Tartrazine from aqueous solution by activated coal. *Tenside Surfactants Detergents*, **47** (1), 13-17.

Full Text: Ten Sur Det47, 13.pdf

Abstract: Removal of industrially important Tartrazine dye from aqueous solution was carried with virgin and variously activated coal samples at room temperature. The morphological study indicated that the number of coal particles was increased when the coal was evacuated at 200ºC while aggregated form was observed at 400ºC evacuation temperature. The coal particles were again formed at 600ºC evacuation temperature. The coal, which was evacuated at 400ºC, adsorbed less Tartrazine than the coal samples which were evacuated at 200 and 600ºC. This might be caused by the aggregation of the coal particles at 400ºC (because of the plastic range of coal swelling), which results in a decrease of the coal surface area. The obtained adsorption data were also fitted to Langmuir and Freundlich isotherms, which followed both Langmuir and Freundlich isotherms models.

Keywords: Adsorbents, Adsorption, Adsorption-Isotherms, Aggregation, Aqueous Solution, Bagasse-Fly-Ash, Basic-Dyes, Coal, Data, Dye, Effluent, Equilibrium, Freundlich, Hazardous Dye, Isotherms, Kinetics, Langmuir, Langmuir and Freundlich Isotherms, Models, Morphology, Particles, Range, Removal, Room Temperature, Scanning Electron Microscopy, Silica, Solution, Sorption, Surface, Surface Area, Swelling, Tartrazine, Temperature

# Title: Telemedicine Journal and E-Health

Full Journal Title: Telemedicine Journal and E-Health

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1530-5627

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Williams, T.L., May, C.R. and Esmail, A. (2001), Limitations of patient satisfaction studies in telehealthcare: A systematic review of the literature. *Telemedicine Journal and E-Health*, **7** (4), 293-316.

Full Text: [2001\Tel J E-Hea7, 293.pdf](2001/Tel%20J%20E-Hea7,%20293.pdf)

Abstract: The objective of this study is to provide a systematic review of studies on patient satisfaction with telemedicine. The review included empirical studies that investigated patient satisfaction with that telemedicine service. The search strategy involved matching at least one of 11 ‘telemedicine’ terms with one of 5 ‘satisfaction’ terms. The following databases were searched: Telemedicine Information Exchange (TIE) database, MEDLINE, Science Citation Index (SCI), Social Science Citation Index (SSCI), Psycinfo, and Citation Index of Nursing and Allied Health (CINAHL). A highly structured instrument was used for data extraction. The review included 93 studies. Telepsychiatry represents the largest portion of these studies (25%), followed by multispecialty care (14%), nursing (11%), and dermatology (8%). Real-time video-conferencing was used in 88% of these studies. Only 19 (20%) included an independent control group, including 9 (10%) randomized control trial (RCT) studies. One third of studies were based on samples of less than 20 patients, and only 21% had samples of over 100 patients. Aspects of patient satisfaction most commonly assessed were: professional-patient interaction, the patient’s feeling about the consultation, and technical aspects of the consultation. Only 33% of the studies included a measure of preference between telemedicine and face-to-face consultation. Almost half the studies measured only 1 or 2 dimensions of satisfaction. Reported levels of satisfaction with telemedicine are consistently greater than 80%, and frequently reported at 100%. Progression of telemedicine services from ‘trial’ status to routine health service must be supported by improved research into patients’ satisfaction with telemedicine. Further investigation of factors that influence patient acceptance of telemedicine is indicated.

Keywords: Randomized Controlled Trial, Face-to-Face, Primary-Care, Medical-Care, Pilot Project, Telemedicine Consultations, User Satisfaction, General-Practice, Federal Bureau, Meta-Analysis

# Title: Technovation

Full Journal Title: [Technovation](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=01664972); [Technovation](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=01664972)

ISO Abbreviated Title: Technovation

JCR Abbreviated Title: Technovation

ISSN: 0166-4972

Issues/Year: 12

Language: English

Journal Country/Territory: Netherlands

Publisher: Elsevier Science BV

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

Subject Categories:

Engineering, Industrial: Impact Factor 0.582, 18/32 (2006); Impact Factor 1.907, 4/33 (2008); Impact Factor 2.466, 1/37 (2009)

Operations Research & Management Science: Impact Factor 0.582, 9/64 (2006); Impact Factor 1.907, 18/32 (2008); Impact Factor 2.466, 5/73 (2009)

Kostoff, R.N. (1999), Science and technology innovation. *Technovation*, **19** (10), 593-604.

Full Text: [1999\Technovation19, 593.pdf](1999/Technovation19,%20593.pdf)

Abstract: This paper describes two novel complementary approaches for systematically enhancing the process of innovation and discovery. One approach is workshop-based and the other approach is literature-based. Both approaches have the common feature of exploring knowledge from very disparate technical disciplines and technologies, and transferring insights and understanding from one or more disparate technical areas to another. It is highly recommended that the approaches be combined into a single process. The integrated approach has the potential to be a major breakthrough for the systematic promotion of innovation and discovery.

Keywords: Innovation, Discovery, Complementary Literatures, Disparate Disciplines, Cross-Discipline, Database Tomography, Computational Linguistics, Bibliometrics, Workshops

McQueen, D.H. and Olsson, H. (2003), Growth of embedded software related patents. *Technovation*, **23** (6), 533-544.

Full Text: [2003\Technovation23, 533.pdf](2003/Technovation23,%20533.pdf)

Abstract: The distribution of embedded software related patent applications across 118 IPC patent classes has been determined for 1988, 1993 and 1998. using a bibliometric technique. The patent applications were identified using search words based on patent claims concerning various aspects of embedded software. The number of these patent application assignments each year increased at an annual rate of about 17% while the distribution over IPC patent classes narrowed only slightly. In terms of patent classification sections, in 1998 over 41% of all embedded software related patent application assignments were in section G (Physics) while section H (Electricity) contained another 36% of them. In terms of patent classes, the most important patent classes are H04 (Electric communication technique) and G06 (Computing, calculating, counting) accounting for a little more than 40% of all embedded software patent application assignments. In only two patent classes, H04 and G06, is there a majority of embedded software related patent applications.

Since patent application assignments are mainly according to the character of the problem to be solved and its solution, rather than the field of the application of the solution found, these statistics relate to the technical problems solved by the inventions. This is in contrast to economic statistics on the distribution of embedded software over branches of industry that characterizes the application of the problem solutions. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Patent, Embedded Software, Bibliometric, R-and-D, Innovative Activities, Statistics, Indicators, Technology

Tuzi, F. (2004), Useful science is good science: Empirical evidence from the Italian National Research Council. *Technovation*, **25** (5), 505-512.

Full Text: [2004\Technovation25, 505.pdf](2004/Technovation25,%20505.pdf)

Abstract: Useful science is good science. According to Pavitt’s claim (Research Policy 27 (1998) 793), the aim of this paper is to show that the differences in innovation intensity of the scientific bodies (institutes) belonging to the largest public research institution in Italy (National Research Council, CNR) are affected rather by the carrying out of basic scientific activities than the development of research activities suitable to the innovation needs of firms. CNR has remarkable records of scientific achievements, mainly in basic science, medicine, biology, computer science and engineering, performed by 108 institutes spread over all Italian regions. Regarding its mission, a novel framework of CNR technology production has been introduced, in order to guide an empirical analysis into the determinants of the differences in technology production of CNR institutes. This framework relates the CNR patenting data and a selected set of scientific indicators, in order to single out the kind of link between technological production and scientific activities. The analysis shows the following results: There is a positive correlation between scientific activity, measured by bibliometric analysis, and technological production; The collaboration with other public or private institution and market oriented activity do not affect the innovation intensity of the CNR institutes. (c) 2003 Elsevier Ltd. All rights reserved.

Keywords: Bibliometric, Bibliometric Analysis, Citation Impact, Collaboration, Computer, Development, Indicators, Innovation, Patent, Research, Technological Change, Technology

McQueen, D.H. (2005), Growth of software related patents in different countries. *Technovation*, **25** (6), 657-671.

Full Text: [2005\Technovation25, 657.pdf](2005/Technovation25,%20657.pdf)

Abstract: The distribution of software related patent applications in fifteen European countries, the United States and Japan has been determined for 1987, 1990, 1993, 1996 and 1999 using a bibliometric technique. The results were used for extrapolation to 2002 and 2005. The patent applications were identified using search words extracted from patent claims concerning various aspects of computer software. World-wide, the annual growth in the number of these patent applications is about 19%. In Europe and the United States there are signs of saturation in the growth rate while in Japan the growth continues to be exponential. The largest numbers of applications are assigned to IPC patent section G (Physics), in particular to classes G11, G09, G01, G06, G05 and G08. The next most populous class is H (Electricity) represented most strongly by classes H01, H03 and H04. Growth in the number of software related patent applications is especially strong in section C (Chemistry), represented most strongly by class C07 followed by classes C12 and C08, which may overtake section H in the near future. Most applications assigned to section B (Performing operations; transporting) are in class B60 while in section A (Human necessities) the most important class is A61. In Europe, Germany dominates patenting in general and software related patenting in particular. The number of European software related patent applications slackened considerably in 1999. This slackening is observable over the whole spectrum of patent sections and classes in which software related patents are significantly present. Since there was no corresponding slump in patenting in general, this slackening is interpreted as related to conditions in the software sector in particular rather than to general economic conditions or the like. The importance of the EPO as a receiving office for software related patent applications (priority establishing applications) has increased relative to national receiving offices during the nineties.

Keywords: Bibliometric, Chemistry, Class, Computer, Computer Software, Distribution, Economic, Europe, Extrapolation, General, Germany, Growth, Growth Rate, Indicators, Industry, Japan, National, Patent, Patents, Property, R-and-D, Recent Surge, Rights, Saturation, Sector, Software, Statistics, Technology, United States

? Butcher, J. and Jeffrey, P. (2005), The use of bibliometric indicators to explore industry–academia collaboration trends over time in the field of membrane use for water treatment. *Technovation*, **25** (11), 1273-1280.

Full Text: [2005\Technovation25, 1273.pdf](2005/Technovation25,%201273.pdf)

Abstract: Industry–academia collaboration has become a subject of great interest to academics, industry leaders and policymakers, as it is now acknowledged that such relationships are valuable for innovation. The aim of the study reported here is to explore collaboration trends over time in the field of membrane use for water treatment by carrying out bibliometric analysis of scientific publications related to the field. It is part of a broader project looking at factors that influence industry–academia collaborative research in the water sector. Thousand six hundred and seventy eight papers from eight journals from the years 1967 to 2001 were analysed for co-authorship patterns. Thousand three hundred and seventy papers from the last decade were examined for a snapshot view of inter-institutional, cross-disciplinary, industry–academic and international collaboration trends. Results show that the field is highly collaborative with the majority (87%) of papers involving two or more authors. In terms of industry–academic collaboration, there was an increase in the number of papers from 1994 onwards, and a very high proportion (91%) were cross-disciplinary.

Keywords: Analysis, Authors, Bibliometric, Bibliometric Analysis, Bibliometric Indicators, Bibliometrics, Co-Authorship, Coauthorship, Collaboration, Collaborative Research, Development Networks, Field, Indicators, Industry-Academic Collaboration, Influence, Innovation, International, Journals, Membrane, Membrane Science, Netherlands, NOV, Papers, Publications, Relationships, Research, Rights, Sciences, Scientific Publications, Sector, Treatment, Trends, Water, Water Sector, Water Treatment

? Cornelius, B. and Persson, O. (2005), Who’s who in venture capital research. *Technovation*, **26** (2), 142-150.

Full Text: [2006\Technovation26, 142.pdf](2006/Technovation26,%20142.pdf)

Abstract: A bibliometric analysis of research papers in venture capital reveals an increasing interest over time by researchers across a broad spectrum of business disciplines. It also reveals the dominance of North American, particularly American researchers who entered the field early. Interestingly, the analysis demonstrates that two schools of entrepreneurial research compete for dominance in the venture capital framework. Much of the core research, the knowledge base, crosses disciplinary lines but is developed, from there-on, in a discipline specific fashion. Researchers whose primary interest is in finance and economics use quantitative, neo-classical models almost exclusively and publish, with the exception of the most cited authors, solely in economics and finance journals. These researchers tend to be more successful at achieving internal university funding for their projects while the second group, publishing in journals dedicated to management and entrepreneurship research, uses a broader array of theoretical techniques, apply both quantitative and qualitative methodologies and are more often funded externally. The core group of researchers, with reputations supported by large numbers of citations, appear to be able to raise funds both internally (through university bodies) and externally.

Keywords: American, Analysis, Author Cocitation Analysis, Authors, Bibliometric, Bibliometric Analysis, Bibliometrics, Bodies, Business, Citation Analysis, Citations, Economics, Field, Framework, Funding, Group, Journals, Knowledge, Knowledge Base, Management, Methodologies, Models, North, Papers, Primary, Publishing, Qualitative, Research, Research Front, Research Funding, Rights, Schools, Techniques, University, Venture Capital

? Pilkington, A. and Teichert, T. (2006), Management of technology: Themes, concepts and relationships. *Technovation*, **26** (3), 288-299.

Full Text: [2006\Technovation26, 288.pdf](2006/Technovation26,%20288.pdf)

Abstract: In this paper, bibliometric (co-citation analysis) and social network analysis techniques are used to investigate the intellectual pillars of the technology management literature as reported in Technovation. Network analysis tools are also used to show that the research agenda of scholars from different parts of the world differ substantially from each other, and it is argued that such differences may have exacerbated the delays experienced in developing technology management as a respected academic discipline. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Academic, Academic Discipline, Analysis, Author Cocitation, Bibliometric, Bibliometric Techniques, Citation Analysis, Citation Analysis, Co-Citation, Co-Citation Analysis, Cocitation, Cocitation Analysis, Developing, Discipline, Factor Analysis, Journals, Literature, Management, Mar, Network, Network Analysis, Relationships, Research, Research Agenda, Rights, Scientific Literature, Social, Social Network, Social Network Analysis, Techniques, Technology, Technology Management, World

? Chao, C.C., Yang, J.M. and Jen, W.Y. (2007), Determining technology trends and forecasts of RFID by a historical review and bibliometric analysis from 1991 to 2005. *Technovation*, **27** (5), 268-279.

Full Text: [2007\Technovation27, 268.pdf](2007/Technovation27,%20268.pdf)

Abstract: Radio frequency identification (RFID) has been identified as one of the ten greatest contributory technologies of the 21st century. This technology has found a rapidly growing market, with global sales expected to top US $7 billion by 2008. An increasing variety of enterprises are employing RFID to improve their efficiency of operations and to gain a competitive advantage. To shed light on RFID trends, and contributions, a historical review and bibliometric analysis are included in this research. The bibliometric analytical technique was used to examine this topic in SCI journals from 1991 through November of 2005. Also, a historical review method was used to analyze RFID innovation, adoption by organizations, and market diffusion. From the analysis of the study’s findings, supply chain management (SCM), health industry, and privacy issues emerge as the major trends in RFID. Also, the contributions of the RFID industry and forecasts of technological trends were also analyzed, concluding that RFID will be more ubiquitously diffused and assimilated into our daily lives in the near future.

Keywords: Adoption, Analysis, Bibliometric, Bibliometric Analysis, Competitive, Competitive Advantage, Construction, Daily, Design, Diffusion, Efficiency, Enterprises, Forecasts, Health, Historical Review, Identification, Implementation, Industry, Innovation, Journals, Management, Market, Organizations, Privacy, Radio-Frequency-Identification, Research, Review, RFID, SCI, Smart, Supply Chain, Supply Chain Management, Supply-Chain Applications, Systems, Tags, Technique, Technologies, Technology, Trends, US

? Chao, C.C., Jen, W.Y., Hung, M.C., Li, Y.C. and Chi, Y.P. (2007), An innovative mobile approach for patient safety services: The case of a Taiwan health care provider. *Technovation*, **27** (6-7), 342-351.

Full Text: [2007\Technovation27, 342.pdf](2007/Technovation27,%20342.pdf)

Abstract: As the importance of patient safety increases for hospital management, many health care providers have begun to use innovative mobile technology to make their procedures more accurate and efficient, and to reduce the risk of human error. This paper explores an innovative mobile approach for patient safety and health care services in a Taiwan hospital, where a web-based patient safety services (PSS) system was implemented to enhance the efficiency of diagnosis and patient safety. The functions and operating procedures of the PSS system are introduced. Furthermore, the contributions of the PSS system over a six-month period of clinical use are analyzed. Finally, the managerial implications of mobile PSS are discussed.

Keywords: Patient Safety, Mobile Health Care Service, Health Care Providers, Mobile Technology

? Miyazaki, K. and Islam, N. (2007), Nanotechnology systems of innovation - An analysis of industry and academia research activities. *Technovation*, **27** (11), 661-675.

Full Text: [2007\Technovation27, 661.pdf](2007/Technovation27,%20661.pdf)

Abstract: Nanotechnology promises significant improvements of advanced materials and manufacturing techniques, which are critical for the future competitiveness of national industries. This paper is concerned with the sectoral innovation system in nanotechnology in a global perspective with an aim to understand worldwide developments in nanotechnology research from its emerging stage. The research highlights cross-country comparisons, actors and institutions in the innovation system based on quantitative method (bibliometrics and tech mining). The authors present also the varying involvement of academia, public research institutions and commercial companies in relevant research by finding main research contributors, discourse development, as well as clusters or knowledge networks of affiliations and countries. The research findings show that the significant output of commercial companies in Japan and the United States is different from the situation in the European Union, where the relevant scientific activities are dominated by academic and government research institutions. The research reveals the learning patterns of nanotech innovation structure for the science pole. The findings can be particularly useful for forming technology strategies, science and technology policies by revealing strengths and weaknesses of the emerging innovation system in nanotech, existing country-level competencies and differences. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Academia, Academic, Analysis, Authors, Bibliometrics, Bibliometrics and Tech Mining, Competencies, Development, Discourse, European Union, Government, Innovation, Innovation System, Institutions, Involvement, Japan, Knowledge, Learning, Manufacturing, Mining, Nanotechnology, Nanotechnology Research, National, Networks, NOV, Policies, Public, Research, Rights, Science, Science and Technology, Science and Technology Policy, Structure, Systems, Tech Mining, Techniques, Technology, United States

? Boardman, P.C. (2008), Beyond the stars: The impact of affiliation with university biotechnology centers on the industrial involvement of university scientists. *Technovation*, **28** (5), 291-297.

Full Text: [2008\Technovation28, 291.pdf](2008/Technovation28,%20291.pdf)

Abstract: Most study of university-industry interactions in biotechnology emphasizes the productivity (e.g., patents, spin-off firms) of a relative few number of “star” university scientists. This study uses a national survey of university scientists to assess the industry involvement of university scientists who affiliate with university research centers focused on biotechnology. The results demonstrate such affiliation to correlate positively with informal interactions with industry, such as knowledge exchange, but not with reports of the production of economic and bibliometric outputs. Implications for policy and centers programs are discussed. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Affiliation, Bibliometric, Biotechnology, Economic, Impact, Innovation, Knowledge, National Survey, Networks, Patents, Policy, Productivity, Public-Sector Research, Research, Rights, Survey, Technology, University, University Research Centers, University-Industry Interactions

? Boardman, P.C. (2008), Beyond the stars: The impact of affiliation with university biotechnology centers on the industrial involvement of university scientists. *Technovation*, **28** (5), 291-297.

Full Text: [2008\Technovation28, 291.pdf](2008/Technovation28,%20291.pdf)

Abstract: Most study of university-industry interactions in biotechnology emphasizes the productivity (e.g., patents, spin-off firms) of a relative few number of “star” university scientists. This study uses a national survey of university scientists to assess the industry involvement of university scientists who affiliate with university research centers focused on biotechnology. The results demonstrate such affiliation to correlate positively with informal interactions with industry, such as knowledge exchange, but not with reports of the production of economic and bibliometric outputs. Implications for policy and centers programs are discussed. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Affiliation, Bibliometric, Biotechnology, Economic, Impact, Innovation, Knowledge, National Survey, Networks, Patents, Policy, Productivity, Public-Sector Research, Research, Rights, Survey, Technology, University, University Research Centers, University-Industry Interactions

? Shibata, N., Kajikawa, Y., Takeda, Y. and Matsushima, K. (2008), Detecting emerging research fronts based on topological measures in citation networks of scientific publications. *Technovation*, **28** (11), 758-775.

Full Text: [2008\Technovation28, 758.pdf](2008/Technovation28,%20758.pdf)

Abstract: In this paper, we performed a comparative study in two research domains in order to develop a method of detecting emerging knowledge domains. The selected domains are research on gallium nitride (GaN) and research on complex networks, which represent recent examples of innovative research. We divided citation networks into clusters using the topological clustering method, tracked the positions of papers in each cluster, and visualized citation networks with characteristic terms for each cluster. Analyzing the clustering results with the average age and parent-children relationship of each cluster may be helpful in detecting emergence. In addition, topological measures, within-cluster degree z and participation coefficient P, succeeded in determining whether there are emerging knowledge clusters. There were at least two types of development of knowledge domains. One is incremental innovation as in GaN and the other is branching innovation as in complex networks. In the domains where incremental innovation occurs, papers changed their position to large z and large P. On the other hand, in the case of branching innovation, they moved to a position with large z and small P, because there is a new emerging cluster, and active research centers shift rapidly. Our results showed that topological measures are beneficial in detecting branching innovation in the citation network of scientific publications. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Age, AIN Buffer Layer, Bibliometric Methods, Bibliometrics, Citation, Citation Network, Cluster, Clustering, Comparative Study, Complex Networks, Development, Domain Visualization, Economic Growth, Emergence, Future-Prospects, Innovation, Intellectual Property, Knowledge, Knowledge Domain, Knowledge Domains, Network, Networks, NOV, P, Papers, Participation, Productivity Growth, Publications, R&D Management, Research, Research Front, Research Fronts, Rights, Science Maps, Scientific Publications, Small, Technology Management, Topological Clustering

? Lee, S., Yoon, B. and Park, Y. (2009), An approach to discovering new technology opportunities: Keyword-based patent map approach. *Technovation*, **29** (6-7), 481-497.

Full Text: [2009\Technovation29, 481.pdf](2009/Technovation29,%20481.pdf)

Abstract: This paper proposes an approach for creating and utilizing keyword-based patent maps for use in new technology creation activity. The proposed approach comprises the following sub-modules. First, text mining is used to transform patent documents into structured data to identify keyword vectors. Second, principal component analysis is employed to reduce the numbers of keyword vectors to make suitable for use on a two-dimensional map. Third, patent ‘vacancies’, defined as blank areas in the map that are sparse in patent density but large in size, are identified. The validity of the vacancy is then tested against Such criteria as technological criticality and technological trends. If a vacancy is judged as meaningful, its technological features are investigated in detail to identify the potential for new technology creation. The procedure of the proposed approach is described in detail by employing an illustrative patent database and is implemented into an expert system for new technology creation. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Bibliometrics, Database, Industry, Intellectual Property, Keyword-Based, New Technology Creation, Patent Information, Patent Map, PCA, Performance, System, Technology Vacancy, Text-Mining, Trends, Visualization

? Abramo, G., D’Angelo, C.A., Di Costa, F. and Solazzi, M. (2009), University-industry collaboration in Italy: A bibliometric examination. *Technovation*, **29** (6-7), 498-507.

Full Text: [2009\Technovation29, 498.pdf](2009/Technovation29,%20498.pdf)

Abstract: This work investigates public-private research collaboration between Italian universities and domestic industry, applying a bibliometric type of approach. The study is based on an exhaustive listing of all co-authored publications in international journals that are jointly realized by Italian university scientists and researchers in the private sector; this listing permits the development of a national mapping system for public-private collaboration that is unique for its extensive and representative character. It is shown that, in absolute terms, most collaborations occur in medicine and chemistry, while it is industrial and information engineering that shows the highest percentage of co-authored articles Out of all articles in the field. In addition, the investigation empirically examines and tests several hypotheses concerning the qualitative-quantitative impact of collaboration on the scientific production of individual university researchers. The analyses demonstrate that university researchers who collaborate with those in the private sector show research performance that is superior to that of colleagues who are not involved in such collaboration. But the impact factor of journals publishing academic articles co-authored by industry is generally lower than that concerning co-authorships with other entities. Finally, a further specific elaboration also reveals that publications with public-private co-authorship do not show a level of multidisciplinarity that is significantly different from that of other publications. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Academic, Bayh-Dole Act, Bibliometrics, Co-Authorships, Collaboration, Impact, Impact Factor, Italy, Journals, Knowledge, Multidisciplinarity, Publications, R&D Cooperation, Research, Scientific Production, University, University-Industry Collaboration, US

? Ho, Y.S. (2009), Comments on “Determining technology trends and forecasts of RFID by a historical review and bibliometric analysis from 1991 to 2005”. *Technovation*, **29** (10), 725-727.

Full Text: [2009\Technovation2009-Ho.pdf](2009/Technovation2009-Ho.pdf); [2009\Technovation2009-Ho1.pdf](2009/Technovation2009-Ho1.pdf); [2009\Technovation29, 725.pdf](2009/Technovation29,%20725.pdf)

Keywords: Bibliometric, Bibliometric Analysis, Review, Technology, Trends

? Choi, D.G., Lee, Y.B., Jung, M.J. and Lee, H. (2012), National characteristics and competitiveness in MOT research: A comparative analysis of ten specialty journals, 2000-2009. *Technovation*, **32** (1), 9-18.

Full Text: [2012\Technovation32, 9.pdf](2012/Technovation32,%209.pdf)

Abstract: This paper addresses how countries placed a different intellectual focus on the management of technology and innovation (MOT) research in ten leading MOT specialty journals published in 2000-2009. The result confirms that each country has quite diverse relative research interests and performances in MOT domains. Among the top seven leading countries in MOT research, the US has a comparative advantage in project management (PJM); the UK has one in social change (SCH); and Spain has one in intellectual property (IPR). The other four countries show much more dynamic observations. Netherlands has clearly a comparative advantage in technology policy (TPO), while Taiwan has one in technology analysis and forecast (TAF), Germany in entrepreneurship (ENT), and Italy in technology transfer and commercialization (TTC). This paper contributes to the MOT community by providing much clearer evidence of how countries become differently positioned in the global MOT arena. These empirical findings demonstrate significant differences in the comparative competitiveness of countries involved in MOT research that were little known earlier. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Analysis, Bibliometric Analysis, Bibliometric Analysis, Citation, Cooperation, Countries, Differences, Ent, Germany, Innovation, Innovation Management Journals, Italy, Journals, Knowledge, Management, Management of Technology And Innovation, MOT Research, National Competitiveness for MOT, Perspective, Policy, Publication, Relative Research Advantage Profile, Research, RRA, Social, Social Change, Spain, Systems, Taiwan, Technology, Technology Management, UK, US

# Title: Tekstil

Full Journal Title: Tekstil

ISO Abbreviated Title: Tekstil

JCR Abbreviated Title: Tekstil

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Jokic, M. (2001), Journal *Tekstil* in the course of fifty years from 1952 to 2000 - some bibliometrical indicators. *Tekstil*, **50** (12), 614-622.

Abstract: The development of Tekstil journal is presented for the 50-year period from 1952 to 2000. Dynamics of publication is analysed, as well as the influence of editorial board on the development of the journal through paper categorisation, the number of authors per paper published, communication between the authors through the institutions they are employed in, languages of the papers published, and also the status of the journal among Croatian professional journals and globally. Quotations of the journal are presented as a separate indicator. The results obtained show that the journal meets the most stringent formal criteria through its presence in the most renowned world secondary sources of information and data bases. The importance of the journal and its impact on the trade can be seen through its continuous monthly publication in the fifty years analysed. Editors of the journal will have to take responsibility and decide upon the future of Tekstil and its development.

Keywords: Authors, Board, Communication, Course, Criteria, Data, Development, Dynamics, Impact, Indicator, Indicators, Influence, Information, Institutions, Journal, Journals, Languages, Papers, Presence, Professional, Publication, Responsibility, Sources, Sources of Information, Status, Trade, World

? Purenovic, M., Miljkovic, M., Randelovic, M. and Momcilovic, M. (2010), Removal of reactive dye Procion Red MX-5B from model aqueus solutions using Mg-Al layered double hydroxide. *Tekstil*, **59** (3), 59-67.

Full Text: Tekstil59, 59.pdf

Abstract: Layered double hydroxides (LDHs), known as the anionic clays, have a layered structure and a permanent positive charge due to the partial substitution of bivalent cations with trivalent cations. Therefore, these compounds show anion exchange properties and they are suitable for removing anionic pollutants from water. In this paper, Mg-Al double hydroxide was synthesized and examined in terms of the characterization of its surface and its efficiency of the removal of the reactive dye Procion Red MX-5B from model aqueous solutions. It was found that the initial concentration, the contact time, pH value of solution and the competitive effect of sulfate anion, affect the dye adsorption process at constant temperature. Adsorption kinetics is interpreted by the pseudo second-order kinetics model, while the Temkin model of adsorption isotherm best describes the equilibrium condition. Infrared spectroscopy and surface photomicrography were used for characterization of materials in the native state and after adsorption. The results showed that the dye retention is performed by establishing hydrogen bonds and electrostatic interactions.

Keywords: Adsorption, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Aqueous Solutions, Aqueous-Solution, Azo-Dye, Characterization, Charge, Clays, Competitive, Concentration, Decolorization, Degradation, Double Hydroxide, Dye, Dye Adsorption, Efficiency, Equilibrium, Hydrogen, Isotherm, Kinetics, Kinetics Model, Layered Double Hydroxide, Layered Double Hydroxides, Malachite Green, MAR, Model, Optimization, Parameters, Permanent, pH, pH Value, Pollutants, Procion Red MX-5B, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo Second-Order, Pseudo-Second-Order, Reactive Dye, Removal, Retention, Second Order, Second Order Kinetics, Second-Order, Second-Order Kinetics, Solution, Solutions, Spectroscopy, State, Structure, Substitution, Sulfate, Surface, Temperature, Value, Water

# Title: Test

Full Journal Title: Test

ISO Abbreviated Title: Test

JCR Abbreviated Title: Test

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gil, J.A., Peña, D. and Rodríguez, J. (2000), Statistical research in Europe: 1985-1997. *Test*, **9** (1), 255-281.

Full Text: [2000\Test9, 255.pdf](2000/Test9,%20255.pdf)

Abstract: This work presents a descriptive analysis of statistical research in Europe in the period 1985-1997. Research productivity is measured by using the volume of articles published in a set of journals with high impact index. We present a comparison of the research productivity of the different countries in this period, and study their dynamic evolution by comparing the research productivity in the first and the last five years in the sample. This type of analysis is also applied to compare the statistical research institutions in Europe.

Keywords: Analysis, Bibliometrics, Countries, Europe, Evolution, Impact, Journals, Productivity, Productivity Rankings, Quality Indices, Research, Research Productivity, Statistical Research, Trends of Countries, Trends of Institutions

# Title: Teoreticheskaya I Eksperimentalnaya Khimiya

Full Journal Title: Teoreticheskaya I Eksperimentalnaya Khimiya

ISO Abbreviated Title: Teor. Eksp. Khimiya

JCR Abbreviated Title: Teor Eksp Khim

ISSN: 0497-2627

Issues/Year: 6

Journal Country/Territory: Ukraine

Language: English

Publisher: Inst Fiz Khim

Publisher Address: L V Pisarzhevsky Inst Physical Chem Natl Acad Sci Ukraine Prospekt Nauki 31

Subject Categories:

Chemistry, Physical: Impact Factor

? Tarasevych, Y.I. (1998), Inversed selectivity series for adsorption of alkali metal cations at side faces of layer alumo silicate crystals. *Teoreticheskaya I Eksperimentalnaya Khimiya*, **34** (1), 32-35.

Abstract: Adsorption of alkali metal cations at side faces of montmorillonite and kaolinite crystals is shown to be described by inversed selectivity series. The results obtained are compared with the data concerning the adsorbability of alkali metal cations at silica gel for neutral and high pH values, and also at aluminium oxide and gematite at pH values which exceed their corresponding isoelectric points. Which adsorbability series actually takes place, direct or inversed, depends on the concentration of ions which determine the potential of mineral ion exchanger surface, and also on the contribution of electrostatic repulsion between neighbouring cations into total energy of their adsorption at the ion exchanger.

# Title: Terapevticheskii Arkhiv

Full Journal Title: Terapevticheskii Arkhiv

ISO Abbreviated Title: Ter. Arkhiv

JCR Abbreviated Title: Terapevt Arkh

ISSN: 0040-3660

Issues/Year: 12

Journal Country/Territory: Russia

Language: English

Publisher: Izd Vo Meditsina

Publisher Address: Petroverigskii Per 6-8, K-142 Moscow, Russia

Subject Categories:

Medicine, General & Internal: Impact Factor

? Korshunov, N.I., Grigoryeva, E.A., Kapustina, L.V., Axenfeld, R.G., Baranova, E.Y. and Parusova, N.I. (1991), Problems, mental-disorders and life quality in patients with rheumatoid-arthritis. *Terapevticheskii Arkhiv*, **63** (8), 100-104.

Abstract: There were 157 patients with rheumatoid arthritis. of these, only 65 patients (41.4 %) failed to show any factor at the disease onset, which could be estimated as provoking. Psychoemotional factor was most common (in 47.7 % of cases). Later the indicated factor played a more important part: only 5.1 % of the patients denied or doubted it. In most cases, the distress was caused by family relations. There was an appreciable difference in the intensity of the problems in family and single patients. Affective disorders (neurotic and hypopsychotic depressions) were mostly recorded among mental disorders. The life quality determined in accordance with the self-estimation of the <<health>> and happiness>> noticeably depended both on biological factors (pain intensity, the degree of damage to the bones and joints, and the disease stage) and on social factors-the educational level and social position. The degree of personality merits defined according to the self-estimation of the <<mentality>> and <<character>> appeared higher in persons with higher education and in patients suffering from erosive arthritis. The data obtained provide evidence for the necessity of psychosomatic orientation of practicing physicians.

# Title: Terra Nova

Full Journal Title: Terra Nova

ISO Abbreviated Title: Terr. Nova

JCR Abbreviated Title: Terra Nova

ISSN: 0954-4879

Issues/Year: 6

Journal Country/Territory: England

Language: English

Publisher: Blackwell Science Ltd

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

Subject Categories:

Geosciences, Interdisciplinary: Impact Factor

? Trifonov, V.G., Bayractutan, M.S., Karakhanian, A.S. and Ivanova, T.P. (1993), The Erzincan earthquake of 13 march 1992 in eastern Turkey: Tectonic aspects. *Terra Nova*, **5** (2), 184-189.

Full Text: Ter Nov5, 184.pdf

Abstract: The tectonic significance of the Erzincan earthquake of 13 March, 1992 in Eastern Turkey is discussed. The intersection of the North Anatolian and The East Anatolian strike-slip fault zones has resulted in formation of the Erzincan pull-apart basin and new seismically active fault branches on its northeastern side. Local concentrations of surface ruptures strike along the most active branches of the North Anatolian fault zone (N300-degrees-W) for 62 km. They are usually open fractures with northeastern sides uplifted up to 20 cm and rarely with dextral offset up to 10 cm. These secondary ruptures manifest indirectly oblique seismic fault displacement corresponding to the Late Quaternary motion on the fault zone, although at the surface the dextral component has been suppressed relative to the vertical one.

? Barka, A. and Eyidogan, H. (1993), The Erzincan earthquake of 13 march 1992 in eastern Turkey. *Terra Nova*, **5** (2), 190-194.

Abstract: The 13 March 1992 Erzincan earthquake, M = 6.8, occurred in the eastern half of the Erzincan basin. The largest aftershock took place near Pulumur on 15 March 1992. No clear surface breaks were observed, although teleseismic studies suggested that it was a strike-slip earthquake striking parallel to the North Anatolian fault, with a focus of approximately 10±2 km depth, 30 km rupture length, 95 cm of slip, and a 1.16×1026 dyn.cm seismic moment. The aftershock distribution concentrated at an area of the intersection between the North Anatolian fault and the Ovaclk fault. These results indicate that the previously suggested seismic gap along the North Anatolian fault, east of Erzincan, still remains unruptured.

? Herak, M., Allegretti, I. and Duda, S.J. (1996), Magnification of undamped seismographs and the analysis of the 1906 San Francisco earthquake record obtained on the Vicentini seismograph in Zagreb (Croatia). *Terra Nova*, **8** (3), 286-292.

Abstract: A method to estimate the dynamic magnification of nonlinear seismographs is presented. The method was tested by applying it to the record of the 1906 San Francisco earthquake seismogram obtained on the Vicentini seismograph in Zagreb, in order to reconstruct the ground motion amplitudes. The magnitudes inferred from the corrected Vicentini recording of P-and surface waves are internally consistent (mb = 7.74, Ms = 8.48) and agree with the values published in various catalogues, within the error limits of magnitude determination for individual events. The corrected P-waveform is compatible with a rupture slip profile exhibiting several distinct maxima along the 300 km-long section of the San Andreas fault, in accordance with recent studies and contemporary geodetic measurements.

? Eyidogan, H. and Barka, A. (1996), The 1 October 1995 Dinar earthquake, SW Turkey. *Terra Nova*, **8** (5), 479-485.

Abstract: The Dinar earthquake (M (s) = 6.1, USGS-PDE) of 1 October 1995 occurred on the NWSE-trending Dinar Fault. The earthquake is associated with a 10-km-long surface rupture with predominantly normal faulting. The mainshock was preceded by a series of foreshocks that started 6 days before the mainshock and included two Md = 4.5 events. The mainshock source mechanism derived from the inversion of broad-band P waves revealed that two sub-events occurred on a NW-SE trending normal fault with a small strike-slip component. According to the source model estimated in this study, the first rupture started at a depth of about 8 km and reached to a depth of about 12 km propagating north-west. The total seismic moment found from the inversion of P waveforms is 2.0×1018 Nm. The seismic moment of the second subevent was about four times larger than the first one. Field observations, GPS measurements and slip vector obtained from the inversion of broad-band P waveforms suggest that the NW-SE trending Dinar Fault is due to the internal deformation of SW Anatolia moving southwestwards.

# Title: Terrestrial Atmospheric and Oceanic Sciences

Full Journal Title: Terrestrial Atmospheric and Oceanic Sciences

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1017-0839

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Seno, T. (2000), The 21 September, 1999 Chi-Chi earthquake in Taiwan: Implications for Tsunami earthquakes. *Terrestrial Atmospheric and Oceanic Sciences*, **11** (3), 701-708.

Abstract: The 1999 Chi-Chi earthquake in Taiwan can be regarded as a subduction zone earthquake in a tectonic sense. It was associated with an abnormally uplifted area in the northwestern corner of the earthquake fault, The area is in the river bed where the Ta-Chia River runs from east to west. The large horizontal movement of the basement south of the river to the north could have produced the multiple thrusts and the abnormal uplifts amounting to 3-6 m due to the shortening of the accretionary prism.

These inelastic uplifts would imply an abnormal tsunami if the area were under the sea, thus suggesting a new factor for the mechanism of tsunami earthquakes, which is an uplift of the sediment or weak accretionary prism caused by a sudden horizontal movement on the decollement beneath the lowermost inner trench slope like sand being pushed up by a bulldozer. This is consistent with the features of tsunami earthquakes having the low dip angle thrust extending to the trench.

Keywords: Chi-Chi Earthquake, Accretion, Sediment, Decollement, Tsunami Earthquakes, Accretionary Wedges, Thrust Belts, Mechanics

# Title: Tetsu to Hagane-Journal of the Iron and Steel Institute of Japan

Full Journal Title: Tetsu to Hagane-Journal of the Iron and Steel Institute of Japan

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shen, F., Takahashi, R. and Yagi, J. (1991), Kinetics of water gas shift reaction with the catalysts of metallic iron and nickel. *Tetsu to Hagane-Journal of the Iron and Steel Institute of Japan*, **77** (10), 1577-1584.

Abstract: An attempt was made to clarify the reaction mechanism and to determine the rate parameters for water gas shift reaction with solid metal as catalyst. For the reaction, the influence of gaseous adsorption on the surface of metal catalyst played an important role. In the present work, both lumpy iron and spherical nickel were used as catalysts and the rate of water gas shift reaction was observed at pressure range of 0.13 to 1.01 MPa. Adsorption of gas species was experimentally found to surpress the reaction. The rate equation of water gas shift reaction was derived on the basis of the Temkin’s adsorption theory as follows:

[GRAPHICS]

The parameters of k(app), m and n in the above equation were determined from the results of experiments. Calculated values based on the rate equation agreed well with observed data.

The order of catalytic activity of various catalysts at 873 K in the basis of unit area and unit time was found as follows: Lumpy iron > Spherical nickel > Reduced iron pellet (reduced at 1273 K by hydrogen)

Keywords: Water Gas Shift Reaction, Catalytic Reaction, Metallic Catalyst, Rate Equation, Gas Adsorption, Catalytic Activity, CO

# Title: Texas Medicine

(Tex. Med.)

? Gant, N.F. and Mondy, L. (1986), Immigrant health-care-Are we responsible, or not. *Texas Medicine*, **82** (11), 7.

? Mauro, G. (1990), A better environment means better public health. *Tex Med*, **86** (12), 31-32.

# Title: Textile Chemist and Colorist

Full Journal Title: Textile Chemist and Colorist

ISO Abbreviated Title: Text. Chem. Color.

JCR Abbreviated Title: Text Chem Color

ISSN: 0040-490X

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Amer Assn Text Chem Color

Publisher Address: PO Box 12215, Res Triangle PK, NC 27709

Subject Categories:

Materials Science, Textiles: Impact Factor

? Laszlo, J.A. (1996), Preparing an ion exchange resin from sugarcane bagasse to remove reactive dye from wastewater. *Textile Chemist and Colorist*, **28** (5), 13-17.

Abstract: Conventional treatments of wastewater containing reactive dye are either very costly or environmentally unsound. A strong anion-exchange resin can be prepared from sugarcane bagasse, a lignocellulosic byproduct of sugarcane processing, that effectively and inexpensively decolorizes dyehouse wastewater in an environmentally benign manner. Bagasse-derived resin binds hydrolyzed reactive dye with high affinity. The rate of dye binding is inversely proportional to resin particle size. Dye binding is largely unaffected by high salt concentrations. The materials cost (i.e., bagasse plus chemicals) for making the resin is quite low. It may be economically feasible to use the bagasse-derived resin without regeneration, in a batch process, which would provide great flexibility in the wastewater treatment regimen with minimal capital expenditure.

Keywords: Decolorization, Ion Exchange, Reactive Dyes, Wastewater Treatment, Cotton

? (1996), DOE and CMA sign responsible care agreement. *Textile Chemist and Colorist*, **28** (9), 3.

# Title: Textile Institute and Industry

Full Journal Title: Textile Institute and Industry

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0039-8357

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Rhys, O.G. (1978), Adsorption on activated carbon: Solution to dye-waste problems. *Textile Institute and Industry*, **16** (10), 312-314.

# Title: Textile Research Journal

Full Journal Title: [Textile Research Journal](http://trj.sagepub.com/)

ISO Abbreviated Title: Text. Res. J.

JCR Abbreviated Title: Text Res J

ISSN: 0040-5175

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Textile Research Inst

Publisher Address: PO Box 625, Princeton, NJ 08540

Subject Categories:

Materials Science, Textiles: Impact Factor

Notes: highly cited

? Halsey, G., White, Jr., H.J. and Eyring, H. (1945), Mechanical properties of textiles. I. *Textile Research Journal*, **15** (9), 295-311.

Full Text: [-1959\Tex Res J15, 295.pdf](-1959/Tex%20Res%20J15,%20295.pdf)

? Halsey, G. and Eyring, H. (1945), The mechanical properties of textiles. II. A general theory of elasticity with application to partially rubber-like substances. *Textile Research Journal*, **15** (12), 451-459.

Full Text: [-1959\Tex Res J15, 451.pdf](-1959/Tex%20Res%20J15,%20451.pdf)

Abstract: This paper is concerned with the deformation of a number of essentially independent molecules or molecular segments distributed statistically with respect to the distance between the ends of the molecules. They are supposed to be free to assume many configurations as a result of thermal agitation except at certain points which are stabilized by chemical forces to form the more or less tightly held and thus well-defined ends of the molecules. The problem solved here is as follows: Given an equilibrium distribution as a function of certain parameters, and given the expression for bulk properties in terms of molecular coordinates, what is the form of the tension as a function of the elongation and the various parameters?

? Eyring, H. and Halsey, G. (1946), The mechanical properties of textiles. III. *Textile Research Journal*, **16** (1), 13-25.

Full Text: [-1959\Tex Res J16, 13.pdf](-1959/Tex%20Res%20J16,%2013.pdf)

? Stein, R., Halsey, G. and Eyring, H. (1946), Mechanical properties of textiles. IV. *Textile Research Journal*, **16** (2), 53-60.

Full Text: [-1959\Tex Res J16, 53.pdf](-1959/Tex%20Res%20J16,%2053.pdf)

? Eyring, H. and Halsey, G. (1946), Mechanical properties of textiles. V. The three-element model under any experimental conditions. *Textile Research Journal*, **16** (3), 124-129.

Full Text: [-1959\Tex Res J16, 124.pdf](-1959/Tex%20Res%20J16,%20124.pdf)

? Holland, H.D., Halsey, G. and Eyring, H. (1946), Mechanical properties of textiles. VI. A study of creep of fibers. *Textile Research Journal*, **16** (5), 201-210.

Full Text: [-1959\Tex Res J16, 201.pdf](-1959/Tex%20Res%20J16,%20201.pdf)

? Katz, S., Halsey, G. and Eyring, H. (1946), Supplementary data for “the mechanical properties of textiles, III”. *Textile Research Journal*, **16** (6), 284-285.

Full Text: [-1959\Tex Res J16, 624.pdf](-1959/Tex%20Res%20J16,%20624.pdf)

Abstract: We are publishing this communication which presents supplementary data from the authors and Mr. Katz in connection with Part III of the series “The Mechanical Properties of Textiles.” This paper appeared on page 13 of the January, 1946, issue of TEXTILE RESEARCH JOURNAL.

? Halsey, G. and Eyring, H. (1946), Mechanical properties of textiles. VII. The visco-elastic properties of a wool fiber. *Textile Research Journal*, **16** (7), 329-334.

Full Text: [-1959\Tex Res J16, 329.pdf](-1959/Tex%20Res%20J16,%20329.pdf)

? Eyring, H. and Halsey, G. (1946), Mechanical properties of textiles. VIII. The stress-strain relationship of a plush fabric. *Textile Research Journal*, **16** (7), 335-337.

Full Text: [-1959\Tex Res J16, 335.pdf](-1959/Tex%20Res%20J16,%20335.pdf)

Abstract: In this paper the spring-dashpot theory which has been applied in previous papers in this series to single fibers and to yarns is applied here to the experimental investigations of a plush fabric which have been published by Fox and Schwarz. This serves to outline the experimental methods which should be followed if the data are to have maximum theoretical significance.

? Katz, S., Halsey, G. and Eyring, H. (1946), Mechanical properties of textiles. IX. A system showing a distribution of non-Newtonian viscous elements. *Textile Research Journal*, **16** (8), 378-381.

Full Text: [-1959\Tex Res J16, 378.pdf](-1959/Tex%20Res%20J16,%20378.pdf)

? Reichardt, C.H., Halsey, G. and Eyring, H. (1946), Mechanical properties of textiles. X. Analysis of steinberger data on creep of cellulose acetate filaments. *Textile Research Journal*, **16** (8), 382-389.

Full Text: [-1959\Tex Res J16, 382.pdf](-1959/Tex%20Res%20J16,%20382.pdf)

? Alexander, P. and Charman, D.A. (1950), The kinetics of wool dyeing. Part II. The adsorption of surface-active dyes by wool and other fibers. *Textile Research Journal*, **20** (11), 761-770.

Full Text: [-1959\Tex Res J20, 761.pdf](-1959/Tex%20Res%20J20,%20761.pdf)

Abstract: The kinetic curves for the adsorption on textile fibers of a dye having a long hydrocarbon chain (Carbolan Crimson BS) indicate that there is an initial rapid, but limited, reaction which is followed by a much slower reaction. The influence of electrolytes, dye concentration, and temperature was studied, and the magnitude of the initial adsorption was correlated with the surface activity of the solution. The dye thus taken up was shown to be located on the fiber surface which, being largely nonpolar, is an interface for adsorption of surface-active substances. It is suggested that the surface activity of the dye contributes substantially to its high anion affinity.

Medley, J.A. and Anderws, M.W. (1959), The effects of a surface barrier on uptake rates of dye into wool fibres. *Textile Research Journal*, **29**, 398-403.

Full Text: [-1959\Tex Res J29, 398.pdf](-1959/Tex%20Res%20J29,%20398.pdf)

Abstract: It is shown that any surface barrier to the entry of a dye into a fiber must modify the form of the uptake-time relation, the barrier exerting its greatest influence in the early stages of sorption, but becoming progressively less important as sorption proceeds. This is manifested by an initially concave-upwards tendency in the uptake-timel curve. The analysis, which takes account of variable diffusion characteristics of fibers forming the assembly, is applied to the uptake of Naphthalene Orange G by wool, and a small but definite effect is found, which could for instance be attributed to the epicuticle.

Notes: MModel

? McGregor, R., Whitney, C.K. and Hamilton, R.L. (1965), Applicability of Fick’s law to diffusion and sorption data. *Textile Research Journal*, **35** (3), 279-280.

Full Text: [1960-80\Tex Res J35, 279.pdf](1960-80/Tex%20Res%20J35,%20279.pdf)

? Giles, C.H. and Haslam, R. (1977), Measurement of particle-size of a high-lightfastness direct dye in cellulose by para-nitrophenol adsorption. *Textile Research Journal*, **47** (5), 347-350.

Full Text: 1960-80\Tex Res J47, 347.pdf

Keywords: Adsorption, Cellulose, Dye

? Giles, C.H. and Haslam, R. (1978), Study of physical state of some water-soluble dyes in cellulose by para-nitrophenol adsorption. *Textile Research Journal*, **48** (8), 490-494.

Full Text: [1960-80\Tex Res J48, 490.pdf](1960-80/Tex%20Res%20J48,%20490.pdf)

Abstract: The p-nitrophenol adsorption method has been used to measure the specific surface of two direct dyes and an acid wool dye in various forms of cellulose. The state of association is then determined. At weak shade depths a monolayer of dye is formed on the internal surface of the substrate, but as the shade is deepened multilayers appear to form, and eventually these break up into three-dimensional aggregates. Association occurs more readily in “never-dried” regenerated cettutose film than in normal film and is not influenced by drying. There is a correspondence between the state of association of C.I. Direct Blue1 measured by the present method and heat of dyeing and specific gravity data of the same dye/film system, determined by Daruwalla and D’Silva.

Keywords: Adsorption, Cellulose, Dyes

? Madan, G.L. and Shrivastava, S.K. (1979), Physical chemistry of dyeing of cellulosic fibers with reactive dyes. Part I: Role of electrolytes in the sorption of hydrolyzed reactive dyes. *Textile Research Journal*, **49** (6), 322-325.

Full Text: [1960-80\Tex Res J49, 322.pdf](1960-80/Tex%20Res%20J49,%20322.pdf)

Abstract: The effect of different electrolytes on the sorption of the hydrolyzed form of four different reactive dyes has been investigated. The electrolytes studied were sodium, ammonium, lithium, and magnesium chlorides, and ammonium sulfate, which differ widely in their ability to increase the sorption of hydrolyzed reactive dyes by cellulose. Their relative efficiencies were in the order: ammonium chloride > ammonium sulfate > sodium chloride > lithium chloride ≈ magnesium chloride. The effect of the electrolytes has been discussed in terms of partial screening of the urface charge on cellulose by the crowding of the cations at the cellulose-water interface, pH of the bath, and the ability to modify the structure of water. The ability of the electrolytes to modify the pH of the solution plays a dominant role in sorption increase at lower concentrations of electrolytes, whereas at higher concentrations the ability of the electrolytes to modify the cellulose-water interface plays a decisive role.

Etters, J.N. and Urbanik, A. (1983), An automated computation of diffusion equation solutions. *Textile Research Journal*, **53**, 598-605.

Full Text: [1983\Tex Res J53, 598.pdf](1983/Tex%20Res%20J53,%20598.pdf)

Abstract: The range of applicability and the level of accuracy of the Wilson, Carman-Haul, and Crank equations and Shibusawa’s approximations are revealed through detailed numerical computations. Also discussed is a calculator program which completely automates the computations involved in describing finite and infinite bath diffusion in a cylinder, resulting in a general accuracy to 4-5 significant figures in Mt/Mα or (Dt/r2)1/2.

? Espinosa-Jiménez, M. and Cano-Suárez, A. (1993), Effect of ethyl xanthogenate on sorption of an acid dye on polyester fibers. Part II: Kinetics and thermodynamics. *Textile Research Journal*, **63** (11), 667-674.

Full Text: [1993\Tex Res J63, 667.pdf](1993/Tex%20Res%20J63,%20667.pdf)

Abstract: Data are presented on the kinetics and thermodynamics of adsorption of Sirius red 4B on untreated polyester fibers along with the uptake of the same acid dye on polyester fibers treated with constant amounts of potassium ethyl xanthogenate at different temperatures. Temperature increases of the system decrease the adsorption of Sirius red 4B on untreated polyester, but increase uptake on polyester treated with ethyl xanthogenate. Sorption equilibria, specific rate constants, diffusion coefficients, activation energy, standard affinity, enthalpy and entropy of reaction have been determined in these processes. The results show that adsorption of Sirius red 4B on untreated polyester in the temperature interval tested probably takes place by means of H-bonds between the phenolic hydroxyl groups of the dye and the carboxyl end-group of the polyester. Also, on the basis of these compounds’ molecular structures, the results suggest that dye uptake by treated polyester probably takes place by means of a nucleophilic attack of the negatively charged-S- group of the ethyl xanthogenate ion taken up by the fiber on the carbonyl group of Sirius red 4B.

Keywords: Electrokinetic Properties, Finite Baths, Cotton

? Espinosa-Jiménez, M. and Cano-Suárez, A. (1995), Effect of ethyl xanthogenate on the absorption of a cationic dye on polyester fibers: Zeta potential and sorption thermodynamics. *Textile Research Journal*, **65** (3), 171-177.

Full Text: [1995\Tex Res J65, 171.pdf](1995/Tex%20Res%20J65,%20171.pdf)

Abstract: Data are presented for the zeta potential, kinetics, and sorption thermodynamics of CI Brilliant Green on both untreated polyester fibers and polyester pretreated with constant amounts of potassium ethyl xanthogenate at different temperatures. The rising temperature of the system increases dye absorption on untreated polyester, and the rising temperature of absorption increases dye uptake on pretreated polyester. Cationic dye absorption is enhanced by increasing amounts of ethyl xanthogenate taken up by the fibers during pretreatment. The negative zeta potential of pretreated polyester rises when the amount of ethyl xanthogenate in the pretreatment is increased at low concentrations of dye solution. The zeta potential sign changes at high concentrations of cationic dye in the liquid phase. When the amount of ethyl xanthogenate in the pretreatment increases, there is a displacement of this sign inversion toward lesser concentrations. Absorption equilibria, empirical rate constants, activation energy, standard affinity, and enthalpy and entropy of reaction are determined for cationic dye absorption on untreated and pretreated polyester. The results and the molecular structure of the dye and ethyl xanthogenate suggest that the absorption of CI Brilliant Green on the pretreated polyester probably takes place by means of an electrostatic attraction between the dye cation and the negatively charged - S- groups of the ethyl xanthogenate.

Keywords: Electrokinetic Properties

? Espinosa-Jiménez, M., Gimenez-Martin, E. and Ontiveros-Ortega, A. (1997), Absorption of N-cetylpyridinium chloride on Leacril fibers: Kinetics and thermodynamics. *Textile Research Journal*, **67** (9), 677-683.

Full Text: 1997\Tex Res J67, 677.pdf

Abstract: Data are presented on the kinetics and thermodynamics of absorption of N-cetylpyridinium chloride (N-CP-Cl) by Leacril fibers at different temperatures. The increased temperature of the system increases the surfactant content of the fibers. The experimental time sorption isotherms are represented by the exponential kinetic equation, M-t = M-eq(1 - e(-kt)): where M-t and M-eq refer to the amounts of surfactant taken up by Leacril at time t and equilibrium, respectively, and k refers to the rate constant. The empirical rate constant decreases with temperature. Values of half-absorption time at different temperatures are presented. Sorption equilibria of N-CP-Cl by Leacril are described by a Freundlich isotherm equation. Changes of enthalpy and entropy related to the process of absorption are calculated from the Clausius-Clapeyron equation. Isosteric heats of absorption are positive, between 20 and 120 kT/mol. The global change of entropy is positive, between 126 and 500 J/mol K. The best thermodynamic conditions for surfactant uptake by Leacril appear at the highest temperatures, when the standard free energy of absorption takes the most negative values. From the results, we find that the absorption of N-GP-Cl by Leacril in the temperature interval investigated takes place with establishment of chemical bonds, although physical contributions of an electrostatic nature between the cation of the surfactant and the sulphonate and sulfate end-groups of Leacril are the most important.

Keywords: Electrokinetic Properties, Adsorption, Sorption, Dye

Cleve, E., Bach, E., Denter, U., Duffner, H. and Schollmeyer, E. (1997), New mathematical model for determining time-dependent adsorption and diffusion of dyes into fibers through dye sorption curves in combination shades. Part I: Mathematical fundamentals. *Textile Research Journal*, **67** (10), 701-706.

Full Text: 1997\Tex Res J67, 701.pdf

Abstract: Dye uptake of textile substrates can be described as time-dependent by a new mathematical model, in which the sorption process is divided into fast and slow subprocesses. The fast subprocess describes the adsorption of the dye onto the fiber surface, and the slow one details the diffusion of the dye into the fiber. In addition, dye desorption is simultaneously considered along with adsorption. Relating this concept to the dyeing process, it is possible to divide the process into two parts-dye adsorption and diffusion. The model is verified by dyeing cotton with direct dyes, but the results are also transferable to other fibers and dye classes. Using this model, optimum dyeing parameters and dye combinations can be determined from the sorption curves, which are easily obtained by UV-VIS spectrophotometry.

? Sasaki, H., Morikawa, H. and Ito, H. (1999), Dyeing kinetics of CI Acid Orange 7 in multiple layers of a chemically modified wool fabric. *Textile Research Journal*, **69** (12), 944-948.

Full Text: [1999\Tex Res J69, 944.pdf](1999/Tex%20Res%20J69,%20944.pdf)

Abstract: When the concentration distribution of an acid dye in multiple layers of a chemically modified wool fabric is investigated, the concentration distribution curves have a sigmoidal shape. The adsorption isotherm is approximately described in terms of a Langmuir-type adsorption model. The dyeing rate curve shows the sorption delay during the initial stage of dyeing due to the diffusional boundary layer. We assume that the relationship between the diffusion coefficient D-f, dye concentration C, and constant alpha takes the form D-f = D-f(o) exp(alpha C). The diffusion parameters are estimated in such a way that the experimental data fit the theoretical curve of the concentration distribution based on the diffusional boundary layer model. The surface concentrations of the dye in multiple layers do not depend on the dyeing time, and they equal the equilibrium uptake. The constant surface concentration is explained by the affinity of the dye to the fibers.

Keywords: Diffusion

? Marzoug, I.B., Sakli, F. and Roudesli, S. (2009), Evaluation of dye sorption of reinforced zeolite esparto fiber. *Textile Research Journal*, **79** (4), 291-300.

Full Text: [2009\Tex Res J79, 291.pdf](2009/Tex%20Res%20J79,%20291.pdf)

Abstract: Rising concern about environmental issues has promoted the textile industry to investigate appropriate environmentally friendly treatment technology. Effluent aqueous waste containing dye compounds causes serious problems. Removal of dyes from the dye-containing effluents is currently based on a wide variety of physicochemical processes. The search for alternative and innovative wastewater treatment techniques has focussed on the use of biological materials. Activated carbon, zeolite and diatomite have been used as efficient methods for adsorption. For the first time, this paper reports on the use of reinforced zeolite esparto fiber as a cheaper alternative for the removal and absorbency of reactive dyes from aqueous solution. Reinforced zeolite esparto fibers were synthesized from cellulose esparto fibers pretreated with NaOH and preformed zeolite powders. Deposition of zeolite onto esparto fiber was made at fixed conditions of treatment and drying. Several techniques, such as infrared spectroscopy, X-ray diffraction, scanning electron microscopy and atomic force microscopy, were used to characterize these materials. The obtained materials were treated with solution of reactive dyes in different conditions to evaluate their sorption capacities. This uptake from aqueous solution was found to be influenced by pH of the solution, temperature, salt quantity and initial dye concentration. Sorption of reinforced zeolite cellulosic esparto fibers increased as the initial dye concentration increased in the solution. Maximum absorption capacity for reinforced zeolite esparto fiber at equilibrium was evaluated with variation of pH, temperature and salts quantities. Equilibrium data fitted very well to the Langmuir model in the studied concentrations. The sorption data were found to follow the second-order kinetic model with r2 of 0.97.

Keywords: Absorbency, Absorption, Absorption And Adsorption Capacities, Activated Carbon, Adsorption, Alternative, Aqueous Solution, Atomic Force Microscopy, Biological, Biosorption, Blue, Capacity, Carbon, Cellulose, Concentration, Concern, Data, Decolorization, Diatomite, Dye, Dyes, Effect of pH, Effluents, Electron Microscopy, Environmental, Environmentally Friendly, Equilibrium, Esparto Fiber, Esparto Fiber Reinforced Zeolite, Evaluation, Fibers, First, Force, Infrared, Infrared Spectroscopy, Kinetic, Kinetic Model, Langmuir, Langmuir Model, Mar, Methods, Microscopy, Model, NaOH, pH, Reactive Dyes, Removal, Removal of Dyes, Salt, Salts, Scanning Electron Microscopy, Second Order, Second-Order, Solution, Sorption, Spectroscopy, Techniques, Technology, Temperature, Temperature and Salt Quantity, Textile Industry, Treatment, Treatment Technology, Uptake, Waste, Wastewater, Wastewater Treatment, X-Ray, X-Ray Diffraction, Zeolite

? Farizadeh, K., Yazdanshenas, M.E., Montazer, M., Malek, R.M.A. and Rashidi, A. (2010), Kinetic studies of adsorption of madder on wool using various models. *Textile Research Journal*, **80** (9), 847-855.

Full Text: [2010\Tex Res J80, 847.pdf](2010/Tex%20Res%20J80,%20847.pdf)

Abstract: In this research, the kinetics of adsorption of madder on scoured wool and mordanted wool with aluminum sulfate was studied. First the madder solution was prepared and the main compounds, alizarin, purpurin and quinizarin (1, 4 dihydroxyanthraquinone) of madder were identified by high pressure liquid chromatography (HPLC). The values of CIELAB of samples dyed with madder at different temperatures and times were measured and the results confirmed that the adsorption of madder on wool is an exothermic process. The kinetic study of adsorption of madder on scoured wool and mordanted wool fiber was fitted by pseudo first order, pseudo second order, Elovich and intra-particle diffusion models at different temperatures. The results show that the kinetic study of adsorption of madder on scoured wool and mordanted fiber was fitted by the pseudo second order model. The activation energy and adsorption kinetic of the dyes extracted from madder on scoured wool and mordanted wool were also determined by the pseudo second order model. The results indicated that increase in temperature leads to a decrease in dye adsorption on both scoured and mordanted wool fibers. The HPLC analysis of dye effluent for scoured wool confirms that decrease in dyeing temperature leads to a decrease in remaining dye compounds in the effluent.

Keywords: Activation, Activation Energy, Adsorption, Adsorption Kinetic, Aluminum, Ammonia, Analysis, Chromatography, Cotton, Diffusion, Dye, Dye Adsorption, Dyeing, Dyes, Elovich, Energy, Exothermic, Fibers, First, First Order, High Pressure Liquid Chromatography, HPLC, Intra-Particle Diffusion, Intraparticle Diffusion, Kinetic, Kinetic Study, Kinetics, Kinetics Of Adsorption, Lac, Liquid, Madder, Model, Models, Mordant, Natural Dye, Pressure, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Research, Roots, Second Order, Second-Order, Solution, Sulfate, Temperature, Wool

? Yu, D., He, J.X., Ma, Y.H. and Wang, W. (2011), Mechanisms and kinetics of chelating reaction between chitosan and Pd(II) in chemical plating pretreatment. *Textile Research Journal*, **81** (1), 51-57.

Full Text: [2011\Tex Res J81, 51.pdf](2011/Tex%20Res%20J81,%2051.pdf)

Abstract: The adsorption capability and kinetics of the adsorption of Pd(II) on polyester fabric treated with chitosan have been studied. Batch adsorption experiments were carried out in which the experimental parameters such as the initial metal ion concentration, contact time and temperature were varied. Langmuir and Freundlich isotherm models were employed to analyze the experimental data. The best approximation to the experimental data was given by the Langmuir isotherm and the maximum adsorption capacity was found to be 1.241 mg center dot g(-1) for Pd(II) on chitosan. The kinetic data were analyzed using pseudo-first-order and pseudo-second-order kinetic models. The data correlated well with the pseudo-second-order kinetic model, indicating that the chemical sorption was the rate-limiting step. The thermodynamic parameters like Gibbs free energy (ΔGº), enthalpy (ΔHº) and entropy (ΔSº) were also evaluated by applying the Van’t Hoff equation. The results indicated the exothermic nature of the adsorption process. This study offers a general model for the study of the kinetics of reactions between chitosan and metal ions on a polyester fabric base. It could be confirmed that the Pd-chitosan layer was deposited on polyester fabric when observed by scanning electron microscopy (SEM) and scanning probe microscopy (SPM).

Keywords: Adsorption, Adsorption Behavior, Adsorption Capacity, Aqueous-Solutions, Batch Adsorption, Beads, Capacity, Chemical, Chitosan, Concentration, Data, Derivatives, Dye, Electron Microscopy, Energy, Enthalpy, Entropy, Equilibrium, Exothermic, Experimental, Experiments, Freundlich, Freundlich Isotherm, General, Gibbs Free Energy, Ions, Isotherm, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir, Langmuir Isotherm, Mechanisms, Metal, Metal Ions, Metal-Ions, Model, Models, Pd(II), Pretreatment, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Rate Limiting Step, Rate-Limiting Step, Scanning Electron Microscopy, SEM, Sorption, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics

# Title: Theoretical Foundations of Chemical Engineering

Full Journal Title: [Theoretical Foundations of Chemical Engineering](http://www.springerlink.com/content/106294/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Okunev, A.Y. and Laguntsov, N.I. (2007), Effect of nonequilibrium absorption on gas transport in heterogeneous systems. *Theoretical Foundations of Chemical Engineering*, **41** (3), 257-263.

Full Text: [2007\The Fou Che Eng41, 257.pdf](2007/The%20Fou%20Che%20Eng41,%20257.pdf)

Abstract: A mathematical model is suggested for nonequilibrium gas absorption by a condensed medium through a free surface or a membrane. Surface reactions describe by first- and second-order rate equations arc taken into account. Gas transport through membranes and nonequilibrium gas sorption by liquids through a membrane are considered by way of examples. The effect of the sorption rate can be accounted for by introducing an efficient permeability of the gas-liquid interface.

Keywords: Absorption, Equations, Heterogeneous, Interface, Liquids, Mathematical Model, Membrane, Membranes, Model, Nonequilibrium, Permeability, Rate, Second Order, Sorption, Sorption Rate, Surface, Transport

# Title: Theoretical Medicine and Bioethics

Full Journal Title: [Theoretical Medicine and Bioethics](http://www.springerlink.com/content/103004/?p=a578c2f781b44deca549801e3b7c63b2&pi=0)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Garfield, E. and Welljamsdorof, A. (1992), Of Nobel class: A citation perspective on high-impact research authors. *Theoretical Medicine and Bioethics*, **13** (2), 117-135.

Full Text: [1992\The Med13, 117.pdf](1992/The%20Med13,%20117.pdf)

Abstract: The purpose of this paper was to determine if quantitative rankings of highly cited research authors confirm Nobel prize awards. Six studies covering different time periods and author sample sizes were reviewed. The number of Nobel laureates at the time each study was published was tabulated, as was the number of high impact authors who later became laureates. ne Nobelists and laureates-to-be were also compared with non-Nobelists to see if they differed in terms of impact and productivity. The results indicate that high rankings by citation frequency identify researchers of Nobel class - that is, a small set of authors that includes a high proportion of actual Nobelists and laureates-to-be. Also, the average impact (citations per author) of Nobelists and laureates-to-be is sufficiently high to distinguish them from non-Nobelists in these rankings. In conclusion, a simple, quantitative, and objective algorithm based on citation data can effectively corroborate - and even forecast - a complex, qualitative, and subjective selection process based on human judgement.

Keywords: Authors, Citation, Citation Analysis, Citation Impact, Citations, Impact, Nobel Prize, Productivity, Research, Researchers, Science Citation Index, Scientific Literature, Scientometrics

# Title: Theory and Practice of Logic Programming

Full Journal Title: Theory and Practice of Logic Programming

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Oetsch, J., Puhrer, J., Schwengerer, M. and Tompits, H. (2010), The system Kato: Detecting cases of plagiarism for answer-set programs. *Theory and Practice of Logic Programming*, **10**, 759-775.

Abstract: Plagiarism detection is a growing need among educational institutions and solutions for different purposes exist. An important field in this direction is detecting cases of source-code plagiarism. In this paper, we present the tool Kato for supporting the detection of this kind of plagiarism in the area of answer-set programming (ASP). Currently, the tool is implemented for DLV programs but it is designed to handle other logic-programming dialects as well. We review the basic features of Kato, introduce its theoretical underpinnings, and discuss an application of Kato for plagiarism detection in the context of courses on logic programming at the Vienna University of Technology.

Keywords: Answer-Set Programming, Plagiarism, Plagiarism Detection, Program Analysis, Review, Source Code, University

# Title: The Theory of Rate Processes

McGraw-Hill, New York

? Glasston, S., Laidler, K.J. and Eyring, H. (1941), *The Theory of Rate Processes*, McGraw-Hill, New York.

# Title: Therapie

Full Journal Title: [Therapie](http://www.journal-therapie.org/index.php?option=com_issues&task=all&Itemid=39&lang=fr_FR.utf8%2C+fr_FR.UT)

ISO Abbreviated Title: Therapie

JCR Abbreviated Title: Therapie

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Bador, P. and Lafouge, T. (2010), Comparative analysis of impact factor and h-index for pharmacology journals. *Thérapie*, **65** (2), 129-137.

Full Text: Therapie65, 129.pdf

Abstract: Comparative Analysis of Impact Factor and h-index for Pharmacology Journals. Using the strictly same parameters (identical two publication years (2004-2005) and identical one-year citation window (2006)), Impact Factor (IF) 2006 was compared with h-index 2006 for one sample of “Pharmacology and Pharmacy” journals computed from the ISI Web of Science. For this sample, the IF and the h-index rankings of the journals are very different. The correlation coefficient between the IF and the h-index is low for “Pharmacology and Pharmacy” journals. The IF and h-index can be completely complementary when evaluating journals of the same scientific discipline.

Keywords: Citation, Correlation, h Index, h-Index, IF, Impact, Impact Factor, Impact-Factor, ISI, ISI Web, ISI Web of Science, Journal Impact Factor, Journal Ranking, Journals, Parameters, Publication, Rankings, Science, Web of Science

# Title: Thermochimica Acta

Full Journal Title: [Thermochimica Acta](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5292&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=3835ffbc48e30e67440378589b669e68)

ISO Abbreviated Title: Thermochim. Acta

JCR Abbreviated Title: Thermochim Acta

ISSN: 0040-6031

Issues/Year: 22

Journal Country/Territory: Netherlands

Language: Multi-Language

Publisher: Elsevier Science BV

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

Subject Categories:

Chemistry, Analytical: Impact Factor 1.417, 35/68 (2006)

Chemistry, Physical: Impact Factor 0.807, 67/91 (2000); Impact Factor 1.417, 68/108 (2006)

Van Bokhoven, J.J.G.M. (1979), A method to measure the net heat of adsorption and the adsorption isotherm simultaneously. *Thermochimica Acta*, **34** (1), 109-126.

Full Text: [T\The Act34, 109.pdf](T/The%20Act34,%20109.pdf)

Abstract: A new method is described to measure net differential heats of adsorption; it is applied to the adsorption of water vapour on active carbon and synthetic zeolite samples. The method seems equally appropriate for many other systems. By compensating the heat of adsorption instrumentally with the heat of condensation during an adsorption process, it is possible to measure directly the net differential heat of adsorption.

Amounts adsorbed are also measured calorimetrically, while the pressure is registered simultaneously. The method may be operated in either a stepwise or a continuous dosing mode. A procedure is given to derive from the experimental data (adsorption isotherm and differential heat of adsorption) the differential entropy and energy of adsorption.

Dollimore, D. (1980), The effect of heat treatment on the adsorption properties of solids. I. Introduction. *Thermochimica Acta*, **38** (1), 1-14.

Full Text: [T\The Act38, 1.pdf](T/The%20Act38,%201.pdf)

Abstract: The use of various parameters calculated from the adsorption isotherm to follow the thermal treatment of solids is outlined. The parameters include the variation in the BET-C constant, the calculation of the apparent pore volume, the average pore radius and the pore size distribution. It is pointed out that the actual character of the adsorption isotherm can be altered by the heat treatment process. Three mechanisms of heat treatment are considered, namely, sintering, gasification of solids, and the thermal decomposition of crystals. The manner in which the specific surface area may be related to these processes is described.

Dollimore, D., Spooner, P. and Turner, A. (1980), The effect of heat treatment on the adsorption properties of solids. II. The effect of heat treatment on the character of the adsorption isotherm. *Thermochimica Acta*, **38** (1), 15-26.

Full Text: [T\The Act38, 15.pdf](T/The%20Act38,%2015.pdf)

Abstract: In this study the nitrogen adsorption isotherms of heat-treated zinc oxalate, sintered magnesium oxide, and some oxidised pitch resins are considered. It is shown that characterisation of the adsorption isotherm can be via the monolayer capacity, the BET constant *C*, or plots of the degree of coverage of the surface at various relative vapour pressures. These parameters are critically assessed and shown to be dependent upon the closeness to the manner in which the complete adsorption isotherm is described by the BET equation. In considering the complete adsorption isotherm it is considered best to characterise the adsorption data by quoting the statistical monolayer capacity and the value of *C* at this point on the adsorption isotherm. The adsorption isotherms are then best compared by plotting as the number of statistical layers against the relative pressure. The further characterisation by plotting the apparent variation in *C* or the degree of coverage of the surface against the relative pressure has a usefulness if the limitations of the method are noted.

Spiewak, B.E. and Dumesic, J.A. (1998), Applications of adsorption microcalorimetry for the characterization of metal-based catalysts. *Thermochimica Acta*, **312** (1-2), 95-104.

Full Text: [T\The Act312, 95.pdf](T/The%20Act312,%2095.pdf)

Abstract: Microcalorimetry is a useful tool for studies of heterogeneous catalysts, because it provides a direct measurement of the strength with which molecules interact with solid surfaces. The following communication reviews adsorption microcalorimetric studies of unsupported metals and metal-based catalysts performed over the last 20 years, and then presents three advanced microcalorimetric techniques and their applications to the study of low surface-area-metalsingle crystals, films and powders, and metalsurfaces/catalysts that are highly reactive toward oxygenates.

Guil, J.M., Masiá, A.P., Paniego, A.R. and Menayo, J.M.T. (1998), Energetics of H2 and O2 adsorption on Ir/γ-Al2O3 and Ir/SiO2 catalysts, dependence on support and on metal particle size. *Thermochimica Acta*, **312** (1-2), 115-124.

Full Text: [T\The Act312, 115.pdf](T/The%20Act312,%20115.pdf)

Abstract: The adsorption of hydrogen and oxygen on Ir/SiO2 and Ir/Al2O3 catalysts of various metal lic percentages and different metal particle sizes has been studied by adsorption microcalorimetry. The hydrogen adsorption stoichiometries lay between 1.1 and 2.4, depending on the support and on degree of dispersion. The variation of hydrogen adsorption heat with amount adsorbed revealed significant differences in surface heterogeneity between the various samples. The dependence of hydrogen adsorption stoichiometry and differential heat of adsorption vs. coverage curves on support and on particle size may be related to crystallite size and shape, and to differences in metal-support interaction. On the contrary, oxygen adsorption stoichiometries and differential heat of adsorption vs. coverage curves were very similar for all samples. The amount of oxygen adsorbed at the completion of the monolayer, clearly identified in the differential calorimetric isotherms, coincided with the amount of superficial iridium as determined by a volumetric method.

Matas, A.J., Cuartero, J. and Heredia, A. (2004), Phase transitions in the biopolyester cutin isolated from tomato fruit cuticles. *Thermochimica Acta*, **409** (2), 165-168.

Full Text: [T\The Act409, 165.pdf](T/The%20Act409,%20165.pdf)

Abstract: The specific heat of isolated tomato fruit cuticles and their corresponding cutins have been measured by first time for the physiological temperature in the range of 0–55 °C. Variation of specific heat of the different isolates during fruit growth have been also measured. Isolated cuticles and cutin from young tomato fruits presented a clear glass transition temperature around 23 °C. Water sorption on cutin samples shifted the glass transition temperature to 16.3 °C indicating a clear plasticization of the biopolymer. The presence of these second-order transitions in these lipophilic plant material that act as a molecular barrier between the atmosphere and the plant cell, determine the mechanical and rheological properties of this biological barrier modulating the mass transfer between the environment ant the plant cell.

Keywords: Plant Cuticle, Plant Cutin, Glass Transition, Rheological Properties

Lima, I.S. and Airoldi, C. (2004), A thermodynamic investigation on chitosan-divalent cation interactions. *Thermochimica Acta*, **421** (1-2), 133-139.

Full Text: [T\The Act421, 133.pdf](T/The%20Act421,%20133.pdf)

Abstract: The alpha-form of the biopolymer chitin, with particle sizes in the 80-200 mesh range was deacetylated under hot alkaline conditions to yield chitosan. These biopolymers were characterized by nitrogen elemental analyses, infrared spectroscopy, X-ray diffractometry and carbon-13 NMR. The degree of deacetylation found was 80.5%, which was determined via infrared spectroscopy. Chitosan suspended in water adsorbs the divalent cations cobalt, nickel, copper and zinc, as represented by batch process isotherms, in which the number of moles adsorbed as a function of cation concentration gave a defined isotherm for each cation, indicating saturation of the available nitrogen centers on the organic polymeric chain by cations in an acid-base interaction. The cation-biopolymer interaction was quantitatively followed through calorimetric fitration, whose values enabled the calculation of the thermodynamic values. The exothermic enthalpy, the negative Gibbs free energy and the positive entropic values are in agreement with a favorable thermodynamic condition for cation-chitosan amine group interaction. Based on negative enthalpic values, -26.66 ± 0.05, -27.58 ± 0.03, -39.05 ± 0.01 and -27.71 ± 0.04 kJ mol-1, the sequence expresses the Irving-Williams series, Co < Ni < Cu > Zn. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Chitosan, Chitin, Coordination, Adsorption, Thermodynamics, Atomic-Absorption-Spectrometry, Metal-Ion Enrichment, Enzyme Immobilization, Copper Adsorption, N-Deacetylation, Chitin, Derivatives, Acid, Preconcentration, Behavior

Bausach, M., Krammer, G. and Cunill, F. (2004), Reaction of Ca(OH)2 with HCl in the presence of water vapour at low temperatures. *Thermochimica Acta*, **421** (1-2), 217-223.

Full Text: [T\The Act421, 217.pdf](T/The%20Act421,%20217.pdf)

Abstract: The final products of the reaction between HCl and Ca(OH)2 can be Ca(OH)Cl, CaCl2, or both simultaneously depending on the temperature, HCl concentration and reaction time. A possible mechanistic pathway consistent with the experimental results concerns two consecutive reactions: The formation of Ca(OH)Cl and the final formation of CaCl2 from the reaction of Ca(OH)Cl with HCl. However, the second reaction might take place only, when Ca(OH)2 is missing. The amount of water retained by the solid during the reaction between HCl and Ca(OH)2 reaction is determined at 120 °C and 18% relative humidity employing a thermogravimetric analyser. The amount of water retained is a measure for the tendency of the solid to agglomerate. The stability of the Ca(OH)Cl at ambient conditions is studied and found to be good.

Keywords: Thermogravimetric Analyzer, In-Duct Dry Sorbent Injection, Desulfurisation, Hydrogen Chloride

? Cestari, A.R., Vieira, E.F.S. and da Rocha, F.C. (2005), Kinetics of interaction of hardened oil-well cement slurries with acidic solutions from isothermal heat-conduction calorimetry. *Thermochimica Acta*, **430** (1-2), 211-215.

Full Text: [T\The Act430, 211.pdf](T/The%20Act430,%20211.pdf)

Abstract: The kinetics of interaction of hydrochloric acid with oil-well cement slurries treated with the silane coupling agents, tetraethyl orthosilicate, 3-(trimethoxysilyl)-1-propanethiol and 3-(chloropropyl)-trimethoxysilane have been investigated isothermal heat-conduction calorimetry at 298.15K. The Avrami kinetic model gives a better fit to the experimental data than the traditional Lagergren kinetics models. A pore diffusion model suggests acid diffusion only for the standard slurry. The results indicate that isothermal heat-conduction calorimetry is suitable to evaluate the protective role of silane coupling agents on hardened oil-well cement slurries. (c) 2005 Elsevier B.V. All rights reserved.

Keywords: Hardened Cement Slurries, Silane Coupling Agents, Hydrochloric Acid Attack, Isothermal Heat-Conduction Calorimetry, Kinetic Modeling, Metal-Ions, Adsorption, Chitosan, Sorption, Dyes, Parameters, Resistance, Silica, Attack

? Vyazovkin, S., Rives, V. and Schick, C. (2010), Making impact in thermal sciences: Overview of highly cited papers published in *Thermochimica Acta*. *Thermochimica Acta*, **500** (1-2), 1-5.

Full Text: [2010\The Act500, 1.pdf](2010/The%20Act500,%201.pdf)

Abstract: Thermochimica Acta has been serving the thermal science community for 40 years and has now published its 500th volume. The editors provide a brief overview of the highly cited papers published by the journal. Analysis of the topics of the highly cited papers suggests that Thermochimica Acta possesses major strength in the areas of instrumentation, materials, and kinetics. (C) 2010 Published by Elsevier B.V.

Keywords: Computational Aspects, Crystallization Kinetics, Differential Scanning Calorimetry, Differential Scanning Calorimetry, DSC, Ictac Kinetics Project, Impact, Ionic Liquids, Isoconversional Methods, Journal, Kinetics, Modulated Temperature DSC, N-H Compounds, Overview, Papers, Poly(Ethylene Succinate), TGA, Thermal Analysis, Thermodynamic Properties, Thermogravimetry

# Title: Thin Solid Films

Full Journal Title: [Thin Solid Films](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5548&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=c25531ad29484eba401c8f79cfe0aae3)

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Materials Science Physics, Applied Physics, Condensed Matter: Impact Factor

Jaroniec, M. (1979), Effects of lateral interactions and surface heterogeneity in kinetics of adsorption from multicomponent gas-mixtures. *Thin Solid Films*, **59** (2), 249-254.

Full Text: [T\Thi Sol Fil59, 249.pdf](T/Thi%20Sol%20Fil59,%20249.pdf)

Abstract: The kinetics of monolayer adsorption from multicomponent gas mixtures with lateral interactions in the adsorbed phase are discussed. Using the Bragg-Williams approximation the equations for sorption rate and kinetic adsorption isotherms are derived for homogeneous and heterogeneous solid surfaces with patchwise and random distribution of adsorption sites. The equilibrium adsorption isotherms generated by equations of sorption rate are also presented.

Jaroniec, M. and Garbacz, J.K. (1979), Unified description of the kinetics of localized and mobile monolayer adsorption from the gaseous-phase onto solid-surfaces. *Thin Solid Films*, **62** (2), 237-246.

Full Text: [T\Thi Sol Fil62, 237.pdf](T/Thi%20Sol%20Fil62,%20237.pdf)

Abstract: A unified description of the kinetics of mobile and localized adsorption on solids is proposed. Theoretical considerations are presented for monolayer adsorption of single gases and binary gas mixtures with and without lateral interactions on homogeneous and heterogeneous solid surfaces. The equations for the sorption rate, derived in terms of this description, at equilibrium yield the majority of known adsorption isotherms and predict some new isotherms.

Jaroniec, M. (1980), Description of kinetics and equilibrium state of adsorption from multicomponent gas-mixtures on solid-surfaces. *Thin Solid Films*, **71** (2), 273-304.

Full Text: [T\Thi Sol Fil71, 273.pdf](T/Thi%20Sol%20Fil71,%20273.pdf)

Garbacz, J.K. and Jaroniec, M. (1983), Theoretical description of adsorbate adsorbate association in the case of mobile monolayer adsorption of gases on homogeneous solid-surfaces. *Thin Solid Films*, **100** (1), 43-51.

Full Text: [T\Thi Sol Fil100, 43.pdf](T/Thi%20Sol%20Fil100,%2043.pdf)

Notes: KKinitics

Abstract: The concept of adsorbate-adsorbate association is used for describing the mobile monolayer adsorption of gases on energetically homogeneous solid surfaces. Starting from the canonical partition functions for the mobile associated monolayers, a general procedure is proposed for deriving the analytical equations of adsorption isotherms. These equations are derived by applying different expressions for the free adsorbent surface area and by assuming the formation of double and multimolecular associates in the surface phase.

Jaroniec, M. (1983), Physical adsorption on heterogeneous solids: Present and future. *Thin Solid Films*, **100** (4), 325-328.

Full Text: [T\Thi Sol Fil100, 325.pdf](T/Thi%20Sol%20Fil100,%20325.pdf)

Abstract: Physical adsorption of gases and of gas and liquid mixtures on heterogeneous solids is briefly reviewed. A special emphasis is given to the outlook for the future theoretical work in this field. The elaboration of a unified description of physical adsorption on heterogeneous solids at fluid-solid interfaces and a standard method for evaluating the energy distribution function seem to be the most important problems in physical adsorption.

Dabrowski, A., Jaroniec, M. and Garbacz, J.K. (1983), Theory of multilayer adsorption from multicomponent liquid-mixtures on homogeneous solid-surfaces. *Thin Solid Films*, **103** (4), 399-415.

Full Text: [T\Thi Sol Fil103, 399.pdf](T/Thi%20Sol%20Fil103,%20399.pdf)

Abstract: Multilayer adsorption from multicomponent liquid mixtures on energetically homogeneous solid surfaces is discussed in terms of statistical thermodynamics. The canonical partition function is formulated for a multilayer surface phase consisting of molecules of identical molecular sizes. General relationships defining the equilibrium state are considered and are used to derive analytical equations for the adsorption isotherms.

Jaroniec, M., Piotrowska, J. and Bülow, M. (1983), Adsorption of mixtures of methane and krypton on CAA zeolite. II. Analysis of the experimental-data using Freundlich-type and Dubinin-Radushkevich-type equations derived by assuming similar heterogeneity parameters for single-gas adsorption. *Thin Solid Films*, **106** (3), 219-224.

Full Text: [T\Thi Sol Fil106, 219.pdf](T/Thi%20Sol%20Fil106,%20219.pdf)

Abstract: Equations for mixed-gas adsorption isotherms were derived on the basis of the integral equation of the adsorption isotherm by assuming constant differences in the adsorption energies for all types of adsorption sites. The application of Freundlich- and Dubinin-Radushkevich-type isotherms to the interpretation of experimental data for methane-krypton mixtures is also presented.

Notes: highly cited

? Decher, G., Hong, J.D. and Schmitt, J. (1992), Buildup of ultrathin multilayer films by a self-assembly process. III. Consecutively alternating adsorption of anionic and cationic polyelectrolytes on charged surfaces. *Thin Solid Films*, **210** (1-2), 831-835.

Full Text: [1992\Thi Sol Fil210, 831.pdf](1992/Thi%20Sol%20Fil210,%20831.pdf)

Abstract: A solid substrate with a positively charged planar surface is immersed in a solution containing an anionic polyelectrolyte and a monolayer of the polyanion is adsorbed. Since the adsorption is carried out at relatively high concentrations of polyelectrolyte, a large number of ionic residues remain exposed to the interface with the solution and thus the surface charge is effectively reversed. After rinsing in pure water the substrate is immersed in the solution containing a cationic polyelectrolyte. Again a monolayer is adsorbed but now the original surface charge is restored. By repeating both steps in a cyclic fashion, alternating multilayer assemblies of both polymers are obtained. The buildup of the multilayer films was followed by UV/vis spectroscopy and small angle X-ray scattering (SAXS). It is demonstrated that multilayer films composed of at least 100 consecutively alternating layers can be assembled.

Keywords: Monolayers

Creighton, J.R. (1994), The surface chemistry and kinetics of tungsten chemical vapor deposition and selectivity loss. *Thin Solid Films*, **241** (1-2), 310-317.

Full Text: [T\Thi Sol Fil241, 310.pdf](T/Thi%20Sol%20Fil241,%20310.pdf)

Abstract: The mechanism of tungsten chemical vapor deposition (CVD) using hydrogen reduction of tungsten hexafluoride is reviewed, with emphasis on the relevant fundamental surface chemistry and kinetics. We also briefly review the kinetics and mechanism of selectivity loss involving tungsten subfluorides. Most kinetic studies of the H2 + WF6 reaction for typical low pressure CVD conditions report a phenomenological rate law for deposition that is zeroth order in WF6 pressure and 1/2-order in H2 pressure. Unfortunately, most of the reaction mechanisms reported to yield the observed rate law are inconsistent with the known (or estimated) surface chemical properties of H2 and WF6 on tungsten. There are also many conditions where the accepted rate law is not valid. For instance, as the H2 pressure is lowered and becomes comparable with the WF6 pressure, the deposition rate drops to zero. Under these conditions hydrogen chemisorption is apparently completely quenched and the surface is saturated with adsorbed fluorine. Just above the H2 pressure threshold the deposition rate is first order rather than 1/2-order with respect to H2. In this regime the WF6 pressure dependence is also strongly negative order rather than zeroth order. All the deviations from the normal rate law can be qualitatively explained using a Langmuir-Hinshelwood reaction mechanism with competitive adsorption. An important intrinsic mechanism of selectivity loss that occurs during tungsten CVD involves tungsten transport by the formation and disproportionation of volatile tungsten subfluorides. We present some recent measurements of the tungsten subfluoride formation rate using the microbalance technique.

Angelova, A., Vollhardt, D. and Ionov, R. (1996), Domain pattern instability of a lipid monolayer induced by adsorption/desorption of a cyanine dye. *Thin Solid Films*, **285**, 85-89.

Full Text: [T\Thi Sol Fil285, 85.pdf](T/Thi%20Sol%20Fil285,%2085.pdf)

Abstract: Brewster angle microscopy (BAM) is applied for studying the in-plane morphology of a cationic lipid monolayer and its interaction with a novel, water-soluble, J-aggregate forming, negatively charged carbocyanine dye. A methodology of monolayer compression/recompression is followed to influence the dye crystallization upon adsorption from an aqueous subsolution at a charged interface. Crystalline domains of a dendritic type are observed in the lipid monolayer compressed on a pure water subphase. Dye aggregation and crystalline nucleation is established by means of BAM for 2D lipid densities corresponding to the onset of the main phase transition of the composite monolayer. Subphase conditions, which prevent the nucleation of lipid 2D crystalline phase domains, are found to not favor dye crystallization at the interface. Dye adsorption and aggregation is established to be partially irreversible upon monolayer decompression. Dye desorption is related to the observation of stripe-like objects in the lipid monolayer, developing undulation instability, which produces non-equilibrium 2D labyrinthine patterns with time.

Kusano, H., Kimura, S., Kitagawa, M. and Kobayashi, H. (1997), Application of cellulose Langmuir-Blodgett films as humidity sensors, and characteristics of the sorption of water molecules into polymer monolayers. *Thin Solid Films*, **295** (1-2), 53-59.

Full Text: [T\Thi Sol Fil295, 53.pdf](T/Thi%20Sol%20Fil295,%2053.pdf)

Abstract: Palmitoil cellulose Langmuir-Blodgett (LB) films have been prepared on quartz crystal oscillators in the fabrication of novel humidity sensors. The water sorption characteristics of the cellulose LB humidity sensors were investigated quantitatively by the microbalance method using a quartz oscillator. The dependence of the frequency difference of the oscillator with the adsorption of water molecules on the number of monolayers in the film and the temporal change have been measured under a wide range of fixed relative humidity conditions. The humidity dependence of the sorption characteristics falls into two regions: the lower relative humidity region shows slow desorption/sorption and a linear dependence on the number of monolayers in the film, and the higher relative humidity region shows a rapid desorption/sorption process and is independent of the number of monolayers.

In the lower relative humidity region, water sorption proceeds through the well ordered palmitoil cellulose LB monolayers onto various sites with different sorption energies in the glucose base unit. In the higher relative humidity region near saturation, the sorption is controlled simply by the free condensation of water molecules onto the him surface. These characteristics can be expressed numerically by the so-called Freundlich isotherm and the Polanyi theory. The applications of LB monolayer-based humidity sensors are briefly discussed. (C) 1997 Elsevier Science S.A.

Keywords: Langmuir-Blodgett Films (Lb Films), Monolayers, Polymers, Sensors, FT-IR

Matsumaru, K., Fukuyama, H., Susa, M. and Nagata, K. (1998), Evaporation from synthetic incinerator ashes melted by plasma arc. *Thin Solid Films*, **316** (1-2), 105-110.

Full Text: [T\Thi Sol Fil316, 105.pdf](T/Thi%20Sol%20Fil316,%20105.pdf)

Abstract: Synthetic incinerator ashes of 40 mass %SiO2–40CaO–20Al2O3 (named Glass) and 36 mass %SiO2–36CaO–18Al2O3–10Fe2O3 (named Fe-Glass) were melted by argon plasma arc, with iron rods used for arc ignition. A direct current transferred type plasma generator was used with an output power of 6 kW. During arc melting, the iron rod was melted and located in the centre of the molten ash. The temperature at the boundary between the iron and ash melts was 2200 K and that at the edge of the ash 1870 K. X-Ray diffraction showed that the deposit vaporised from Glass was composed of Fe, FeSi and amorphous SiO2. The evaporation rates from Glass and Fe-Glass were 3.8×10−4 g/s and 1.4×10−4 g/s, respectively. It has been concluded that the rate of evaporation from the molten ash is affected by the vaporisation reaction which determines the oxygen partial pressure in the whole system.

Keywords: Synthetic Incinerator Ashes, Argon plasma Arc, Evaporation

Raposo, M., Mattoso, L.H.C. and Oliveira, O.N. (1998), Adsorption isotherms of poly(o-methoxyaniline). *Thin Solid Films*, **327-329**, 739-742.

Full Text: [T\Thi Sol Fil327, 739.pdf](T/Thi%20Sol%20Fil327,%20739.pdf)

Abstract: Adsorption isotherms have been obtained for poly(o-methoxyaniline) (POMA) deposited from aqueous solutions onto glass substrates using UV-visible spectroscopy. Since the peaks in the UV-vis spectra are shifted due to dedoping of POMA during the adsorption process, isosbestic points had to be determined for estimating the amount of polymer adsorbed per unit area. Experiments were carried out at various temperatures. For 25°C, the data could be fitted with a Gu isotherm equation, which indicates that the formation of aggregates occurs for high concentrations. For concentrations below 0.25 g/l, the data could be fitted with a traditional Langmuir-type adsorption isotherm. A Langmuir isotherm also applies to data at the other temperatures employed, viz. 15°C, 40°C, 60°C and 80°C, far which the corresponding equilibrium adsorption constants were calculated. The enthalpy, entropy and free energy adsorption values were then estimated, which showed that POMA adsorption is mostly entropy controlled. (C) 1998 Published by Elsevier Science S.A. All rights reserved.

Keywords: Self-Assembly, Adsorption, Poly(o-methoxyaniline), Polyvinylsulfonic Acid, Adsorption Enthalpy, Isosbestic Point, Conjugated Polyions, Films, Surfactants, Surfaces

Nguyen, Q.T., Kidder, J.N. and Ehrman, S.H. (2002), Hybrid gas-to-particle conversion and chemical vapor deposition for the production of porous alumina films. *Thin Solid Films*, **410** (1-2), 42-52.

Full Text: [T\Thi Sol Fil410, 42.pdf](T/Thi%20Sol%20Fil410,%2042.pdf)

Abstract: Porous alumina films can be found in a wide variety of materials, including filters, thermal insulation components, dielectrics, biomedical and catalyst supports, coatings and adsorbents. Production methods for these films are as equally diverse as their applications. In this work, a hybrid process based upon chemical vapor deposition and gas-to-particle conversion is presented as an alternative technique for producing porous alumina films, with the main advantages of solvent-free, low substrate-temperature operation. In this process, nanoparticles were produced in the vapor phase by reaction of aluminum acetylacetonate in the presence of oxygen. Downstream of this reaction zone, these nanoparticles were collected via thermophoresis onto a cooled substrate, forming a porous film. Some deposited films were subjected to post-processing in the form of annealing in air. Fourier-transform infrared spectra and X-ray energy-dispersive spectroscopy analysis confirmed the production of alumina at processing temperatures above 973 K. X-Ray diffraction revealed that the films were amorphous. Film thickness, ranging from 30 to 250 μm, and the average deposition rate were determined from scanning electron microscopy results. From transmission electron microscopy, the average primary particle size was determined to be approximately 18 nm and the formation of nanoparticle aggregates was evident. Annealing of the films at temperatures ranging from 523 to 1173 K in the presence of air did not have an effect on particle size. The specific surface area of the powder composing the films ranged from 10 to 185 m2 g-1, as determined from nitrogen gas adsorption by the Brunauer-Emmett-Teller method. (C) 2002 Elsevier Science B.V All rights reserved.

Keywords: Aluminum Oxide, Chemical Vapor Deposition (CVD), Deposition Process, Fourier-Transform Infrared Spectroscopy (Ftir), High-Pressure Compaction, Surface-Area, Water-Vapor, Acetylacetonate, Phase, Kinetics, Growth, Size

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? Mountain, C.F. (1992), Surgical critical care: Who is responsible. *Thoracic and Cardiovascular Surgeon*, **40** (4), 173-177.

Full Text: Tho Car Sur40, 173.pdf

? Eshraghi, M., Habibi, G., Rahim, M.B., Mirkazemi, R., Ghaemi, M., Omidimorad, A., Alavi, A.A. and Banazadeh, M. (2011), Bibliometric analysis of lung transplantation research articles. *Thoracic and Cardiovascular Surgeon*, **59** (2), 108-114.

Full Text: [2011\Tho Car Sur59, 108.pdf](2011/Tho%20Car%20Sur59,%20108.pdf)

Abstract: Background: In the last 30 years lung transplantation has proven to be a lifesaving therapeutic option for patients with end-stage lung disease. The objective of this study was to perform a bibliometric analysis of lung transplantation research articles. Method: A bibliometric evaluation of the evolution of scientific production in the field of lung transplantations between 1989 and 2009 was conducted using the ISI Web of Science. The search terms selected were “lung transplant\*” OR “pulmonary transplant\*”. Specific features including year of publication, language, geographical distribution, first author, main journal publishing these articles, journals publishing highly cited articles, and institutional affiliation were analyzed. The citation characteristics of articles were additionally analyzed. Results: A total of 6409 (58.0%) research articles were found. The time trend of the number of articles showed an increase of more than 6.81 between 1989 and 2009. North America contributed 50.4% and Europe contributed 46.0% of published articles. The greatest number of contributions came from the USA (43.6%), followed by England (9.1%) and Germany (8.6%). There were 104522 citations of these articles by 25 July 2010. The average citation per article was 16.31. The New England Journal of Medicine ranked first with regard to the number of articles and the number of highly cited articles. G. A. Patterson, Washington University, and the US National Institutes of Health (NIH) were the top author, institution and funding agency, respectively. Conclusion: The number of publications and the scientific interest in lung transplantation has increased rapidly in recent years. Citations of articles published in the field of lung transplantation are increasing and the numbers of uncited articles are fewer compared to the average citations of articles and uncited articles in the field of medicine.

Keywords: Affiliation, Analysis, Articles, Bibliometric, Bibliometric Analysis, Bibliometric Evaluation, Bibliometrics, Bronchiolitis, Characteristics, Citation, Citations, Disease, Distribution, England, Europe, Evaluation, Evolution, Fibrosis, Field, First, Funding, Germany, Heart, International-Society, ISI, ISI Web of Science, Journal, Journals, Lung, Lung Benign or Congenital Lesions, Lung Transplantation, Mar, Medicine, National Institutes of Health, NIH, Nomenclature, North, North America, Patients, Primary Pulmonary-Hypertension, Publication, Publications, Publishing, Pulmonary Transplant, Recent, Registry, Research, Science, Scientific Production, Standardization, Therapeutic, Therapy, Time Trend, Transplantation, Transplantation Heart-Lung, Transplantation Lung, Trend, University, US, USA, Washington, Web of Science, Working Formulation

? Heinemann, M.K. (2011), Bibliometric analysis of lung transplantation research articles editor’s commentary. *Thoracic and Cardiovascular Surgeon*, **59** (2), 114.

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Respiratory System: Impact Factor

? Devereux, G., Ayatollahi, T., Ward, R., Bromly, C., Bourke, S.J., Stenton, S.C. and Hendrick, D.J. (1996), Asthma, airways responsiveness and air pollution in 2 contrasting districts of Northern England. *Thorax*, **51**, 169-174.

Full Text: Thorax51, 169.pdf

Abstract: BACKGROUND-To assess the possible magnitude of differences between normal populations an epidemiological investigation of asthma was conducted in two strongly contrasting districts of northern England-rural West Cumbria on the west coast and urban Newcastle upon Tyne on the east coast.

METHODS-A cross sectional survey of randomly identified men aged 20-44 years was conducted in two phases: phase 1, a postal survey of respiratory symptoms and asthma medication in 3000 men from each district; and phase 2, a clinical assessment of 300 men from each district comprising investigator administered questionnaires, skin prick tests, spirometry and methacholine challenge tests.

RESULTS-The phase 1 (but not phase 2) study showed a small excess of ‘ever wheezed’) in Newcastle (44% versus 40%), but neither phase showed differences between the two districts for recent wheeze or for other symptoms characteristic of asthma. There were also no differences with regard to diagnosed asthma, current asthma medication, spirometric parameters, or airways responsiveness. The prevalence of quantifiable airways responsiveness (PD20 less than or equal to 6400 µg) was 27.7% in West Cumbria and 28.2% in Newcastle. Regression analyses showed that PD20 was negatively associated with atopy and positively with forced expiratory volume in one second (FEV (1)); that an association between PD20 and current smoking could be explained by diminished FEV (1); and that PD20 was not related to geographical site of residence.

CONCLUSIONS Neither airways responsiveness nor the other parameters of diagnostic relevance to asthma varied much between the two study populations, despite the apparent environmental differences. The most obvious of these were the levels of outdoor air pollution attributable to vehicle exhaust emissions, the ambient levels of which were 2-10 fold greater in Newcastle. Our findings consequently shed some doubt over the role of such pollution in perceived recent increases in asthma prevalence. It is possible, however, that an air pollution effect in Newcastle has been balanced by asthmagenic effects of other agents in West Cumbria.

? Scarlett, J.F., Abbott, K.J., Peacock, J.L., Strachan, D.P. and Anderson, H.R. (1996), Acute effects of summer air pollution on respiratory function in primary school children in southern England. *Thorax*, **51**, 1109-1114.

Abstract: BACKGROUND-There is growing concern about health effects of air pollution in the UK. Studies in the USA have reported adverse effects on lung function among children but no comparable studies have been published in the UK. This study investigates the relationship between daily changes in ambient air pollution and short term variations in lung function in a panel of school children.

METHODS-One hundred and fifty four children aged 7-11 attending a primary school adjacent to a major motorway in Surrey, south-east England, were studied. fellows spirometry was performed daily on 31 schooldays between 6 June and 21 July 1994. Levels of ozone, nitrogen dioxide and particulates of less than 10 µm in diameter (PM (10)) were measured continuously at the school and the pollen count was measured six miles away. Relationships between daily changes in forced expiratory volume in 0.75 seconds (FEV (0.75)), forced vital capacity (FVC), the FEV (0.75)/FVC ratio and pollutants were analysed using separate autoregressive models for each child. A weighted average of the resulting slopes was then calculated.

RESULTS-There was a significant inverse relationship between daily mean PM (10) levels lagged one day and FVC, with a reduction in lung function of 1% (95% CI 0.3% to 2%) across the whole range of PM (10) levels (20-150 µg/m3). The effect on FEV (0.75) was similar (-0.5%) but was not significant when weighted by 1/SE (2) (95% CI-1.2% to 0.2%). There was no effect of PM (10) levels on the FEV (0.75)/FVC ratio. No significant association was seen between FEV (0.75), FVC, or the FEV (0.75)/FVC ratio and either ozone or nitrogen dioxide levels. There was no evidence that wheezy children were more affected than healthy children. Pollen levels on the previous day had no effect on lung function and did not change the air pollution results.

CONCLUSIONS-There is a very small, but statistically significant, adverse effect of airborne respirable particulate matter, measured as PM (10), on lung function in this study group. There is no evidence for an inverse association of lung function with levels of ozone or NO2 measured on the previous day.

? Partridge, M.R., Rippon, I. and Lewison, G. (2003), WHO funds UK respiratory research? *Thorax*, **58**, 22.

Full Text: Thorax58, 22.pdf

# Title: Thrombosis and Haemostasis

Full Journal Title: Thrombosis and Haemostasis

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Akl, E.A., Terrenato, I., Barba, M., Sperati, F., Muti, P. and Schunemann, H.J. (2008), Extended perioperative thromboprophylaxis in patients with cancer. *Thrombosis and Haemostasis*, **100** (6), 1176-1180.

Abstract: We systematically reviewed the literature to compare the relative efficacy and safety of extended versus limited duration heparin for perioperative thromboprophylaxis in patients with cancer. We followed the Cochrane Collaboration systematic review methodology and searched MEDLINE, EMBASE, ISI the Web of Science, and CENTRAL. The outcomes of interest included mortality, symptomatic deep venous thrombosis (DVT), pulmonary embolism, and bleeding. We evaluated the quality of evidence by outcome using the GRADE approach. of 3,986 identified citations, we included three randomized clinical trials using low-molecular-weight heparin (LMWH). The quality of evidence for mortality, DVT, and major bleeding was low. There was no significant difference between extended (4 weeks) and limited duration thromboprophylaxis in terms of death at three months (relative risk [RR]=0.49; 95% confidence interval [CI] 0.12-1.94), or major bleeding at four weeks (RR=2.94; 95% CI 0.12-71.85). An extended regimen was associated with a significantly lower risk of asymptomatic DVT (RR=0.21; 95% Cl 0.05-0.94). No data was available for symptomatic DVT In conclusion, there is limited and low-quality evidence that extended duration LMWH for perioperative thromboprophylaxis reduces DVT in patients with cancer undergoing major abdominal or pelvic surgery. More and better quality evidence is needed to justify extended regimens.

Keywords: Cancer, Citations, Clinical Trials, Cochrane, Collaboration, Complications, Efficacy, Embase, Grade, Heparin, Heparins, Interest, ISI, Literature, Low-Molecular-Weight, Major Abdominal-Surgery, Malignancy, Medline, Metaanalysis, Methodology, Mortality, Outcome, Outcomes, Patients, Prevention, Prolonged Thromboprophylaxis, Prophylaxis, Prophylaxis, Pulmonary Embolism, Randomized Clinical Trials, Recommendations, Relative Risk, Review, Risk, Safety, Science, Surgery, Systematic, Systematic Review, Thrombosis, Thrombosis, Venous Thromboembolism, Venous Thrombosis, Web of Science

? Sofi, F., Cesari, F., Abbate, R., Gensini, G.F., Broze, G. and Fedi, S. (2010), A meta-analysis of potential risks of low levels of protein Z for diseases related to vascular thrombosis. *Thrombosis and Haemostasis*, **103** (4), 749-756.

Abstract: The relationship between protein Z levels and thrombosis is controversial. We performed a systematic review and meta-analysis of the available studies to assess the association between protein Z and vascular thrombotic diseases. We conducted an electronic literature search through MEDLINE, EMBASE, Google Scholar, Web of Science, The Cochrane Library, bibliographies of retrieved articles and abstracts of congresses up to October, 2009. Studies were included if they analysed protein Z levels in patients with vascular thrombotic diseases. After the review process, 28 case-control studies (33 patient cohorts), including 4,218 patients with thrombotic diseases and 4,778 controls, were selected for analysis. The overall analysis using a random-effects model showed that low protein Z levels were associated with an increased risk of thrombosis (odds ratio [OR] 2.90, 95% confidence interval [CI] 2.05-4.12; p<0.00001). On subgroup analysis, a significant association was found between low protein Z levels and arterial vascular diseases (OR 2.67, 95%CI 1.60-4.48; p=0.0002), pregnancy complications (OR 4.17, 95%CI 2.31-7.52; p<0.00001), and venous thromboembolic diseases (OR 2.18, 95%CI 1.19-4.00; p=0.01). The results of this meta-analysis are consistent with a role for protein Z deficiency in thrombotic diseases, including arterial thrombosis, pregnancy complications and venous thromboembolism.

Keywords: Analysis, Atherosclerosis, Case-Control, Case-Control Studies, Coagulation, Cochrane, G79a Polymorphism, Google Scholar, Inhibitor, Ischemic-Stroke, Literature, Meta Analysis, Meta-Analysis, Model, Patients, Pregnancy, Pregnancy Complications, Protein Z, Prothrombotic Phenotype, Ratio, Review, Risk, Science, Systematic, Systematic Review, Thromboembolism, Thrombosis, Venous Thrombosis, Web of Science, Z Deficiency, Z Gene, Z Plasma-Levels

# Title: Thrombosis Research

Full Journal Title: [Thrombosis Research](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=4887&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=cc3973aacd0bccf50cdaf9e7d7ee1144)

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JCR Abbreviated Title:

ISSN: 0049-3848

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Dores, G.M., Miller, M.E. and Thorpe, S.L. (1993), Platelet adhesion at low shear rate: Study of a normal population. *Thrombosis Research*, **69** (2), 173-184.

Full Text: [T\Thr Res69, 173.pdf](T/Thr%20Res69,%20173.pdf)

Abstract: The use of oral contraceptives (OCs) has been associated with vascular complications. The mechanism(s) by which OCs predispose to thrombotic events remains unclear. Recent studies have demonstrated that postmenopausal (PM) women who take estrogen replacement therapy (ERT) have a decreased incidence of myocardial infarction compared to those who do not take ERT. This study was undertaken to determine if healthy individuals have differences in platelet adhesion depending on hormonal status. Men, PM women taking ERT, PM women not taking ERT, OC users, and premenopausal women not taking any medications were studied. Platelet studies were performed in a Hele-Shaw flow chamber at a low shear rate using platelet-rich plasma. The platelet adhesion process to subendothelial components: fibronectin, collagen I and collagen III was recorded using a 35 mm camera mounted on an inverted microscope. Photographs were taken at 30 second intervals for a total of 12 minutes and analyzed using a modified computer program which provided a numerical account of platelet adhesion. OC users had significantly higher platelet adherence to fibronectin, collagen I and collagen III compared to all other groups. All other study groups had similar platelet adhesion independent of hormonal status. These findings suggest that OCs cause increased platelet adhesion in some individuals and this may be one of the mechanisms by which OCs contribute to thrombotic events.

Keywords: Platelet Adhesion, Estrogen Replacement Therapy, Oral Contraceptives Corresponding Author, Dose Oral-Contraceptives, Vascular Subendothelium, Cardiovascular-Disease, Venous Thromboembolism, Human-Blood, Coagulation, Collagen, Surface

? Pai, M., Evans, N.S., Shah, S.J., Green, D., Cook, D. and Crowther, M.A. (2011), Statins in the prevention of venous thromboembolism: A meta-analysis of observational studies. *Thrombosis Research*, **128** (5), 422-430.

Full Text: [2011\Thr Res128, 422.pdf](2011/Thr%20Res128,%20422.pdf)

Abstract: Introduction: Studies have established a relationship between inflammation and venous thromboembolism (VTE). Though statins modulate inflammation, it is uncertain if they prevent VTE in heterogeneous populations. A recent randomized trial demonstrated that statins prevent VTE in healthy older adults, yet this has not been well established in other groups, including younger individuals and individuals with comorbidities. The objective of this meta-analysis was to estimate the effect of statins on VTE in a heterogeneous group of adults. Methods: We systematically reviewed the effect of statins in preventing VTE in adult inpatients and outpatients. We systematically searched MEDLINE (1966-Jan 2010), EMBASE (1980-Jan 2010), Google Scholar, Cochrane Library, PapersFirst, ProceedingsFirst, and ISI Web of Science, manually reviewed references, and contacted experts. Observational studies that compared any dose of statin to no statin or placebo, examined inpatients or outpatients, and assessed VTE, pulmonary embolism, and/or deep vein thrombosis were included. Study selection, data abstraction and study quality evaluation (using the Newcastle-Ottawa Scale) were independently conducted in duplicate. Results: Four cohort studies and four case-control studies met criteria. Comparing statins to control, the odds ratio for VTE was 0.67 (95% confidence interval 0.53, 0.84), and for deep vein thrombosis was 0.53 (95% confidence interval 0.22, 1.29). The association was attenuated in lower-quality studies and studies enrolling older individuals. Conclusions: Further well-designed trials are needed to evaluate the risks and benefits of statins in preventing VTE in heterogenous populations of adults, identify high-risk subgroups, and analyze cost-effectiveness of statin use for this indication. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Adult, Adults, Association, Cardiovascular Events, Case-Control, Case-Control Studies, Cochrane, Cohort, Cohort Studies, Control, Cost-Effectiveness, Deep Vein Thrombosis, Embase, Evaluation, Google Scholar, Health, Hydroxymethylglutaryl-Coa, Inflammation, Inflammation, ISI, ISI Web of Science, Medline, Meta Analysis, Meta-Analysis, Methods, Observational, Observational Studies, Older Adults, Prevention, Pulmonary Embolism, Ratio, Reductase Inhibitors, Risk, Scale, Science, Statins, Therapy, Thromboembolism, Thrombosis, Venous Thrombosis, Web of Science

# Title: Thyroidology

Full Journal Title: Thyroidology

ISO Abbreviated Title: Thyroidology

JCR Abbreviated Title: Thyroidology

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gaitan, E. (1990), Intervention policy in endemic goitre areas. *Thyroidology*, **2** (3), 113-119.

Abstract: The multifactorial nature and complex interactions of regionspecific environmental conditions with host factors in the pathogenesis of endemic goitre constitute a major challenge to the understanding and control of the problem in endemic areas. However, to control and prevent this important public health problem, the most obvious but difficult initial step requires substantial socioeconomic improvements in the affected areas of less developed countries, including, first, provision of efficient iodine prophylaxis programs, second, diversification of dietary constituents with adequate daily protein-calorie intake, and third, institution of proper sanitary conditions with effective water treatment to eliminate organic and bacterial pollutants. This last intervention is also a requirement to control and prevent goitre in the iodine-sufficient more developed countries. In this regard, more research is needed to provide effective ways of water treatment that can be applied in individual households or at the community level.

# Title: Tianjin Library Journal

Full Journal Title: [Tianjin Library Journal](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=JTXK&NaviLink=%e6%b4%a5%e5%9b%be%e5%ad%a6%e5%88%8a)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1005-8753

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Zhang, G.H. (2001), A review of architecture journals in foreign languages. *Tianjin Library Journal*, **??** (??), ??-??.

Abstract: This paper presents a statistical analysis of foreign journals in the field of architecture.All statistics are based on the 9th edition of the ‘Bibliography of Foreign Periodicals and Newspapers’.

Keywords: Bibliometric Analysis, Scholarly Journals

# Title: Tierarztliche Umschau

Full Journal Title: Tierarztliche Umschau

ISO Abbreviated Title: Tierarztl. Umsch.

JCR Abbreviated Title: Tierarztl Umschau

ISSN: 0049-3864

Issues/Year: 12

Journal Country/Territory: Germany

Language: English

Publisher: Terra-Verlag GmbH

Publisher Address: Postfach 10 21 44, D-78421 Konstanz, Germany

Subject Categories:

Veterinary Sciences: Impact Factor 0.261, / (2000)

? Pox, C. (1990), What it means to study homeopathy. *Tierarztliche Umschau*, **45** (4), 224-225.

# Title: Tidsskrift for den Norske Laegeforening

Full Journal Title: Tidsskrift for den Norske Laegeforening

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Seglen, P.O. (1989), The use of citation analysis and other bibliometric methods in evaluating research quality. *Tidsskrift for den Norske Laegeforening*, **109** (31), 3229-3234.

# Title: Tijdschrift Voor Diergeneeskunde

Full Journal Title: Tijdschrift Voor Diergeneeskunde

ISO Abbreviated Title: Tijdschr. Diergeneeskd.

JCR Abbreviated Title: Tijdschr Diergeneesk

ISSN: 0040-7453

Issues/Year: 24

Journal Country/Territory: Netherlands

Language: English

Publisher: Royal Netherlands Veterinary Assoc

Publisher Address: PO Box 14031, 3508 Utrecht, Netherlands

Subject Categories:

Veterinary Sciences: Impact Factor

? Wijbenga, A. (1992), Environmental-pollution focused on risks for cattle: Case-study in the province of south-holland. *Tijdschrift Voor Diergeneeskunde*, **117** (18), 517-519.

Abstract: Cattle are exposed to pollution by air, water, grass or soil. Exposure to environmental pollution is mainly through the eating of contaminated grass or feed Case studies in the province of South-Holland show the importance of risk evaluation not just for human health but also for the health of cattle. The sequence ‘environment-cattle-public health’ needs attention. The economic effects of pollution on agriculture may be considerable.

# Title: Tijdschrift Voor Economische en Sociale Geografie (Journal of Economic and Social Geography)

Full Journal Title: [Tijdschrift Voor Economische en Sociale Geografie](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=tesg)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Garcia-Ramon, M.D. and Caballe, A. (1998), Situating gender geographies: A bibliometric analysis. *Tijdschrift Voor Economische en Sociale Geografie*, **89** (2), 210-216.

Full Text: [T\Tij Voo Eco Soc Geo89, 210.pdf](T/Tij%20voo%20Eco%20Soc%20Geo89,%20210.pdf)

Abstract: Gender geography is now widely present on the agenda of international geography. In this paper we analyse its evolution through a bibliometric analysis of the articles and book reviews on gender published in 71 journals from 23 different countries, paying attention to the sex of the authors. We also make a thematic classification of the articles, taking into account the different languages and regions in which the journals are published. It is clear that gender geography from English speaking countries has played a very important role in the initial development of gender geography in other regional contexts, but, in spite of common origins and continuing strong influences, somehow different regional models of gender geography are emerging. We advocate the value of making greater efforts to integrate the work being done outside English speaking academia into the general surveys of gender geography.

Keywords: Articles, Bibliometric, Bibliometric Analysis, Classification, Evolution, Feminist Geography, Gender, Gender Geography, Geographical Journals, International Geography, Journals, Models

? Frenken, K. (2002), Europeanisation of science. *Tijdschrift Voor Economische en Sociale Geografie*, **93** (5), 563-569.

Full Text: [2002\Tij Voo Eco Soc Geo93, 563.pdf](2002/Tij%20voo%20Eco%20Soc%20Geo93,%20563.pdf)

Abstract: Data from the Science Citation Index on scientific collaborations within and between European countries are used to address the question of whether the European science system is integrating over time. It is argued that a simple comparison of the number of national collaborations and European collaborations is misleading as a means of analysing European integration, as this procedure does not control for differences in countries’ sizes. The larger a country, the more collaboration is expected to be oriented nationally because there are more opportunities to interact within the national borders. An alternative statistical analysis is proposed that compares the observed propensities to collaborate with the propensities that would occur when partner selection is random. The results show that, typically, larger countries are better integrated in the European system when size is controlled for, which suggests that scale advantages render larger countries more attractive partners than smaller countries.

Keywords: Citation, Collaboration, Comparison, European Integration, European Science, Integration, Knowledge Production, Localisation, Network Externalities, Research Collaboration, Scale, Science, Science Citation Index, Science Policy, System

? Cooke, P. (2009), The economic geography of knowledge flow hierarchies among internationally networked medical bioclusters: A scientometric analysis. *Tijdschrift Voor Economische en Sociale Geografie*, **100** (3), 332-347.

Full Text: [2009\Tij Voo Eco Soc Geo100, 332.pdf](2009/Tij%20voo%20Eco%20Soc%20Geo100,%20332.pdf)

Abstract: This paper builds on a suite of research studies examining the metamorphosis in industry organisation, as Penrose calls it, regarding the centrality of firm capabilities in biosciences. Whereas knowledge leadership capabilities used to be inside global corporations now they have given way to university laboratories and dedicated biotechnology firm networks to access innovative research. The basic argument is that research centre and small firm knowledge capabilities have generally outstripped those of the multinationals in knowledge-intensive industry, a consequence of which is a re-alignment in cause-and-effect outcomes shaping economic geography. This is particularly pronounced in biosciences and pharmaceuticals. The paper mobilises a new theoretical framework and new data that support the thesis that a realignment of industry organisation around knowledge capabilities was pioneered in biosciences, is active in other industries, and biosciences is now entering a new phase. This mirrors a rise in systems biology that re-asserts the dominance of key nodes in global bioeconomy hierarchies.

Keywords: Bioscience Firms, Bioscience Megacentres, Capabilities, Geography, Industry, Industry Organisation, Innovation, Knowledge, Knowledge Capabilities, Networks, Outcomes, Research, Scientometric, Scientometric Analysis, University

# Title: Tijdschrift Voor Nederlandse Taal-en Letterkunde

Full Journal Title: Tijdschrift Voor Nederlandse Taal-en Letterkunde

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? van Dijk, Y. (2010), ‘Do not you wait for inspiration’ Plagiarism, imitation and re-enactment in the novels of Arnon Grunberg. *Tijdschrift Voor Nederlandse Taal-en Letterkunde*, **126** (3), 228-241.

Abstract: The work of the succesful Dutch author Arnon Grunberg seems to be intertextual in a postmodern way: he recycles, quotes and refers to existing stories and novels. However, the functions of this intertextuality are different in Grunberg’s oeuvre than they were in postmodernism. Here I try to give a more adequate description and interpretation of intertextuality in his novels. We may speak of imitation (Mary Orr) or parody (Linda Hutcheon): biblical stories for example are rewritten by Grunberg, with an emphasis on difference. The aim is not to undermine the source-text, but rather to place the new text in a context of universal stories about humanity. And in the case of the ‘culture-text’ of the Holocaust, parody and ‘re-enactment’ (Ernst van Alphen) seem to be ways to come to terms with the past.

Keywords: Imitation, Interpretation, Plagiarism

# Title: Tissue Antigens

Full Journal Title: Tissue Antigens

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kamdi, A.S., Kandavalli, N.B., Emusu, D., Jain, N., Mamtani, M. and Porterfield, J.R. (2011), Weak or absent evidence for the association of HLA-DR antigens with risk of thyroid carcinoma: A meta-analysis of observational studies. *Tissue Antigens*, **78** (5), 382-389.

Full Text: [2011\Tis Ant78, 382.pdf](2011/Tis%20Ant78,%20382.pdf)

Abstract: Inconsistent reports of associations between human leukocyte antigen (HLA)-DR and thyroid cancers exist. We conducted a comprehensive search of the PubMed, Scopus and Web of Science databases. Using random-effects modeling, subgroup analyses, meta-regression and prediction interval (PI) estimation, we combined the existing evidence from 13 studies (977 cases of thyroid cancer and 3735 controls). Only HLA-DR1 and HLA-DR11 were significantly associated; however, the evidence for HLA-DR11 came from only three studies while that for HLA-DR1 had large between-study heterogeneity. All the PIs estimated in the study straddled unity. Therefore, current evidence for the studied association is incomplete as well as uncertain. Attempts to include HLA-DR typing as a prognostic or therapeutic marker may be premature at this time.

Keywords: Association, Autoimmune-Thyroiditis, Cancer, Carcinoma, Class-II Antigen, Databases, Expression, Graves-Disease, Hashimotos-Thyroiditis, Human, Human Leukocyte Antigen, Iodine Sufficiency, Major Histocompatibility Complex, Major Histocompatibility Complex, Meta Analysis, Meta-Analysis, Modeling, Observational, Observational Studies, PI, Population, Pubmed, Risk, Science, Scopus, Susceptibility, Thyroid Carcinoma, Web of Science

# Title: Tobacco Control

Full Journal Title: Tobacco Control

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Scollo, M., Lal, A., Hyland, A. and Glantz, S. (2003), Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry. *Tobacco Control*, **12** (1), 13-20.

Full Text: [2003\Tob Con12, 13.pdf](2003/Tob%20Con12,%2013.pdf)

Abstract: Objective: To compare the quality and funding source of studies concluding a negative economic impact of smoke-free policies in the hospitality industry to studies concluding no such negative impact. Data sources: Researchers sought all studies produced before 3 1 August 2002. Articles published in scientific journals were located with MEDLINE, Science Citation Index, Social Sciences Citation Index, Current Contents, PsychInfo, Econlit, and Healthstar. Unpublished studies were located from tobacco company websites and through internet searches. Study selection: 97 studies that made statements about economic impact were included. 93% of the studies located met the selection criteria as determined by consensus between multiple reviewers. Data extraction: Findings and characteristics of studies (apart from funding source) were classified independently by two researchers. A third assessor blind to both the objective of the present stud and to funding source also classified each study. Data synthesis: In studies concluding a negative impact, the odds of using a subjective outcome measure was 4.0 times (95% confidence interval (CI) 1.4 to 9.6; p = 0.007) and the odds of not being peer reviewed was 20 times (95% Cl 2.6 to 166.7; p = 0.004) that of studies concluding no such negative impact. All of the studies concluding a negative impact were supported by the tobacco industry. 94% of the tobacco industry supported studies concluded a negative economic impact compared to none of the non-industry supported studies. Conclusion: All of the best designed studies report no impact or a positive impact of smoke-free restaurant and bar laws on sales or employment. Policymakers can act to protect workers and patrons from the toxins in secondhand smoke confident in rejecting industry claims that there will be an adverse economic impact.

Keywords: Characteristics, Confidence, Consensus, Criteria, Economic, Employment, Extraction, Funding, Impact, Interval, Journals, Laws, Measure, Outcome, Peer-Reviewed, Policies, Quality, Quality of, Science Citation Index, Scientific Journals, Selection Criteria, Source, Sources, Synthesis, Tobacco

? Byrne, F. and Chapman, S. (2005), The most cited authors and papers in tobacco control. *Tobacco Control*, **14** (3), 155-160

Full Text: [2005\Tob Con14, 155.pdf](2005/Tob%20Con14,%20155.pdf)

Keywords: Authors, Citations, Control, Papers, Tobacco, Tobacco Control

? Lee, J.G.L., Griffin, G.K. and Melvin, C.L. (2009), Tobacco use among sexual minorities in the USA, 1987 to May 2007: A systematic review. *Tobacco Control*, **18** (4), 275-282.

Full Text: [2009\Tob Con18, 275.pdf](2009/Tob%20Con18,%20275.pdf)

Abstract: Objectives: This paper examines the prevalence of tobacco use among sexual minorities in the US through a systematic review of literature from 1987 to May 2007. Methods: Seven databases were searched for peer-reviewed research (Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library via Wiley InterScience, Education Resources Information Center (ERIC), Health Source: Nursing/Academic, Institute for Scientific Information (ISI) Web of Science, PsycINFO via EBSCO Host and PUBMED). No language restrictions were used. Abstracts were identified in the literature search (n = 734) and were independently read and coded for inclusion or exclusion by two reviewers. When agreement was not reached, a third reviewer acted as arbitrator. Abstracts were included if they presented data collected in the US from 1987 to May 2007 and reported prevalence or correlation of tobacco use with sexual minority status. Studies reporting data from HIV-positive samples were excluded. The identified articles (n = 46) were independently read by two reviewers who recorded key outcome measures, including prevalence and/or odds ratios of tobacco use, sample size and domain of sexuality (identity, behaviour, or desire). Factors relating to study design and methodology were used to assess study quality according to nine criteria. Results: In the 42 included studies, 119 measures of tobacco prevalence or association were reported. The available evidence points to disparities in smoking among sexual minorities that are significantly higher than among the general population. Conclusions: Ongoing, targeted interventions addressing smoking among sexual minorities are warranted in tobacco control programs.

Keywords: Bisexual College-Students, Cigarette-Smoking, Cochrane, Control, Databases, Design, Disparities, Education, Factors, Health, Health-Related Behaviors, Heterosexual Women, Identity, Interventions, ISI, Literature, Methodology, Methods, Minorities, Nursing, Of-The-Literature, Outcome, Points, Prevalence, Pubmed, Research, Review, Risk-Factors, Same-Sex, Science, Scientific Information, Smoking, Substance-Use Behaviors, Systematic, Systematic Review, Tobacco, Tobacco Control, Transgender Community, United-States, US, Web of Science

# Title: Tohoku Journal of Experimental Medicine

Full Journal Title: Tohoku Journal of Experimental Medicine

ISO Abbreviated Title: Tohoku J. Exp. Med.

JCR Abbreviated Title: Tohoku J Exp Med

ISSN: 0040-8727

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Journal Country/Territory: Japan

Language: Multi-Language

Publisher: Tohoku Univ Medical Press

Publisher Address: School of Medicine, Sendai 980-77, Japan

Subject Categories:

Medicine, General & Internal Medicine, Research & Experimental: Impact Factor

? Komatsu, S., Masuda, T. and Hisamichi, S. (1991), Effect of calcium on rat gastric carcinogenesis induced by N-methyl-N’-nitro-N-nitrosoguanidine. *Tohoku Journal of Experimental Medicine*, **165** (4), 291-297.

Abstract: The effect of calcium carbonate (CaCO3) on the initiation of gastroduodenal carcinogenesis induced by N-methyl-N’-nitro-N-nitrosoguanidine (MNNG) was examined under the conditions with and without sodium chloride. Male Wistar rats were given drinking water containing MNNG (100 mg/liter) and one of the following diets during the first 20 weeks ad libitum. Group 1 was given basal diet; group 2, diet with 10% NaCl; group 3, diet with 10% NaCl and 2.5% CaCO3; group 4, diet with 10% NaCl and 7.5% CaCO3; group 5, diet with 7.5% CaCO3. During the next 20 weeks, all groups were fed with the basal diet and tap water. The carcinogenic incidences of glandular stomach between the nonsalted diet groups, 1 and 5 (15% and 16% respectively), were not significantly different at the 40th week. The incidences in the salted diet groups 2, 3, and 4 were 59, 63, and 43%, respectively, indicating no statistical difference among them. Thus, CaCO3 showed no anticarcinogenic effect on gastroduodenal carcinogenesis. In the groups 3 and 4, however, increased incidence of duodenal cancer was observed.

Keywords: Calcium, Gastric Carcinogenesis, Rat, Sodium Chloride, N-Methyl-N’-Nitro-N-Nitrosoguanidine, Induced Ornithine Decarboxylase, DNA-Synthesis, Stomach Mucosa

# Title: Tokyo University of Information Sciences

東京情報大学研究論集

Harvey, N.W. and Chantawong, V. (2001), Adsorption of heavy metals by ballclay: Their compatition and selectivity. *Tokyo University of Information Sciences*, **5** (1), 79-86.

Full Text: [T\Tok Uni Inf Sci8, 79.pdf](T/Tok%20Uni%20Inf%20Sci8,%2079.pdf)

# Title: Topics in Applied Physics

Full Journal Title: [Topics in Applied Physics](http://www.springerlink.com.ludwig.lub.lu.se/content/vn4g54223084/#section=372889&page=1&locus=0)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Cardona, M. and Merlin, R. (2007), Light scattering in solids IX. *Topics in Applied Physics*, **108**, 1-15.

Full Text: [2007\Top App Phy108, 1.pdf](2007/Top%20App%20Phy108,%201.pdf)

Abstract: We briefly review the contents of this as well as previous volumes of the series Light Scattering in Solids, and present a, chronological account of the International Conference on Raman spectroscopy (ICORS).

A bibliometric study of early publications on the Raman effect is also presented together with a succint historical outline of the discovery of the effect and information recently made available about the Nobel Prize awarded to Sir Chandrasekhar Venkata Raman in 1930.

Keywords: Bibliometric, Bibliometric Study, Diffusion, Discovery, Historical, Information, IX, Liquids, Made, Publications, Radiation, Raman Spectroscopy, Review, Spectroscopy

# Title: Topics in Early Childhood Special Education

Full Journal Title: [Topics in Early Childhood Special Education](http://tec.sagepub.com/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Pool, J.L., Macy, M., McManus, S.B. and Noh, J. (2008), An exploratory investigation of frequently cited articles from the early childhood intervention literature, 1994 to 2005. *Topics in Early Childhood Special Education*, **28** (3), 181-189.

Full Text: [2008\Top Ear Chi Spe Edu28, 181.pdf](2008/Top%20Ear%20Chi%20Spe%20Edu28,%20181.pdf)

Abstract: The authors explored frequently cited articles across four peer-reviewed journals in early intervention (EI) and early childhood special education (ECSE). The Social Sciences Citation Index was used to examine journal articles from 1994 to 2005 in Early Childhood Research Quarterly, Infants and Young Children, the Journal of Early Intervention, and Topics in Early Childhood Special Education. Results for the most frequently cited El and ECSE journal articles are reported.

Keywords: Analysis-of-Behavior, Applied-Behavior-Analysis, Authors, Citation Analysis, Citation Trends, Classic Articles, Cross-Citations, Disabilities, Early Childhood Special Education, Early Intervention, JABA Authorship, Journal, Journals, Mental-Retardation, Self-Citations, Serving Young-Children, Special-Education Research

# Title: Torfianaia Promyshlennost

(Torf. Promst. Torf. Prom-st. TORPA)

Kosarevich, I.V. (1988), Structural-theological properties of peat dispersions. *Torfianaia Promyshlennost*, **10**, 16-18.

Gavril’chik, A.P., Mal, S.S., Serookaya, A.A., Beznosik, A.V., Kuntsevich, V.B. and Kostyukov, A.S. (1988), Changes in peat properties during production. *Torfianaia Promyshlennost*, **12**, 23-26.

Maslennikov, B.I. and Kiseleva, S.A. (1989), Physic-chemical basis for the use of peat in ion-exchange technology and adsorption processes. *Torfianaia Promyshlennost*, **5**, 23-25.

Chistova, L.R., Rogach, L.M., Sokolova, T.V. and Pekhtereva, V.S. (1990), Removal of heavy metal ions from electroplating wastewaters by granulated peat. *Torfianaia Promyshlennost*, **2**, 25-28.

# Title: Tourism Management

Full Journal Title: [Tourism Management](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5905&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=341a1db773debb5624811dc7516fc6b9)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Jogaratnam, G., Chon, K., McCleary, K., Mena, M. and Yoo, J. (2005), An analysis of institutional contributors to three major academic tourism journals: 1992–2001. *Tourism Management*, **26** (5), 641-648.

Full Text: [2005\Tou Man26, 641.pdf](2005/Tou%20Man26,%20641.pdf)

Abstract: The purpose of this research is to replicate an earlier study that analyzed tourism research contributions during the decade of the 1980s (Sheldon, 1991) using a time frame of 1992–2001, the most recent 10-year period for which complete publication information was available. The three refereed travel and tourism journals, *Annals of Tourism Research, Journal of Travel Research,* and *Tourism Management* were the focus of analysis. The results of a productivity analyses pertaining to author affiliation, repeat authorship, and research contributions from different regions of the world are presented. There has been considerable movement in the ranking of employing institutions when compared to the decade of the 1980s as well as significant change in contributions from different regions of the world.

Keywords: Tourism Research, Tourism Journals, Institutions, Research Productivity

? Hall, C.M. (2005), Systems of surveillance and control: Commentary on ‘An analysis of institutional contributors to three major academic tourism journals: 1992–2001’. *Tourism Management*, **26** (5), 653-656.

Full Text: [2005\Tou Man26, 653.pdf](2005/Tou%20Man26,%20653.pdf)

Abstract: The assessment of academic publishing performance has impliations not only for individuals and institutions, but also the development of tourism as a field of study. The article examines the ways in which academic journals are used and how this relates to scholarship and performance. The article notes some of the difficulties in citation analysis, questions what should be regarded as core quality tourism journals, and argues that citation analyses, without being linked to a broader understanding of the sociology of tourism knowledge, may be highly instrumental in character. The article concludes by questioning whether citation analyses are undertaken to actually contribute to understanding the development of a field and the knowledge networks which eventuate, or whether they represent a flawed attempt to develop league tables’ of performance.

Keywords: Sociology of Tourism Knowledge, Academic Journals, Citation Evaluation, Instrumentalism, Surveillance

? Jamal, T., Smith, B. and Watson, E. (2008), Ranking, rating and scoring of tourism journals: Interdisciplinary challenges and innovations. *Tourism Management*, **29** (1), 66-78.

Full Text: [2008\Tou Man29, 66.pdf](2008/Tou%20Man29,%2066.pdf)

Abstract: This paper provides a critical analysis of journal ranking and citation analysis in tourism studies. Authors and institutions using journal impact factors, citation frequency and hits as measures of academic productivity or importance should exercise great care in their use. A close look at Journal Citation Reports produced by Social Science Citation Index, ‘hits’ on CAB International, and citation analyses from several databases shows that the desire for a universal ranking system has so far only generated some imperfect systems and inconsistent applications to suit different needs. One size simply does not fit all. Drawing upon insights from other fields that have been addressing similar ranking and citation issues, concrete suggestions are offered for developing alternative evaluation parameters and processes for managing the diverse range of interdisciplinary journals in tourism and hospitality. Specifically, the analysis argues for differentiating journals by scope, influence, relevance and quality, and a scoring system that involves participation from the community of social scientists. Innovations for timely, effective dissemination of tourism knowledge are also forwarded. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Applications, Authors, Authorship Analysis, CAB International, Citation, Citation Analysis, Citation Frequency, Citations, Databases, Elsevier, Evaluation, Impact, Impact Factors, Impact-Factor, Interdisciplinary, International, Journal, Journal Citation Report (JCR), Journal Citation Reports, Journal Impact, Journal Impact Factor, Journal Ranking, Journals, Knowledge, Productivity, Quality, Ranking, Science, Science Citation Index, Social Science Citation Index, Social Science Citation Index (SSCI), System, Tourism Studies

? Hall, C.M. (2011), Publish and perish? Bibliometric analysis, journal ranking and the assessment of research quality in tourism. *Tourism Management*, **32** (1), 16-27.

Full Text: [2011\Tou Man32, 16.pdf](2011/Tou%20Man32,%2016.pdf)

Abstract: Bibliometric analysis is important in tourism as a result of external evaluation of research quality, interest in impact and prestige factors, and study of the field’s development. Although bibliometric analysis can be applied to any type of publication the main focus is on journals. Five approaches to the evaluation of journal quality are identified: stated preference, citation-based, derived, hybrid, and expert panels. Different productivity, impact and hybrid metrics are used to identify rankings of tourism journals from Scopus/SCImago data, compared with a derived RAE ranking, and three expert panel rankings. The different rankings reinforces that bibliometric understanding of scientific impact is a multi-dimensional construct. However, bibliometric analysis does not occur in an institutional and policy vacuum. The institutional context of government and private organization evaluations of research quality increasingly determine which metrics are applied, with subsequent effects on performance evaluation, career development and future direction of tourism-studies. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Analysis, Assessment, Bibliometric, Bibliometric Analysis, Career Development, Context, Data, Development, Economization, Evaluating Research Performance, Evaluation, Expert Panel, Hospitality, Hybrid, Impact, Indicators, Institutional Context, Institutional Contributors, Journal, Journal Impact, Journal Prestige, Journal Quality, Journal Ranking, Journals, Management, Metrics, Multidimensional, Neoliberalism, Organization, Performance, Performance Evaluation, Policy, Preference, Productivity, Publication, Quality, Rae, Ranking, Rankings, Research, Research Assessment Exercise, Research Quality, Rights, Scientific Impact, Scimago, Scopus, Social-Sciences, Tourism, Understanding, United-Kingdom, Vacuum

# Title: Tourism Tribune

Full Journal Title: [Tourism Tribune](http://e36.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=LYXK&NaviLink=%e6%97%85%e6%b8%b8%e5%ad%a6%e5%88%8a)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1002-5006

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Wang, M., Zhao, L.M. and He, Y. (2006), A study on the academic influence of tourism tribune from CAJCCR. *Tourism Tribune*, **21**, 93-96.

Full Text: [2006\Tou Tri21, 93.pdf](2006/Tou%20Tri21,%2093.pdf)

Abstract: The paper, using 408 papers published on ‘Tourism Tribune’ from 2001—2004 as the sample and applying the method of statistics from the data of ‘Reports on Comprehensive Citations of Chinese Journals and Periodicals’ (CAJCCR), makes a comparative analysis of its scientometrics. The results obtained objectively reflect the current ‘Tourism Tribune’ and its academic status as well as the problems to be noticed. This will be of certain instructions for scientific research personnel to pay attention to up-...

Keywords: Tourism Tribune, Scientometrics, CAJCCR, Index

# Title: Toxicity Assessment

? Rosenberg, F.A. and Duquino, H.H. (1989), Antibiotic-resistance of *Pseudomonas* from german mineral waters. *Toxicity Assessment*, **4** (3), 281-294.

# Title: Toxicological and Environmental Chemistry

(*Toxicol. Environ. Chem.*)

Full Journal Title: Toxicological and Environmental Chemistry

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Heaton, C., Frame, J. and Hardy, J.K. (1986), Lead uptake by *Eichhornia Crassipes*. *Toxicological and Environmental Chemistry*, **11**, 125-135.

? Rossi, C., Poli, P., Buschini, A., Cassoni, F., Galli, A., Vellosi, R. and Delcarratore, R. (1991), Genetic-activity of samples collected from a waste incinerator and its neighboring areas. *Toxicological and Environmental Chemistry*, **30** (1-2), 51-61.

Yamuna, R.T. and Namasivayam, C. (1993), Color removal from aqueous solution by biogas residual slurry. *Toxicological and Environmental Chemistry*, **38** (3-4), 131-143.

Abstract: The adsorption of Acid Brilliant Blue on biogas residual slurry has been investigated. The parameters studied include dye concentration, agitation time, adsorbent dosage and pH. The equilibrium data fit well with both the Langmuir and Freundlich models of adsorption isotherm. Maximum removal of 99% was observed at pH 2.56. Desorption studies indicate that the dye is solubilised in 50%(v/v) acetic acid to the extent of 59% and the remainder appears to be chemically complexed irreversibly to the adsorbent.

Keywords: Biogas Residual Slurry, Acid Brilliant Blue, Adsorption Isotherm, Intraparticle Diffusion, Particle Size, pH Effect, Waste Slurry, Congo Red, Adsorption, Adsorbents, Silica, Dyes

? Samara, C., Kouimtzis, T. and Katsoulos, G.A. (1994), Characterization of airborne particulate matter in Thessaloniki, Greece. Part II. A multivariate modeling approach for the source apportionment of heavy metal concentrations within total suspended particles. *Toxicological and Environmental Chemistry*, **41**, 221-232.

Full Text: 1994\Tox Env Che41, 221.pdf

Abstract: A receptor modeling approach has been applied to identify and apportion sources of airborne particulate matter in Thessaloniki, Greece, The absolute principal component analysis source apportionment technique used, provided quantitative information regarding both source particle characteristics and impacts. The analysis identified four major sources of heavy metals within total suspended particles (TSP) in the centre of the city: oil burning, pyrometallurgical non-ferrous metal processes, motor vehicles and soil resuspension. Their contributions to TSP estimated by regression on absolute principal component scores (APCS) were 12%, 8%, 5% and 4%, respectively. A similar analysis conducted for a sampling site close to the industrial area identified five major sources: oil burning, industrial Cr source, soil resuspension, pyrometallurgical non-ferrous metal processes and motor vehicles with contributions 20%, 15%, 9%, 8% and 4%, respectively.

? Samara, C., Kouimtzis, T. and Katsoulos, G.A. (1994), Characterization of airborne particulate matter in Thessaloniki, Greece. Part III. Comparison of two multivariate modeling approaches for the source apportionment of heavy metal concentrations within total suspended particles. *Toxicological and Environmental Chemistry*, **44** (3-4), 147-160.

Full Text: 1994\Tox Env Che44, 147.pdf

Abstract: Two different receptor models were applied for the source apportionment of airborne particulate matter in Thessaloniki, Greece. The two models, regression on absolute principal component scores and a modified version of factor analysis/multiple regression, were developed using heavy metal concentration data within total suspended particles. The results indicate that the use of more than one receptor modeling approach is a useful validation tool when apportioning sources of the suspended particulate matter. The type of sources resolved by both approaches were similar. Source contribution estimates and source emission profiles calculated with the two modeling approaches were also comparable.

Jain, A.K., Suhas, Jain, S. and Bhatnagar, A. (2003), Utilization of industrial wastes for the removal of anionic dyes. *Toxicological and Environmental Chemistry*, **84** (1-4), 41-52.

Full Text: [T\Tox Env Che84, 41.pdf](T/Tox%20Env%20Che84,%2041.pdf)

Abstract: Four adsorbents have been prepared from industrial wastes obtained from steel and fertilizer industries and investigated for their utility to remove anionic 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 fertilizer industry was found to show good porosity and appreciable surface area and consequently adsorbs dyes to an appreciable extent. The adsorption of two anionic dyes viz. methyl orange and brilliant blue G 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 which is about 90% of that observed with standard activated charcoal sample. Thus, it can be fruitfully used for the removal of dyes and is a suitable alternative of standard activated charcoal in view of its cheaper cost.

Keywords: Adsorption, Anionic Dyes, Industrial Wastes, Low Cost Adsorbents

? Ghaedi, M., Shokrollahi, A., Tavallali, H., Shojaiepoor, F., Keshavarz, B., Hossainian, H., Soylak, M. and Purkait, M.K. (2011), Activated carbon and multiwalled carbon nanotubes as efficient adsorbents for removal of arsenazo(III) and methyl red from waste water. *Toxicological and Environmental Chemistry*, **93** (3), 438-449.

Full Text: [2011\Tox Env Che93, 438.pdf](2011/Tox%20Env%20Che93,%20438.pdf)

Abstract: In this study, removal of arsenazo(III) using activated carbon (AC) and multiwalled carbon nanotubes and of methyl red using AC from waste water is reported. The influences of pH, temperature, concentration of the dye, amount of adsorbents, particle size of adsorbent, and contact time on the efficiency of removal from aqueous solution are investigated. Adsorption experiments indicate that the extent of adsorption is strongly dependent on the pH of the solution. Changes in free energy of adsorption (ΔG(0)), enthalpy (ΔH-0), and entropy (ΔS-0) are calculated to understand the nature of adsorption. The calculated values of ΔG(0) indicate that the adsorption process is spontaneous. The estimated values of ΔH-0 and ΔS-0 are positive which indicates that the adsorption process is endothermic and that the dye molecules are organized on the adsorbent surface in a more random fashion than in solution. The dye adsorption process follows a pseudo-second-order model under involvement of an intra-particle diffusion mechanism. Standard adsorption isotherms are used to fit the experimental data.

Keywords: Activated Carbon, Adsorption, Aqueous-Solutions, Basic Dye, Decolorization, Dye, Environmental-Samples, Equilibrium, Fly-Ash, Heavy-Metal Ions, Peat, pH, Solid-Phase Extraction

? Mohapatra, M., Padhi, T., Dash, T., Singh, P., Anand, S. and Mishra, B.K. (2011), Ambient temperature synthesis of nanorod 6-line ferrihydrite and its cation sorption behavior. *Toxicological and Environmental Chemistry*, **93** (5), 844-859.

Full Text: [2011\Tox Env Che93, 844.pdf](2011/Tox%20Env%20Che93,%20844.pdf)

Abstract: Nano-structured rod-shaped particles of 6-line ferrihydrite were synthesized at ambient temperature under controlled conditions. The phase formation was confirmed through X-ray diffraction (XRD). Shape and size of the particles were observed by transmission electron microscopy. Batch sorption studies for Pb(II), Cd(II), and Cu(II) were carried out. A pseudo second order rate model fitted to the kinetic data was obtained for the three cations. By increasing the pH from 2.0 to 5.3, sorption of the three cations increased. At a pH of 5.3, maximum loading capacities were 0.4, 0.7, and 0.9 mmol g-1. The isothermal data for Pb(II) and Cu(II) fitted to the Langmuir model, the Cd(II) data to a Freundlich isotherm. Cu(II) uptake increased with an increase of Cl- concentration, that of Cd(II) decreased. The Pb(II) uptake capacity passed through a maxima of 25 mg L-1 Cl-. Presence of [image omitted] had beneficial effect on the sorption of both Cu(II) and Pb(II) but affected Cd(II) sorption adversely. Depending on the sorbed metal ion, XRD results showed disappearance, shift in d-values, or variation in relative intensities. The sorption from solutions containing two or all three of the metal ions exhibited some selectivity.

Keywords: 6-Line Ferrihydrite, Adsorption, Batch, Cations, Cd(II), Cu(II), Electron Microscopy, Freundlich, Freundlich Isotherm, Goethite Alpha-Feooh, Heavy-Metal Pollution, Iron-Oxide, Isotherm, Kinetic, Langmuir, Pb(II), PH, Removal, Selectivity, Sorption, Surface Complexation, Temperature, Transition Electron Microscopy, Uptake, Water Interface, X-Ray Diffraction

# Title: Toxicological Sciences

Full Journal Title: [Toxicological Sciences](http://toxsci.oxfordjournals.org/archive/); [Toxicological Sciences](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=7158&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=f8829b0d20905fd19f9a7c9e959a9e29)

ISO Abbreviated Title: Toxicol. Sci.

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Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Oxford Univ Press

Publisher Address: Great Clarendon St, Oxford OX2 6DP, England

Subject Categories:

Toxicology: Impact Factor 3.088, 10/75 (2005)

? Garcia Arenas, G., Claudio, L., Perez Severiano, F. and Rios, C. (1999), Lead acetate exposure inhibits nitric oxide synthase activity in capillary and synaptosomal fractions of mouse brain. *Toxicological Sciences*, **50** (2), 244-248.

Full Text: [1999\Tox Sci50, 244.pdf](1999/Tox%20Sci50,%20244.pdf)

Abstract: The toxicity of lead (Pb) is of concern to public health due to its persistence in the environment. Brain is one of the major target organs where severe neurologic alterations may be triggered after exposure. The primary effects of lead on brain functions are thought to be a damage to the nervous system microvasculature. However, the mechanism of this toxicity is poorly understood. Nitric oxide synthase (NOS) may be a target for lead and changes in its function can result in a cascade of pathophysiological effects that may be observed in isolated capillaries and synaptosomes. We have determined the concentration of lead in blood, capillaries and synaptosomes in brain from mice receiving 0, 250, 500, and 1000 ppm of lead for 14 days, through the drinking water. NOS activity was determined in the capillaries and synaptosomes by following the conversion of H-3-L-arginine to H-3-L-citrulline. The results show that blood lead levels were dose-dependent. Brain capillaries showed a preferential accumulation of lead as compared to synaptosomes. With all Pb treatments, synaptosomal constitutive NOS was inhibited (about 50% of control) while the inducible NOS activity in capillaries was enhanced. These data suggest that inhibition of cNOS activity and increase in iNOS may contribute to the Pb effects on the CNS.

? Phillips, T.D. (1999), Dietary clay in the chemoprevention of aflatoxin-induced disease. *Toxicological Sciences*, **52** (2 SS), 118-126.

Full Text: Tox Sci52, 118.pdf

Abstract: Aflatoxins are harmful by-products of mold growth and, though invisible to the naked eye, are potentially fatal. The aflatoxin problem is long-standing and inextricable. Concerns about the aflatoxins originate from the strong implications of their involvement in disease and death in humans and animals, yet scientists and clinicians are still seeking ways to effectively deal with these dangerous and elusive chemicals. Safe, practical, and effective strategies for the detoxification of aflatoxin-contaminated food and feed are highly desirable. A simple and effective approach to the chemoprevention of aflatoxicosis has been to diminish or block exposure to aflatoxins via the inclusion of HSCAS clay in the diet. HSCAS clay acts as an a aflatoxin enterosorbent that tightly and selectively binds these poisons in the gastrointestinal tract of animals, decreasing their bioavailability and associated toxicities, Further studies to delineate the molecular mechanisms of action have shown that the dicarbonyl system of aflatoxin is essential for tight binding by HSCAS. In these studies, adsorption data was fitted to multiple isotherm equations including the Langmuir, multi-Langmuir, general Freundlich, Langmuir-Freundlich, Tóth and various transforms. Information derived included: the Gibbs standard free energy change of adsorption, enthalpy of adsorption, capacity, affinity, and heterogeneity coefficient. Computer modeling was also utilized to provide additional structural information and insight into the mechanism. Evidence suggests that aflatoxins may react at multiple sites on HSCAS particles, especially the interlayer region, but also at edges and basal surfaces. Since clay and zeolitic minerals comprise a broad family of functionally diverse chemicals, there may be significant hidden risks associated with their indiscriminate inclusion in the diet, All aflatoxin binding agents should be rigorously tested, paying particular attention to their effectiveness and safety in aflatoxin-sensitive animals and their potential for interactions with critical nutrients.

Keywords: Sodium-Calcium Aluminosilicate, Growing-Pigs, In-Vitro, Toxicity, Efficacy, Prevention, Sorbent, Zearalenone, Adsorption, Reduce, Clay, Hscas Clay, Chemoprevention, Chemoprotection, Chemoprophylaxis, Enterosorbent, Aflatoxin, Aflatoxicosis, Primary Hepatic Cancer, Sorption, Aflatoxin Binder, Detoxification

? Bae, D.S., Gennings, C., Carter, W.H., Yang, R.S.H. and Campain, J.A. (2001), Toxicological interactions among arsenic, cadmium, chromium, and lead in human keratinocytes. *Toxicological Sciences*, **63** (1), 132-142.

Full Text: [2001\Tox Sci63, 132.pdf](2001/Tox%20Sci63,%20132.pdf)

Abstract: To evaluate health effects of chemical mixtures, such as multiple heavy metals in drinking water, we have been developing efficient and accurate hazard identification strategies. Thus, in this study, we determine the cytotoxicity of arsenic, cadmium, chromium, and lead, and characterize interactions among these metals in human epidermal keratinocytes. Three immortal keratinocyte cell lines (RHEK-1, HaCaT, and NM1) and primary keratinocytes (NHEK) were. used. A statistical approach applying an additivity response surface methodology was used to test the validity of the additivity concept for a 4-metal mixture. Responses of the 4 keratinocyte strains to the metal mixture were highly dose-dependent. A growth stimulatory effect (hormesis) was observed in RHEK-1, NM1, and NHEK cells with the metal mixture at low concentrations (low ppb range). This hormesis effect was not significant in HaCaT. As the mixture concentration increased, a trend of additivity changed to synergistic cytotoxicity in all 4 cell strains. However, in NHEK, RHEK-1, and HaCaT, at the highest mixture concentrations tested, the responses to the metal mixtures were antagonistic. In NM1, no significant antagonistic interaction among the metals was observed. To explore a mechanistic basis for these differential sensitivities, levels of glutathione and metallothioneins I and II were determined in the keratinocyte cell strains. Initial data are consistent with the suggestion that synergistic cytotoxicity turned to antagonistic effects because at highest mixture exposure concentrations cellular defense mechanisms were enhanced.

Keywords: Keratinocytes, Toxicological Interactions, Additivity Response Surface, GSH, MT, Human Epidermal-Keratinocytes, Hamster Ovary Cells, Heat-Shock Protein, I/II Null Mice, Chemical Hormesis, Neoplastic Transformation, Sodium Arsenite, Gene-Expression, Growth-Factors, Metallothionein

# Title: Toxicologic Pathology

Full Journal Title: Toxicologic Pathology

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Journal Country/Territory: United States

Language: English

Publisher: Soc Toxicologic Pathologists

Publisher Address: 19 Mantua Rd, MT Royal, NJ 08061

Subject Categories:

Pathology, Toxicology: Impact Factor

? Calabrese, E.J. and Baldwin, L.A. (1999), The marginalization of hormesis. *Toxicologic Pathology*, **27** (2), 187-194.

Abstract: Despite the substantial development and publication of highly reproducible toxicological data, the concept of hermetic dose-response relationships was never integrated into the mainstream of toxicological thought. Review of the historical foundations of the interpretation of the bioassay and assessment of competitive theories of dose-response relationships lead to the conclusion that multiple factors contributed to the marginalization of hormesis during the middle and subsequent decades of the 20th Century. These factors include the following: (a) the close association of hormesis with homeopathy, which led to the hostility of modern medicine toward homeopathy, thereby creating a guilt-by-association framework, and the carryover influence of that hostility toward hormesis in the judgements of medically based pharmacologists/toxicologists; (b) the emphasis of high-dose effects linked with a lack of appreciation of the significance of the implications of low-dose stimulatory effects; (c) the lack of an evolution-based mechanism(s) to account for hermetic effects; and (d) lack of appropriate scientific advocates to counter aggressive and intellectually powerful critics of the hermetic perspective.

Keywords: Low Dose, Stimulation, Beta-Curve, Chemical Hormesis

? Toussaint, M.W., Wolfe, M.J., Burton, D.T., Hoffmann, F.J., Shedd, T.R. and Gardner, Jr., H.S. (1999), Histopathology of Japanese medaka (Oryzias latipes) chronically exposed to a complex environmental mixture. *Toxicologic Pathology*, **27** (6), 652-363.

Abstract: Japanese medaka (Oryzias latipes) were used to evaluate the carcinogenicity of a complex groundwater that contained 5 U.S. Environmental Protection Agency priority pollutant heavy metals and 13 chlorinated aliphatic hydrocarbons. A test protocol that used 10 mg/L diethylnitrosamine (DEN) prior to groundwater exposure was designed to assess both initiation and promotion. The fish were exposed continuously for 9 mo with 0, 1, 5, or 25% groundwater, by volume, with either West Branch of Canal Creek water (Aberdeen Proving Ground-Edgewood Area, Aberdeen Proving Ground, MD) or dechlorinated tap water as the diluent, while concurrent controls were run in the laboratory. Incidental findings included various neoplasms in the nares, ovary, skeletal muscle, skin, swim bladder, testis, thymus, and thyroid. Factors evaluated during statistical analyses of fish neoplasm prevalence included diluent type, groundwater percentage, fish gender, and DEN initiation. Liver neoplasm prevalence was higher in DEN-initiated fish and was frequently higher in males. Concentrations of up to 25% groundwater, by volume, showed no evidence of being a complete carcinogen and showed no consistent, conclusive evidence of being a promoter.

# Title: Toxicology

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Toxicology: Impact Factor 2.584, 13/75 (2005)

Yang, R.S. and Rauckman, E.J. (1987), Toxicological studies of chemical mixtures of environmental concern at the National Toxicology Program: Health effects of groundwater contaminants. *Toxicology*, **47** (1-2), 15-34.

Full Text: [T\Toxicology47, 15.pdf](T/Toxicology47,%2015.pdf)

Abstract: In cooperation with the Agency for Toxic Substances and Disease Registry, the National Toxicology Program is participating in a Public Health Service activity related to the Comprehensive Environmental Response, Compensation and Liability Act (Superfund Act) by conducting toxicology studies on chemicals found in high-priority hazardous waste sites and for which adequate toxicological data are not available. As part of this effort, a project on the toxicology of chemical mixtures of groundwater contaminants was initiated. The first study, centered on the health effects of groundwater contaminants, is at the contractual stage. Nineteen organic and six inorganic chemicals, selected from more than 1000 known groundwater contaminants, will be given in drinking water to Fischer 344 rats and B6C3F1 mice for 3 or 6 months. Controls and five dose levels, based on average concentrations (i.e., baseline level) of individual component chemicals, or 0.1-, 10-, or 1000-fold of the baseline level, will be used. Toxicological end points include mortality, clinical signs, water and food consumption, body and organ weights, clinical pathology analytes (e.g., hematology, clinical chemistry, and urinalysis), gross and histopathology, neurobehavioral tests, sperm morphology and vaginal cytology evaluations (SMVCE), and cytogenetics. This paper summarizes the rationale behind our experimental design and the factors one must consider when designing studies of complex chemical mixtures.

Liimatainen, A., Müller, D., Vartiainen, T., Jahn, F., Kleeberg, U., Klinger, W. and Hänninen, O. (1988), Chlorinated drinking water is mutagenic and causes 3-methylcholanthrene type induction of hepatic monooxygenase. *Toxicology*, **51** (2-3), 281-289.

Full Text: [T\Toxicology51, 281.pdf](T/Toxicology51,%20281.pdf)

Abstract: Acid/neutral fractions of 4 chlorinated drinking water samples were tested for mutagenicity in the Ames’ test and injected intraperitoneally to 10-and 20-day-old Wistar rats at doses of 200 and 100 liters of water/kg body weight. Cytochrome P-450 mediated enzyme activities of ethylmorphine-N-demethylase (EMND), 7-ethoxycoumarin-O-deethylase (ECOD), 7-ethoxyresorufin-O-deethylase (EROD) and 7-pentoxyresorufin-O-dealkylase (PEROD) were determined in the 9000 g supernatant fraction of liver homogenate. EROD was introduced by the concentrates. The induction was related to the mutagenic activity. About 4-fold increase in activity was observed with the most mutagenic sample. PEROD was also slightly enhanced. EMND and ECOD activities were not affected by the lower dose, but the higher dose caused inhibition of 30-40%. Although the extracts were not toxic to bacteria, they were unexpectedly toxic to rats. It is concluded that the samples contained 3-methylcholanthrene (3-MC) type inducer (s).

Penn, A., Lu, M.X. and Parkes, J.L. (1990), Ingestion of chlorinated water has no effect upon indicators of cardiovascular disease in pigeons. *Toxicology*, **63** (3), 301-313.

Full Text: [T\Toxicology63, 301.pdf](T/Toxicology63,%20301.pdf)

Abstract: Cardiovascular disease (CVD) accounts for nearly half the deaths, yearly, in the United States. The arterio (athero) sclerotic plaque is the principal lesion of CVD. The White Carneau (WC) pigeon is an animal model that has been employed extensively for studying CVD. Cholesterol (CHOL) feeding aggravates atherosclerosis in WC pigeons greater than 2 years old. In, (1986), two reports appeared from a single laboratory claiming a direct effect of drinking chlorinated (Cl) water upon lipid levels and plaque development in young (less than 1 year) WC pigeons. These are the only reports of such direct effects, to date. Three months’ exposure to 2 ppm or 15 ppm Cl in the drinking water, resulted in increased circulating CHOL levels in young male WC pigeons fed a normocholesterolemic (NC) diet in which Ca2+ levels were reduced. In addition, at both Cl concentrations there was a significant increase in plaque size, compared to controls. Pigeons in the 2 ppm group also exhibited elevated low density lipoprotein (LDL) levels after 3 months on the NC diet. These findings, if extrapolated to man, could have considerable public health consequences, since nearly 200 million people in the United States drink Cl water. We have carried out a similar set of studies but with strikingly different results. We used the same suppliers of pigeons and feed as did the authors of the 1986 reports and followed their approach where possible. Six month-old male WC pigeons drank water with 2 ppm or 15 ppm Cl (pH 8.5) and ate a NC diet with Ca2+ reduced to 80% of normal. At both 1 and 3 months, body weight, CHOL, triglyceride and LDL levels were unaffected by drinking Cl water. There was also no effect of Cl water on plaque size after 3 months. Thus, we found no evidence that drinking chlorinated water has any effect upon circulating lipid levels or upon the development of arteriosclerotic plaques, in this animal model.

Siracusa, G., Bastone, A., Sbraccia, M., Settimi, L., Mallozzi, C., Monaco, E. and Frontali N. (1992), Effects of 2,5-hexanedione on the ovary and fertility. An experimental study in mice. *Toxicology*, **75** (1), 39-50.

Full Text: [T\Toxicology75, 39.pdf](T/Toxicology75,%2039.pdf)

Abstract: Sixty-day-old virgin female Swiss CD1 mice were treated with 1.5% 2, 5-hexanedione in their drinking water; control mice received tap water; duration of treatment was either 4 or 6 weeks. Under these conditions the treated mice did not show any clinical symptoms although electromyography revealed some signs of polyneuropathy. Protein and DNA content per mg of ovarian tissue in treated mice were not significantly different from controls. Histological examination of ovarian sections at the light microscope level showed no significant alterations after exposure. A morphometric study revealed a statistically significant reduction in the number of growing oocytes after 6 weeks of treatment. For fertility studies three groups of 15 female mice each were treated for 0, 4 or 6 weeks as above and then permanently housed with untreated proven breeder male mice (one male per female); cages were checked daily for newly born mice. All litters appeared normal by gross examination. During the first 14 weeks of continuous mating the mean litter size (number of newborns per litter) remained about 11.4 in all groups; this number subsequently began to decrease. Control and 4-week treatment regression curves did not differ statistically, while the slope of the 6-week line was significantly steeper, indicating a faster decrease in litter size over time and a shortening of fertile life in the latter group of treated females.

? Adonaylo, V.N. and Oteiza, P.I. (1999), Lead intoxication: Antioxidant defenses and oxidative damage in rat brain. *Toxicology*, **135** (2-3), 77-85.

Full Text: [1999\Toxicology135, 77.pdf](1999/Toxicology135,%2077.pdf)

Abstract: Oxidative damage associated with the presence of lead (Pb) in the brain has been proposed as one possible mechanism involved in Pb toxicity. To investigate this hypothesis, we examined the long-term effects of Pb2+ on parameters of oxidative stress in the brain from rats chronically exposed to the metal (1 g Pb acetate/l drinking water). After 8 weeks of treatment, Pb2+-intoxicated rats (blood Pb concentration > 100 μg/dl) showed lower body weight, and lower hematocrit and 5-aminolevulinic acid dehydratase activity as compared to controls. The content of brain 2-thiobarbituric acid-reactive substances (TBARS), an indicator of lipid oxidation, was significantly (P < 0.05) higher in the Pb2+-intoxicated animals than in controls. Higher activities of the antioxidant enzymes glutathione reductase and glutathione peroxidase, and a lower (44%) level of ubiquinol 10 were found in the brain of the Pb2+-treated rats, compared to controls. A negative correlation between brain ubiquinol 9 (r(2) = 0.79), 10 (r(2) = 0.84) and blood Pb concentration was observed. Brain alpha-tocopherol levels, superoxide dismutase activity and parameters of oxidative damage to proteins were similar between control and Pb2+-treated rats. The present results indicate that chronic Pb2+ intoxication induces an oxidative stress situation in rat brain. (C) 1999 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Antioxidants, Free Radicals, Lead Intoxication, Neurotoxicity, Lipid-Peroxidation, Toxicity, Cells, Acid, Erythrocytes, Exposure, Binding, Stress, Liver

? Choi, D.W., Kim, J.H., Cho, S.Y., Kim, D.H. and Chang, S.Y. (2002), Regulation and quality control of herbal drugs in Korea. *Toxicology*, **181-182**, 581-586.

Full Text: [T\Toxicology181-182, 581.pdf](T/Toxicology181-182,%20581.pdf)

Abstract: Korea has a great diversity in resources of medicinal plants. The traditional herbal medicines and their preparations have been widely used in Korea as well as in China and Japan for thousands of years. One of the characteristics of Korean herbal medicine preparations is that all the herbal medicines are incorporated into an extractor at the same time and extracted with boiling water during the decoction process. In this process, a variety of interactions between the active components of several herbal medicines may occur. This is the main reason why quality control of oriental herbal drug is more difficult than that of western herbal drug. In this paper, we would like to present an overview of the characteristics of regulation and quality control of herbal medicines in Korea.

Keywords: Korean Herbal Medicine, Quality Control, Decoction

Notes: highly cited

? Waisberg, M., Joseph, P., Hale, B. and Beyersmann, D. (2003), Molecular and cellular mechanisms of cadmium carcinogenesis. *Toxicology*, **192** (2-3), 95-117.

Full Text: [2003\Toxicology192, 95.pdf](2003/Toxicology192,%2095.pdf)

Abstract: Cadmium is a heavy metal, which is widely used in industry, affecting human health through occupational and environmental exposure. In mammals, it exerts multiple toxic effects and has been classified as a human carcinogen by the International Agency for Research on Cancer. Cadmium affects cell proliferation, differentiation, apoptosis and other cellular activities. Cd2+ does not catalyze Fenton-type reactions because it does not accept or donate electrons under physiological conditions, and it is only weakly genotoxic. Hence, indirect mechanisms are implicated in the carcinogenicity of cadmium. In this review multiple mechanisms are discussed, such as modulation of gene expression and signal transduction, interference with enzymes of the cellular antioxidant system and generation of reactive oxygen species (ROS), inhibition of DNA repair and DNA methylation, role in apoptosis and disruption of E-cadherin-mediated cell-cell adhesion. Cadmium affects both gene transcription and translation. The major mechanisms of gene induction by cadmium known so far are modulation of cellular signal transduction pathways by enhancement of protein phosphorylation and activation of transcription and translation factors. Cadmium interferes with antioxidant defense mechanisms and stimulates the production of reactive oxygen species, which may act as signaling molecules in the induction of gene expression and apoptosis. The inhibition of DNA repair processes by cadmium represents a mechanism by which cadmium enhances the genotoxicity of other agents and may contribute to the tumor initiation by this metal. The disruption of E-cadherin-mediated cell-cell adhesion by cadmium probably further stimulates the development of tumors. It becomes clear that there exist multiple mechanisms which contribute to the carcinogenicity of cadmium, although the relative weights of these contributions are difficult to estimate. (C) 2003 Elsevier Ireland Ltd. All fights reserved.

Keywords: Cadmium, Oxidative Stress, Cancer, DNA Repair, Gene Regulation, Reactive Oxygen Species, E-Cadherin, Apoptosis, Alveolar Epithelial-Cells, Metallothionein Gene-Expression, Protein-Kinase-C, Zinc-Finger Proteins, Upstream Stimulatory Factor, Human Promonocytic Cells, Proximal Tubule Cells, Heme Oxygenase Gene, Heat-Shock Element, Rat L6 Myoblasts

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? Cantilena, L.R. and Klaassen, C.D. (1982), Decreased effectiveness of chelation-therapy with time after acute cadmium poisoning. *Toxicology and Applied Pharmacology*, **63** (2), 173-180.

Full Text: Tox App Pha63, 173.pdf

Abstract: The effect of increasing the time interval between cadmium (Cd) exposure and chelation therapy was studied in male Swiss Webster mice. The following chelating agents were administered ip at 0, 2, 12, 36, and 72 hr after giving radioactive Cd (1 mg Cd/kg, iv): diethylenetriaminepentaacetic acid (DTPA), ethylenediaminetetraacetic acid (EDTA), and 2,3-dimercaptosuccinic acid (DMSA). Daily elimination of Cd into urine and feces was determined for 5 days after which time the mice were killed, and the concentration of Cd was determined in various organs. In most of the tissues examined, including kidney and liver, only administration of chelators immediately after Cd significantly reduced tissue Cd concentrations. The mice treated immediately after Cd administration excreted between 50 and 75% of the Cd into urine in the first 24 hr compared to 0.1% excreted by controls. Treatment at later times (2 to 72 hr) significantly increased Cd excretion but the magnitude of the effect was far less than that seen in mice treated immediately after Cd. In a separate group of mice, the time course for the induction of metallothionein synthesis was determined by administering 1 mg Cd/kg iv at various times before death. Metallothionein concentration increased within 2 hr after Cd administration and reached a maximum within 8 hr. The results show that the length of time before initiating chelation therapy for Cd poisoning greatly influences the effectiveness of the therapy. Hepatic metallothionein may be responsible for this phenomenon.

van Barneveld, A.A. and van den Hamer, C.J. (1985), Influence of Ca and Mg on the uptake and deposition of Pb and Cd in mice. *Toxicology and Applied Pharmacology*, **79** (1), 1-10.

Full Text: [T\Tox App Pha79, 1.pdf](T/Tox%20App%20Pha79,%201.pdf)

Abstract: The influence of high but not extreme concentrations of Ca and Mg (25 µmol/ml) on the apparent absorption and retention of 203Pb and 115mCd from water was investigated in mice. Ca reduced the absorption of Pb from an intubated solution by 62% and the absorption of Cd by 22%, but these effects were not significant. Mg showed no effect on Pb and Cd absorption. The retention of ip-injected Pb and Cd was not influenced by addition of Ca or Mg to the drinking water. Feeding of a Ca-deprived diet for 2 weeks prior to dosage stimulated the absorption of Pb from water by more than 100% (p less than 0.01) and the absorption of Cd from water by 17% (p less than 0.05). Feeding of a Ca-supplemented diet did not influence the absorption of Pb or Cd, but fecal Cd excretion seemed to be reduced. Feeding of Mg-deprived or Mg-supplemented diets did not show any effect on Pb and Cd metabolism. These results give supporting evidence that in soft water regions the uptake of Pb from the drinking water could be increased because of the absence of Ca in the drinking water, particularly when dietary Ca intake is low. This relationship between drinking water hardness and absorption of Pb could be important in view of general public health.

Hobara, T., Kobayashi, H., Kawamoto, T., Iwamoto, S. and Sakai, T. (1987), Intestinal absorption of trichloroethylene in dogs. *Toxicology and Applied Pharmacology*, **91** (2), 256-265.

Full Text: [T\Tox App Pha91, 256.pdf](T/Tox%20App%20Pha91,%20256.pdf)

Abstract: In order to examine the intestinal absorption of trichloroethylene (TRI), we developed the intestinal circulation system of dogs and administered TRI solution at three concentrations (0.1, 0.25 and 0.5%) to the three parts of the intestinal tract (jejunum, ileum, and colon) of the operated dogs. We measured TRI and its metabolites, free-trichloroethanol, trichloroacetic acid, and conjugated trichloroethanol, in serum or blood, urine, bile and circulating solutions. The absorption rates of TRI from the intestine were 50-70% of the administered volume of TRI 2 hr after administration in all groups, and all parts of intestine readily absorbed TRI. Moreover, there were no significant differences in the absorption rates of TRI and water between the jejunum and ileum, and ileum and colon, respectively. The excretion rates of TRI and its metabolites in urine and bile were very low (0.1-0.4%) compared with the volume of absorbed TRI from the intestine 2 hr after administration in all groups. The high degree of absorption of TRI should be considered when threshold limits for TRI in the drinking water, the surface water, and the ground water are established.

? Moser, R., Oberley, T.D., Daggett, D.A., Friedman, A.L., Johnson, J.A. and Siegel, F.L. (1995), Effects of lead administration on developing rat-kidney. I. Glutathione-s-transferase isoenzymes. *Toxicology and Applied Pharmacology*, **131** (1), 85-93.

Full Text: [1995\Tox App Pha131, 85.pdf](1995/Tox%20App%20Pha131,%2085.pdf)

Abstract: The effects of acute and chronic exposure to lead on glutathione S-transferase (GST) isoforms were determined in developing kidney in the rat. The ontogeny of glutathione S-transferase isoforms was characterized as were the effects of depletion of dietary calcium on glutathione S-transferase isoform profiles in control and lead-treated rats, In the acute exposure experiments, rats of 14 and 50 days of age received three daily injections of lead acetate (114 mg/kg) and in the chronic exposure studies, rats received lead acetate at doses ranging from 50 to 500 ppm in their drinking water. Lead acetate administration in these chronic studies began 1 day after conception. Acute and chronic lead exposure had similar effects, causing increases in all but one glutathione S-transferase isoform (Yb-3); these increases were markedly exacerbated by dietary calcium depletion, In all lead paradigms, GST subunits Yb-1 and Yp showed the largest increases-greater than 25-fold in rats fed a low-calcium diet, GST subunit Yb-3 showed small increases in the 14-day acute lead and the 4 week low-calcium animals and did not increase in other groups. Lead-related increases in GSTs were partially reversed by transferring animals previously receiving lead to lead-free water for a 4-week period. Kidneys of rats fed the low-calcium diet did not have detectable GST Yk, but in rats on this low-calcium diet that received 500 ppm lead; this GST isoform was found at levels comparable to those in control rats fed lab chow. (C) 1995 Academic Press. Inc.

Keywords: Intranuclear Inclusion-Bodies, Dietary Calcium, Liver, Expression, Induction, Binding, Nephrotoxicity, Resistance, Pressure, Subunits

? Oberley, T.D., Friedman, A.L., Moser, R. and Siegel, F.L. (1995), Effects of lead administration on developing rat-kidney. II. Functional, morphologic, and immunohistochemical studies. *Toxicology and Applied Pharmacology*, **131** (1), 94-107.

Full Text: [1995\Tox App Pha131, 94.pdf](1995/Tox%20App%20Pha131,%2094.pdf)

Abstract: The effects of chronic lead administration on renal function and cytoarchitecture and on the immunohistochemical localization of glutathione S-transferase (GST) isoenzymes were determined. Pregnant rats were given 250 ppm lead acetate in drinking water from conception until weaning and mothers and pups received 500 ppm of lead acetate from weaning until termination at either 3 or 7 weeks of age, Light and electron microscopic studies after 3 weeks of lead administration showed tubular injury with frequent mitoses noted in proximal tubular cells and, after 7 weeks of treatment, interstitial fibrosis, characteristic intranuclear inclusions, and tubular injury characterized by both nuclear and cytoplasmic pleomorphism. Rats treated with lead for 7 weeks showed significantly lower body weights and creatinine clearances than age-matched control animals, Immunohistochemical studies of glutathione transferase subunits in control rats showed unique isoform localization in each segment of the nephron; treatment with lead caused large increases in immunoreactive protein of Yc, Yk, Yb-1, and Yp GST subunits in proximal tubules, No increases in the antioxidant enzymes copper-zinc superoxide dismutase, catalase, and glutathione peroxidase were found in lead-treated rats, but there was a diffuse lead-related increase in immunoreactive protein for manganese superoxide dismutase throughout the renal cortex. Our results demonstrate large lead-induced increases of specific isoforms of glutathione S-transferase in specific kidney cell types and show that these increases preceded irreversible renal damage. (C) 1995 Academic Press, Inc.

Keywords: Glutathione-S-Transferase, Manganese Superoxide-Dismutase, Syrian-Hamster Tissues, Antioxidant Enzymes, Catalytic Activity, Messenger-RNAs, Cell-Nucleus, Nephropathy, Localization, Isoenzymes

? Ronis, M.J.J., Badger, T.M., Shema, S.J., Roberson, P.K. and Shaikh, F. (1996), Reproductive toxicity and growth effects in rats exposed to lead at different periods during development. *Toxicology and Applied Pharmacology*, **136** (2), 361-371.

Full Text: [1996\Tox App Pha136, 361.pdf](1996/Tox%20App%20Pha136,%20361.pdf)

Abstract: The reproductive toxicity and growth effects of developmental lead exposure were assessed using a rat model in which 0.6% (w/ v) lead acetate was administered in the drinking water ad libitum. Three series of experiments were conducted in which lead exposure was initiated beginning in utero, prepubertally, or postpubertally. Lead effects were measured on reproductive physiology and endocrinology, sexually dimorphic hepatic testosterone hydroxylation, and growth rates in both male and female animals. In male animals secondary sex organ weights were significantly decreased only in animals exposed prepubertally. In addition, serum testosterone levels were significantly suppressed, most severely in animals exposed from in utero (in the in utero group). Little effect was observed in adult female rats. However, in female animals exposed prepubertally, delayed vaginal opening and disrupted estrus cycling was observed, More severe reproductive disruption was accompanied by suppression of circulating estradiol in the in utero group. Effects on circulating sex steroids were accompanied by variable effects on circulating luteinizing hormone (LH) levels, pituitary LH, and pituitary LH beta mRNA, suggesting a dual site of lead action: (a) at the level of the hypothalamic pituitary unit, and (b) directly at the level of gonadal steroid biosynthesis. Prepubertal growth in both sexes was suppressed 25% in the in utero group. However, pubertal growth rates were significantly suppressed only in male animals and postpubertal growth was not significantly different from controls in any of the experiments, despite continued exposure to high lead levels in the drinking water. In addition, at age 85 days, male-specific hepatic hydroxylation of testosterone at positions 2 alpha and 16 alpha, which is catalyzed by a cytochrome P450 isozyme CYP 2C11, itself regulated by sexually dimorphic growth hormone secretion, was unaffected. This suggests that the growth effects of lead are possibly due to a delay in the development of sex-specific pituitary growth hormone secretion patterns rather than a persistent developmental defect. Thus, the reproductive and growth effects of lead are complex and sex-dependent, and appear to involve multiple sites on the hypothalamic- pituitary gonadal axis. (C) 1996 academic Press, Inc.

Keywords: Blood Lead, Stimulating Hormone, Weanling Rats, Pituitary, Pregnancy, Children, Ethanol, Mice, Axis, Age

Kulp, K.S., Vulliet, P.R. (1996), Mimosine blocks cell cycle progression by chelating iron in asynchronous human breast cancer cells. *Toxicology and Applied Pharmacology*, **139** (2), 356-364.

Full Text: [T\Tox App Pha139, 356.pdf](T/Tox%20App%20Pha139,%20356.pdf)

Abstract: Mimosine is a toxic nonprotein amino acid that is a major constituent of the tropical legumes Leucaena and Mimosa. Mimosine has been shown to cause acute and chronic toxicosis in livestock fed from forage containing these plants. Recently, mimosine has been demonstrated to reversibly block cell cycle progression in mammalian cells in culture. In this study, we compared the effects of mimosine to desferrioxamine (DFO), a well-characterized iron chelator, and found that both chemicals similarly altered cell cycle progression in MDA-MB-453 human breast cancer cells. Mimosine (400 µM) and DFO (150 µM) both reduced DNA synthesis by greater than 90% of control within 4 hr of treatment, and suppressed total proline-directed protein kinase activity to less than 10% of control after 16 hr treatment. These effects were antagonized by the addition of iron as ferrous sulfate (250 µM), which is bound to transferrin and imported into the cell via transferrin receptor endocytosis, or as hemin (100 µM), which passes through the cell membrane and releases iron into the cytosol. After 24 hr treatment with the chelators, a large portion of the available transferrin receptors moved to the cell surface, indicating that the cells were iron-starved. Our data demonstrate that mimosine, through iron chelation, blocks cell cycle progression in MDA-MB-453 human breast cancer cells. (C) 1996 Academic Press, Inc.

Keywords: Mammalian Ribonucleotide Reductase, Chinese-Hamster Cells, Plant Amino-Acid, Protein-Kinase, DNA-Synthesis, S-Phase, Transferrin Receptors, Diphosphate Reductase, Tumor-Cells, G1 Phase

Zheng, W., Shen, H., Blaner, W.S., Zhao, Q., Ren, X. and Graziano, J.H. (1996), Chronic lead exposure alters transthyretin concentration in rat cerebrospinal fluid: The role of the choroid plexus. *Toxicology and Applied Pharmacology*, **139** (2), 445-450.

Full Text: [T\Tox App Pha139, 445.pdf](T/Tox%20App%20Pha139,%20445.pdf)

Abstract: The choroid plexus, which is responsible for the maintenance of the biochemical milieu of the cerebrospinal fluid (CSF), avidly sequesters Pb. In order to test the hypothesis that chronic Pb exposure may impair choroid plexus function, male weanling Sprague-Dawley rats were exposed to Pb in drinking water at doses of 0, 50, or 250 micrograms Pb/ml (as Pb acetate) for 30, 60, or 90 days. The function of the choroid plexus was assessed as reflected by CSF concentrations of transthyretin (TTR, a major CSF protein manufactured by brain choroid plexus) and CSF essential metal ions (Ca2+, Mg2+, K+, and Na+). TTR concentrations were determined by radioimmunoassay using a monospecific rabbit anti-rat TTR polyclonal antibody, and CSF metal ions analyzed by flame atomic absorption spectrophotometry. Two-way ANOVA of CSF TTR concentrations revealed highly significant dose (p < 0.0001), time (p < 0.0223), and dose-by-time effects (p < 0.0379). Moreover, the percentage of reduction of CSF TTR was directly correlated with Pb concentrations in the choroid plexus (r = 0.703, p < 0.05). Pb exposure significantly increased CSF concentrations of Mg2+, but did not markedly altered CSF concentrations of Ca2+, K+, and Na+. Histopathologic examination under the light microscope did not show distinct alterations of plexus structure in Pb-treated rats. Since TTR is responsible for transport of thyroid hormones to the developing brain, we postulate that the depression of choroid plexus TTR production (and/or secretion) by Pb may impair brain development in young animals by depriving the CNS of thyroid hormones.

Wilson, A.K. and Bhattacharyya, M.H. (1997), Effects of cadmium on bone: A *in vitro* model for the early response. *Toxicology and Applied Pharmacology*, **145** (1), 68-73.

Full Text: [T\Tox App Pha145, 68.pdf](T/Tox%20App%20Pha145,%2068.pdf)

Abstract: Cadmium (Cd) exposure induces bone resorption in vitro and in vivo that can lead to low bone mass and increased incidence of fracture. We have developed an animal model for following the early skeletal response to Cd. A low-calcium (but not calcium-deficient) diet is used to increase gastrointestinal absorption of calcium so that the endogenous fecal calcium excretion is essentially the total fecal calcium excretion. The bone response is followed by quantitation of stable fecal calcium and does not require a radioactive label. After mice were adjusted to a low-calcium diet, Cd was administered by a single gavage and fecal calcium was monitored to determine the magnitude of the calcium release from bone. Fecal calcium excretion (µg Ca/hr; mean±SE) remained at the background level for 8 hr (13.6±1.8, n = 18) but increased during the 8-to 24-hr and 24-to 56-hr collection periods (43.8±6.8, n = 12; 50.75±3.7, n = 6, respectively). The bone response was transient and dropped to nearly background levels during the 56-to 104-hr collection period. Blood calcium levels were normal throughout the time course. Bone resorption occurred at Cd levels of 7.9±0.7 µg/liter blood (mean±SE, n = 6), which is in the range of occupational exposure levels. The transient nature of the bone response contrasted to the slow but continuing rise observed in blood Cd levels. These results suggest that a threshold level of Cd is required for a bone response but that chronic levels of Cd in blood do not necessarily indicate the occurrence of continuous active bone resorption. This model can be used to probe early gene changes (prior to the bone response) that may be occurring in response to Cd exposure. (C) 1997 Academic Press.

Keywords: Calcium-Deficient Diet, Occupational Exposure, Resorption, Mice, Rat, Osteopetrosis, Macrophage, Metabolism, Culture, Workers

Zhao, Q., Slavkovich, V. and Zheng, W. (1998), Lead exposure promotes translocation of protein kinase C activities in rat choroid plexus *in vitro*, but not *in vivo*. *Toxicology and Applied Pharmacology*, **149** (1), 99-106.

Full Text: [T\Tox App Pha149, 99.pdf](T/Tox%20App%20Pha149,%2099.pdf)

Abstract: Lead (Pb) exposure reportedly modulates PKC activity in brain endothelial preparations, which may underlie Pb-induced damage at the blood-brain barrier. Our previous work indicates that Pb accumulates in the choroid plexus and causes dysfunction of this blood-cerebrospinal fluid (CSF) barrier. The present studies were undertaken to test the hypothesis that Pb in the choroid plexus may alter PKC activity and thus affect the functions of the blood-CSF barrier. When choroidal epithelial cells in a primary culture were exposed to Pb (10 microM in culture medium), the membrane-bound PKC activity increased by 5.2-fold, while the cytosolic PKC activities decreased, an indication of the induction of PKC translocation by Pb. The effect of Pb on cellular PKC was concentration dependent in the range of 0.1-10 microM. We further evaluated PKC activity of the choroid plexus in rats chronically exposed to Pb in the drinking water (control, 50 or 250 micrograms Pb/ml) for 30, 60, or 90 days. Two-way analysis of variance revealed a significant age-related decline of PKC activities in both cytosol and membrane of the choroid plexus. However, Pb treatment did not alter plexus PKC activities. In addition, we found that short-term, acute Pb exposure in rats did not significantly change PKC activities nor did it affect the expression of PKC isoenzymes in the choroid plexus. Our results suggest that Pb exposure may promote the translocation of PKC from cytosol to membrane in rat blood-CSF barrier in vitro, but not in vivo.

? Costa, M. (2003), Potential hazards of hexavalent chromate in our drinking water. *Toxicology and Applied Pharmacology*, **188** (1), 1-5.

Full Text: [2003\Tox App Pha188, 1.pdf](2003/Tox%20App%20Pha188,%201.pdf)

Abstract: A consideration of the consequences of human exposure to hexavalent Cr in the drinking water has been compiled. Since there is an absence of adequate human data on this subject the problem has been analyzed not only from human and animal studies but also from a mechanistic point of view. This treatise has been inspired by recent reviews and speculations that suggest that we may safely drink hexavalent Cr in great excess of the current EPA and states drinking water standards of 50-100 ppb. (C) 2003 Elsevier Science (USA). All rights reserved.

Keywords: Chromium, Cancer, Cellular Uptake, Reduction, In-Vitro, Chromium Picolinate, Gene-Expression, Strand Breaks, DNA, Cells, Carcinogenesis, Ingestion, Toxicity, Glutathione

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? Vanderslice, R.R., Orme, J., Ohanian, E.V. and Sonich Mullin, C. (1989), Problems in assessing the risks of mixtures of contaminants in drinking water. *Toxicology and Industrial Health*, **5** (5), 747-755.

Abstract: In conducting risk assessments on drinking water contaminants, the U.S. Environmental Protection Agency (EPA) attempts to evaluate all available toxicity data to develop Health Advisory (HA) and Maximum Contaminant Level Goal (MCLG) values. The EPA often has grappled with the issues surrounding the toxicity of chemical mixtures, including radioactive contaminants, nitrate/nitrite, and trihalomethanes (THMs). In evaluating the toxicity of chemical mixtures, the EPA’s immediate concern is whether the individual HA values and MCLGs are protecting public health when multiple contaminants are present in drinking water. Potential toxic interactions between drinking water contaminants are difficult to predict because experimental studies are generally performed only at high doses relative to environmental levels. Although the contamination of drinking water involves mixtures of contaminants, drinking water regulations are generally based on an assessment of the risks of individual contaminants. This paper discusses three issues of major concern to the EPA: the synergistic effects of solvent mixtures, vehicle effects in laboratory studies, and setting standards for essential trace nutrients where the absorption and/or toxicity are affected by an individual’s nutritional status or other dietary components.

? Kreis, I.A. (1990), Cadmium contamination of the countryside, a case study on health effects. *Toxicology and Industrial Health*, **6** (5), 181-188.

Abstract: The border region between Belgium and The Netherlands, the Kempen, was found to be polluted with cadmium. The main route of pollution had been by air but some cadmium came by way of surface-water and solid waste. This resulted in an increase in the cadmium content of locally grown vegetables. The consequential exposure to cadmium of humans living in the area has been estimated using various methods and is approximately the FAO/WHO maximum allowable daily intake, smoking disregarded. Several studies of possible effects on public health were conducted. Among these studies were two geographic studies, one on hospital admissions for various non-malignant diseases and one on cancer-incidence. Two cohort studies on possible teratogenic effects in a non-occupationally exposed, non-smoking vegetarian population with a high fertility and good registration were also conducted. A survey on cadmium content of the urine and kidney damage in a longtime but non-occupationally exposed rural population and a reference population formed the main study. Also, a survey on cadmium content of the kidney samples of autopsied patients in a population based study and a reference population was conducted. Together these studies showed that the extra exposure had lead to an additional body-burden of cadmium resulting in various signs of malfunction. In consequence of the findings the Netherlands Ministry for Housing, Physical Planning and Environment appropriated money to cleanup contaminated gardens.

? Tanaka, T. (1993), Reproductive and neurobehavioral effects of amaranth administered to mice in drinking water. *Toxicology and Industrial Health*, **9** (6), 1027-1035.

Abstract: The color additive amaranth was given in the drinking water at levels of 0 (control), 0.025, 0.075, and 0.225% from 5 weeks of age in F0 generation until F1 generation mice were weaned, with selected reproductive, developmental and behavioral parameters being measured. Amaranth had little adverse effect upon litter size, litter weight and sex ratio. Average body weight in both sexes of the F1 mice was significantly increased in the 0.025% group in both sexes. Survival index at postnatal day (PND) 21 was reduced in the 0.025% amaranth group. For the neurobehavioral parameters, surface righting at PND 4 in female offspring and olfactory orientation in both sexes were significantly affected by treatment. Several parameters of movement activity of male offspring at 3 weeks of age were affected in amaranth 0.075% group, but those of female offspring were similar in all groups. The dose levels of amaranth in this study produced a little adverse effect on behavioral development in mice.

? Mumtaz, M.M., George, J.D., Gold, K.W., Cibulas, W. and de Rosa, C.T. (1996), ATSDR evaluation of health effects of chemicals. IV. Polycyclic aromatic hydrocarbons (PAHs): Understanding a complex problem. *Toxicology and Industrial Health*, **12** (6), 742-971.

Abstract: Polycyclic Aromatic Hydrocarbons (PAHs) are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 PAHs. PAHs generally occur as complex mixtures (for example, as part of products such as soot), not as single compounds. PAHs are found throughout the environment in the air, water, and soil. As part of its mandate, the Agency for Toxic Substances and Disease Registry (ATSDR) prepares toxicological profiles on hazardous chemicals, including PAHs (ATSDR, 1995), found at facilities on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) and which pose the most significant potential threat to human health, as determined by ATSDR and the Environmental Protection Agency (EPA). These profiles include information on health effects of chemicals from different routes and durations of exposure, their potential for exposure, regulations and advisories, and the adequacy of the existing database. Assessing the health effects of PAHs is a major challenge because environmental exposures to these chemicals are usually to complex mixtures of PAHs with other chemicals. The biological consequences of human exposure to mixtures of PAHs depend on the toxicity, carcinogenic and noncarcinogenic, of the individual components of the mixture, the types of interactions among them, and confounding factors that are not thoroughly understood. Also identified are components of exposure and health effects research needed on PAHs that will allow estimation of realistic human health risks posed by exposures to PAHs. The exposure assessment component of research should focus on (1) development of reliable analytical methods for the determination of bioavailable PAHs following ingestion, (2) estimation of bioavailable PAHs from environmental media, particularly the determination of particle-bound PAHs, (3) data on ambient levels of PAHs metabolites in tissues/fluids of control populations, and (4) the need for a critical evaluation of current levels of PAHs found in environmental media including data from hazardous waste sites. The health effects component should focus on obtaining information on (1) the health effects of mixtures of PAHs particularly their noncarcinogenic effects in humans, and (2) their toxicokinetics. This report provides excerpts from the toxicological profile of PAHs (ATSDR, 1995) that contains more detailed information.

? Burg, J.R. and Gist, G.L. (1998), The National Exposure Registry: Analyses of health outcomes from the benzene subregistry. *Toxicology and Industrial Health*, **14** (3), 367-387.

Abstract: The purpose of the National Exposure Registry is to assess the long-term health consequences to a general population from long-term, low-level exposures to specific substances in the environment. This study investigates the health outcomes of 1,143 persons (1,127 living, 16 deceased) living in south central Texas who had documented environmental exposure to benzene (up to 66ppb) in tap water. As with all subregistries, face-to-face interviews were used to collect self-reported information for 25 general health status questions. Using computer-assisted telephone interviewing, the same health questions were asked 1 year (Followup 1, F1) and 2 years later (Followup 2, F2). The health outcome rates for Baseline and Followup 1 and 2 data collections for the Benzene Subregistry were compared with national norms, that is, the National Health Interview Survey (NHIS) rates. For at least one of the three reporting periods, specific age and sex groups of the Benzene Subregistry population reported more adverse health outcomes when compared with the NHIS population, including anemia and other blood disorders, ulcers, gall bladder trouble, and stomach or intestinal problems, stroke, urinary tract disorders, skin rashes, diabetes, kidney disease, and respiratory allergies. Statistically significant deficits for the Benzene Subregistry population overall were found for asthma, emphysema, or chronic bronchitis; arthritis, rheumatism, or other joint disorders; hearing impairment; and speech impairment. No statistically significant differences between the two populations were seen for the outcomes hypertension; liver disease; mental retardation; or cancer. These results do not identify a causal relationship between benzene exposure and adverse health effects; however, they do reinforce the need for continued followup of registrants.

? Fay, M., Eisenmann, C., Diwan, S. and de Rosa, C. (1998), ATSDR evaluation of health effects of chemicals. V. Xylenes: Health effects, toxicokinetics, human exposure, and environmental fate. *Toxicology and Industrial Health*, **14** (5), 571-776.

Abstract: Xylenes, or dimethylbenzenes, are among the highest-volume chemicals in production. Common uses are for gasoline blending, as a solvent or component in a wide variety of products from paints to printing ink, and in the production of phthalates and polyester. They are often encountered as a mixture of the three dimethyl isomers, together with ethylbenzene. As part of its mandate, the Agency for Toxic Substances and Disease Registry (ATSDR) prepares toxicological profiles on hazardous chemicals found at Comprehensive Environment Responses, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) sites that are of greatest concern for public health purposes. These profiles comprehensively summarize toxicological and environmental information. This article constitutes the release of the bulk of this profile (ATSDR, 1995) into the mainstream scientific literature. An extensive listing of known human and animal health effects, organized by route, duration, and end point, is presented. Toxicological information on toxicokinetics, biomarkers, interactions, sensitive subpopulations, reducing toxicity after exposure, and relevance to public health is also included. Environmental information encompasses physical properties, production and use, environmental fate, levels seen in the environment, analytical methods, and a listing of regulations. ATSDR, as mandated by CERCLA (or Superfund), prepares these profiles to inform and assist the public.

? Porter, W.P., Jaeger, J.W. and Carlson, I.H. (1999), Endocrine, immune, and behavioral effects of aldicarb (carbamate), atrazine (triazine) and nitrate (fertilizer) mixtures at groundwater concentrations. *Toxicology and Industrial Health*, **15** (1-2), 133-150.

Abstract: This paper describes the results of 5 years of research on interactive effects of mixtures of aldicarb, atrazine, and nitrate on endocrine, immune, and nervous system function. The concentrations of chemicals used were the same order of magnitude as current maximum contaminant levels (MCLs) for all three compounds. Such levels occur in groundwater across the United States. Dosing was through voluntary consumption of drinking water. We used fractional and full factorial designs with center replicates to determine multifactor effects. We used chronic doses in experiments that varied in duration from 22 to 103 days. We tested for changes in thyroid hormone levels, ability to make antibodies to foreign proteins, and aggression in wild deer mice, Peromyscus maniculatus, and white outbred Swiss Webster mice, Mus musculus, ND4 strain. Endocrine, immune, and behavior changes occurred due to doses of mixtures, but rarely due to single compounds at the same concentrations. Immune assay data suggest the possibility of seasonal effects at low doses. We present a multiple-level model to help interpret the data in the context of human health and biological conservation concerns. We discuss six testing deficiencies of currently registered pesticides, and suggest areas of human health concerns if present trends in pesticide use continue.

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Subject Categories:

Toxicology: Impact Factor 2.430, 15/75 (2005)

Risto, L., Vartiainen, T. and Komulainen, H. (1993), Formation of methemoglobin by 3-chloro-4-(dichloromethyl)-5-hydroxy-2 (5H)-furanone, MX, in rat erythrocytes in vitro. *Toxicology Letters*, **68** (3), 325-332.

Full Text: [T\Tox Let68, 325.pdf](T/Tox%20Let68,%20325.pdf)

Abstract: Oxidative effects of 3-chloro-4-(dichloromethyl)-5-hydroxy-2 (5H)-furanone (MX), the principal bacterial mutagen in chlorinated drinking water were studied in rat erythrocytes. Upon incubation of rat blood with 14C-labelled MX (2 micrograms/ml), 42% of the radioactivity was found in plasma, 26% in erythrocyte cell membranes and 32% bound in hemoglobin. Although it was bound to hemoglobin, MX (1 mM) did not immediately affect the oxygen binding capacity of hemoglobin. MX (0.5 to 5 mM) decreased the portion of oxyhemoglobin and increased that of methemoglobin in erythrocytes suspended in buffer in a time-and concentration-dependent fashion. In the same concentration range MX did not stimulate proteolysis nor did it cause hemolysis in erythrocytes. The results indicate that MX binds to hemoglobin and stimulates oxidation of hemoglobin in erythrocytes but MX does not cause overt oxidative damage to erythrocytes.

Clark, N.W.E. and Chipman, J.K. (1995), Absorption of 3-chloro-4-(dichloromethyl)-5-hydroxy-2-[5H] furanone (MX) through rat small intestine in vitro. *Toxicology Letters*, **81** (1), 33-38.

Full Text: [T\Tox Let81, 33.pdf](T/Tox%20Let81,%2033.pdf)

Abstract: The intestinal absorption of 3-chloro-4-(dichloromethyl)-5-hydroxy-2-[5H] furanone (MX), a highly mutagenic furanone found in chlorinated waters, was studied using an in vitro everted rat gut sac system, using reverse mutation in Salmonella typhimurium to detect mutagens transported from the mucosal to the serosal compartments. Absorption was measurable, but limited, with significant increase in bacterial revertants (serosal compartment) noted at a dose of 50 µg/ml MX (mucosal compartment, p < 0.05). Gut sac incubation with MX and glutathione (GSH, 1.0 mM) resulted in no detectable absorption of mutagens. Preincubation with diethylmaleate to deplete mucosal GSH resulted in increased absorption of MX-derived mutagens compared to controls (a significant induction of revertant colonies was noted at a dose of 25 µg/ml MX p < 0.05). Gut sac incubation with chlorinated fulvic acids resulted in no detectable absorption of mutagens. In vitro studies to assess the possibility of beta-lyase activation of the postulated MX-GSH conjugate showed no mutagenic activation.

Keywords: 3-Chloro-4-(Dichloromethyl)-5-Hydroxy-2-Furanone, Absorption, Mutagenicity, Humic Substances, Beta-Lyase, In Vitro, Mutagenic By-Products, Glutathione, Disinfection, Chlorination, Cancer, Water

Mumtaz, M.M. (1995), Risk assessment of chemical mixtures from a public health perspective. *Toxicology Letters*, **82-83**, 527-532.

Full Text: [T\Tox Let82-83, 527.pdf](T/Tox%20Let82-83,%20527.pdf)

Abstract: Health risk assessment is the practice of evaluating the degree of danger associated with chemical exposure, whether the exposure is intentional (pharmacologic agents, pesticides) or unintentional (industrial/automobile by-products). Chemical exposure can either be to a single chemical or to complex mixtures such as industrial effluents, municipal wastes, jet fuels, gasoline, or mixtures of drinking water contaminants. The mixtures can be simple or complex; partially or completely characterized; and stable or varying in composition. Three different approaches are often used in health risk assessment of chemical mixtures (51 FR 33992-34054). These 3 approaches consist of (a) use of data on the specific mixture of concern; (b) use of data on a similar mixture; and (c) use of data on each component of the mixture. The individual component-based approach is by far the most often used because it allows the individual risks from each component to be combined, usually by dose or response additivity, to calculate an overall risk for the mixture. In addition, several innovative methods, such as the toxicity equivalency factor, relative potency, and even the use of indicator chemicals, are also employed. More recently, a binary weight-of-evidence approach has been proposed to evaluate potential interactions between the various components and to integrate them into the overall toxicity assessment of the mixture. Because no single approach is suitable for assessing the health risk associated with all the exposure scenarios associated with the various types of mixtures, the use of professional judgment is still imperative in conducting health risk assessments.

Keywords: Chemical Mixtures, Toxicity Assessment, Chemical Interactions, Hazard Index, Public Health, Analgesia

Randow, F.F., Hübener, T. and Merkel, G. (1996), Hazards for the Rostock water supply from a tar-contaminated sediment in the river Warnow. *Toxicology Letters*, **88** (1-3), 355-358.

Full Text: [T\Tox Let88, 355.pdf](T/Tox%20Let88,%20355.pdf)

Abstract: By the gas plant at Schwaan (a small city near Rostock), tar and other by-products were released into the river Warnow which supplies Rostock with drinking water 20 km downstream. The tar-contaminated river sediment contained phenols and polycyclic aromatic hydrocarbons (PAH), indicating a mutagenic potential. Investigations in the catchment area and on tributaries showed PAH contents up to about 10 ng/l in the water. The river sediment was found to be the sole PAH source. Although the PAH level is very low, sediment disturbances may produce an increase in concentrations. The consequences of such a worst case are difficult to estimate, even though the content of seston and humic substances in the river seems to reduce the PAH concentrations. Although this lowers the probability that increased PAH concentrations reach the Rostock water supply, the removal of the tar-contaminated sediment from the river is strongly recommended.

Černá, M., Pastorkoveá, A., Šmíd, J., Dobiáš, L. and Rössner, P. (1998), The use of YG bacterial tester strains for the monitoring of drinking water mutagenicity. *Toxicology Letters*, **96-97**, 335-339.

Full Text: [T\Tox Let96-97, 335.pdf](T/Tox%20Let96-97,%20335.pdf)

Abstract: The organic extract from the 50 drinking water specimens taken in four cities were tested for mutagenicity in the Ames test (plate incorporation assay) using the parent TA98 and TA100 strains, and derived YG1041 and YG1042 strains. Four dose levels of extractable organic matter (EOM) with duplicate plate per dose were used. Slopes (revertants/mg EOM) were calculated by the Bernstein linear regression rejection model using GeneTox Manager software. The mutagenicity observed in the conventional strains TA98 and TA100 did not reach the significant increase in all tested samples with the higher mutagenic response found in TA100-S9. With the YG1041 and YG1042 tester strains, the results obtained demonstrated the clear-cut direct dose-related mutagenicity response in all tested drinking water extracts. Compared with TA98 and TA100 strains, the numbers of YG induced revertants were approximately 20 times higher. The high sensitivity of the YG tester strains could facilitate the mutagenicity monitoring in drinking water extracts, and help reduce the volume of sample required. However, to identify the chemical contaminants in drinking water responsible for the mutagenicity further studies are required.

Ruan, Y., Peterson, M.H., Wauson, E.M., Gelineau-Van Waes, J., Finnell, R.H. and Vorce, R.L. (2000), Folic acid protects SWV/Fnn embryo fibroblasts against arsenic toxicity. *Toxicology Letters*, **117** (3), 129-137.

Full Text: [T\Tox Let117, 129.pdf](T/Tox%20Let117,%20129.pdf)

Abstract: It has been proposed that arsenic exerts its toxic effects, in part, by perturbing cellular methyl metabolism. Based on the hypothesis that folic acid treatment will attenuate the cytotoxic and growth inhibitory effects of arsenic, SWV/Fnn embryo fibroblasts were cultured in media supplemented with Various concentrations of folic acid during treatment with sodium arsenite or dimethylarsinic acid (DMA). It was found that folic acid protects SWV/Fnn embryo fibroblasts from sodium arsenite and DMA cytotoxicity in a dose-dependent manner. In contrast, folic acid supplementation has no effect on toxicity resulting from treatment with ethanol or staurosporine. suggesting that folic acid is not generally protective against necrosis and apoptosis. Although folic acid protects against acute arsenic toxicity, this agent shows a modest and delayed ability to attenuate the growth inhibitory effect of arsenic on these cells. These results support a model in which perturbations of methyl metabolism contribute to the acute cytotoxicity of arsenic. (C) 2000 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Arsenic, Folic Acid, Cytotoxicity, DMA, Arsenite, Neural-Tube Defects, Drinking-Water, Gene-Expression, Developmental Toxicity, Blackfoot Disease, Sodium Arsenite, Skin-Lesions, West-Bengal, Cancer, Taiwan

? Rodríguez, V.M., Jiménez-Capdeville, M.E. and Giordano, M. (2003), The effects of arsenic exposure on the nervous system. *Toxicology Letters*, **145** (1), 1-18,

Full Text: [2003\Tox Let145, 1.pdf](2003/Tox%20Let145,%201.pdf)

Abstract: Arsenic (As) is a common environmental contaminant widely distributed around the world. Human exposure to this metalloid comes from well water and contaminated soil, from fish and other sea organisms rich in methylated arsenic species, and from occupational exposure. It has been reported that human arsenic exposure causes several health problems such as cancer, liver damage, dermatosis, and nervous system disturbances such as polyneuropathy, EEG abnormalities and, in extreme cases, hallucinations, disorientation and agitation. Although there is evidence that arsenic exposure has a toxic effect on the nervous system there are few studies that address this issue. The purpose of this review is to describe what is presently known about the effects of arsenic compounds on the nervous system in humans and rodents and to discuss its possible mechanisms of action. (C) 2003 Elsevier Ireland Ltd. All fights reserved.

Keywords: Arsenic, Neurotoxicity, Behavior, Nervous System, Neurotransmitter, Barre-Like Syndrome, Sodium Arsenite, Enzymatic Methylation, Urinary-Excretion, Gene-Expression, Drinking-Water, Permeability Transition, Environmental Exposure, Developmental Toxicity, Induced Apoptosis

? Miró, Ò., Montori, E., Ramos, X., Galicia, M. and Nogu, S. (2009), Trends in research activity in toxicology and by toxicologists in seven European countries. *Toxicology Letters*, **189** (1), 1-4.

Full Text: [2009\Tox Let189, 1.pdf](2009/Tox%20Let189,%201.pdf)

Keywords: Bibliometric Analysis, Impact, Oil Syndrome, Policy, Publications, Research, Spanish Scientific Production

# Title: Toxicology of Metals: Clinical and Experimental Research

Fllis Horwood, New York, Chichester, Brisbane and Toronto

Brown, S.S. and Kodama, Y. (1987), *Toxicology of Metals: Clinical and Experimental Research*, Ellis Horwood Limited, New York, Chichester, Brisbane and Toronto.

Sunderman, Jr., F.W. (1987), Physicochemical and biological attributes of nickel compounds in relationship to carcinogenic activities. in *Toxicology of Metals: Clinical and Experimental Research*, (Edited by Brown, S.S. and Kodama, Y.), Ellis Horwood Limited, New York, Chichester, Brisbane and Toronto, 255-365.

# Title: Toxicon

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? Gutierrez, J.M., Gene, J.A., Rojas, G. and Cerdas, L. (1985), Neutralization of proteolytic and hemorrhagic activities of Costa Rican snake-venoms by a polyvalent antivenom. *Toxicon*, **23** (6), 887-893.

Full Text: [1985\Toxicon23, 887.pdf](1985/Toxicon23,%20887.pdf)

? Gene, J.A., Roy, A., Rojas, G., Gutierrez, J.M. and Cerdas, L. (1989), Comparative-study on coagulant, defibrinating, fibrinolytic and fibrinogenolytic activities of Costa-Rican crotaline snake-venoms and their neutralization by a polyvalent antivenom. *Toxicon*, **27** (8), 841-848.

Full Text: [1989\Toxicon27, 841.pdf](1989/Toxicon27,%20841.pdf)

Morris, R.J., Williams, D.E., Luu, H.A., Holmes, C.F.B., Andersen, R.J. and Calvert, S.E. (2000), The adsorption of microcystin-LR by natural clay particles. *Toxicon*, **38** (2), 303-308.

Full Text: [T\Toxicon38, 303.pdf](T/Toxicon38,%20303.pdf)

Abstract: The microcystin cyanobacterial hepatotoxins represent an increasingly severe global health hazard. Sines microcystins are found world wide in drinking water reservoirs concern about the impact on human health has prompted investigations into remedial water treatment methods. This preliminary study investigates the scavenging from water of microcystin-LR by fine-grained particles known to have a high concentration of the clay minerals kaolinite and montmorillonite. The results show that more than 81% of microcystin-LR can be removed from water by clay material. Thus, microcystin-LR is indeed scavenged from water bodies by fine-grained particles and that this property may offer an effective method of stripping these toxins from drinking water supplies. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Protein Phosphatase Inhibitors, Diarrhetic Shellfish Toxins, Oscillatoria-Agardhii, Tumor Promotion, Okadaic Acid, Cyanobacteria, Identification, Bloom, Decomposition, Environment

? Guimaraes, J.A. and Carlini, C.R. (2004), Most cited papers in *Toxicon*. *Toxicon*, **44** (4), 345-359.

Full Text: [2004\Toxicon44, 345.pdf](2004/Toxicon44,%20345.pdf)

Abstract: Citation of a published work is one of the parameters considered in the analysis of relevance and importance of scientific contributions. In 2002. for the first time the Impact Factor of Toxicon has risen above 2.0, placing it at the 17th position among 76 journals in the ‘toxicology’ field. The aim of this article was to identify the most cited articles in Toxicon, that have contributed to the steady increase of its Impact Factor. The number of citations, complete reference and type of all documents appearing in Toxicon in the period 1963-2003 were retrieved from the ISI Web-of-Science homepage. The documents retrieved were sorted by the number of citations received. A ‘citation index’, defined as the number of citations divided by the number of years since publication, was calculated for each document. It was clearly seen that reviews in Toxicon received 4.4-fold more citations than articles. Unexpectedly, it was found that recent papers were proportionally more cited than old ones. A decrease in the proportion of papers dealing on ‘snake\*’ through out the period and the broadened range of subjects of the most cited papers recently published in Toxicon reflects an increased ‘visibility’ in other fields of toxinology. Research on plant toxins gained its own space in Toxicon with newer publications showing high citation indexes. It can be postulated that these facts helped to increase Toxicon’s Impact Factor from 1.248 in 1999 to 2.003 in 2002. With the increased number of issues in Toxicon as well as publications of subject-dedicated volumes containing mostly reviews, the Impact Factor of Toxicon is expected to keep rising in the near future. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Anabaena-Flos-Aquae, Analysis, Blue-Green-Algae, Bothrops-Asper Venom, Buthus-Martensi Karsch, Citation, Citation Index, Citation Indexes, Citations, Cyanobacteria, Cyanobacterium Microcystis-Aeruginosa, Eclipta-Prostrata Asteraceae, Engaddensis Burrowing Asp, Impact, Impact Factor, Indexes, ISI, Isi Web of Science, Journals, Linked-Immunosorbent-Assay, Papers, Paralytic Shellfish Toxins, Plant, Plant Lantana-Camara, Plant Toxins, Publication, Publications, Research, Snakes, Visibility, Web of Science

? Qiao, R.P., Li, N., Qi, X.H., Wang, Q.S. and Zhuang, Y.Y. (2000), Degradation of microcystin-RR by UV radiation in the presence of hydrogen peroxide. *Toxicon*, **45** (6), 745-752.

Full Text: [T\Toxicon38, 745.pdf](T/Toxicon38,%20745.pdf)

Abstract: Experiments were conducted to investigate the degradation of microcystin-RR in order to assess the effectiveness and feasibility of the combined UV/H2O2 catalytic system for purification of water polluted by microcystins. The operating parameters such as hydrogen peroxide dosage, pH value, UV light intensity, initial concentration of microcystin-RR and reaction time were evaluated, respectively. The degradation efficiency increased nonlinearly with increasing UV light intensity and hydrogen peroxide dosage, respectively. There existed an optimal hydrogen peroxide dosage, beyond which the reagent exhibited an inhibitory effect, for degrading microcystin-RR. The degradation process could be fitted by both of the pseudo-first-order and second-order kinetics well and primarily followed a mechanism of both direct photolysis and hydroxyl radical oxidation. Compared with the treatment using UV radiation and hydrogen peroxide individually, the combined UV/H2O2 system could significantly enhance the degradation efficiency due to the synergetic effect between UV radiation and hydrogen peroxide oxidation. The observed rate constants decreased and the corresponding half-lives prolonged as the concentrations of microcystin-RR increased. The combined UV/H2O2 process provides an effective technology for the removal of microcystins from drinking water supplies. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Photocatalytic Degradation, Microcystins, Combined UV/H2O2 Process, Kinetics**,** Water-Treatment Processes, Cyanobacterial Toxins, Ultraviolet-Radiation, Titanium-Dioxide, Photocatalytic Degradation, Treatment Options, Kinetic-Model, Destruction, Hepatotoxins, LR

? Chen, X.G., Xiao, B.D., Liu, J.T., Fang, T. and Xu, X.Q. (2000), Kinetics of the oxidation of MCRR by potassium permanganate. *Toxicon*, **45** (7), 911-917.

Full Text: [T\Toxicon45, 911.pdf](T/Toxicon45,%20911.pdf)

Abstract: The occurrence of the microcystins in the water bodies, especially in drinking water resources, has received considerable attentions. In situ chemical oxidation is a promising cost-effective treatment method to remove MC from water body. This research investigated the reaction kinetics of the oxidation of MCRR by permanganate. Experimental results indicate that the reaction is second order overall and first order with respect to both permanganate and MCRR, and has an activation energy of 18.9 kJ/mol. The second-order rate constant ranges from 0.154 to 0.225 l/mg/min at temperature from 15 to 30°C. The MCRR degradation rates can be accelerated through increasing reaction temperature and oxidant concentration. The reaction under acid conditions was slightly faster than under alkaline conditions. The half-life of the reaction was less than 1 min, and more than 99.5% of MCRR was degraded within 10 min. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Microcystin-RR, Potassium Permanganate, Oxidation, Kinetics, Water-Treatment, Microcystin-LR, Cyanobacterial Toxins, Removal, Hepatotoxin, Dioxide, Carbon, Acid

# Title: Toxins

Full Journal Title: Toxins

ISO Abbreviated Title: Toxins

JCR Abbreviated Title: Toxins

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Varga, J., Kocsubé, S., Péteri, Z., Vágvölgyi, C. and Tóth, B. (2010), Chemical, physical and biological approaches to prevent ochratoxin induced toxicoses in humans and animals. *Toxins*, **2** (7), 1718-1750.

Full text: [2010\Toxins2, 1718.pdf](2010/Toxins2,%201718.pdf)

Abstract: Ochratoxins are polyketide derived fungal secondary metabolites with nephrotoxic, immunosuppressive, teratogenic, and carcinogenic properties. Ochratoxin-producing fungi may contaminate agricultural products in the field (preharvest spoilage), during storage (postharvest spoilage), or during processing. Ochratoxin contamination of foods and feeds poses a serious health hazard to animals and humans. Several strategies have been investigated for lowering the ochratoxin content in agricultural products. These strategies can be classified into three main categories: prevention of ochratoxin contamination, decontamination or detoxification of foods contaminated with ochratoxins, and inhibition of the absorption of consumed ochratoxins in the gastrointestinal tract. This paper gives an overview of the strategies that are promising with regard to lowering the ochratoxin burden of animals and humans.

# Title: Trabajos de Prehistoria

Full Journal Title: Trabajos de Prehistoria

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0082-5638

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ruiz, I.M., Heras, M.G. and Lopez-Romero, E. (2007), Archaeometry: Changes and current trends. *Trabajos de Prehistoria*, **64** (1), 23-40.

Abstract: This paper looks through the definition of the term Archaeometry and its different meanings since the first use of the term in the 1950s to the present. It is also concerned with the historical background of Archaeometry, its evolution throughout recent decades and the fields currently covered by this new area of knowledge, which must be understood within the limits of archaeology. In addition, a bibliometric analysis has served to show in depth the trends of archaeometric studies and to assess their role in current archaeological research. Finally, some ideas on the particular knowledge generated by Archaeometry as well as its future and immediate perspectives are also discussed.

Keywords: Academic Discipline, Analysis, Archaeological Daub, Archaeology, Archaeometry, Bibliometric, Bibliometric Analysis, Bibliometry, Definition, Depth, Evolution, First, Interdisciplinary Research, Iron-Age Site, Knowledge, Neanderthal Burial, Northeast Thailand, Probable Industrial Origin, Research, Role, Science, Term, Trends

# Title: Trace Elements in Medicine

Full Journal Title: Trace Elements in Medicine

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Maier, R.H., Purser, S.M., Bray, J.T. and Pories, W.J. (1993), Trace metal characterization of some standard smokeless tobaccos. *Trace Elements in Medicine*, **10** (1), 48-53.

Abstract: Chemical forms of Cd, Cu, Ni, and Zn in standard types of chewing tobacco, and both moist and dry snuff were characterized by determining the differential solubility patterns for the trace metals as a function of chelating agent extractant, nature of ionic charge of the trace metal constituents, and the proportion of soluble trace metals which were chelatable and non-chelatable. Different discrete chemical forms of the trace metals were determined and were a function of the trace metal and of the type of standard tobacco. These chemical forms may show a more reliable relationship to toxicological assays of smokeless tobacco than the total amount of the metal present in the tobacco.

Keywords: Trace Metal Characterization, Smokeless Tobacco, Trace Element Chemical Forms

# Title: Trace Metals in the Environmental 1. Heavy Metals in the Environment

Elsevier, Amsterdam, London, New York and Tokyo

Pacyna, J.M., Münch, J. and Axenfeld, F. (1991), European inventory of trace metal emissions to the atmosphere. in *Trace Metals in the Environmental 1. Heavy Metals in the Environment*, (Edited by Vernet, J.P.), Elsevier, Amsterdam, London, New York and Tokyo, 1-20.

Orlov, M.M., Mladinic, N.M., Kulic, P.I., Dolinac, D.Z., Dubravcic, M.N. and Kurajica, L.B. (1991), Health effects of the workers exposed to airborne lead. in *Trace Metals in the Environmental 1. Heavy Metals in the Environment*, (Edited by Vernet, J.P.), Elsevier, Amsterdam, London, New York and Tokyo, 219-227.

Tien, C.T. and Huang, C.P. (1991), Formation of surface complexes between heavy metals and sludge particles. in *Trace Metals in the Environmental 1. Heavy Metals in the Environment*, (Edited by Vernet, J.P.), Elsevier, Amsterdam, London, New York and Tokyo, 295-311.

Tien, C.T. and Huang, C.P. (1991), Kinetics of heavy metal adsorption on sludge particulate. in *Trace Metals in the Environmental 1. Heavy Metals in the Environment*, (Edited by Vernet, J.P.), Elsevier, Amsterdam, London, New York and Tokyo, 313-328.

Huang, J.P., Huang, C.P. and Morehart, A.L. (1991), Removal of heavy metals by fungal (*Aspergillus oryzae*) adsorption. in *Trace Metals in the Environmental 1. Heavy Metals in the Environment*, (Edited by Vernet, J.P.), Elsevier, Amsterdam, London, New York and Tokyo, 329-349.

# Title: TrAC-Trends in Analytical Chemistry

Full Journal Title: [TrAC Trends in Analytical Chemistry](http://www.sciencedirect.com/science/journal/01659936)

ISO Abbreviated Title: TrAC-Trends Anal. Chem.

JCR Abbreviated Title:

ISSN: 0165-9936

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Bujdosó, E., Braun, T. and Lyon, W.S. (1982), Information flow in analytical journals. *TrAC-Trends in Analytical Chemistry*, **1** (12), 268-273.

Full Text: [T\TrAC-Tre Ana Che1, 268.pdf](T/TrAC-Tre%20Ana%20Che1,%20268.pdf)

Abstract: Scientometric methods, based on the statistical evaluation of journal citations and references, are helping the analyst to achieve a better understanding of the interactions and relationships between the main communication channels in his field of research.

Braun, T., Schubert, A. and Zsindely, S. (1989), Analytical chemistry: The most frequently cited papers during the past 25 years. *TrAC-Trends in Analytical Chemistry*, **8** (1), 1-5.

Full Text: [T\TrAC-Tre Ana Che8, 1.pdf](T/TrAC-Tre%20Ana%20Che8,%201.pdf)

Braun, T., Glänzel, W. and Schubert, A. (1989), Charting national research performances in analytical chemistry, 1981-1985. *TrAC-Trends in Analytical Chemistry*, **8** (8), 281-284.

Full Text: [T\TrAC-Tre Ana Che8, 281.pdf](T/TrAC-Tre%20Ana%20Che8,%20281.pdf)

Braun, T., Glänzel, W. and Schubert, A. (1989), National research efforts in analytical chemistry, 1981-1985. *TrAC-Trends in Analytical Chemistry*, **8** (9), 316-318.

Full Text: [T\TrAC-Tre Ana Che8, 316.pdf](T/TrAC-Tre%20Ana%20Che8,%20316.pdf)

Braun, T. and Schubert, A. (1990), National publication productivities and performance in analytical chemistry core journals, 1981-1985. *TrAC-Trends in Analytical Chemistry*, **9** (6), 176-182.

Full Text: [T\TrAC-Tre Ana Che9, 176.pdf](T/TrAC-Tre%20Ana%20Che9,%20176.pdf)

Braun, T., Glänzel, W. and Schubert, A. (1990), The geography of world research in analytical chemistry, 1981-1985. *TrAC-Trends in Analytical Chemistry*, **9** (9), 278-279.

Full Text: [T\TrAC-Tre Ana Che9, 278.pdf](T/TrAC-Tre%20Ana%20Che9,%20278.pdf)

Braun, T. and Schubert, A. (1991), ‘Hot’ topics in global analytical chemistry research: 1981-1990. *TrAC-Trends in Analytical Chemistry*, **10** (1), 1-3.

Full Text: [T\TrAC-Tre Ana Che10, 1.pdf](T/TrAC-Tre%20Ana%20Che10,%201.pdf)

Valcárcel, M. and Ríos, A. (1995), The evolution of quality in analytical chemistry journals. *TrAC-Trends in Analytical Chemistry*, **14** (3), 94-100.

Full Text: [T\TrAC-Tre Ana Che14, 94.pdf](T/TrAC-Tre%20Ana%20Che14,%2094.pdf)

Abstract: The remarkable increase in the impact factor for analytical chemistry journals observed on comparing the Science Citation Indices of the Institute for Scientific Information (ISI) for the years 1991 and 1992 instigated a systematic study of changes in two quality parameters for major analytical publications over a ten-year period (1983-1992). Differences in the impact factors between analytical publications and those in other branches of chemistry have been greatly reduced recently, which indicates that the quality of the former has increased with respect to the latter.

Wong, A.Y.S. and Tanner, P.A. (1997), Monitoring environmental pollution in Hong Kong: Trends and prospects. *TrAC-Trends in Analytical Chemistry*, **16** (4), 180-190.

Full Text: [1997\TrAC-Tre Ana Che16, 180.pdf](1997/TrAC-Tre%20Ana%20Che16,%20180.pdf)

Abstract: Located at the SE of China, with 1092 km2 land area and 6.5x106 inhabitants, Hong Kong (HK), with a current GDP per capita of US$ 23 019 and a life expectancy of 78.7 year can be considered a fully economically developed region. The widespread environmental pollution resulting from burgeoning industrial development during the 1970s remained unchecked until the start of control legislation in 1981, with a ten-year strategy put forward by the Government in 1989. Environmental monitoring results and methods of control of water and air pollution are reported in this article, together with the waste treatment and disposal strategies. Weak enforcement of environmental legislation has occurred at a time when massive infrastructural projects and construction activities are in progress so that environmental protection lags behind economic growth.

? (1998), Most cited chemists. *Trac-Trends in Analytical Chemistry*, **17** (1), VII.

Full Text: 1998\TrAC-Tre Ana Che17, VII.pdf

? Ridley, D.D. (2001), Citation searches in on-line databases: Possibilities and pitfalls. *TrAC-Trends in Analytical Chemistry*, **20** (1), 1-10.

Full Text: [2001\TrAC-Tre Ana Che20, 1.pdf](2001/TrAC-Tre%20Ana%20Che20,%201.pdf)

Abstract: Until recently the main source of scientific journal citations was the science citation index, which is now available in print and electronic formats. Searches in the electronic format were performed mainly by information professionals, but with the introduction of citations in the chemical abstracts service bibliographic database and the acceptance of the Web of Science as a means to access citations, many scientists and managers are searching directly for citation data. For comprehensive results the most reliable method is to use search terms based on first-listed authors of each publication, but this may be very time consuming. Electronic sources provide search algorithms which fast-track the process, but it is important that users understand the issues and how these algorithms work if reasonably reliable data are to be obtained. (C) 2001 Elsevier Science B.V. All rights reserved.

Keywords: Science Citation Index, Chemical Abstracts Service, Citations, Citation Analysis, On-Line Searching, Impact Factors, Quality, Index

Notes: highly cited

? Ternes, T.A. (2001), Analytical methods for the determination of pharmaceuticals in aqueous environmental samples. *TrAC-Trends in Analytical Chemistry*, **20** (8), 419-434.

Full Text: [2001\TrAC-Tre Ana Che20, 419.pdf](2001/TrAC-Tre%20Ana%20Che20,%20419.pdf)

Abstract: Recently several methods have been developed for the determination of drugs and their metabolites in the lower ng/l range using solid phase extraction (SPE), derivatization, detection and confirmation by gas chromatography/mass spectrometry (GC/MS) and GC/MS/MS or LC-electrospray tandem MS (LC-ES/MS/MS). A wide range of pharmaceuticals from different medicinal classes can be determined down to the lower ng/l range. Due to the basically elevated polarity of pharmaceuticals either analysis by LC-ES/MS/MS or an efficient derivatization prior to measurements by GC/MS are mostly essential. A direct comparison of GC/MS and LC-ES/MS/MS displayed that only the latter allows for the analysis of the extreme polar betablockers atenolol and sotalol due to an incomplete derivatization of the functional groups. Further; the relative standard deviation using LC-ES/MS/MS was lower. However, when analyzing highly contaminated samples such as sewage a suppression of the electrospray ionization is likely to occur. Thus, to guarantee accurate and reproducible data either an efficient clean-up step has to be included into the sample preparation or an appropriate surrogate standard has to be spiked prior to SPE enrichment. (C) 2001 Elsevier Science B.V. All rights reserved.

Keywords: LC-ES/MS/MS, Pharmaceuticals, GC/MS Water, Wastewater, Endocrine Disruptors, Capillary Gas-Chromatography, Sewage-Treatment Plants, Nonsteroidal Antiinflammatory Drugs, Aquatic Environment, Mass-Spectrometry, Antiepileptic Drugs, Surface Waters, Beta-Blockers, Waste-Water, Behavior

Georgiou, C.A. and Thomaidis, N.S. (2001), Analytical chemistry in the European Union during 1993-1999: An appraisal on the basis of papers abstracted in Analytical Abstracts. *TrAC-Trends in Analytical Chemistry*, **20** (9), 462-466.

Full Text: [T\TrAC-Tre Ana Che20, 462.pdf](T/TrAC-Tre%20Ana%20Che20,%20462.pdf)

Abstract: This study focuses on the status of analytical chemistry publications among the member states of the European Union (EU) during the cumulative 7-year period 1993-1999. For assessing the scientific publication productivity in analytical chemistry and its impact among the EU countries, the total number of publications from each country, the number of publications per head of population and the mean impact factor for each country are calculated. Moreover, the preference to publish in specific journals per country is appraised. (C) 2001 Elsevier Science B.V. All rights reserved.

Keywords: Scientometric Indices, Publication Productivity, Impact Factor, Analytical Chemistry, European Union, Publication

? (2003), NMR provides one of the most cited papers in engineering. *Trac-Trends in Analytical Chemistry*, **22** (9), VIII-VIIX.

Full Text: 1998\TrAC-Tre Ana Che22, VIII.pdf

Keywords: NMR, papers

? Aller, A.J. and Castro, M.A. (2006), Live bacterial cells as analytical tools for speciation analysis: Hypothetical or practical? *TrAC-Trends in Analytical Chemistry*, **25** (9), 887-898.

Full Text: [2006\TrAC-Tre Ana Che25, 887.pdf](2006/TrAC-Tre%20Ana%20Che25,%20887.pdf)

Abstract: This review tries to show the capability of live bacterial cells in speciation analysis, so it emphasizes speciation analysis of metalloid and organometalloid species by combining an uptake process by live bacterial cells with a specific detector. Especially covered in depth is the uptake process, because better understanding of equilibrium and retention mechanisms provides the basis for optimizing the use of bacterial cells. We outline the main parameters affecting the uptake process and the analytical characteristics. We also cover bacteria-based biosensors that represent a research field of growing interest in using live bacteria. We also highlight some future considerations about the role of recombinant bacterial cells in analytical chemistry. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Accumulation, Bacteria-Based Biosensors, Live Bacterial Cells, Recombinant Bacteria, Speciation Analysis, Uptake Process, Atomic-Absorption-Spectrometry, Genetically-Engineered Bacteria, Catabolic Reporter Bacterium, Selective Membrane Electrode, Trace-Metal Preconcentration, Escherichia-Coli, Bacillus-Subtilis, Heavy-Metals, Chemical Speciation, Pseudomonas-Putida

# Title: Traffic Injury Prevention

Full Journal Title: [Traffic Injury Prevention](http://www.informaworld.com/smpp/title~db=all~content=t713456148)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Desapriya, E., Subzwari, S., Sasges, D., Basic, A., Alidina, A., Turcotte, K. and Pike, I. (2010), Do light truck vehicles (LTV) impose greater risk of pedestrian injury than passenger cars? A meta-analysis and systematic review. *Traffic Injury Prevention*, **11** (1), 48-56.

Full Text: [2010\Tra InjPre11, 48.pdf](2010/Tra%20InjPre11,%2048.pdf)

Abstract: Objective: Pedestrian crashes present a growing challenge for public health trauma and road safety researchers around the world. They are associated with substantial morbidity, mortality, and cost, yet there is an international lack of published work on the topic, especially when compared with vehicle occupant safety studies. Our review attempts to quantify the risk of fatal injury among vulnerable road users. The specific objective of this systematic review and meta-analysis is to quantify and compare the impact of light truck vehicles (LTVs) versus conventional cars on pedestrian fatal injury. Methods: A protocol was developed using methods of the Cochrane Collaboration. We conducted a search for the studies in bibliographic databases that included ATI (Australian Transport Index); Cochrane Injuries Group Specialized Register; EMBASE; ERIC; MEDLINE; National Research Register; PsycINFO; Road Res (ARRB); SIGLE; Science (and Social Science) Citation Index; TRANSPORT (NTIS, TRIS, TRANSDOC, IRRD). Web sites of traffic and road accident research bodies, government agencies, and injury prevention organizations were searched for grey literature. Reference lists from selected papers or topic reviews were scanned for potentially relevant papers. Results: Our initial search identified 878 potentially eligible studies. After thorough review by three of the researchers a total of 12 studies were included in the systematic review, 11 of which were included in the meta-analysis. The overall pooled odds ratio for the risk of fatal injury in pedestrian collisions with LTVs compared to conventional cars was odds ratio 1.54, 95 percent confidence interval 1.15-1.93, p = 0.001. Thus, the risk for pedestrians of sustaining fatal injury is 50 percent greater in collisions with LTVs than in collisions with conventional cars. Conclusions: Our systematic review and meta-analysis suggests that LTVs pose a greater risk of pedestrian injury death compared to conventional cars. These findings have important implications for the automotive industry and the safety of vulnerable road users.

Keywords: Bumper Height, Citation, Collaboration, Collisions, Compatibility, Crashes, Databases, Determinants, Epidemiology, Front Design Modifications, Greater Mass, Impact, Increased Stiffness, Injury Prevention, Light Truck Vehicles, Literature, Medline, Meta-Analysis, Older Pedestrians, Pedestrian Fatal Injury Crashes, Protection, Public Health, Research, Researchers, Review, Safety, Science, Sports-Utility Vehicles, Systematic Review, Topic, Transport, United-States

# Title: Transactions of the American Institute of Chemical Engineers

Full Journal Title: Transactions of the American Institute of Chemical Engineers

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0096-7408

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Haanel, B.F. (1920), The manufacture of peat fuel and its utilization for various purposes. *Transactions of the American Institute of Chemical Engineers*, **13** (1), 431-459.

Notes: highly cited

? Newman, A.B. (1931), The drying of porous solids diffusion and surface emission equations. *Transactions of the American Institute of Chemical Engineers*, **27**, 203-220.

Full Text: Tra Ame Ins Che Eng27, 203.pdf

Notes: highly cited

? Newman, A.B. (1931), The drying of porous solids diffusion calculations. *Transactions of the American Institute of Chemical Engineers*, **27**, 310-333.

Full Text: Tra Ame Ins Che Eng27, 310.pdf

Notes: highly cited

? Higbie, R. (1935), The rate of absorption of a pure gas into a still liquid during short periods of exposure. *Transactions of the American Institute of Chemical Engineers*, **31**, 365-389.

Full Text: [-1959\Tra Ame Ins Che Eng31, 365.pdf](-1959/Tra%20Ame%20Ins%20Che%20Eng31,%20365.pdf)

# Title: Transactions of the American Nuclear Society

Full Journal Title: Transactions of the American Nuclear Society

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0003-018X

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lung, H.C., Chambre, P.L. and Pigford, T.H. (1983), Nuclide migration in backfill with a non-linear sorption isotherm. *Transactions of the American Nuclear Society*, **45**, 107-108.

# Title: Transactions of the British Mycological Society

Full Journal Title: Transactions of the British Mycological Society

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Wainwright, M. (1988), Metabolic diversity of fungi in relation to growth and mineral cycling in soil: A review. *Transactions of the British Mycological Society*, **90**, 159-170.

# Title: Transactions of the Faraday Society

(J. Chem. S. F. J. Chem. Soc. Faraday Trans.)

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)

Full Journal Title: [Transactions of the Faraday Society](http://www.rsc.org/Publishing/Journals/tf/Article.asp?Type=CurrentIssue)

ISO Abbreviated Title: J. Chem. Soc.

JCR Abbreviated Title: J Chem Soc

ISSN: 0014-7672

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Firth, J.B. (1921), Sorption of iodine by carbon. *Transactions of the Faraday Society*, **16**, 434-452.

Full Text: [-1959\Tra Far Soc16, 434.pdf](-1959/Tra%20Far%20Soc16,%20434.pdf)

Abstract: Iodine is dissolved in benzene (solubility 103.9 gm. per litre at 15°C.) or chloroform (36.2 gm.) and absorbed by lamp-black, sugar carbon, blood charcoal, animal charcoal, and coconut charcoal, both from the fruit and the shell, to study the influence of time (up to five years), size of particles, and previous treatment; most of the experiments are made at 25°C. The paper is largely tabular. There is a rapid surface condensation (adsorption) followed by a slow diffusion into the interior (absorption). The former is mostly instantaneous and is complete in a few hours; the latter may continue for years. The rate of sorption is influenced by the natures of both the solvent and the sorbing solid. In blood charcoal the adsorption is very high; in coconut charcoal absorption is the predominating factor. The concentration of the dissolved iodine decreases to a minimum, and then remains almost constant; the initial adsorption is the greater, the smaller the carbon particles. Blood charcoal in chloroform sorbs 90% of the total iodine, coconut (fruit) charcoal less than 3%; the time taken to reach the concentration minimum amounts to 6 days in the former case (6 or 8 gm. of carbon per cm.3 of solution) and 5 years in the latter; in sugar carbon the minimum was not reached after 5 years. Fine powdering much increases the rate of sorption of coconut carbon; the relative amounts of adsorption and absorption depend to some extent on the size of the particles, and absorption may only cease to be a factor when the carbon particles approach molecular dimensions. The presence of water in the carbon lowers the adsorption capacity, especially in lamp-black.

? Freundlich, H.M.F. (1932), Of the adsorption of gases. Section II. Kinetics and energetics of gas adsorption. Introductory paper to section II. *Transactions of the Faraday Society*, **28**, 195-201.

Full Text: [-1959\Tra Far Soc28, 195.pdf](-1959/Tra%20Far%20Soc28,%20195.pdf)

? Polanyi, M. (1932), Theories of the adsorption of gases. A general survey and some additional remarks. Introductory paper to section III. *Transactions of the Faraday Society*, **28**, 316-333.

Full Text: [-1959\Tra Far Soc28, 316.pdf](-1959/Tra%20Far%20Soc28,%20316.pdf)

Notes: highly cited

? Lennard-Jones, J.E. (1932), Processes of adsorption and diffusion on solid surfaces. *Transactions of the Faraday Society*, **28**, 333-358.

Full Text: [-1959\Tra Far Soc28, 333.pdf](-1959/Tra%20Far%20Soc28,%20333.pdf)

Notes: highly cited

? Evans, M.G. and Polanyi, M. (1935), Some applications of the transition state method to the calculation of reaction velocities, especially in solution. *Transactions of the Faraday Society*, **31** (1), 875-893.

Full Text: [-1959\Tra Far Soc31, 875.pdf](-1959/Tra%20Far%20Soc31,%20875.pdf)

Barrer, R.M. (1936), The rates of interaction of proto- and deutero-hydrogen and methane with charcoal. *Transactions of the Faraday Society*, **32**, 481-486.

Full Text: [-1959\Tra Far Soc32, 481.pdf](-1959/Tra%20Far%20Soc32,%20481.pdf)

Barrer, R.M. (1936), The interaction of ligh and heavy water with aluminum carbide and calcium phosphide. *Transactions of the Faraday Society*, **32**, 486-490.

Full Text: [-1959\Tra Far Soc32, 486.pdf](-1959/Tra%20Far%20Soc32,%20486.pdf)

Barrer, R.M. (1936), The thermal decomposition of light and heavy ammonia and phosphine on tungsten. *Transactions of the Faraday Society*, **32**, 490-501.

Full Text: [-1959\Tra Far Soc32, 490.pdf](-1959/Tra%20Far%20Soc32,%20490.pdf)

Notes: highly cited

? Evans, M.G. and Polanyi, M. (1936), Further considerations on the thermodynamics of chemical equilibria and reaction rates. *Transactions of the Faraday Society*, **32** (2), 1333-1359.

Full Text: [-1959\Tra Far Soc32, 1333.pdf](-1959/Tra%20Far%20Soc32,%201333.pdf)

Notes: highly cited

? Evans, M.G. and Polanyi, M. (1938), Inertia and driving force of chemical reactions. *Transactions of the Faraday Society*, **34** (1), 11-23.

Full Text: [-1959\Tra Far Soc34, 11.pdf](-1959/Tra%20Far%20Soc34,%2011.pdf)

? McBain, J.W., Mills, G.F. and Ford, T.F. (1940), The interferometer method for measuring absolute adsorption in the surface of solutions. *Transactions of the Faraday Society*, **36**, 930-935.

Full Text: [-1959\Tra Far Soc36, 930.pdf](-1959/Tra%20Far%20Soc36,%20930.pdf)

Keywords: Adsorption, Method, Solutions, Surface

? Duncan, J.F. (1949), The determination of the surface area of a solid from an adsorption isotherm. *Transactions of the Faraday Society*, **45** (9), 879-891.

Full Text: [-1959\Tra Far Soc45, 879.pdf](-1959/Tra%20Far%20Soc45,%20879.pdf)

Abstract: The Harkins method, and the Brunauer, Emmett and Teller method of estimating the surface area of a solid from the adsorption isotherm of a suitable gas are applied to isotherms of ethylene at liquid air temperature. It is shown that both methods lead to the same results for a given isotherm. The isotherm equation of Harkins, and the Brunauer, Emmett and Teller equation as modified by Anderson are reduced to the form p/po = C(I - v m / (D V)); it is shown that from the Anderson constant K, and assuming a given value for the area occupied by an adsorbed molecule, the Harkins constant K may be estimated approximately. A more accurate value of k is obtained from the plot of p/po against I/V for isotherms of nitrogen and ethylene. A quick method of determining the surface areas of large numbers of solids to about 20 yo accuracy is suggested, based on the assumption of a value for the Anderson constant, and the linearity of the p / p o - I/V plot over the range of p/po from 0.25 to 0.75.

? Fergusson, R.R. and Barrer, R.M. (1950), Derivation and development of Hüttig’s multilayer sorption isotherm. *Transactions of the Faraday Society*, **46** (4-5), 400-407.

Full Text: [-1959\Tra Far Soc46, 400.pdf](-1959/Tra%20Far%20Soc46,%20400.pdf)

Abstract: A statistical derivation has been given of the most generalized form of sorption isotherm based on Hüttig’s view of the evaporation-condensation properties of a sorbed molecule. From this general equation a number of characteristic isotherm equations have been obtained analogous to the various modifications of the B.E.T. isotherm. From calculations based upon these Hüttig-type multilayer sorption isotherms it has been shown possible to obtain curves corresponding to isotherms of types I, III and to some extent V, of Brunauer’s classiffication, but not to types II and IV. It is also possible to obtain limiting values of the sorption corresponding to less or much more than the two layers given by Hüttig’s original isotherm equation.

? Eley, D.D. (1953), The kinetics of unimolecular processes in condensed phases, including adsorption. *Transactions of the Faraday Society*, **49** (6), 643-649.

Full Text: [-1959\Tra Far Soc49, 643.pdf](-1959/Tra%20Far%20Soc49,%20643.pdf)

Abstract: A kinetic equation is deduced for a unimolecular process occurring in a condensed phase, which, as a result of molecular interactions, possesses a free energy of activation which increases during the course of the reaction.

The equation is shown to fit certain data on elastic, magnetic, and volume creep in solids. It also fits some data on the rate of desorption of gases on metals, and on the activated adsorption of gases on oxides. A tentative conclusion is that the interaction effect is more marked for metals than oxides. The equation does not fit data on dielectric creep, which is known to be described by a Gaussian distribution of unimolecular processes.

? Gkueckauf, E. (1955), Theory of chromatography. Part 10. Formulae for diffusion into spheres and their application to chromatography. *Transactions of the Faraday Society*, **51** (11), 1540-1551.

Full Text: [-1959\Tra Far Soc51, 1540.pdf](-1959/Tra%20Far%20Soc51,%201540.pdf)

? Frumkin, A.N. (1959), Influence of cation adsorption on the kinetics of electrode processes. *Transactions of the Faraday Society*, **55** (1), 156-167.

Full Text: [-1959\Tra Far Soc55, 156.pdf](-1959/Tra%20Far%20Soc55,%20156.pdf)

Abstract: The influence of cation adsorption on the rate of the electroreduction and formation of cations as well as on the electroreduction of anions is discussed. The effects observed are correlated with changes of the ψ1-potential, but whereas in reactions with the participation of cations average values of the ψ1-potential can be used, in the anion electroreduction the dependence oL the ψ1-potential on the distance between the reacting anion and the cation which is its next neighbour must be taken into account. The electroreduction of the PtC42- anion which has a flat configuration shows a much smaller sensitivity towards cations than the electroreduction of the S2O82- and Fe(CN)63- anions.

Measurements of reaction rates and differential capacities in the presence of Cs+ ions indicate a certain specific adsorbability of the Cs+ ion. If both the cation and the anion are surface-active, that effect of the adsorption on reaction rates which prevails at a definite potential is still enhanced.

? Scholten, J.J.F., Zwietering, P., Konvalinka, J.A, and Deboer, J.H. (1959), Chemisorption of nitrogen on iron catalysts in connection with ammonia synthesis. Part 1. The kinetics of the adsorption and desorption of nitrogen. *Transactions of the Faraday Society*, **55** (12), 2166-2179.

Full Text: [-1959\Tra Far Soc55, 2166.pdf](-1959/Tra%20Far%20Soc55,%202166.pdf)

Abstract: An extensive gravimetric study was made of both the adsorption and desorption kinetics of nitrogen on a highly reduced singly promoted iron catalyst. The activation energy of adsorption rises linearly with coverage up to 0 21 0.22. Above this value the activation energy remains constant at 23 kcal/mole. The activation energy of desorption decreases gradually with the coverage over the whole range investigated. The kinetics are discussed in terms of the absolute reaction rate theory. It appears that the chemisorptive behaviour of the catalyst approaches the behaviour of iron films.

With the help of the isotherms found by equalizing the adsorption and desorption rates, a computation is made of the entropy of the adsorbed particles. The results lead to a picture of the state of nitrogen molecules on the surface which is in agreement with the kinetic data.

? Miller, I.R. (1961), Kinetic of adsorption of unionized polymethacrylic acid (PMA) and polylysine in mercury-water interface. *Transactions of the Faraday Society*, **57** (2), 301-311.

Full Text: [1960-80\Tra Far Soc57, 301.pdf](1960-80/Tra%20Far%20Soc57,%20301.pdf)

Abstract: The differential capacity of the electrical double layer at the Hg/electrolyte solution interface in the presence of added unionized polymethacrylic acid and polylysine has been measured. The surface concentration of the partly covered surface has been calculated by assuming a diffusion-controlled adsorption process. The linear relation between capacity, surface charge density and surface tension and between polymer surface concentration has been found and discussed. The linear plot of capacity or surface tension against polymer concentration when the surface was only partially covered was extrapolated towards concentrations at which there is full coverage of the surface exposed to the adsorption process for a certain time t. This procedure allows the determination of the concentration of a fully compact but non-compressed polymeric surface film. As the amount of segments anchored in the mercury surface can be estimated from capacity or surface charge density data, the anchored segment fraction p can be evaluated.

? Thomas, J.G. (1961), Kinetics of electrolytic hydrogen evolution and adsorption of hydrogen by metals. *Transactions of the Faraday Society*, **57** (9), 1603-1611.

Full Text: [1960-80\Tra Far Soc57, 1603.pdf](1960-80/Tra%20Far%20Soc57,%201603.pdf)

Abstract: For metals where the electrolytic hydrogen evolution reaction gives a Tafcl line of low slope, e.g., 2.3 RT/2F or 2.3 RUF, the formulation of the reaction kinetics oil the assumption that the adsorbed hydrogen atoms obey a Lzngmuir isotherm is not in good agreenient with espcriniental data on surfxe coverage and reaction rates. A more consistent kinetic scheme is obtained by taking into account the variation with coierage of the heat of adsorption and activation energies for adsorption and desorption of hydrogen 011 metals. A Tafel slope of 2.3 RT/2F corresponds to a fast discharge reactloii fdhwed by a ratedetermining combination reaction, where the chemisorption of hydrogeir by tile metal is not activated. A Tafel slope of 2.3 RTIF corresponds to a fast discharge reaction followed by either a rate-deterrninii2g combiiiation reaction, where the chemisorption of hydrogen by the metal is activated, or by a rate-deiermining ioniatom reaction. It is possible to distinguish these alternatives by considering the change in Tafel slope at high current densities.

? Everett, D.H. (1964), Thermodynamics of adsorption from solution. Part 1. Perfect systems. *Transactions of the Faraday Society*, **60** (502P), 1803-1813.

Full Text: [1960-80\Tra Far Soc60, 1803.pdf](1960-80/Tra%20Far%20Soc60,%201803.pdf)

Abstract: The preferential adsorption of molecules from a perfect solution by a Langmuir-type adsorbing surface is discussed. Equations are given for the chemical potentials of the adsorbed species and for the adsorption isotherms. The adsorption equation is found to represent satisfactorily the data for several simple systems and leads to a new method of estimating the surface areas of solids. A possible method is suggested for the correlation of adsorption phenomena at the solid/vapour, solid/liquid and liquid/vapour interfaces. A discussion is also given of the relationship between heats of immersion of solids in solutions and the corresponding adsorption isotherms.

? Gilman, S. (1965), Studies of hydrocarbon surface processes by multipulse potentiodynamic method. Part 1. Kinetics and mechanisms of ethane adsorption on platinum. *Transactions of the Faraday Society*, **61**, 2546-2560.

Full Text: [1960-80\Tra Far Soc61, 2546.pdf](1960-80/Tra%20Far%20Soc61,%202546.pdf)

Abstract: A pulse sequence was devised to allow the study of ethanc adsorption on a clean platinum surface under well-defined conditions. A charge QE, quantitatively related to the surface coverage with ethane, may be measured by means of a linear anodic sweep of proper speed. Lf the desorption processes are minimized, the rate of adsorption of ethane is initially constant and then follows an empirical Elovich relationship. The data may be interprcted as indicative of an adsorption rate-determining step which is second-order in free surface sites, and first order in dissolved ethane concentration. This applies from zero to high fractional surface coverages. Departure from this law at highest surface coverages may be due to steric hindrance effects.

? Gilman, S. (1966), Studies of hydrocarbon surface processes by multipulse potentiodynamic method. Part 3. Kinetics of adsorption of ethylene and acetylene on platinum and structure of adsorbed layer at low potentials. *Transactions of the Faraday Society*, **62**, 466-480.

Full Text: [1960-80\Tra Far Soc62, 466.pdf](1960-80/Tra%20Far%20Soc62,%20466.pdf)

Abstract: A sequence of potential pulses may be used to effect the reproducible adsorption of ethylene or of acetylene from perchloric acid solution. During the course of adsorption (smooth platinum micro-electrode) at 0.4 V and 30°C, measurement was made of the charge corresponding to adsorbed hydrocarbon (through oxidation to CO2 and H2O), the charge corresponding to hydrogen co-deposition, and the current corresponding to hydrogen dissociated from ethylene. The results suggest similar compositions of the ad-layers (probably corresponding to the composition C2H2) for the two different adsorbates, under the specific conditions employed. The adsorption rate conforms well to a simple diffusion law, establishing the quantitative validity of the MPP measurement technique for these systems.

? Eley, D.D. and Leslie, R.B. (1966), Kinetics of adsorption of water vapour and electrical conduction in bovine plasma albumin. *Transactions of the Faraday Society*, **62**, 1002-1014.

Full Text: [1960-80\Tra Far Soc62, 1002.pdf](1960-80/Tra%20Far%20Soc62,%201002.pdf)

Abstract: A vacuum microbalance has been constructed, and used to make rate and equilibrium studies of the adsorption of water vapour on bovine plasma albumin. A rapid rise of temperature occurs over the first few minutes, and thereafter the kinetics may be described by a modification of the Roginsky-Zeldovich equation. dmdt=Kp0.6exp –(α‘mp**R**T). This equation is interpreted in terms of repulsive interaction between the charge-transfer dipoles of water molecules ‘adsorbed’ by hydrogen bonds on to >Chttp://www.rsc.org/images/entities/char_e001.gifO … H—N< groups. The model, which is generalized as an impurity semiconductor model, also gives a qualitative account of heat of adsorption and electrical conductance as a function of amount of water adsorbed.

? Griffith, R. and Pryde, J.A. (1967), Adsorption-absorption kinetics of nitrogen+tantalum system. *Transactions of the Faraday Society*, **63**, 2522-2527.

Full Text: [1960-80\Tra Far Soc63, 2522.pdf](1960-80/Tra%20Far%20Soc63,%202522.pdf)

Abstract: The nitrogen sorption behaviour of tantalum has been studied using both constant pressure and constant volume techniques in the pressure and temperature ranges 10–9–10–4 toor and 295–1600°K respectively. Chemisorption at room temperature occurs with an initial sticking probability of 0.33 and ceases at a saturation coverage of about 5×1014 atoms cm–2, which is independent of pressure in the range 5×10–9–3×10–7 torr. There is evidence for the existence of two binding states. Above about 500°K adsorption and absorption occur simultaneously, the energy barrier to gas entry into the metal from the surface being about 38 kcal (g atom)–1.

? Baret, J.F., Armand, L., Bernard, M. and Danoy, G. (1968), Kinetics of adsorption at liquid/liquid interface - role of diffusion energy barrier and number of free sites when desorption is slight. *Transactions of the Faraday Society*, **64**, 2539-2548.

Full Text: [1960-80\Tra Far Soc64, 2539.pdf](1960-80/Tra%20Far%20Soc64,%202539.pdf)

Abstract: The general equation describing the adsorption kinetics at an interface may be simplified when the desorption is slight. The number of solute molecules lying at the interface, at any time is given by the relation, n= 2C0(Dt/π)½(SS/S) exp (εb–εa)/**kT**. The quantity 2C0(Dt/π)½ comes from the diffusion equations, whereas SS/S brings in the fraction of free interface and exp[εb–εa/**kT**] is the transfer probability of a solute molecule over an adsorption energy barrier. The introduction of an interfacial equation of state allows one to test this theory with the experimental results obtained, with the aid of a pendant-drop tensiometer, for chlorophyll adsorbing at the paraffin oil/water interface. The influence of the temperature and of the introduction of a second polar solute (lauric alcohol) with the adsorption kinetics is studied.

? Giles, C.H. and Dsilva, A.P. (1969), Molecular sieve effects of powders towards dyes - Measurement of porosity by dye adsorption. *Transactions of the Faraday Society*, **65** (559P), 1943-1951.

Full Text: [1960-80\Tra Far Soc65, 1943.pdf](1960-80/Tra%20Far%20Soc65,%201943.pdf)

Abstract: p-Nitrophenol (PNP) in water or in benzene solution, and several dyes, have been used to measure the apparent specific surface of porous charcoals, silicas and alumina by adsorption. The results reveal a relation between the apparent surface and pore size distribution. The method measures the actual surface accessible through pores of given minimum radius, rather than the pore volume, which is the parameter measured by, e.g., benzene desorption or mercury porosimetry. Nevertheless, when allowance is made for the probable aggregate size of the adsorbed dye, there is reasonable agreement between results by the present method, and these other two methods. The present methods offer a simple means of determining pore size and area distribution in the transitional pore range, which is the range of most interest in treatments involving liquids.

Keywords: Adsorption, Dye, Dyes, Porosity

? Aharoni, C. and Tompkins, F.C. (1970), Rates of adsorption of hydrogen, carbon monoxide and their mixtures on zinc oxide. *Transactions of the Faraday Society*, **66**, 434-446.

Full Text: [1960-80\Tra Far Soc66, 434.pdf](1960-80/Tra%20Far%20Soc66,%20434.pdf)

Abstract: The rates of adsorption of hydrogen on zinc oxide at 24.6°C at various pressure (50-300 Torr) have been measured. After an initial period of time, the Elovich equation was closely obeyed. Out-gassing at 410°C for 30 h (high temperature regeneration) did not reproduce the original surface and the rates continuously decreased with each high temperature regeneration. A detailed study was therefore made of the effect of the presence of residual absorbate left on the surface due to ineffective outgassing, viz., evacuation at 24.6°C. Neither a model of a surface having a site heterogeneity but absence of induced effects, nor one of a uniform surface on which induced heterogeneity was developed, can account for the kinetics of readsorption, but a combined model in which both site and induced effects are postulated gives an adequate representation of the experimental results. Some general features of the distribution of site activation energies can also be deduced.Carbon monoxide was rapidly adsorbed by zinc oxide at 24.6°C but the subsequent increase of adsorption with time was negligible. For a binary gaseous mixture of carbon monoxide and hydrogen, the rate of adsorption of hydrogen was decreased but an activated rate of adsorption subsequently developed. This mutual enhancement of the rate of adsorption of both gases is brought about by strong interaction between the two adsorbates on the surface. By introduction of an attractive potential into the analysis of the combined model, the kinetics of adsorption of each gas from a binary mixture can be adequately explained; furthermore, a comparison of the rates for the two components enables the empirical formula of the surface complex, viz., H2CO, to be deduced. This method of detecting the presence of a surface compound formation and determining its composition should have general validity for simple systems.

? Pugh, D., Giles, C.H. and Duff, D.G. (1971), Determination of the aggregation number of anionic dyes by studies of deviation from Beer’s Law. *Transactions of the Faraday Society*, **67** (578), 563-573.

Full Text: [1960-80\Tra Far Soc67, 563.pdf](1960-80/Tra%20Far%20Soc67,%20563.pdf)

Abstract: The aggregation of four anionic azo dyes has been studied spectrophotometrically at high aqueous concentrations, using a cell of very small path length. The dyes all show apparent deviations from Beer's law and, using narrow particle size fractions of an azo pigment, apparent deviations from the law occur only when the particle size distribution of the absorbing species changes with concentration. On the basis of the stacking of the individual dye molecules behind one another to form aggregates, a theory has been developed relating the apparent deviation from Beer's law to the degree of aggregation, and average molecular weights have been evaluated for the four dyes.

Keywords: Adsorption, Aggregation, Determination, Dyes

? Horgan, A.M. and King, D.A. (1971), Kinetics of adsorption, replacement and catalysis in interaction of O2 and CO with clean nickel surfaces. *Transactions of the Faraday Society*, **67**, 2145-2157.

Full Text: [1960-80\Tra Far Soc67, 2145.pdf](1960-80/Tra%20Far%20Soc67,%202145.pdf)

Abstract: The kinetics of the interaction of O2 with CO on Ni films under ultra-high vacuum conditions has been investigated utilizing an apparatus designed for sticking probability profile measurement. With it, absolute rates of adsorption, replacement and catalysis, and surface coverages in the reacting species were simultaneously measured. The results reveal marked differences in the chemical reactivity of the different binding states in the adlayer. The catalytic reaction of preadsorbed O2 with gaseous CO to form CO2 was found to proceed only when the coverage θ in the preadsorbed O2 layer was < ¼ monolayer. The catalytically active species β‘-O2 is converted to a more tightly bound, inert species β-O2 at θO2 > ¼ monolayer, this transformation having a marked effect on the sticking probability profile for O2 on Ni.4 Reaction kinetics indicate that the β‘-O2 state is non-dissociatively adsorbed. When gaseous O2 is introduced to Ni films with preadsorbed CO, the CO is efficiently and quantitatively displaced from the surface as Co and CO2. The strongly bound β-CO state yields CO2 and a more weakly bound α-CO state yields CO, both processes being preceded by a short induction period. Reaction mechanisms are proposed which are supported by infra-red data obtained from supported nickel-on-silica samples. The continuous catalytic reaction of CO with O2 to form CO2 to form CO2 over O2-presaturated Ni films was also examined, and a possible reaction mechanism is discussed.

# Title: Transactions of the Indian Institute of Metals

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Subject Categories:

Metallurgy & Metallurgical Engineering: Impact Factor

? Nath, S.K., Jena, A. and Mishra, S.P. (1997), Removal of cadmium by wood charcoal. *Transactions of the Indian Institute of Metals*, **50** (4), 235-239.

Abstract: Wood charcoal was used to remove Cd from acidic waste water. The adsorption of Cd depends on various adsorption parameters such as pH, temperature, metal ion concentration and amount of adsorbent. Adsorption kinetics were fast initially followed by slower kinetics and attained a stationery phase within one hour. The activation energy was found to be 64.844 kJ/mole. From the enthalpy change the adsorption reaction was found to be endothermic. Various other thermodynamic parameters such as free energy change and entropy change were also calculated.

Keywords: Activation, Adsorbent, Adsorption, Cadmium, Cd, Charcoal, Kinetics, Metal, pH, Waste, Waste Water, Water, Wood

# Title: Transactions of the Institute of British Geographers

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? Levins, D.M. and Glastonburg, J.R. (2003), Mark Melton’s geomorphology and geography’s quantitative revolution Christopher J Keylock. *Transactions of the Institute of British Geographers*, **28** (2), 142-157.

Full Text: Tra Ins Bri Geo28, 142

Abstract: Mark Melton published some important papers in the late 1950s that have had a significant influence upon the subsequent development of geomorphology. Two of these papers were published in the same journal in the same year, and have a similar number of total citations, and these are compared in this study. Although both papers present novel empirical findings and discuss innovative conceptual frameworks, the extent and manner to which they have been used within geography and geology differs quite markedly. This reveals marked differences in the conceptual frameworks and research priorities of the two groups of scientists, which may help explain why geomorphology has proceeded differently on the two sides of the Atlantic since the quantitative revolution.

# Title: Transactions of the Institution of Chemical Engineers and the Chemical Engineer

Full Journal Title: Transactions of the Institution of Chemical Engineers and the Chemical Engineer

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Subject Categories:

: Impact Factor

? Levins, D.M. and Glastonburg, J.R. (1972), Particle-liquid hydrodynamics and mass-transfer in a stirred vessel. 2. Mass-transfer. *Transactions of the Institution of Chemical Engineers and the Chemical Engineer*, **50** (2), 132-??.

# Title: Transactions of the Institute of Metal Finishing

Full Journal Title: [Transactions of the Institute of Metal Finishing](http://www.uk-finishing.org.uk/imfframeset.htm)

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Subject Categories:

Metallurgy & Metallurgical Engineering: Impact Factor 0.248, / (2003)

Materials Science, Coatings & Films: Impact Factor 0.248, / (2003)

? Gyliene, O., Tarozaite, R. and Nivinskiene, O. (2004), Sorption of Ni(II)-citrate complex from electroless nickel plating solutions onto chitosan. *Transactions of the Institute of Metal Finishing*, **82** (1-2), 38-42.

Abstract: Spent electroless nickel plating solutions contain Ni(II)-citrate complexes which are hazardous to the environment. These, complexes can be removed by using chitosan as a sorbent. Kinetic investigations indicate that Ni(II) sorption front complex solutions onto chitosan can be described by a pseudo-second order rate model. The experimental data of the adsorption under equilibrium conditions for both Ni(II) and citrate correlate well with the Freundlich isotherm equation. During the sorption of Ni(II)-citrate complex on chitosan competition between Ni(H) and citrate ions takes place. The citrate sorption prevails.

Adipate, the additive used in electroless nickel plating solutions, is not sorbed by chitosan, but its presence in solutions has an increasing effect on citrate sorption from citrate solutions without Ni(II) and the increasing effect on Ni(II) sorption from Ni(II)-citrate complex solutions. The other components of electroless nickel plating solution, i.e. hypophosphite, sulphate, phosphite have no influence on sorption.

Keywords: Electroless Nickel Plating, Ni(II)-Citrate Adipate, Chitosan, Adsorption, Freundlich Isotherm, Pseudo-Second Order Kinetic Model, FT-IR Investigations, Heavy-Metal Ions, Aqueous-Solutions, Removal, Chitin, Equilibrium, Sorbents

# Title: Transactions of Nonferrous Metals Society of China

Full Journal Title: [Transactions of Nonferrous Metals Society of China](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=33042&_auth=y&_acct=C000053193&_version=1&_urlVersion=0&_userid=1495547&md5=b9feeee1254b8a0857653bc82ecee9f8)

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Journal Country/Territory: Peoples R China

Language: English

Publisher: Allerton Press Inc

Publisher Address: 150 Fifth Ave, New York, NY 10011

Subject Categories:

Metallurgy & Metallurgical Engineering: Impact Factor

? Xia, H.P. and Ke, J.J. (1996), Adsorption mechanism of some bivalent heavy metal cations in solutions using montmorillonite. *Transactions of Nonferrous Metals Society of China*, **6** (1), 32-34.

Full Text: Tra Non Met Soc Chi6, 32.pdf

Abstract: The frontier orbital energies of montmorillonite molecule and [Me (H2O)6]2+ (Me = Cu2+, Zn2+, Co2+ and Ni2+) were calculated by INDO method. Results showed that the chemical interaction between montmorillonite molecule and [CU (H2O)6]2+ or [Zn (H2O)6]2+ was possible. The experimental results of powder X-ray diffraction and isothermal adsorption supported the above-mentioned calculation results.

? Dong, H.J. and Jin, C. (1996), Adsorption and activation of metal ions on kyanite. *Transactions of Nonferrous Metals Society of China*, **6** (3), 22-24.

Full Text: [1996\Tra Non Met Soc Chi6, 22.pdf](1996/Tra%20Non%20Met%20Soc%20Chi6,%2022.pdf)

Abstract: It was discovered that the adsorption of metal ions on mineral surface had much to do with their activation for mineral in flotation. The authors proposed a percentage of adsorptive precipitation (PAP) to represent activation power of metal ions. The greater the PAP of the metal ion, the stronger its activation power. When the PAP was small to a certain extent, the metal ion showed a depression effect on mineral in flotation.

? Liu, Y.G., Li, C.F., Zhao, X., Tang, C.F., Xu, W.H., Li, X. and Nakanishi, A. (2004), Effect of pH on cadmium adsorption by red soil. *Transactions of Nonferrous Metals Society of China*, **14** (1), 60-65.

Full Text: Tra Non Met Soc Chi14, 60.pdf

Abstract: To study the effect of pH on Cd adsorption and species, the red soil was taken as adsorbent. The curve of Cd adsorbed vs pH shows three stages, namely, the adsorption amount increasing slowly at low pH, then increasing quickly with the rise of pH, and reaching the maximum amount at high pH. The result of theoretical analysis on precipitation reactions indicates that the precipitation reaction is controlled by carbonate until pH is a bit higher than 11. The adsorption data at different pH values and initial Cd(R) concentrations were fitted by a linear least squares technique, to the Langmuir, Frundlich and Temkin adsorption isotherms, and the results show that Langmuir isotherm is the best which can well describe the adsorption behavior of Cd in red soil. At last, a pH-dependent model of adsorption isotherms of Cd was established by substituting the fitting results obtained from experimental data for the parameters in Langmuir equation.

Keywords: Cd, Mineral Adsorbent, Coordination, Red Soil, Organic-Matter, Solubility, Speciation, Water

? Liu, Y.G., Fan, T., Zeng, G.M., Li, X., Tong, Q., Ye, F., Zhou, M., Xu, W.H. and Huang, Y.E. (2006), Removal of cadmium and zinc ions from aqueous solution by living *Aspergillus niger*. *Transactions of Nonferrous Metals Society of China*, **16** (3), 681-686.

Full Text: [2006\Tra Non Met Soc Chi16, 681.pdf](2006/Tra%20Non%20Met%20Soc%20Chi16,%20681.pdf)

Abstract: The potential of living *Aspergillus niger* to remove cadmium and zinc from aqueous solution was investigated. Effects of pH, initial concentration, contact time, temperature and agitation rate on the biosorption of Cd(II) and Zn(II) ions were studied. The optimum adsorption pH value for Cd(II) and Zn(II) were 4.0 and 6.0. The best temperature and agitation rate were in the range of 25-30°C and 120 r/min for all metal ions. Under the optimal conditions, the maximum uptake capacities of Cd(II) and Zn(II) ions are 15.50 mg/g and 23.70 mg/g at initial concentrations of 75 mg/L and 150 mg/L, respectively. Biosorption equilibrium is established within 24 h for cadmium and zinc ions. The adsorption data provide an excellent fit to Langmuir isotherm model. The results of the kinetic studies show that the rate of adsorption follows the pseudo-second order kinetics.

Keywords: *Aspergillus Niger*, Biosorption, Cadmium, Zinc, Biosorption Isotherm, Kinetic Model, Biosorption, Lead, Bioaccumulation, Chromium(VI), Copper(II), Biomass, Metals, Strain, Zn2+, Cd2+

? Chai, L.Y., Wei, S.W., Peng, B. and Li, Z.Y. (2007), Adsorption of Ag(I) on H2TiO3 from aqueous solutions. *Transactions of Nonferrous Metals Society of China*, **17** (4), 832-835.

Full Text: [2007\Tra Non Met Soc Chi17, 832.pdf](2007/Tra%20Non%20Met%20Soc%20Chi17,%20832.pdf)

Abstract: Adsorption of silver ions from aqueous solution onto H2TiO3 was studied. Equilibrium experimental studies were performed to determine the adsorption capacity of H2TiO3 for silver ion at various pH values. Batch experiments were conducted in the range of pH value 3-7 and silver ions concentration 10-200 mg/L. The results show that the adsorption is strongly dependent on pH value. The equilibrium absorption capacity of H2TiO3 increases significantly with the increase of pH value from 3 to 7. The adsorption of silver ion obeys the Langmuir isothermal equation well in the concentration range studied, the adsorption constant is 0.054 7, 0.052 4, 0.088 1 at pH 5, 6 and 7, respectively, and the maximum adsorption capacities are 23.64, 29.76 and 40.82 mg/g.

Keywords: Silver Ions, Adsorption, Hydrous Titania, Photocatalytic Activity, Antibacterial Activity, Thin-Films, Silver, Fibers, Metal, TiO2, Ions, Zinc

? Chai, L.Y., Chen, Y.N., Shu, Y.D., Chang, H. and Li, Q.Z. (2007), Adsorption and removal of cadmium(II) from aqueous solutions by bio-formulation. *Transactions of Nonferrous Metals Society of China*, **17** (5), 1057-1062.

Full Text: [2007\Tra Non Met Soc Chi17, 1057.pdf](2007/Tra%20Non%20Met%20Soc%20Chi17,%201057.pdf)

Abstract: A novel sorbent, bio-formulation(BF), was prepared and employed for the adsorption of cadmium(Cd) ion from. aqueous system. The process of adsorption follows the pseudo second-order kinetic equation and the adsorption behavior is fitted with a Freundlich isotherm. The removal rate of Cd is slightly dependent on the initial pH value over a wide range of 4-11. The addition of Zn2+ and Cu2+ ions hardly affects the Cd adsorption, whereas the coexisting Pb2+ ion greatly interferes with the adsorption. The adsorption mechanism is supposed as a cation-exchange process between Cd2+ and calcium and Mg2+ present on the surface of BF, and somewhat as adsorption in a hydrolyzed form. The adsorbed Cd ions are desorbed effectively by a 0. 1 mol/L HCl solution.

Keywords: Adsorption, Adsorption Behavior, Adsorption Mechanism, Aqueous Solutions, Behavior, Bio-Formulation(BF), Biomass, Biosorption, Cadmium, Calcium, Cation Exchange, Cation-Exchange, Cd, Cd2+, Cu2+, Desorption, Freundlich, Freundlich Isotherm, HCl, HCl Solution, Ion, Ions, Isotherm, Kinetic, Kinetic Equation, Mechanism, Metal-Cations, Mg2+, Pb2+, pH, Process, Pseudo Second Order, Pseudo Second Order Kinetic, Pseudo Second-Order, Pseudo-Second-Order, Range, Rate, Removal, Removal Rate, Second Order, Solutions, Sorbent, Sorption, Surface, Value, Zn2+

? Liu, Y.G., Feng, B.Y., Fan, T., Zhou, H.Z. and Li, X. (2008), Tolerance and removal of chromium(VI) by *Bacillus* sp strain YB-1 isolated from electroplating sludge. *Transactions of Nonferrous Metals Society of China*, **18** (2), 480-487.

Full Text: [2008\Tra Non Met Soc Chi18, 480.pdf](2008/Tra%20Non%20Met%20Soc%20Chi18,%20480.pdf)

Abstract: Four chromium(VI)-resistant bacteria named YB-1, YB-2, YB-3 and YB-4 were isolated from Cr-electroplating sludge. YB-1 and YB-2 were identified as a member of Bacillus sp. based on morphology and Biolog Microstation System. The strain of YB-1 was selected to test for its resistance and ability to remove Cr(VI) from aqueous solution. The results indicate that YB-1 exhibits high MIC value which can almost reach 140 mg/L and the growth of YB-1 in liquid medium containing 60 mg/L Cr(VI) is affected especially in the late exponential phase and stationary phase. Furthermore, the potential of living and freeze-dried YB-1 biomass to remove Cr(VI) was studied in different pH, biosorbent dose, contact time and initial concentration using the batch method. At the optimal conditions, living and freeze-dried biomass are capable of absorbing 34.5 mg/g and 17.8 mg/g chromium(VI) at initial concentration of 60 mg/L, respectively. The adsorption data were fitted to Langmuir isotherm model for these two sorbents. Kinetic studies show that the rates of sorption all follow the pseudo-second order kinetics.

Keywords: Adsorption, Aqueous Solution, Aqueous-Solution, Aspergillus-Niger, Bacillus, Bacillus sp., Bacteria, Biomass, Biosorbent, Biosorption, Biosorption, Cadmium, Chromium(VI), Cr(VI), Cr(VI), Growth, Ions, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Minimal Inhibitory Concentration, Model, Morphology, pH, Potential, Pseudo-Second Order, Removal, Resistance, Sludge, Solution, Sorption

? Feng, N.C., Guo, X.Y. and Liang, S. (2009), Kinetic and thermodynamic studies on biosorption of Cu(II) by chemically modified orange peel. *Transactions of Nonferrous Metals Society of China*, **19** (5), 1365-1370.

Full Text: [2009\Tra Non Met Soc Chi19, 1365.pdf](2009/Tra%20Non%20Met%20Soc%20Chi19,%201365.pdf)

Abstract: Cu(II) biosorption by orange peel that was chemically modified with sodium hydroxide and calcium chloride was investigated. The effects of temperature, contact time, initial concentration of metal ions and pH on the biosorption of Cu(II) ions were assessed. Thermodynamic parameters including change of free energy (ΔG°), enthalpy (ΔH°) and entropy (ΔS°) during the biosorption were determined. The results show that the biosorption process of Cu(II) ions by chemically treated orange peel is feasible, spontaneous and exothermic under studied conditions. Equilibrium is well described by Langmuir equation with the maximum biosorption capacity(*q*m) for Cu(II) as 72.73 mg/g and kinetics is found to fit pseudo-second order type biosorption kinetics. As the temperature increases from 16ºC to 60ºC, copper biosorption decreases. The loaded biosorbent is regenerated using HCl solution for repeatedly use for five times with little loss of biosorption capacity.

Keywords: Adsorption, Aqueous-Solutions, Biosorbent, Biosorption, Biosorption Kinetics, Calcium, Calcium Chloride, Capacity, Chloride, Concentration, Copper, Copper, Copper Biosorption, Cu(II), Cu(II) Biosorption, Cu(II) Ions, Energy, Equilibrium, Exothermic, Hydroxide, Ions, Isotherms, Kinetic, Kinetics, Langmuir, Langmuir Equation, Metal, Metal Ions, Modified, Orange Peel, pH, Pretreated Biomass, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Sodium, Solution, Sorption, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamic Studies, Thermodynamics, Waste-Water

? Gu, W., Sun, C.J., Liu, Q. and Cui, H.X. (2009), Adsorption of avermectins on activated carbon: Equilibrium, kinetics, and UV-shielding. *Transactions of Nonferrous Metals Society of China*, **19**, S845-S850.

Full Text: [2009\Tra Non Met Soc Chi19, S845.pdf](2009/Tra%20Non%20Met%20Soc%20Chi19,%20S845.pdf)

Abstract: The adsorption of biopesticide avermectins onto activated carbon from ethanol solution with different initial concentrations at 303.15 K was performed. The obtained equilibrium and kinetic data of the adsorption process were assayed to evaluate the adsorption potential of activated carbon for avermectins. The results show that the activated carbon is effective for the adsorption of avermectins. Moreover, the adsorption of avermectins onto activated carbon agrees with Langmuir isotherm model, while pseudo-second-order kinetics model is better fitable for such adsorption process. In addition, activated carbon can efficiently protect adsorbed avermectins from photodegradation.

Keywords: Activated Carbon, Adsorption, Aqueous-Solution, Avermectins, Carbon, Constitution, Data, Equilibrium, Ethanol, Fundamental Properties, Isotherm, Isotherm Model, Kinetic, Kinetics, Kinetics Model, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Liquids, Model, Photodegradation, Potential, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Solids, Solution, UV-Shielding, Waste

? Feng, N.C., Guo, X.Y. and Liang, S. (2010), Enhanced Cu(II) adsorption by orange peel modified with sodium hydroxide. *Transactions of Nonferrous Metals Society of China*, **20**, S146-S152.

Full Text: [2010\Tra Non Met Soc Chi20, S146.pdf](2010/Tra%20Non%20Met%20Soc%20Chi20,%20S146.pdf)

Abstract: Copper adsorption by orange peel, which was chemically modified with sodium hydroxide, was investigated. The adsorbent was characterized using surface area analyzer, infrared spectroscopy and scanning electron microscopy. Total negative charge and zeta potentials on the adsorbent surface were determined. Equilibrium isotherms and kinetics were obtained and the effects of solution pH value, adsorbent concentration and temperature were studied in batch experiments. Column experiments were performed to study practical applicability, and breakthrough curves were obtained. Equilibrium is well described by Langmuir and Freundlich isotherms, and kinetics is found to fit pseudo-second order type adsorption kinetics. According to Langmuir equation, the maximum adsorption capacity for Cu(II) is 50.25 mg/g at pH value of 5.3. The results show additional chemical modification of the adsorbent by NaOH and the increased adsorption capacity.

Keywords: Acid, Adsorbent, Adsorption, Adsorption Kinetics, Aqueous-Solutions, Biosorption, Cadmium(II), Copper, Equilibrium, Isotherms, Kinetic, Kinetics, Langmuir, Maximum Adsorption Capacity, Orange Peel, Recovery, Removal, Vulgaris, Waste-Water

? Xu, Z.G., Wu, Y.K., Zhang, J.D., Zhang, L. and Wang, L.J. (2010), Equilibrium and kinetic data of adsorption and separation for zirconium and hafnium onto MIBK extraction resin. *Transactions of Nonferrous Metals Society of China*, **20** (8), 1527-1533.

Full Text: [2010\Tra Non Met Soc Chi20, 1527.pdf](2010/Tra%20Non%20Met%20Soc%20Chi20,%201527.pdf)

Abstract: The equilibrium and kinetics of methyl isobutyl ketone (MIBK) extraction resin for adsorption and separation of zirconium and hafnium were studied under the different conditions of acidity, initial total concentrations of zirconium and hafnium and temperature. The equilibrium data of both zirconium and hafnium are found to follow the Freundlich adsorption isotherm, and the Freundlich isotherm constants (K-F) are 3.53 and 0.64 mg/g, respectively. The equilibrium data of zirconium also fit the Langmuir adsorption isotherm, and the saturation adsorption capacity (Qmax) and the Langmuir isotherm constant (K-L) are 75.93 mg/g and -0.012 7 L/g, respectively. The obtained kinetic data of both zirconium and hafnium are found to fit the HO pseudo-second-order kinetic model, and the rate constants of pseudo-second-order equation (k(2)) are -0.019 and 0.41 g/(mg.min), respectively. Column tests show that the MIBK extraction resin could be used as efficient adsorbent material for separating hafnium from zirconium.

Keywords: Acid, Acidity, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Isotherm, Aqueous-Solutions, Capacity, Column, Data, Equilibrium, Extraction, Extraction Resin, Freundlich, Freundlich Adsorption Isotherm, Freundlich Isotherm, Hafnium, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Adsorption Isotherm, Langmuir Isotherm, Methyl Isobutyl Ketone, Model, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Equation, Pseudo-Second-Order Kinetic Model, Rate Constants, Removal, Resin, Saturation, Separation, Sorption, Temperature, XAD-4, Zirconium

? Wen, J.J., Zhang, Q.X., Zhang, G.Q. and Cao, Z.Y. (2010), Deep removal of copper from cobalt sulfate electrolyte by ion-exchange. *Transactions of Nonferrous Metals Society of China*, **20** (8), 1534-1540.

Full Text: [2010\Tra Non Met Soc Chi20, 1534.pdf](2010/Tra%20Non%20Met%20Soc%20Chi20,%201534.pdf)

Abstract: SP-C was applied for the removal of Cu2+ from simulated cobalt sulfate electrolyte containing Co2+ 50 g/L and Cu2+ 0.5-2.0 g/L. Experimental conditions included pH of 2-4, temperature of 20-60ºC and contact time of 10-40 min. The investigation demonstrated that SP-C had recommendable efficiency in adsorbing Cu2+ from the electrolyte with 25- to 100-fold of Co2+. The optimal adsorption conditions of SP-C were pH of 4, contact time of 30 min and ambient temperature. The study also showed that the loaded resin could be effectively eluted with 2.0 mol/L H2SO4 solution at a contact time of 40 min; the peak concentration of Cu2+ in the eluate was about 35 g/L. The sorption characteristics of Cu2+ by SP-C could be described by Langmuir isotherm and the pseudo second-order kinetic equation. Infrared spectra showed that nitrogen atoms in the functional group coordinated with Cu2+ to form coordination bands.

Keywords: Adsorption, Characteristics, Chelating Resin, Co2+, Cobalt, Cobalt Sulfate Electrolyte, Concentration, Coordination, Copper, Cu2+, Efficiency, Equilibrium, Functional Group, Investigation, Ion Exchange, Ion-Exchange, Ionexchange, Isotherm, Kinetic, Kinetic Equation, Langmuir, Langmuir Isotherm, Loaded Resin, Nickel, Nitrogen, Pb2+, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Recovery, Removal, Removal of Copper, Resin, Second Order, Second-Order, Solution, Sorption, Sulfate, Temperature

? Xiong, C.H., Wang, G.T. and Yao, C.P. (2011), Adsorption of ytterbium(III) from aqueous solution by SQD-85 resin. *Transactions of Nonferrous Metals Society of China*, **21** (12), 2764-2771.

Full Text: [2011\Tra Non Met Soc Chi21, 2764.pdf](2011/Tra%20Non%20Met%20Soc%20Chi21,%202764.pdf)

Abstract: Adsorption and desorption behavior of Yb(III) by SQD-85 resin was investigated by various chemical methods and IR spectrometry. The adsorption capacity of SQD-85 resin for Yb(III) was studied as a function of solution pH, initial concentration of Yb(III), temperature and contact time. The optimal pH for the adsorption was 5.50 in the HAc-NaAc system, and the maximum adsorption capacity was estimated to be 347.6 mg/g at 308 K. The isotherms adsorption data fit well with Langmuir model. The adsorption kinetics data are in agreement with pseudo-second-order model. Thermodynamic parameters indicate that Yb(III) adsorption by SQD-85 resin is endothermic and spontaneous in nature. Thomas model is reasonably accurate in predicting experimental column results. The dynamic desorption rate of Yb(III) can increase to 97.3% when the elution agent is 1.0 mol/L HCl. These results suggest that Yb(III) in aqueous solution can be removed and recovered by SQD-85 resin efficiently.

Keywords: Activation, Adsorption, Adsorption Kinetics, Concentration, Desorption, Elution, Ions, Ir, Isotherms, Kinetics, Langmuir, Lead, Mechanism, Metals, pH, Rare-Earth-Elements, Removal, Resin, Samples, Separation, SQD-85 Resin, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Thomas Model, Water, Yb(III)

# Title: Transactions of the Royal Society of Tropical Medicine and Hygiene

Full Journal Title: [Transactions of the Royal Society of Tropical Medicine and Hygiene](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=13100&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=30bcbc8534682fe27e1812da7181cc8b)

ISO Abbreviated Title: Trans. Roy. Soc. Trop. Med. Hyg.

JCR Abbreviated Title: T Roy Soc Trop Med H

ISSN: 0035-9203

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Journal Country/Territory: England

Language: English

Publisher: Royal Soc Tropical Medicine

Publisher Address: Manson House 26 Portland Place, London, England W1N 4EY

Subject Categories:

Public, Environmental & Occupational Health: Impact Factor 1.781, 23/85

Tropical Medicine: Impact Factor 1.781,

? Mulligan, H.W. (1981), Tropical medicine and research in British territories overseas. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **75** (S), 9-11.

Full Text: [1981\Tra Roy Soc Tro Med Hyg75, 9.pdf](1981/Tra%20Roy%20Soc%20Tro%20Med%20Hyg75,%209.pdf)

Almroth, S. and Bidinger, P.D. (1990), No need for water supplementation for exclusively breast-fed infants under hot and arid conditions. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **84** (4), 602-604.

Full Text: [T\Tra Roy Soc Tro Med Hyg84, 602.pdf](T/Tra%20Roy%20Soc%20Tro%20Med%20Hyg84,%20602.pdf)

Abstract: This study was conducted in 4 villages in India during the hottest and driest season of the year to determine whether exclusively breast-fed infants need additional water under extremely hot and dry climatic conditions. The ambient temperature was 35-40°C and the relative humidity 10-35%, except during the early morning hours. 63 urine samples were collected from 31 infants below 6 months of age and 28 samples from 13 infants aged 6-10 months, all of whom were receiving nothing but breast milk. Specific gravity (and corresponding osmolality) of urine samples from the younger group ranged from 1.004 (66 mosmol/litre) to 1.036 (1234 mosmol/litre), with a mean of 1.011 (322 mosmol/litre). For the older group the range was 1.005 (103 mosmol/litre) to 1.029 (978 mosmol/litre) and the mean was 1.015 (468 mosmol/litre). These values are well below levels of urine concentrations known to be attainable by infants of corresponding ages. Thus, even under hotter and drier climatic conditions than have previously been studied, healthy exclusively breast-fed infants do not require additional water. Exclusive breast feeding for the first 4-6 months is therefore a reasonable public health recommendation; it is imperative in areas where contaminated drinking water may contribute to infant morbidity, diarrhoeal disease in particular.

? Jackson, A.C., Ronald, A.R. and Steiner, I. (2010), Plagiarism. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **104** (2), 173.

Full Text: [2010\Tra Roy Soc Tro Med Hyg104, 173.pdf](file:///F:/HO-reference/2010/Tra%20Roy%20Soc%20Tro%20Med%20Hyg104,%20173.pdf)

Keywords: Plagiarism

? Drasar, B. (2010), Plagiarism: Editor’s response. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **104** (2), 173-174.

Full Text: [2010\Tra Roy Soc Tro Med Hyg104, 173-1.pdf](2010/Tra%20Roy%20Soc%20Tro%20Med%20Hyg104,%20173-1.pdf)

Keywords: Plagiarism

? Uneke and Ogbonna. (2010), Malaria and HIV co-infection in pregnancy in sub-Saharan Africa: Impact of treatment using antimalarial and antiretroviral agents (vol 103, pg 761, 2009). *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **104** (2), 174.

Full Text: [2010\Tra Roy Soc Tro Med Hyg104, 174.pdf](2010/Tra%20Roy%20Soc%20Tro%20Med%20Hyg104,%20174.pdf)

Keywords: Plagiarism, Pregnancy

# Title: Transinformacao

Full Journal Title: Transinformacao

ISO Abbreviated Title: Transinformacao

JCR Abbreviated Title: Transinformacao

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Eliel, R.A. (2008), Institutionalization of Information Science in Brazil: study of the convergence between the scientific production and regulatory landmarks of the area. *Transinformacao*, **20** (3), 207-224.

Full Text: [2008\Transinformacao20, 207.pdf](2008/Transinformacao20,%20207.pdf)

Abstract: The objective of the present study is to show the development and the institutionalization of Information Science in Brazil, analyzing the degree of convergence between the scientific production-materialized in thesis and dissertations - and landmarks (Documento de Area da CAPES e Grupos Tematicos da ANCIB). Its empirical object is constituted of references data of thesis and dissertations of information science, analyzed using of scientometrics methodology. Finally, the thesis and dissertations present partial convergence with landmarks, and the information science necessities to surpass some challenges such as to diminish the high number of studies concerning the practice; to guarantee the production of theoretical and conceptual research, in detriment of the research that aims to solve concrete and focused problems, and to define the object of study of the area, avoiding its thematic dispersion and, moreover, promote greater index of growth of the Post-Graduation programs, mainly in relation to the courses of doctorate to guarantee its effective social and cognition institutionalization.

Keywords: Brazil, Information Science, Information Science Institutionalization, Information Science Theoretical Aspects, Research, Science, Scientific Production, Scientometrics, Scientometrics Methodology, Thesis and Dissertations

? Fachin, G.R.B., dos Santos, R.N.M. and Rodrigues, R.S. (2010), Scientific communication and ontologies: A research at Library and Information Science Abstracts. *Transinformacao*, **22** (1), 77-91.

Full Text: [2010\Transinformacao22, 77.pdf](2010/Transinformacao22,%2077.pdf)

Abstract: This article reports a search’s analysis at the database Library and Information Science Abstracts, using the terms scientific communication and ontology. The objective was to analyze search’s possibilities in reference databases with emphasis on metadata standards and interoperability among systems. The methodology is exploratory and descriptive, documental and quant-qualitative; it employs the bibliometric soft wares Infotrans and Dataview for the analysis of the 129 obtained results in the bibliographic survey of data tabulation and analyses. It concludes that the databases and soft wares differ significantly, fact which demands strict standards of metadata to enable efficient and accurate results in searches as well as the utilization of bibliometric tools for analysis and discussion of obtained documents, in order to improve the quantitative indicators of scientific production.

Keywords: Analysis, Bibliometric, Bibliometric Tools, Data, Database, Databases, Indicators, Ontology, Production, Research, Science, Scientific Communication, Survey

? Silva, E.L., Tavares, A.L.D. and Pereira, J.P.S. (2010), State of the art of research in Brazil on scientific communication (1996-2006) in the field of information science. *Transinformacao*, **22** (3), 207-223.

Full Text: [2010\Transinformacao22, 207.pdf](2010/Transinformacao22,%20207.pdf)

Abstract: This study analyses the state of research on scientific communication in Brazil carried out between 1996 and 2006. It analyses this research by taking into consideration trends regarding approach, authorship, and the methodological options of the studies. It characterizes scientific production through the number of articles published per journal, the authors (gender, institution), the year of publication and typology of the article, and the methodological aspects of the studies. It then carries out a content analysis of the scientific articles, uses documentary research techniques and defines as its analytic corpus the Brazilian journals in the field of Information Science (Ciencia da Informacao, Datagramazero, Encontros Bibli, Informacao & Sociedade, Perspectivas em Ciencia da Informacao, Transinformacao). It goes on to demonstrate the accumulation of knowledge on scientific communication, which has contributed to constituting a specialized field of study and research in the area of Information Science in Brazil, taking into consideration the number of articles (148) and the number of authors (238). It is found that 96 (64.86%) of these articles were identified as descriptions of scientific investigations according to the criteria defined in the study, leading to the conclusion that the most common areas of study are documentary research, descriptive studies; followed by the treatment of quantitative data; the use of bibliometric techniques and citation analysis; concerning the research thematic the most common areas were studies of channels, vehicles, cycles and models of communication (including evaluation of journals and information sources).

Keywords: Authors, Authorship, Bibliometric, Brazil, Citation, Citation Analysis, Content Analysis, Descriptive Studies, Information, Information Science, Journal, Journals, Publication, Research, Scientific Communication

# Title: Transition Metal Chemistry

Full Journal Title: [Transition Metal Chemistry](http://www.kluweronline.com/issn/0340-4285/)

ISO Abbreviated Title: Transit. Metal Chem.

JCR Abbreviated Title: Transit Metal Chem

ISSN: 0340-4285

Issues/Year:

Journal Country/Territory:

Language:

Publisher: Kluwer Academic Publ, Dordrecht

Publisher Address:

Subject Categories:

: Impact Factor

? Dasgupta, M. and Mahanti, M.K. (1988), Kinetics of reduction of transition metal ions by sodium tetrahydroborate. Reduction of molybdenum(VI) and tungsten(VI). *Transition Metal Chemistry*, 13 (1), 39-41.

Full Text: [1988\Tra Met Che13, 39.pdf](1988/Tra%20Met%20Che13,%2039.pdf)

Abstract: The kinetics of reduction of molybdenum(VI) and tungsten(VI) ions by NaBH4 in buffered aqueous solution have been investigated. The reaction rate depends upon the first powers of the concentrations of the reactants. The temperature was varied, and the activation parameters were evaluated. Chemical and spectral evidence for the formation of molybdenum(V) and tungsten(V), as the reaction products, is presented. Plausible mechanistic pathways for these reactions are suggested.

Salem, I.A. (2000), Kinetics and mechanism of the color removal from Congo red with hydrogen peroxide catalyzed by supported zirconium oxide. *Transition Metal Chemistry*, **25** (5), 599-604.

Full Text: [T\Tra Met Che25, 599.pdf](T/Tra%20Met%20Che25,%20599.pdf)

Abstract: The kinetics of the oxidative color removal from congo red dye using H2O2 in conjunction with transition metal ions supported on ZrO2 were studied. The rate of reaction is first order on H2O2, the catalyst, and in congo red. It attains a limiting rate at higherconcentrations of reagent. Also, the rate of reaction decreases with increasing [H+], due to protonation of the substrate amino groups, as well as to the low deprotonation constant of H2O2 in acid medium. Addition of KCl to the mixture increased the rate of reaction. The catalytic activity of the catalysts lies in the following order: Ag-I > Cu-II > Hg-II > Co-II > Mn-II > Fe-III > Ni-II > ZrO2 which is correlated with the redox potential, mg loading and % surface content of the supported metal ions. A probable mechanism for the oxidation processes has been suggested, which is consistent with the experimental results.

Keywords: Spent Bleaching Earth, Aqueous-Solutions, Waste-Water, Advanced Oxidation, Organic-Dyes, Metal Ions, Adsorption, Acid, Industry

Zhang, A.Y., Wanyan, G. and Kumagai, M. (2004), Extraction chemistry of palladium(II). Mechanism of antagonistic synergistic extraction of palladium by a 4-aroyl derivative of 1-phenyl-3-methyl-pyrazolone-5-one and trialkylamine of high molecular weight. *Transition Metal Chemistry*, **29** (5), 571-576.

Full Text: [T\Tra Met Che29, 571.pdf](T/Tra%20Met%20Che29,%20571.pdf)

Abstract: The synergistic extraction behavior of Pd-II, one of the main radioactive fission products in the reprocessing process, from HNO3 solutions with a 4-aroyl derivative of 1-phenyl-3-methyl-pyrazolone-5-one (PMP), a weakly acidic chelating extractant 1-phenyl-3-methyl-4-(2-methoxybenzoyl)-pyrazolone-5-one (HPMMBP), and a trialkylamine of high molecular weight, tri-iso-octylamine (TiOA), has been studied. An obviously antagonistic extraction effect was observed in the extraction system under the given conditions. To understand this phenomenon, a preliminary investigation was performed to explain the mechanism of this reaction. According to the theory of the corresponding solutions (TCS), the association between HPMMBP and TiOA is presented and discussed in the organic phase. An associated species HPMMBP TiOA formed through hydrogen bonding in a CHCl3 medium might be the main reason why an antagonistic extraction effect occurred. The association constant between HPMMBP and TiOA was calculated to be 0.212 ± 0.03.

Keywords: Solvent-Extraction, Waste, 1-Phenyl-3-Methyl-4-Benzoyl-Pyrazole-5-One, Separation, Actinides

# Title: Transplantation

Full Journal Title: Transplantation

ISO Abbreviated Title: Transplantation

JCR Abbreviated Title: Transplantation

ISSN:

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Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Cresswel, P. and Sanderso, A.R. (1968), Spatial arrangement of H2 specificities - evidence from antibody adsorption and kinetic studies. *Transition Metal Chemistry*, **6** (9), 996-??.

# Title: Transplantation Proceedings

Full Journal Title: [Transplantation Proceedings](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6080&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=b35a1bb23e471314e98f5343a7fbb635)

ISO Abbreviated Title: Transplant. Proc.

JCR Abbreviated Title: Transplant P

ISSN: 0041-1345

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Journal Country/Territory: United States

Language: English

Publisher: Elsevier Science Inc

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

Subject Categories:

Immunology Surgery Transplantation: Impact Factor

? López-Navidad, A., Domingo, P. and Caballero, F. (1997), Organ shortage: Viability of potential organ donors and possible loss depend on health care workers who are responsible for the organ procurement program. *Transplantation Proceedings*, **29** (8), 3614-3616.

Full Text: [T\Tra Pro29, 3614.pdf](T/Tra%20Pro29,%203614.pdf)

? Aslani, J., Khedmat, H., Assari, S., Khoddami-Vishte, H.R., Alaeddini, F., Einollahi, B. and Sirnforoosh, N. (2007), Transplantation research in Iran: A bibliometric study. *Transplantation Proceedings*, **39** (4), 788-789.

Full Text: [2007\Tra Pro39, 788.pdf](2007/Tra%20Pro39,%20788.pdf)

Abstract: Background. Scientific articles are indicators of research interest and efforts in every country. The aim of the current study is to describe the characteristics of the transplantation-related research efforts with respect to the domestic published works in Iran between 1993 and 2003. Materials and Methods. In a descriptive design, we searched IranMedex (Iranian database for indexing medical articles; available at: http//www.iranmedex.com) for all the biomedical articles published between 1993 and 2003 in 91 Iranian journals. The search was conducted using ‘transplantation’ and ‘transplant’ as key words. A printed copy of the references was reviewed individually so as to identify the transplanted organ, study design, number of authors, and type of article. Results. Among 11371 articles, 545 (4.8%) were related to transplantation. An increasing trend was observed in the number of publications from 1993 to 2003. Most articles were published in Farsi (90%). The most frequently published articles were original articles (84.4%). The main subjects of were kidney (61.7%), followed by liver (12%) and bone marrow transplantation (10.8%). Cornea was the topic of research in only 3% of the papers. Of all manuscripts, 9.5% consisted of clinical trials. The mean number of authors was 3.6 +/- 2.2 (1 to 14). Conclusions. Iranian researchers seem to be interested in the topic of transplantation; however, some fields of transplantation are neglected. This pooling of valuable information can be used by other countries, especially by researchers from the Middle East Society for Organ Transplantation region. Such databases could form an invaluable network for an exchange of experience in the region to solve common problems.

Keywords: Bibliometric, Bibliometric Study, Bone, Bone Marrow, Characteristics, Clinical, Clinical Trials, Current, Databases, Design, Indexing, Indicators, Information, Iran, Journals, Key, Kidney, Liver, Medical, Middle East, Publications, Research, Study Design, Transplantation, Trend

? Zhang, S., Dong, Z., Zhang, M., Xia, Q., Liu, D. and Zhang, J.J. (2011), Right lobe living-donor liver transplantation with or without middle hepatic vein: A meta-analysis. *Transplantation Proceedings*, **43** (10), 3773-3779.

Full Text: [2011\Tra Pro43, 3773.pdf](2011/Tra%20Pro43,%203773.pdf)

Abstract: Objective. The purpose of this meta-analysis was to compare outcomes after right-lobe living-donor liver transplantation (LDLT) with or without the middle hepatic vein (MHV). Methods. Studies were identified through a computerized search of Pubmed, Embase, Ovid, the Cochrane Hepato-Biliary Group Controlled Trials Register, the Cochrane Central Register of Controlled Trials, the Cochrane Library database, and the Web of Science. Two reviewers independently assessed the quality of each study and abstracted outcome data. We extracted data for liver functional recovery in donors, donor hospital stay, donor complications and liver functional recovery in recipients. We synthesized published data using random-effects and fixed-effect models, expressing results as weighted mean differences (WMD) or relative risk (RR). Results. The 11 included eligible studies came from medical centers worldwide. Significant differences between “with MHV” versus “without MHV” groups were not observed for liver functional recovery (P = .08; WMD = -2.88), donor hospital stay (P = .00; WMD = 0.00), or donor complications (P = .90; RR = 1.02). However, our meta-analysis showed a significant benefit for recipients liver functional recovery favoring the MHV group (P = .02; WMD = -33.06). Conclusions. Our meta-analysis discovered that right lobes with MHV not only experienced better liver functional recovery in recipients, but also caused no greater harm or risk to donors.

Keywords: Cochrane, Complications, Congestion, Differences, Drainage, Experience, Functional, Graft, Hospital, Impact, Liver Transplantation, Living Donor Liver Transplantation, Medical, Meta Analysis, Meta-Analysis, Methods, Outcome, Outcomes, Quality, Recovery, Regeneration, Relative Risk, Right Hepatectomy, Risk, Safety, Science, Significant, Transplantation, Web of Science, Web-of-Science

? Bas, K., Dayangac, M., Yaprak, O., Yuzer, Y. and Tokat, Y. (2011), International collaboration of Turkey in liver transplantation research: A bibliometric analysis. *Transplantation Proceedings*, **43** (10), 3796-3801.

Full Text: [2011\Tra Pro43, 3796.pdf](2011/Tra%20Pro43,%203796.pdf)

Abstract: Objectives. Scientific publications are valuable markers of scientific activity for countries. We performed a bibliometric study to evaluate the number of publications written by Turkish authors. The aim of this study is to evaluate Turkey’s contribution in terms of number of publications included in Science Citation Index Expanded (SCI-E) in the scientific field of liver transplantation compared with other countries. To our knowledge, this is the first bibliometric study in liver transplantation research of Turkey. Materials and methods. ISI Web of Knowledge-Science was used for the analysis. All scientific works published included in SCI-E in English from 1980 to August 10, 2011, were analyzed. A retrospective search was performed using key words “liver transplantation,” “hepatic transplantation,” “liver transplant,” and “hepatic transplant.” We further analyzed these results by the “analyze” function of the software in terms of number of papers for each country, type of documentation, number of publications per year, journal, institute, and author. The number of citations to published works was calculated by using the citation function of the same software. We also used the same function of the software to analyze publications from Turkey in the last three decades between 1980 and 1989, 1990 and 1999, and 2000 and 2009 for statistical evaluation. Collected data from the comparison periods were statistically analyzed using the chi-square test. Results. In all, 48,418 publications related to liver transplantation were included in SCI-E in English between 1980 and August 2011. Overall, 675 of those publications were from Turkey (2.05%). There was no publication from Turkey between 1980 and 1989; 37 between 1990 and 1999; and 511 between 2000 and 2009. The rank of Turkey among other countries according to the number of publications was 25th between 1990 and 1999 and improved to 14th between 2000 and 2009. The number of scientific publications in the field of liver transplantation from Turkey among other countries increased during the last three decades. Conclusions. Turkey showed a significant positive trend in publications in the scientific field of liver transplantation in the last 30 years, and the rank of Turkey among other countries improved in recent decades. Currently, Turkey is one of the top 17 countries in terms of number of scientific publications listed in SCI-E. This can be considered as another indicator for Turkey’s progress in the field of liver transplantation.

Keywords: Analysis, Author, Authors, Bibliometric, Bibliometric Study, Chi-Square, Citation, Citations, Collaboration, Contribution, Countries, Documentation, English, Evaluation, International, ISI, Journal, Knowledge, Liver Transplantation, Papers, Publication, Publications, Published Works, Research, Science, Science Citation Index, Science Citation Index Expanded, Scientific Publications, Software, Statistical, Transplantation, Trend, Turkey

# Title: Transport in Porous Media

Full Journal Title: [Transport in Porous Media](http://www.kluweronline.com/issn/0169-3913/); [Transport in Porous Media](http://www.springerlink.com/content/100342/?p=4256ab7a22954c89a5508d964d0c79c3&pi=0)

ISO Abbreviated Title: Transp. Porous Media

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ISSN: 0169-3913

Issues/Year: 12

Journal Country/Territory: Netherlands

Language: English

Publisher: Kluwer Academic Publ

Publisher Address: Spuiboulevard 50, PO Box 17, 3300 AA Dordrecht, Netherlands

Subject Categories:

Engineering, Chemical: Impact Factor 1.037, 21/126 (2002)

? Hadad, A., Bensabat, J. and Rubin, H. (1996), Simulation of immiscible multiphase flow in porous media: A focus on the capillary fringe of oil-contaminated aquifers. *Transport in Porous Media*, **22** (3), 245-269.

Full Text: [1996\Tra Por Med22, 245.pdf](1996/Tra%20Por%20Med22,%20245.pdf)

Abstract: This paper deals with the analysis of some aspects of the vertical and lateral migration of oil spills in the unsaturated and the capillary zone of a phreatic aquifer. Our motivation stems from the fact that such contamination represents a severe danger for ground-water resources all over the world and from the present acute problem of jet-fuel contamination in some location of Israel. In the present study, we shall focus our efforts on the analysis of the upper layers of the aquifer which are often subjected to the most significant oil contamination. Neglecting coupled processes effects such as dilution, adsorption and volatilization, also adopting Richard’s assumption, a three-phase flow model is introduced with capillary heads of the water and the oil as variables. The resulting model which is coupled and strongly non-linear is solved using a vertical two-dimensional Finite-Element procedure together with a quasi-Newton optimization algorithm. Applying that scheme, various scenarios of oil migration in the unsaturated and the capillary zone were simulated. Some migration characteristics prediced by the numerical simulations are discussed. In particular, the dynamics of the water and oil phases during the migration process is discussed.

Keywords: Oil Contaminated Aquifer, Multi-Phase Flow, Aquifer Contamination, Napl Contamination, Organic-Compounds, Unsaturated Zone, Equation, Subsurface, Transport, Migration, Fluids, Model

? Lu, M. and Connell, L.D. (2007), A dual-porosity model for gas reservoir flow incorporating adsorption behaviour - part I. Theoretical development and asymptotic analyses. *Transport in Porous Media*, **68** (2), 153-173.

Full Text: [2007\Tra Por Med68, 153.pdf](2007/Tra%20Por%20Med68,%20153.pdf)

Abstract: In this paper a rigorous dual-porosity model is formulated, which accurately represents the coupling between large-scale fractures and the micropores within dual porosity media. The overall structure of the porous medium is conceptualized as being blocks of diffusion dominated micropores separated by natural fractures (e.g. cleats for coal) through which Darcy’s flow occurs. In the developed model, diffusion in the matrix blocks is fully coupled to the pressure distribution within the fracture system. Specific assumptions on the pressure behaviour at the matrix boundary, such as step-time function employed in some earlier studies, are not invoked. The model involves introducing an analytical solution for diffusion within a matrix block, and the resultant combined flow equation is a nonlinear integro-(partial) differential equation. Analyses to the equation in this text, in addition to the theoretical development of the proposed model, include: (1) discussion on the ‘fading memory’ of the model; (2); one-dimensional perturbation solution subject to a specific condition; and (3) asymptotic analyses of the ‘long-time’ and ‘short-time’ responses of the flow. Two previous models, the Warren-Root and the modified Vermeulen models, are compared with the proposed model. The advantages of the new model are demonstrated, particularly for early time prediction where the approximations of these other models can lead to significant error.

Keywords: Porous Media, Dual-Porosity, Adsorption, Permeability, Diffusion, Asymptotic Analysis, Integro-Differential Equation, Gas Reservoir, Sequestration of CO2, Diffusion

# Title: Transport Reviews

Full Journal Title: [Transport Reviews](http://www.informaworld.com/smpp/title~content=t713766937~link=cover)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Pallis, A.A., Vitsounis, T.K. and De Langen, P.W. (2010), Port economics, policy and management: Review of an emerging research field. *Transport Reviews*, **30** (1), 115-161.

Full Text: [2010\Tra Rev30, 115.pdf](2010/Tra%20Rev30,%20115.pdf)

Abstract: This paper reviews research in port economics, policy and management during the period 1997-2008. In an increasingly international economy, research interest in ports is gradually emerging. This paper examines the developments, themes and characteristics of this research, by reviewing a comprehensive database consisting of all the 395 relevant journal papers on ports that were published during the period 1997-2008. With the use of quantitative and qualitative bibliometric tools, the paper identifies the characteristics of the port research community (such as the authors’ country of affiliation, number of authors involved and international collaboration rates). It also identifies the main characteristics of this emerging scientific research field (such as research approaches, units of analysis, samples of the ports examined and commodities analysed). Finally, the paper develops a content classification that distinguishes the main research subfields, identifies leading papers for these subfields and uses a cross-citation analysis to analyse the coherence of the port research field.

Keywords: Law, Operations-Research, Research, Review, Scientific Cooperation, Transportation

# Title: Transportation Science

Full Journal Title: [Transportation Science](http://transci.journal.informs.org/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0041-1655

Issues/Year:

Journal Country/Territory:

Language:

Publisher: Operations Research Soc Amer, Linthicum Hts

Publisher Address:

Subject Categories:

: Impact Factor

? Mahalel, D. and Hakkert, A.S. (1983), Further aspects of traffic arrival patterns on a multilane highway. *Transportation Science*, **17** (1), 71-86.

Full Text: [1983\Tra Sci17, 71.pdf](1983/Tra%20Sci17,%2071.pdf)

Abstract: The model presented in this study describes the arrival pattern of vehicles on a multilane unidirectional highway. It is based on the assumption that in discrete time intervals, the vehicle arrival patterns can be described as a Markov chain process. The Markov properties conveniently enable the expression of interdependence of vehicle arrivals within and among lanes. From the empirical data collected, it was found that in the fast lane, the arrival process is overdispersed and the tendency for bunching is greater than under Poisson distribution conditions. The arrival process in the slow lane is underdispersed and the vehicles tend to distribute themselves deterministically along the lane. The cross-correlation function between the arrival processes in two adjacent lanes indicates a clear dependence between the two processes. This dependence might limit the number of potential overtakings, increases the friction between lanes and increases the probability for a side collision.

# Title: Trees-Structure and Function

Full Journal Title: Trees-Structure and Function

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kottke, I., Guttenberger, M., Hampp, R. and Oberwinkler, F. (1987), An in vitro method for establishing mycorrhizae on coniferous tree seedlings. *Trees-Structure and Function*, **1** (3), 191-194.

Full Text: [1987\Tre-Str Fun1, 191.pdf](1987/Tre-Str%20Fun1,%20191.pdf)

Abstract: A method for in vitro synthesis of mycorrhizae on coniferous tree seedlings is described. Tree seedlings (Larix decidua Mill., Picea abies (L.) Karst. and Pinus sylvestris L.) and fungi (Amanita muscaria (L. ex Fr.) Hooker, Piloderma croceum Erikss. et Hjorst., Pisolithus tinctorius (Pers.) Coker et Couch. and Suillus grevillei (Klotzsch) Singer were maintained under sterile conditions in petri dishes. Typical ectomycorrhizae were established within 2-3 weeks after inoculation and within 2 months after germination of seedlings. Eventually a high percentage of mycorrhizal root tips was obtained.

Keywords: Basidiomycetes, Coniferous Trees, Ectomycorrhiza, In Vitro Culture, Symbiosis

# Title: Trends in Biochemical Sciences

Full Journal Title: [Trends in Biochemical Sciences](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5180&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=676ff56b3b0a4b0a57e820a61c771c54)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0968-0004

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Sagnella, G.A. (1989), Model fitting, parameter estimation, linear and non-linear regression. *Trends in Biochemical Sciences*, **10** (3), 100-103.

Full Text: [T\Tre Bio Sci10, 100.pdf](T/Tre%20Bio%20Sci10,%20100.pdf)

Abstract: Model fitting and mathematical models are becoming increasingly important in the biochemical sciences. Here the statistical procedures of linear and non-linear regression for parameter estimation and goodness-of-fit analysis are examined. The mechanics of non-linear regression are described for the Gauss-Newton method, with particular reference to the Michaelis-Menten model. Suitable computer software is suggested to entice those who wish to familiarize themselves with these powerful tools.

MacRoberts, M.H. and MacRoberts, B.R. (1989), Citation analysis and the science policy arena. *Trends in Biochemical Sciences*, **14** (1), 8.

Full Text: [T\Tre Bio Sci14, 8.pdf](T/Tre%20Bio%20Sci14,%208.pdf)

Cole, S. (1989), Citation and the evaluation of individual scientiste. *Trends in Biochemical Sciences*, **14** (1), 9-13.

Full Text: [T\Tre Bio Sci14, 8.pdf](T/Tre%20Bio%20Sci14,%208.pdf)

# Title: Trends in Biotechnology

Full Journal Title: [Trends in Biotechnology](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5181&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=ef2fe24d8336e6fb912c987df1f19523)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0167-7799

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Kratochvil, D. and Volesky, B. (1995), Advances in the biosorption of heavy metals. *Trends in Biotechnology*, **16** (7), 291-300.

Full Text: [T\Tre Bio16, 291.pdf](T/Tre%20Bio16,%20291.pdf)

Abstract: The biosorption of heavy metals by certain types of non-living biomass is a highly cost-effective new alternative for the decontamination of metal-containing effluents. Our understanding of the mechanisms of metal biosorption now allows the process to be scaled up and used in field applications, with packed-bed sorption columns being perhaps the most efficient for this purpose. Regenerating the biosorbents increases the process economy by allowing their reuse in multiple sorption cycles. The process results in metal-free effluents and small volumes of solutions containing concentrated metals, which can be easily recovered.

Keywords: Heavy Metals, Biosorption, Decontamination, Concentration, Ion Exchange, Equilibria, Models

Benton, D. (1996), Bioinformatics - Principles and potential of a new multidisciplinary tool. *Trends in Biotechnology*, **14** (8), 261-272.

Full Text: [T\Tre Bio14, 261.pdf](T/Tre%20Bio14,%20261.pdf)

Abstract: The materials of bioinformatics are biological data, and its methods are derived from a wide variety of computational techniques. Recent years have seen an explosive growth in biological data, and the development of novel computational methods. These methods have become essential to research progress in structural biology, genomics, structure-based drug design and molecular evolution. The development and maintenance of a robust infrastructure of biological data is of equal importance if biotechnology is to take maximum advantage of research advances in a wide variety of fields. While bioinformatics has already made important contributions, it faces significant challenges as it matures.

Keywords: Multiple Sequence Alignment, Data-Bank, Structure Prediction, Human Genome, Databases, Crystallography, Information, Libraries, Features, Proteins

Boguski, M.S. (1998), Bioinformatics - a new era. *Trends in Biotechnology*, Suppl. S, 1-3.

Full Text: [T\Tre Bio1.pdf](T/Tre%20Bio1.pdf)

Keywords: Sequence

? Eccles, H. (1999), Treatment of metal-contaminated wastes: Why select a biological process? *Trends in Biotechnology*, **17** (12), 462-465.

Full Text: [1999\Tre Bio17, 462.pdf](1999/Tre%20Bio17,%20462.pdf)

Abstract: Nature has demonstrated some subtle and intricate mechanisms for selectively controlling the mobility of metal pollutants in the environment. However, the application of this science to technology has been disappointing. A small number of pilot-plant studies have been carried out to investigate the potential of microorganisms (primarily bacteria) to remove metals from liquid wastes but only one system in the past 15 years has been commercialized. In order to explain this lack of application, it is important to understand the effectiveness, robustness and reliability of biological processes involving metals and their ability to compete with proven physicochemical technologies.

Keywords: Metals, Physical, Chemical, Biological, Separations, Biosorption, SRB, Comparison

# Title: Trends in Ecology & Evolution

Full Journal Title: [Trends in Ecology & Evolution](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6081&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=a36cd956e6989d5539756b9089a5c84f)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Statzner, B., Resh, V.H. and Kobzina, N.G. (1995), Low impact factors of ecology journals: Don’t worry. *Trends in Ecology & Evolution*, **10** (5), 220.

Full Text: [T\Tre Eco Evo10, 220.pdf](T/Tre%20Eco%20Evo10,%20220.pdf)

Metcalfe, N.B. (1995), Serious bias in journal impact factors. *Trends in Ecology & Evolution*, **10** (11), 461.

Full Text: [T\Tre Eco Evo10, 461.pdf](T/Tre%20Eco%20Evo10,%20461.pdf)

Notes: highly cited

? Finegan, B. (1996), Pattern and process in neotropical secondary rain forests: The first 100 years of succession. *Trends in Ecology & Evolution*, **11** (3), 119-124.

Full Text: [1996\Tre Eco Evo10, 119.pdf](1996/Tre%20Eco%20Evo10,%20119.pdf)

Abstract: More and more areas of deforested wet tropical lands are being handed back to nature as their erstwhile owners abandon attempts to farm them. The resulting secondary successions offer hope that some of the unique characteristics of the original rain forests may be recovered and conserved. However, most of our understanding of what secondary tropical rain forests are and how and why they develop is limited to the first decade of a process that may last for centuries. A longer-term view indicates that the causes of change in neotropical secondary successions are similar to those operating in temperate forests, but yields sobering conclusions for conservation.

Keywords: Tropical Forest, Pioneer Tree, Costa-Rica, Dynamics, Growth, Recruitment, Management, Amazonia, Colombia

Kokko, H. and Sutherland, W.J. (1999), What do impact factors tell us? *Trends in Ecology & Evolution*, **14** (10), 382-384.

Full Text: [T\Tre Eco Evo14, 382.pdf](T/Tre%20Eco%20Evo14,%20382.pdf)

? Kelly, C.D. and Jennions, M.D. (2006), The h index and career assessment by numbers. *Trends in Ecology & Evolution*, **21** (4), 167-170.

Full Text: [2006\Tre Eco Evo21, 167.pdf](2006/Tre%20Eco%20Evo21,%20167.pdf)

Abstract: Growing demand to quantify the research output from public funding has tempted funding agencies, promotion committees and employers to treat numerical indices of research output more seriously. So many assessment exercises are now conducted worldwide that traditional peer assessment is threatened. Here, we describe a new citation-based index (Hirsh’s h index) and examine several factors that might influence it for ecologists and evolutionary biologists, such as gender, country of residence, subdiscipline and total publication output. We suggest that h is not obviously superior to other indices that rely on citations and publication counts to assess research performance.

Keywords: Assessment, Citations, Country, Demand, Gender, h Index, h-Index, Promotion, Publication, Publication Counts, Research, Research Performance

? Purvis, A. (2006), The h index: playing the numbers game. *Trends in Ecology & Evolution*, **21** (8), 422.

Full Text: [2006\Tre Eco Evo21, 422.pdf](2006/Tre%20Eco%20Evo21,%20422.pdf)

Keywords: h Index, h-Index

? Engqvist, L. and Frommen, J.G. (2008), The h-index and self-citations. *Trends in Ecology & Evolution*, **23** (5), 250-252.

Full Text: [2008\Tre Eco Evo23, 250.pdf](2008/Tre%20Eco%20Evo23,%20250.pdf)

Keywords: h Index, h-Index, Numbers, Self-Citations

# Title: Trends in Parasitology

Full Journal Title: [Trends in Parasitology](http://www.sciencedirect.com/science/journal/14714922)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Falagas, M.E. and Panos, G. (2007), Implications of findings of bibliometric analyses in parasitology. *Trends in Parasitology*, **23** (1), 12-13.

Full Text: [2007\Tre Par23, 12.pdf](2007/Tre%20Par23,%2012.pdf)

Keywords: Bibliometric, Disease, Health, Parasitology, Tropical-Medicine

? White, N.J., Turner, G.D.H., Medana, I.M., Dondorp, A.M. and Day, N.P.J. (2010), The murine cerebral malaria phenomenon. *Trends in Parasitology*, **26** (1), 11-15.

Full Text: [2010\Tre Par26, 11.pdf](2010/Tre%20Par26,%2011.pdf)

# Title: Trends in Pharmacological Sciences

Full Journal Title: Trends in Pharmacological Sciences

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? (1996), Top TiPS articles. *Trends in Pharmacological Sciences*, **17** (4), 123.

Keywords: Articles

# Title: Trials

Full Journal Title: Trials

ISO Abbreviated Title: Trials

JCR Abbreviated Title: Trials

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Haykowsky, M., Scott, J., Esch, B., Schopflocher, D., Myers, J., Paterson, I., Warburton, D., Jones, L. and Clark, A.M. (2011), A meta-analysis of the effects of exercise training on left ventricular remodeling following myocardial infarction: Start early and go longer for greatest exercise benefits on remodeling. *Trials*, **12**, Article Number: 92.

Full Text: [2011\Trials12, 92.pdf](2011/Trials12,%2092.pdf)

Abstract: Background: The effects of variations in exercise training on Left ventricular (LV) remodeling in patients shortly after Myocardial Infarction (MI) are important but poorly understood. Methods: Systematic review incorporating meta-analysis using meta-regression. Studies were identified via systematic searches of: OVID MEDLINE (1950 to 2009), Cochrane Central Register of Controlled Trials (1991 to 2009), AMED (1985 to 2009), EMBASE (1988 to 2009), PUBMED (1966 to 2009), SPORT DISCUS (1975 to 2009), SCOPUS (1950 to 2009) and Web of Science (1950 to 2009) using the medical subject headings: myocardial infarction, post myocardial infarction, post infarction, heart attack, ventricular remodeling, ventricular volumes, ejection fraction, left ventricular function, exercise, exercise therapy, kinesiotherapy, exercise training. Reference lists of all identified studies were also manually searched for further relevant studies. Studies selected were randomized controlled trials of exercise training interventions reporting ejection fraction (EF) and/or ventricular volumes in patients following recent MI (<= 3 months) post-MI patients involving control groups. Studies were excluded if they were not randomized, did not have a ‘usual-care’ control (involving no exercise), evaluated a non-exercise intervention, or did not involve human subjects. Non-English studies were also excluded. Results: After screening of 1029 trials, trials were identified that reported EF (12 trials, n = 647), End Systolic Volumes (ESV) (9 trials, n = 475) and End Diastolic Volumes (EDV) (10 trials, n = 512). Meta-regression identified that changes in EF effect size difference decreased as the time between MI and initiation of the exercise program lengthened, and increased as the duration of the program increased (Q = 25.48, df = 2, p < 0.01, R(2) = 0.76). Greater reductions in ESV and EDV (as indicated by effect size decreases) occurred with earlier initiation of exercise training and with longer training durations (ESV: Q = 23.89, df = 2, p < 0.05, R(2) = 0.79; EDV: Q = 27.42, df = 2, p < 0.01, R(2) = 0.83). Differences remained following sensitivity analysis. Each week that exercise was delayed required an additional month of training to achieve the same level of benefit on LV remodeling. Conclusions: Exercise training has beneficial effects on LV remodeling in clinically stable post-MI patients with greatest benefits occurring when training starts earlier following MI (from one week) and lasts longer than 3 months.

Keywords: Analysis, Cardiac Rehabilitation, Cochrane, Control, Control Groups, Coronary-Artery-Disease, Dysfunction, Embase, Exercise, Exercise Therapy, Human, Improvement, Intervention, Interventions, Medical, Medline, Meta Analysis, Meta-Analysis, Methods, Myocardial Infarction, Of-Science, Patients, Prevention, Randomized Clinical-Trials, Randomized Controlled Trials, Review, Science, Scopus, Screening, Sensitivity, Sport, Survival, Systematic, Systematic Review, Therapy, Training, Web, Web-of-Science

? Savard, L.A., Thompson, D.R. and Clark, A.M. (2011), A meta-review of evidence on heart failure disease management programs: the challenges of describing and synthesizing evidence on complex interventions. *Trials*, **12**, Article Number: 194.

Full Text: [2011\Trials12, 194.pdf](2011/Trials12,%20194.pdf)

Abstract: Background: Despite favourable results from past meta-analyses, some recent large trials have not found Heart Failure (HF) disease management programs to be beneficial. To explore reasons for this, we evaluated evidence from existing meta-analyses. Methods: Systematic review incorporating meta-review was used. We selected meta-analyses of randomized controlled trials published after 1995 in English that examined the effects of HF disease management programs on key outcomes. Databases searched: MEDLINE, EMBASE, Cochrane Database of Systematic Reviews (CDSR), DARE, NHS EED, NHS HTA, Ageline, AMED, Scopus, Web of Science and CINAHL; cited references, experts and existing reviews were also searched. Results: 15 meta-analyses were identified containing a mean of 18.5 randomized trials of HF interventions +/- 10.1 (range: 6 to 36). Overall quality of the meta-analyses was very mixed (Mean AMSTAR Score = 6.4 +/- 1.9; range 2-9). Reporting inadequacies were widespread around populations, intervention components, settings and characteristics, comparison, and comparator groups. Heterogeneity (statistical, clinical, and methodological) was not taken into account sufficiently when drawing conclusions from pooled analyses. Conclusions: Meta-analyses of heart failure disease management programs have promising findings but often fail to report key characteristics of populations, interventions, and comparisons. Existing reviews are of mixed quality and do not adequately take account of program complexity and heterogeneity.

Keywords: Admission, Care, Clinical-Outcomes, Cochrane, Database, Databases, Disease, Disease Management, Embase, Heterogeneity, Intervention, Interventions, Management, Medline, Metaanalysis, Methods, Older Patients, Outcomes, Randomized Controlled Trials, Randomized Controlled-Trials, Readmission, Review, Science, Scopus, Statement, Statistical, Systematic, Systematic Review, Systematic Reviews, Web of Science

# Title: Trimestre Economico

Full Journal Title: Trimestre Economico

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Davis, J.C. and Gonzalez, J.G. (1998), Articles on the Mexican economy published in scholarly journals (1978-1995). *Trimestre Economico*, **65** (258), 315-326.

Abstract: In the past decade and a half, the number of pages about the Mexican economy written each year in scholarly journals by social scientists increased over 400 percent. In this bibliometric study, we analyze over 1 000 articles published from 1978 to 1995. We find a cycle in the number of pages published over time and relate the cycle to systemic changes in the Mexican economy. We identify the principal authors, journals and research fields such as international trade. We also analyze the contributions to this literature of Spanish language journals and of authors with Spanish surnames.

Keywords: Articles, Bibliometric, Bibliometric Study, Departmental Rankings, Journals, Literature, Productivity, Research, Scholarly Journals

# Title: Tropical and Geographical Medicine

(Trop. Geogr. Med.)

? van Damme, J.M. (1985), The essential role of drinking water and sanitation in primary health care. *Tropical and Geographical Medicine*, **37** (3), S21-S32.

Abstract: The purpose of the paper is to draw attention to the fact that drinking water supply and the provision of sanitation facilities form an indispensable element in disease prevention and primary health care programmes. The world situation regarding the availability of drinking water and sanitation facilities is dramatic, in that more than 1500 million people lact proper facilities; the implications in terms of health and cost are stupendous. It is therefore a fortunate development that the International Drinking Water and Sanitation Decade (1981-1990) is on its way to an appealing initiative. The paper discusses water and sanitation related diseases, and the established experience that water and sanitation programmes can only have a health impact if they are jointly developed, and if they are integrated with health education. Operational implications of such programmes as an element of primary health care are reviewed.

# Title: Tropical Medicine & International Health

Full Journal Title: [Tropical Medicine & International Health](http://www.ingentaconnect.com/content/bsc/tmih), [Tropical Medicine & International Health](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=tmi)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Van der Stuyft, P. (1996), Editorial: Academic excellence and societal influence in the field of tropical medicine and international health. *Tropical Medicine & International Health*, **1** (6), 737.

Full Text: [1996\Tro Med Int Hea1, 737.pdf](1996/Tro%20Med%20Int%20Hea1,%20737.pdf)

? Schoonbaert, D. (1996), Roelants, Gilbert. Citation analysis for measuring the value of scientific publications: Quality assessment tool or comedy of errors? *Tropical Medicine & International Health*, **1** (6), 739-752.

Full Text: [1996\Tro Med Int Hea1, 739.pdf](1996/Tro%20Med%20Int%20Hea1,%20739.pdf)

Abstract: Summary: The basic concepts of citation analysis and journal impact factors are discussed in the light of quality assessment of scientific publications, individual scientists and research units. The major controversies concerning this topic are addressed: technical limitations, database selectivity, time and discipline-related biases, language and publication type biases, multiple authorship merits and citing motivations. Both positive and negative aspects are put into perspective. The authors conclude that citation analysis, even when based on journal impact factors, can be a worthwhile criterion for evaluating publication records of individual scientists or research units, as long as some of the problems discussed are sufficiently taken into account. However, this conclusion in no way implies that citation analysis may be considered as the one and only evaluation criterion.

? Gulmezoglu, A.M. and Garner, P. (1998), Trichomoniasis treatment in women: A systematic review. *Tropical Medicine & International Health*, **3** (7), 553-558.

Full Text: [1998\Tro Med Int Hea3, 553.pdf](1998/Tro%20Med%20Int%20Hea3,%20553.pdf)

Abstract: OBJECTIVE To compare the effectiveness of various treatment strategies for trichomoniasis in women. DATA SOURCES Medline from 1966 to1996, Embase from 1986 to 1996, Science Citation Index from 1990 to 1996; reference lists of existing reviews; through the manufacturers of metronidazole and tinidazole in the UK, the Cochrane Controlled Trials Register until October 1997 and informal discovery. STUDY SELECTION Any randomized or quasi-randomized trial in nonpregnant women with trichomoniasis where different treatment strategies were compared. 45 of the 124 identified studies met the criteria and were included ill the review. DATA EXTRACTION Settings, diagnostic methods, exclusions, loss to follow-up and partner treatment strategies were extracted. Outcomes sought were parasitological cure, clinical cure and side-effects of treatment. RESULTS Most trials were small, with only two trials containing more than 100 women in each comparison group. Only 11 trials followed up women for more than cine month. Oral nitroimidazoles were effective in achieving parasitological cure. Fourteen trials compared different treatment strategies with the remainder comparing different doses or different drugs. Partner treatment was effective ill decreasing longer-term reinfection rates in the one trial testing this. CONCLUSIONS Parasitological cure rail je achieved by a single oral dose of nitroimidazoles. There is, however, very little data on partner treatment strategies and long-term cure rates after initial treatment. Further research should test various partner treatment strategies to prevent re-infections and reduce trichomoniasis prevalence.

Keywords: Citation, Clinical-Trial, Double-Blind, Metronidazole, Nitroimidazoles, Ovules, Placebo, Research, Review, Science Citation Index, Systematic Review, Trichomonas Vaginalis, Vaginal Trichomoniasis

Schoonbaert, D. (2004), Citation patterns in tropical medicine journals. *Tropical Medicine & International Health*, **9** (11), 1142-1152.

Full Text: [2004\Tro Med Int Hea9, 1142.pdf](2004/Tro%20Med%20Int%20Hea9,%201142.pdf)

Abstract: Selections of most important journals in the field of tropical medicine have previously been identified with the help of resources such as bibliographical and citation databases. This article uses ISI’s Journal Citation Reports (JSR) for 2002 to analyse the citation characteristics of the Tropical Medicine category. According to these data, this small but diverse group of 12 journals bestows some 40% more citations than it receives. Its six typical core journals tend to cite one another heavily, but they also refer a lot to multidisciplinary science and general medicine journals, and to infectious diseases and parasitology journals. Looking at the sources from which JCR’s tropical medicine journals derive their citations, it is clear that in this reverse direction, the specialty’s literature is still more concentrated. Apart from the typical core, this JCR category also contains a number of journals with more idiosyncratic citing patterns, focused on specialties such as paediatrics, a single disease (leprosy) and a representative of Latin American and Francophone biomedical science each. Implications of concentrated citedness and language biases are discussed briefly. This paper features a selection of bibliometric parameters relating to the tropical medicine journals and lists of the 80 journals most citing and cited by them.

Keywords: Tropical Medicine, Biomedical Literature, Journals, Bibliometrics, Citation Analysis, Journal Citation Reports

Glover, S.W. and Bowen, S.L. (2004), Bibliometric analysis of research published in *Tropical Medicine and International Health* 1996–2003. *Tropical Medicine & International Health*, **9** (12), 1327-1330.

Full Text: [2004\Tro Med Int Hea9, 1327.pdf](2004/Tro%20Med%20Int%20Hea9,%201327.pdf)

Abstract: We examine the bibliometric profile of *Tropical Medicine and International Health* using the subjects of the articles published and the geographical distribution of the authors. The most common subject areas of papers published during 1996–2003 are highlighted, and the most cited papers indicated.

Keywords: Bednets, Bibliometric, Bibliometrics, Children, Citation Analysis, Historical Article, Impact, Malaria, Mortality, Nations, Periodicals, Publishing, Randomized-Trial, Research

? Rabie, T. and Curtis, V. (2006), Handwashing and risk of respiratory infections: A quantitative systematic review. *Tropical Medicine & International Health*, **11** (3), 258-267.

Full Text: [2006\Tro Med Int Hea11, 258.pdf](2006/Tro%20Med%20Int%20Hea11,%20258.pdf)

Abstract: To determine the effect of handwashing on the risk of respiratory infection. We searched PUBMED, CAB Abstracts, EMBASE, Web of Science, and the Cochrane library for articles published before June 2004 in all languages. We had searched reference lists of all primary and review articles. Studies were included in the review if they reported the impact of an intervention to promote hand cleansing on respiratory infections. Studies relating to hospital-acquired infections, long-term care facilities, immuno-compromised and elderly people were excluded. We independently evaluated all studies, and inclusion decisions were reached by consensus. From a primary list of 410 articles, eight interventional studies met the eligibility criteria. All eight eligible studies reported that handwashing lowered risks of respiratory infection, with risk reductions ranging from 6% to 44% [pooled value 24% (95% CI 6-40%)]. Pooling the results of only the seven homogenous studies gave a relative risk of 1.19 (95% CI 1.12%-1.26%), implying that hand cleansing can cut the risk of respiratory infection by 16% (95% CI 11-21%). Handwashing is associated with lowered respiratory infection. However, studies were of poor quality, none related to developing countries, and only one to severe disease. Rigorous trials of the impact of handwashing on acute respiratory tract infection morbidity and mortality are urgently needed, especially in developing countries.

Keywords: Acute, Cochrane, Control Program, Controlled-Trial, Day-Care-Centers, Developing Countries, Disease, Elderly, Elderly People, Environmental Surfaces, Hand, Handwashing, Impact, Infection, Intervention, Long-Term Care, Meta-Analysis, Morbidity, Mortality, Parainfluenza Virus Vaccine, Primary, Pubmed, Quantitative, Relative Risk, Respiratory, Respiratory Infections, Review, Rhinovirus Colds, Risk, Science, Syncytial Virus, Systematic, Systematic Review, Tract, Transmission, Web of Science

? Hwang, J., Bitarakwate, E., Pai, M., Reingold, A., Rosenthal, P.J. and Dorsey, G. (2006), Chloroquine or amodiaquine combined with sulfadoxine-pyrimethamine for uncomplicated malaria: A systematic review. *Tropical Medicine & International Health*, **11** (6), 789-799.

Full Text: [2006\Tro Med Int Hea11, 789.pdf](2006/Tro%20Med%20Int%20Hea11,%20789.pdf)

Abstract: OBJECTIVE To compare the efficacies against uncomplicated falciparum malaria of chloroquine (CQ), amodiaquine (AQ), sulfadoxine-pyrimethamine (SP) and combinations of these inexpensive drugs. METHODS We searched MEDLINE, EMBASE, Cochrane CENTRAL Register of Controlled Trials, BIOSIS, Web of Science, African Index Medicus, DARE, Digital Dissertations and Current Controlled Trials for randomised or quasi-randomised controlled trials conducted between 1991 and June 2004 regardless of language and geography. We also contacted malaria experts, searched reference lists, and contacted individual authors for unreported stud), characteristics and additional data. Unpublished data were sought and included in the analyses. RESULTS Thirteen randomised trials (n = 4248) were identified and the summary relative risks of treatment failure at 28 days were calculated. There was marginal benefit in adding CQ to SP, compared with SP monotherapy (RR = 0.74, 95% CI 0.54-1.02). Combining AQ with SP was associated with a significantly lower risk of treatment failure than SP monotherapy (RR = 0.35, 95% CI 0.15-0.82) and AQ monotherapy (RR = 0.59, 95% CI 0.42-0.83). AQ plus SP was associated with a significantly lower risk of treatment failure than CQ plus SP (RR = 0.42, 95% CI 0.25-0.72). Serious adverse events were rare and did not increase with combination therapy. CONCLUSION Amodiaquine plus SP remains an efficacious, affordable and safe option for treating malaria in certain settings.

Keywords: Amodiaquine, Antimalarial-Drugs, Artesunate, Authors, Children, Chloroquine, Cochrane, Combination Therapy, Combination Therapy, Dissertations, Drugs, Efficacy, Malaria, Monotherapy, Plasmodium-Falciparum Malaria, Plus Chloroquine, Randomized Trial, Review, Risk, Science, Sub-Saharan Africa, Sulfadoxine-Pyrimethamine, Systematic, Systematic Review, Therapy, Treatment, Uganda, Web of Science

? Shahmanesh, M., Patel, V., Mabey, D. and Cowan, F. (2008), Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: A systematic review. *Tropical Medicine & International Health*, **13** (5), 659-679.

Full Text: [2008\Tro Med Int Hea13, 659.pdf](2008/Tro%20Med%20Int%20Hea13,%20659.pdf)

Abstract: OBJECTIVE To systematically review the evidence for effectiveness of HIV and sexually transmitted infection (STI) prevention interventions in female sex workers in resource poor settings. METHODS Published and unpublished studies were identified through electronic databases (Cochrane database, MEDLINE, EMBASE, and Web of Science), hand searching and contacting experts. Randomized-controlled-trials and quasi-experimental studies were included if they were conducted in female sex workers from low and middle income settings; if the exposure was described; if the outcome was externally measurable, it was after the discovery of HIV, and if follow-up was longer than 6 months. A priori criteria were used to extract data. Meta-analysis was not performed due to the heterogeneity of studies. RESULTS Twenty-eight interventions were included. Despite methodological limitations, the evidence suggested that combining sexual risk reduction, condom promotion and improved access to STI treatment reduces HIV and STI acquisition in sex workers receiving the intervention. Strong evidence that regular STI screening or periodic treatment of STIs confers additional protection against HIV was lacking. It appears that structural interventions, policy change or empowerment of sex workers, reduce the prevalence of STIs and HIV. CONCLUSION Rigorous evaluation of HIV/STI prevention interventions in sex workers is challenging. There is some evidence for the efficacy of multi-component interventions, and/or structural interventions. The effect of these interventions on the wider population has rarely been evaluated.

Keywords: 100-Percent Condom Program, Bali Std, Aids, Behavioral Intervention, Cochrane, Databases, Effectiveness, Efficacy, Evaluation, Exposure, Female Sex Workers, Follow-up, Hand, HIV, Hiv Prevention, Human-Immunodeficiency-Virus, Income, Infection, Intervention, Interventions, Meta Analysis, Meta-Analysis, Mining Community, Northern Thailand, Outcome, Peer Education, Policy, Prevalence, Prevention, Promotion, Prospective Cohort, Randomized Controlled Trials, Randomized Controlled-Trial, Resource Poor Settings, Review, Risk, Risk Reduction, Science, Screening, Sexually Transmitted Infections, Std Services, Systematic, Systematic Review, Treatment, Web of Science

? Chisti, M.J., Tebruegge, M., La Vincente, S., Graham, S.M. and Duke, T. (2009), Pneumonia in severely malnourished children in developing countries - mortality risk, aetiology and validity of WHO clinical signs: A systematic review. *Tropical Medicine & International Health*, **14** (10), 1173-1189.

Full Text: [2009\Tro Med Int Hea14, 1173.pdf](2009/Tro%20Med%20Int%20Hea14,%201173.pdf)

Abstract: OBJECTIVES To quantify the degree by which moderate and severe degrees of malnutrition increase the mortality risk in pneumonia, to identify potential differences in the aetiology of pneumonia between children with and without severe malnutrition, and to evaluate the validity of WHO-recommended clinical signs (age-specific fast breathing and chest wall indrawing) for the diagnosis of pneumonia in severely malnourished children. METHODS Systematic search of the existing literature using a variety of databases (MEDLINE, EMBASE, the Web of Science, Scopus and CINAHL). RESULTS Mortality risk: Sixteen relevant studies were identified, which universally showed that children with pneumonia and moderate or severe malnutrition are at higher risk of death. For severe malnutrition, reported relative risks ranged from 2.9 to 121.2; odds ratios ranged from 2.5 to 15.1. For moderate malnutrition, relative risks ranged from 1.2 to 36.5. Aetiology: Eleven studies evaluated the aetiology of pneumonia in severely malnourished children. Commonly isolated bacterial pathogens were Klebsiella pneumoniae, Staphylococcus aureus, Streptococcus pneumoniae, Escherichia coli, and Haemophilus influenzae. The spectrum and frequency of organisms differed from those reported in children without severe malnutrition. There are very few data on the role of respiratory viruses and tuberculosis. Clinical signs: Four studies investigating the validity of clinical signs showed that WHO-recommended clinical signs were less sensitive as predictors of radiographic pneumonia in severely malnourished children. CONCLUSIONS Pneumonia and malnutrition are two of the biggest killers in childhood. Guidelines for the care of children with pneumonia and malnutrition need to take into account this strong and often lethal association if they are to contribute to the UN Millennium Development Goal 4, aiming for substantial reductions in childhood mortality. Additional data regarding the optimal diagnostic approach to and management of pneumonia and malnutrition are required from regions where death from these two diseases is common.

Keywords: Aetiology, B Conjugate Vaccine, Bacterial Etiology, Chest Indrawing, Childhood Pneumonia, Children, Community-Acquired Pneumonia, Databases, Developing Countries, Diagnosis, Embase, Fast Breathing, Filipino Children, Frequency, Gambian Children, Hospitalized Children, Interobserver Agreement, Literature, Malnutrition, Management, Mortality, Nigerian Children, Pneumonia, Respiratory, Respiratory-Tract Infections, Review, Risk, Science, Scopus, Sensitivity, Signs, Specificity, Systematic, Systematic Review, Tuberculosis, Validity, Web of Science, Who

? Esu, E., Lenhart, A., Smith, L. and Horstick, O. (2010), Effectiveness of peridomestic space spraying with insecticide on dengue transmission; systematic review. *Tropical Medicine & International Health*, **15** (5), 619-631.

Full Text: [2010\Tro Med Int Hea15, 619.pdf](2010/Tro%20Med%20Int%20Hea15,%20619.pdf)

Abstract: P>Objective To review the evidence on effectiveness of peridomestic space spraying of insecticides in reducing wild Aedes populations and interrupting dengue transmission. Methods Comprehensive literature search of MEDLINE, EMBASE, LILACS, Web of Science, WHOLIS, MedCarib and CENTRAL, and a manual search of reference lists from identified studies. Duplicates were removed and abstracts assessed for selection. All field evaluations of peridomestic space spraying targeting wild adult Aedes vectors in dengue endemic countries were included. Data were extracted, and the methodological quality of the studies was assessed independently by two reviewers. Results Fifteen studies met the inclusion criteria. Outcome measures were heterogeneous, foregoing the possibility of meta-analysis. Thirteen studies showed reductions in immature entomological indices that were not sustained for long periods. The remainder showed space spray interventions to be ineffective at reducing adult and/or immature entomological indices. Only one study measured human disease indicators, but its outcomes could not be directly attributed to space sprays alone. Conclusion Although peridomestic space spraying is commonly applied by national dengue control programmes, there are very few studies evaluating the effectiveness of this intervention. There is no clear evidence for recommending peridomestic space spraying as a single, effective control intervention. Thus, peridomestic space spraying is more likely best applied as part of an integrated vector management strategy. The effectiveness of this intervention should be measured in terms of impact on both adult and immature mosquito populations, as well as on disease transmission.

Keywords: Adult, Aedes, Aedes-Aegypti Diptera, Control, Culicidae, Dengue, Disease, Effectiveness, Efficacy, Embase, Emergency Control, Ground Aerosols, Human, Human Blood, Impact, Insecticides, Intervention, Interventions, Literature, Malathion, Management, Medline, Meta Analysis, Meta-Analysis, Methods, Outcomes, Review, Science, Strategy, Systematic, Systematic Review, Thermal Fog, Ultra-Low-Volume, Vector, Vector Control, Web of Science

? González-Block, M.A., Vargas-Riaño, E.M., Sonela, N., Idrovo, A.J., Ouwe-Missi-Oukem-Boyer, O. and Monot, J.J. (2011), Research capacity for institutional collaboration in implementation research on diseases of poverty. *Tropical Medicine & International Health*, **16** (10), 1285-1290.

Full Text: [2011\Tro Med Int Hea16, 1285.pdf](2011/Tro%20Med%20Int%20Hea16,%201285.pdf)

Abstract: OBJECTIVE To assess the capacity for research collaboration and implementation research in strengthening networks and institutions in developing countries. METHODS Bibliometric analysis of implementation research on diseases of poverty in developing countries from 2005 to 2010 through systematically searching bibliographic databases. Methods identified publication trends, participating institutions and countries and the cohesion and centrality of networks across diverse thematic clusters. RESULTS Implementation research in this field showed a steadily growing trend of networking, although networks are loose and a few institutions show a high degree of centrality. The thematic clusters with greatest cohesion were for tuberculosis and malaria. CONCLUSIONS The capacity to produce implementation research on diseases of poverty is still low, with the prominence of institutions from developed countries. Wide ranges of collaboration and capacity strengthening strategies have been identified which should be put into effect through increased investments.

Keywords: Analysis, Bibliographic, Bibliographic Databases, Bibliometric, Bibliometric Analysis, Bibliometrics, Capacity, Centrality, Collaboration, Databases, Developing Countries, Health, Health Systems, Implementation, Implementation Research, Malaria, Methods, Networks, Poverty, Publication, Publication Trends, Research, Research Capacity, Research Collaboration, Systems, Trend, Trends, Tuberculosis

? Santa-Ana-Tellez, Y., DeMaria, L.M. and Galarraga, O. (2011), Costs of interventions for AIDS orphans and vulnerable children. *Tropical Medicine & International Health*, **16** (11), 1417-1426.

Full Text: [2011\Tro Med Int Hea16, 1417.pdf](2011/Tro%20Med%20Int%20Hea16,%201417.pdf)

Abstract: OBJECTIVE To review the published and grey literature for information regarding the costs and cost-effectiveness of interventions aimed at improving the welfare of orphans and vulnerable children owing to HIV/AIDS in low- and middle-income countries. METHOD We carried out a search of the peer-reviewed literature through PubMed, EconLit, and Web of Science for the period January 2000 to December 2010. We also extensively reviewed the grey literature through generalized web searches and consultations with experts and searches of the web pages of the main organizations active in providing services to orphans and vulnerable children (OVC). The search yielded 216 articles; cross-sectional or longitudinal studies and articles that did not address specific interventions were not considered. The remaining 21 articles were categorized by domain and by type of intervention strategy. RESULTS All studies reviewed were carried out in sub-Saharan Africa. All outcomes are expressed as cost per child per year (in 2010 USD). Foster care estimates range from $614 to $1921. Educational support for primary school ranged from $30 to $75. Health interventions that would ensure child survival can be delivered for about $55. CONCLUSION More research is needed to improve planning and delivery of interventions for OVC. The paucity of cost and cost-effectiveness data reflects the limited number of effectiveness studies. Nevertheless, this systematic literature review shows evidence that suggests that in the area of housing, foster care appears to be more cost effective than institutional care (orphanages).

Keywords: Africa, AID, AIDS, Care, Child, Children, Cost-Effectiveness, Costs, Effectiveness, Health, HIV, AIDS, Information, Intervention, Interventions, Literature, Literature Review, Longitudinal Studies, Low- and Middle-Income Countries, Orphan and Vulnerable Children, Outcomes, Primary, Primary School, Pubmed, Research, Review, Science, Strategy, Sub-Saharan Africa, Survival, Systematic, Systematic Literature Review, Web of Science

# Title: Tropical Medicine and Parasitology

(Trop. Med. Parasitol.)

Full Journal Title: [Tropical Medicine and Parasitology](http://www.ingentaconnect.com/content/maney/atmp); [Tropical Medicine and Parasitology](http://weblinks1.epnet.com/authHjafDetail.asp?tb=1&_ua=bo+B%5F+db+behjnh+bt+ID++%2257G%22+7A50&_ug=sid+00A378DD%2DDF40%2D4324%2DAF9D%2D3AF7A0F6D180%40sessionmgr2+dbs+beh+1106&_us=hd+True+sm+ES+4DBA&_uso=st%5B0+%2DID++57G+tg%5B0+%2D+db%5B0+%2Dbeh+op%5B0+%2D); [Tropical Medicine and Parasitology](http://www.ingentaconnect.com/content/carfax/catm)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mertens, T.E., Fernando, M.A., Marshall, T.F., Kirkwood, B.R., Cairncross, S. and Radalowicz, A. (1990), Determinants of water quality, availability and use in Kurunegala, Sri Lanka. *Tropical Medicine and Parasitology*, **41** (1), 89-97.

Abstract: Between January 1987 and February, (1988), 4590 homes of children under five years of age were visited in three areas of Kurunegala district, Sri Lanka and data were collected on water related practices. 60% of the population used protected wells, 30% used unprotected sources and 10% used handpumps on boreholes or piped supplies. 90% of households had a source less than 1 km away. Mean water consumption was above 25 litres per capita per day and did not correlate with the distance to source. Samples of drinking water were collected and faecal coliform levels were determined in samples of stored water from 3092 households and in samples from the water sources used by 1043 of these households. The absence or presence of organisms in each sample, and the geometric mean count in samples with organisms were used as indices of contamination. Both indices changed with season and varied between areas and between types of water source. The proportion of positive source samples was uniformly high with the exception of piped supplies and handpumps. The mean count was highest for unprotected sources. There was no evidence that ground water contamination occurred in boreholes. With stored samples, boiling appeared to reduce contamination markedly. The proportion of positive stored water samples was also lower with the use of different vessels for collection and storage, with storage inside the house, and with use of a storage container other than an earthenware pot. Because surface water pollution appears to be important it is proposed that headwalls and drainage aprons be built around unprotected sources. Faecal contamination at the source may have more public health significance than contamination of stored water. In this respect public hygiene may play an important role in reducing water pollution at handpumps or protected wells.

# Title: Tropical Pest Management

? Abate, T. (1991), Seed dressing insecticides for bean fly [Ophiomyia-phaseoli (Tryon) (diptera, agromyzidae)] control in ethiopia. *Tropical Pest Management*, **37** (4), 334-337.

Abstract: Six seed dressing insecticides were tested for efficacy against Ophiomyia phaseoli (BF) in 1987 and 1988 at two locations in south-central Ethiopia. Endosulfan and aldrin, at 5 g a.i./kg of seeds, were the least phytotoxic and the most effective. The rest gave variable results; BF control with some insecticides (e.g. furathiocarb) was comparable, but they showed varying degrees of phytotoxicity. The maximum seed yield loss was 36.5%. The results suggest that aldrin be replaced with endosulfan, which is less persistent.

# Title: Tsinghua Science and Technology

Full Journal Title: [Tsinghua Science and Technology](http://www.sciencedirect.com/science/journal/10070214)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Abia, A.A. and Asuquo, E.D. (2007), Kinetics of Cd2+ and Cr3+ sorption from aqueous solutions using mercaptoacetic acid modified and unmodified oil palm fruit fibre (*Elaeis guineensis*) adsorbents. *Tsinghua Science and Technology*, **12** (4), 485-492.

Full Text: [2007\Tsi Sci Tec12, 485.pdf](2007/Tsi%20Sci%20Tec12,%20485.pdf)

Abstract: The kinetics of the sorption of Cd2+ and Cr3+ from aqueous solutions by mercaptoacetic acid modified and unmodified oil palm fruit fibre adsorbents were investigated. The results indicate that sorption equilibrium was reached within 60 min for both metals. Also, the removal efficiency of the three adsorbents was observed to increase for both metals with stronger treatments with mercaptoacetic acid. This may be attributed to the influence of the thiolation of the adsorbents. Furthermore, Cr3+ had higher removal percentages than Cd2+ for all the adsorbents. The sorption mechanism based on the intraparticle diffusion model shows that Cd2+ sorption is better described than Cr3+. The intraparticle diffusion rate constants, Kid, for Cd2+ are 62.04 min-1 (untreated), 67.01 min-1 (treated with 0.5 mol/L mercaptoacetic acid), and 71.43 min-1 (treated with 1.0 mol/L mercaptocacetic acid) while those for Cr3+ are 63.41 min-1 (untreated), 65.79 min-1 (0.5 mol/L acid treated), and 66.25 min-1 (1.0 mol/L acid treated). © 2007 Tsinghua University Press.

Keywords: Adsorbent, Agricultural By-Products, Heavy Metals, Kinetics, Oil Palm Fruit Fibre

# Title: Tsitologiya

Full Journal Title: Tsitologiya

ISO Abbreviated Title: Tsitologiya

JCR Abbreviated Title: Tsitologiya

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shapiro, E.A., Grinfeldt, M.G. and Kaulin, A.B. (1976), Cooperative sorption of tripaflavine by glycerinated muscle-fibers. 1. Sorption isotherm and changes in polarized fluorescence of sorbed dye. *Tsitologiya*, **18** (2), 183-188.

# Title: Tudomanyos es Muszaki Tajekoztatas

Full Journal Title: Tudomanyos es Muszaki Tajekoztatas

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? (1979), The availability in Hungary of the periodicals processed by the computerised data bases of the Institute for Scientific Information (Philadelphia, USA). *Tudomanyos es Muszaki Tajekoztatas*, **26** (5), 220-236.

Abstract: Science policy decisions entrusted the Hungarian Academy of Sciences with the modernization of the information supply of fundamental research. This task might be successfully solved by using machine readable data base. This article was prepared in the Library of the Hungarian Academy of Sciences in the course of a preparatory work for modernization of the information programme of the Academy. Its intention is to clarify the availability of the source periodicals of the Science Citation Index and the Social Sciences Citation Index.

Keywords: Availability, Course, Data, Data Base, Hungary, Information, Institute for Scientific Information, Machine, Periodicals, Policy, Research, Science Citation Index, Source, USA, Work

# Title: Tumor Biology

Full Journal Title: Tumor Biology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Liu, C.B. and Liu, L. (2011), Polymorphisms in three obesity-related genes (*LEP*, *LEPR*, and *PON1*) and breast cancer risk: A meta-analysis. *Tumor Biology*, **32** (6), 1233-1240.

Full Text: [2011\Tum Bio32, 1233.pdf\](2011/Tum%20Bio32,%201233.pdf/)

Abstract: Common genetic variations in the leptin (LEP), leptin receptor (LEPR), and paraoxonase 1 (PON1) genes have been considered to be implicated in the development of breast cancer. However, the results were inconsistent. In this study, a meta-analysis was performed to assess the associations of five polymorphisms, including LEP G2548A, LEPR Q223R, LEPR Lys109Arg, PON1 L55M, and PON1 Q192R polymorphisms, with breast cancer risk. Published literature from PubMed, ISI Web of Science, Embase databases, CNKI, and Wanfang Data were retrieved. All studies evaluating the association between LEP G2548A, LEPR Q223R, LEPR Lys109Arg, PON1 L55M, or PON1 Q192R polymorphism and breast cancer risk were included. Pooled odds ratio (OR) with 95% confidence interval (CI) was calculated using fixed-or random-effects model. Three studies (2,003 cases and 1,967 controls) for LEP G2548A polymorphism, nine studies (4,627 cases and 5,476 controls) for LEPR Q223R polymorphism, five studies (2,759 cases and 2,573 controls) for LEPR Lys109Arg polymorphism, four studies (1,517 cases and 1,379 controls) for PON1 L55M polymorphism, and five studies (1,575 cases and 2,283 controls) for PON1 Q192R polymorphism were included in the meta-analysis. Overall, the results showed null significant association between LEP G2548A, LEPR Q223R, LEPR Lys109Arg, or PON1 Q192R polymorphism and breast cancer risk; however, PON1 L55M was significantly associated with breast cancer risk overall (MM vs. LL: OR=2.16; 95% CI, 1.76-2.66). For LEPR Q223R polymorphism, further subgroup analysis suggested that the association was only statistically significant in East Asians (OR=0.50; 95% CI, 0.36-0.70) but not in Caucasians (OR=1.06; 95% CI, 0.77-1.45) or Africans (OR=1.30; 95% CI, 0.83-2.03). The present meta-analysis suggested that LEPR Q223R polymorphism might be implicated in the development of breast cancer in East Asians; PON1 L55M might increase breast cancer risk. However, given the limited sample size, the findings warrant further investigation.

Keywords: Adiponectin, Analysis, Association, Breast Cancer, Cancer, Databases, Development, Disease, Genes, Genetic, ISI, ISI Web of Science, Leptin, Leptin Receptor, Literature, Meta Analysis, Meta-Analysis, Model, Paraoxonase, Paraoxonase 1, Polymorphism, Polymorphisms, Pubmed, Ratio, Receptor Gene, Risk, Science, Serum Leptin, Web of Science, Weight, Women

# Title: Tumordiagnostik and Therapie

Full Journal Title: [Tumordiagnostik and Therapie](http://www.thieme-connect.de/ejournals/toc/tumor)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Melichar, B., Zeimet, A., Artnerdworzak, E., Schrocksnadel, H., Marth, C., Wachter, H. and Fuchs, D. (1993), Association between increased urinary zinc and neopterin concentrations in women with gynecological cancer. *Tumordiagnostik and Therapie*, **14** (3), 110-112.

# Title: Tunisian Medical

Full Journal Title: Tunisian Medical

ISO Abbreviated Title: Tunis. Med.

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ben Abdelaziz, A., Harrabi, I., Aouf, S., Gaha, R. and Ghannem, H. (2002), Typology of Tunisian medical research indexed in Medline from 1965 to 1999. *Tunisian Medical*, **40** (9), 548-555.

Abstract: The medical research is a criteria of a country development and the performance of its health system. This study tried to describe the typology of the Tunisian medical research (themes, journals, types of publication, ..). It was a bibliometric and exhaustive survey of Tunisian manuscripts indexed in Medline from 1965 to 1999. Among the 3673 eligible references to the study, 73% have been produced in clinic sciences. The main subjects were: Cancer, hydratic cyst and tuberculosis represented respectively 3.9%, 2.9% and 1.8% of manuscripts. 91% of articles have been published in French. 65% of articles have been published in national journals. This work showed that the medical scientific production remains globally lower in relation to the national human resources, that its social relevance is insufficient in relation to the load of morbidity and that the radiance of the Tunisian medical research would be limited by the choice of no English-writing journals. Thus, the promotion of the national medical research requires the backing of the teaching of: documentary techniques, English and written communication.

# Title: Türk Psikoloji Dergisi

Turkish Journal of Psychology

Full Journal Title: [Turk Psikoloji Dergisi](http://www.psikolog.org.tr/dergi/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1300-4433

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Tonta, Y. and İlhan, M. (1997), Turkey’s place in social science publications in the world. *Türk Psikoloji Dergisi*, **12** (40), 67-75.

Full Text: Tur Psi Der12, 67.pdf

Abstract: This paper reviews the publication (articles, notes, book reviews, etc.) of Turkish social scientists as reported in the Social Sciences Citation Index (SSCI) by checking the authors’ affiliation addresses to see if they included the word ‘Turkey’. Altogether, a total of 887 publications were identified between 1985 and 1996. The number of publications in 1996 is 166, which constitutes 0.14% of the total number of publications in the world. Three fourths of the publications were of full-text articles. An overwhelming majority of the contributions (95%) were written in English. Most contributions (93%) came from researchers working at universities. Researchers affiliated with Middle East Technical, Bosporus and Bilkent Universities made more than half (%53) of all social science publications.

Keywords: Social Science Citation Index, Social Science Publications, Turkey, Scientometric Weight, 50 Nations, Chemistry, Physics, Areas

# Title: Turkderm-Archives of the Turkish Dermatology and Venerology

Full Journal Title: [Turkderm-Archives of the Turkish Dermatology and Venerology](http://www.thefreelibrary.com/Archives+of+the+Turkish+Dermatology+and+Venerology-p21742)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Seckin, D. (2009), Thoughts on citation, citation analysis of the articles published in international dermatology journals by Turkish dermatologists and the top-cited articles. *Turkderm-Archives of the Turkish Dermatology and Venerology*, **43** (3), 79-82.

Full Text: [2009\Tur-Arc Tur Der Ven43, 79.pdf](2009/Tur-Arc%20Tur%20Der%20Ven43,%2079.pdf)

Keywords: Citation

? Taşlı, L., Kaçar, N. and Aydemir, E.H. (2010), The citation and articles published in the TURKDERM between 1999-2007: A retrospective assesment. *Turkderm-Archives of the Turkish Dermatology and Venerology*, **44** (1), 8-11.

Full Text: [2010\Tur-Arc Tur Der Ven44, 8.pdf](2010/Tur-Arc%20Tur%20Der%20Ven44,%208.pdf)

Abstract: Background and Design: In this report, it has been aimed to investigate the citation rates of the online issues of the “Turkdem” which has been indexed in the Web of Science since 2008. It is aimed also to have a base to comparing with the results of the citations in the indexed years after 2008 in the future. Material and Method: It was searched the articles published in the “review, original article, case report, continious education, letter to editor, surgical prosedurs and what’s your diagnosis” sections between 1999-2007 by Google scholar programme. The citations from Ulaknet national medical index, ISI and the other online peer-review journals were grouped according to years and article types. Results: Fourty-six % (n=165), 37% (n=131), 10% (n=35), 5% (n=17) and 1% (n=5) of the searched 356 articles were original articles, case reports, reviews, continous education and letters to editor, respectively. There were also three reports, two and one of which were what’s your diagnosis and surgical procedures, respectively. Thirty seven, 30, 7, 5, and one of the cited 80 articles were in the sections of “original article, case report, continiuous education, review and letter to editor”, respectively. The number of self made citations was 13 (13 %). Although only five citations (5%) were determined in the journals with impact factors higher than 1.4 which have been indexed by the Web of Science, 44 citations (44%) were established in national dermatology journals. Conclusion: These results point out the low use rate of national references. (Turkderm 2010; 44: 8-11).

Keywords: Articles, Bibliometric, Citation, Citations, Dermatology, Diagnosis, Education, Impact, Impact Factors, ISI, Journals, Medical, Peer Review, Peer-Review, Review, Science, Turkderm, Web of Science

# Title: Turkish Journal of Chemistry

Full Journal Title: [Turkish Journal of Chemistry](http://mistug.tubitak.gov.tr/bdyim/sayilar.php?dergi=kim)

ISO Abbreviated Title: Turk. J. Chem.

JCR Abbreviated Title: Turk J Chem

ISSN: 1010-7614

Issues/Year: 4

Journal Country/Territory: Turkey

Language: English

Publisher: Scientific Technical Research Council Turkey

Publisher Address: PO Box 605 Yenisehir, 06445 Ankara, Turkey

Subject Categories:

Chemistry: Impact Factor 0.145, 107/121

Engineering, Chemical: Impact Factor 0.145, 93/110

? İnel, O. (1995), Adsorption of ammonium ions and Methylene Blue dye by natural zeolite and effect of thermal treatment and acid activation on adsorption. *Turkish Journal of Chemistry*, **19** (4), 323-330.

Abstract: In this study, the utility of zeolitic tuffs obtained from the Bigadic (Balikesir) region was investigated as an ammonium ion exchanger and decolorizing agent. For this purpose the adsorptions of ammonium ions and Methylene Blue from aqueous solutions on the zeolitic tuffs were studied the batch equilibration technique as a function of adsorbate concentration. Adsorption isotherms were described using the Langmuir isotherm model. The effects of thermal treatments and acid activations on the adsorption capacity of tuffs were also examined.

Keywords: Acid, Acid Activation, Activation, Adsorption, Adsorption Capacity, Ammonium, Ammonium Ion, Capacity, Concentration, Dye, Effects, Function, Ion, Isotherm, Isotherms, Langmuir, Langmuir Isotherm, Methylene Blue, Model, Natural, Natural Zeolite, Thermal Treatment, Treatment, Utility, Zeolite

? Denizli, A., Piskin, E. and Salih, B. (1995), Metal chelate affinity chromatography: Congo Red and Cd(II) attached poly (EGDMA-HEMA) microbeads for specific albumin adsorption. *Turkish Journal of Chemistry*, **19** (4), 296-304.

Abstract: Poly (ethylene glycol dimethacrylate-2-hydroxyethyl methacrylate) microbeads, in the size range of 150-200 µm, were produced by a modified suspension copolymerization of the respective monomers, i.e., ethyleneglycoldimethacrylate (EGDMA) and 2-hydroxyethyl methacrylate (HEMA) in an aqueous media. Polyvinylalcohol and dibenzoyl peroxide were used as the stabilizer and the initiator, respectively. A diluent, namely toluene was included in the polymerization recipie. Congo Red was selected as a metal chelating ligand for specific adsorption of Cd(II) ions and was attached to poly (EGDMA-HEMA) microbeads by treating the dye and polymeric beads in an aqueous alkaline medium. Dye attached polymeric microbeads were characterized by optical microscopy, FTIR and elemental analysis. Adsorption of Cd(II) ions onto the Congo Red attached poly (EGDMA-HEMA) microbeads was investigated in the batch equilibrium experiments by using graphite furnace Atomic Absorption Spectrophotometer. Different amounts of Cd(II) ions (2-18.3 mgCd(II)/g polymer) were conjugated on the microbeads by changing the inital concentration of Cd(II) ions and pH. Bovine serum albumin (BSA) adsorption on these microbeads from aqueous solutions containing different amounts of BSA at different pH and ionic strengths was investigated in batch reactors. The nonspecific BSA adsorption on the poly (EGDMA-HEMA) microbeads was almost zero. Congo Red attachment significantly increased the BSA adsorption (up to 55.3 mgBSA/g polymer). A further increase in the adsorption capacity (up to 86.2 mgBSA/g polymer) was observed when Cd(II) ions were incorporated. More than 90% of the adsorbed BSA was desorbed in 1 h in the desorption medium containing 0.5 M NaSCN at pH 8.0.

Aksoylu, A.E., Akin, A.N., Sunol, S.G. and Onsan, Z.I. (1996), The effect of metal loading on the adsorption parameters of carbon dioxide on coprecipitated nickel-alumina catalysts. *Turkish Journal of Chemistry*, **20** (1), 88-94.

Full Text: [T\Tur J Che20, 88.pdf](T/Tur%20J%20Che20,%2088.pdf)

Abstract: A coprecipitation method has been developed and modified for the preparation of nickel-alumina catalysts having metal loadings in the 0-25 wt% Ni range. The effect of metal loading on CO2 adsorption was investigated under isothermal chromatographic conditions using an elution technique in the temperature range 483-533 K. Average enthalpies of adsorption were determined using the isosteres obtained from the experimental adsorption isotherms. The isotherms were also fitted to the Langmuir equation for the evaluation of adsorption equilibrium coefficients, Gibbs free energies, average adsorption enthalpies and entropies.

Saraydin, D. and Karadağ, E. (1996), A comparison of adsorption isotherms of crosslinked poly(N-vinylpyrrolidone) Basic Brown 1 binding system. *Turkish Journal of Chemistry*, **20** (3), 234-243.

Full Text: [T\Tur J Che20, 234.pdf](T/Tur%20J%20Che20,%20234.pdf)

Abstract: In this study, the binding of a basic dye such as Basic Brown 1 [BB 1] onto a crosslinked poly(N-vinylpyrrolidone) [CPVP] was investigated. Adsorption of the azo dye onto the CPVP was studied by the batch adsorption technique at 25°C. In adsorption experiments a Langmuir type (L) adsorption was found with respect to the Giles classification system. Binding parameters such as initial binding constant (Ki), equilibrium constant (K), monolayer coverage (n), site-size (u), and maximum fractional occupancy (<(theta)over cap>), and thermodynamic parameters such as heat of adsorption (Delta H), free energy of adsorption (Delta G) and entropy of adsorption (Delta S) for the CPVP/BB 1 system were calculated by using Klotz, Scatchard, and Langmuir linearization methods.

Keywords: Crosslinked Poly(N-Vinylpyrrolidone), Basic Brown 1, Binding, Adsorption Isotherm, Hydrogels

İnel, O. and Aşkin, A. (1996), Adsorption of monovalent cationic dyes on some silicates. *Turkish Journal of Chemistry*, **20** (4), 276-282.

Full Text: [T\Tur J Che20, 276.pdf](T/Tur%20J%20Che20,%20276.pdf)

Abstract: Adsorption of two cationic dyes, Methylene blue (MB) and malachite green (MG), was studied on the bentonite, sepiolite and zeolite samples by the batch equilibration technique using a spectrophotometer. In addition, cation exchange capacities (CEC) of samples were determined by NH4+ saturation using Kjeldhal distillation. The adsorption data was found to conform with the Langmuir equation within the concentration range studied, and Langmuir constants were determined for each of the samples. It was observed that the amount of dyes adsorbed was in excess of CEC in the case of bentonite and sepiolite. The adsorption capacities of the samples for both dyes have the following order: bentonite > sepiolite > zeolite.

Keywords: Crystal Violet, Methylene-Blue, Clay-Minerals, Montmorillonite, Surface, Absorption, Laponite, Exchange

Aydin, A.H., Güzel, F. and Tez, Z. (1996), Investigation of adsorption isotherms used for wool dyeing by aqueous extraction of cehri fruit (Fructus Rhamni Petiolari) and dyeing of wool and silk accompanied by various mordants. *Turkish Journal of Chemistry*, **20** (4), 283-288.

Full Text: [T\Tur J Che20, 283.pdf](T/Tur%20J%20Che20,%20283.pdf)

Abstract: In this study, adsorption isotherms were obtained by processing wool with dyestuff solutions of different concentrations extracted from cehri fruit with water. These isotherms follow the Nernst equation; the Nernst constant was determined and interpreted.

In addition, wool and silk fibres were dyed with the same dyestuff solution and various mordants. Colours having a high fastness which could be used on an industrial scale were produced.

Keywords: Dyestuff Adsorption, Natural Dyes, Dyeing Fibres, Cehri Fruit Extract, Wool Dyeing, Silk Dyeing

Topallar, H. (1998), The adsorption isotherms of the bleaching of sunflower-seed oil. *Turkish Journal of Chemistry*, **22** (2), 143-148.

Full Text: [T\Tur J Che22, 143.pdf](T/Tur%20J%20Che22,%20143.pdf)

Abstract: In this study, the absorbance measurements were taken for the bleaching of sunflower-seed oil with wt. 0.3, 0.5, 0.7 and 0.9 % of clay at 60, 70, 80 and 90°C. Bentonite EY-09 was used as the bleaching clay Since the heat evolved during adsorption (0.33-1.07 kJ mol-1) was less than 20 kJ mol-1, the forces between the adsorbent and adsorbate appear to be van der Waals forces, and this type of adsorption is physical or van der Waals adsorption. Thus, it was seen that the Freundlich equation was more applicable than the Langmuir equation to the experimental adsorption isotherms for the bleaching of sunflower-seed oil with Bentonite EY-09.

Keywords: Adsorption Isotherm, Bleaching, Freundlich Equation, Langmuir Equation, Sunflower-Seed Oil

Karadağ, E., Saraydin, D. and Aydin, F. (1998), Removal of water-soluble cationic dyes with TriSyl silicas. *Turkish Journal of Chemistry*, **22** (3), 227-236.

Full Text: [T\Tur J Che22, 227.pdf](T/Tur%20J%20Che22,%20227.pdf)

Abstract: In this study, the adsorption of certain water-soluble cationic dyes, (basic blue 9, basic blue 12, basic blue 17, brilliant cresyl blue, janus green B, basic green 4, basic violet 1, basic violet 3, and thionin) onto TriSyl silicas by batch adsorption at 25°C was investigated. In the adsorption experiments, Langmuir type adsorption in the Giles classification system was found. Binding parameters such as the initial binding constant (Ki), the equilibrium binding constant (K), monolayer coverage (n), site-size (u), maximum fractional occupancy (< (theta)over cap>), and the thermodynamic parameter free energy of adsorption (Delta G) were calculated for TriSyl silica and cationic dye systems by using the linearization methods of Klotz and Langmuir.

Keywords: Acrylamide/Itaconic Acid Hydrogels, Solute Adsorption-Isotherm, Aqueous-Solutions, General Treatment, Binding, Classification, Behaviors, Trisyl Silicas, Cationic Dyes, Binding, Adsorption

İnel, O., Albayrak, F. and Aşkin, A. (1998), Cu and Pb adsorption on some bentonitic clays. *Turkish Journal of Chemistry*, **22** (3), 243-252.

Full Text: [T\Tur J Che22, 243.pdf](T/Tur%20J%20Che22,%20243.pdf)

Abstract: Cu2+ and Pb2+ adsorption isotherms were measured on some clay samples obtained from various regions of Turkey. Also specific surface areas of clays were determined from adsorption data of ortho-phenanthroline(OP). The adsorptions of ions and OP were studied using the batch equilibration technique as a function of adsorbate concentration. The adsorption data, over the whole range of concentrations used, follow the Langmuir adsorption isotherm. The retention capacities of the adsorbates and the cation exchange capacities of the clays were determined. Plots of Kd, the distribution coefficient of ions between the solid and solution phases, vs, Gamma, the surface density of adsorbed ions, showed that all the samples behave similarly: i.e. Kd sharply decreases with increasing values of Gamma. The amount of Pb2+ adsorbed is about 3-4 times that of Cu2+ and the same adsorption capacity sequence was found for each ion.

Keywords: Sorption, Soils, Montmorillonite, Cadmium, Zinc, Cd

Akçay, G. and Yurdakoç, M.K. (1999), Nonyl- and dodecylamines intercalated bentonite and illite from Turkey. *Turkish Journal of Chemistry*, **23** (1), 105-113.

Full Text: [T\Tur J Che23, 105.pdf](T/Tur%20J%20Che23,%20105.pdf)

Abstract: Bentonite and illite were interacted with nonyl- and dodecylammonium salt solutions to see how the alkylammonium ions became attached and oriented within the interlamellar space of the clays. X-ray diffraction analyses were carried out to obtain information on the interlamellar organization and orientation of the adsorbed alkylammonium compounds. Thermogravimetric analysis (TG, DTG) and Fourier Transform Infrared Analyses (FTIR) were performed to characterize the samples and to determine the amounts adsorbed by the clay samples. The modification process was effective in nonyl- and dodecylammonium bentonites. Alkylammonium ions were adsorbed in the interlamellar space of the clays. Regarding the orientation of the alkylammonium ions between the silicate sheets, it was found that the organic cation alkylchains were parallel to the silicate layer. Intercalation was generally greater with DA ions.

Teker, M., İmamoğlu, M. and Saltabaş, Ö. (1999), Adsorption of copper and cadmium ions by activated carbon from rice hulls. *Turkish Journal of Chemistry*, **23** (2), 185-191.

Full Text: [T\Tur J Che23, 185.pdf](T/Tur%20J%20Che23,%20185.pdf)

Abstract: The removal of copper(II) and Cadmium(II) ions from aqueous solutions, by adsorption on activated carbon prepared from rice hulls (ACRH); was investigated depending on pH, activated carbon dosage, contact time, initial metal concentration and solution temperature. The optimum values of pH, ACRH dosage and contact time were determined to be 5-8, 0.5 g ACRH/25 mt solution an 60 minutes respectively for the adsorption of Cu(II) ions and 5-8, 1.5 g ACRH/25 mt solution and 60 minutes for the adsorption of Cd(II) ions. From the initial concentrations, the constants for the Freundlich and Langmuir isotherm were calculated at 293 K and 313 K. The adsorption of Cu(II) and Cd(II) ions from aqueous solutions was found to be exothermic [ΔH° = -13.474 KJ/mol for Cu(II) and ΔH° =-2.302 KJ/mol for Cd(II)]. Furthermore, the other thermodynamic data for ΔG° and ΔS°, were also calculated at 293 K and 313 K.

Keywords: Fly-Ash, Adsorption, Heavy Metal, Activated Carbon, Rice Hulls

Topallar, H. and Bayrak, Y. (1999), Investigation of adsorption isotherms of myristic, palmitic and stearic acids on rice hull ash. *Turkish Journal of Chemistry*, **23** (2), 193-198.

Full Text: [T\Tur J Che23, 193.pdf](T/Tur%20J%20Che23,%20193.pdf)

Abstract: The adsorption of myristic, palmitic and stearic acids on rice hull ash from isooctane as solvent was studied and conformed to a Langmuir isotherm. Monolayer coverage was determined to be 40.08, 38.43 and 37.27 mg/g, respectively. The free energy of adsorption, Delta G(ads)(o), for the adsorption was determined to be -6, 25, -6.32 and -6.39 kcal mol-1 for the adsorbates, respectively. The equilibrium parameter indicated that rice hull ash is a good adsorbent for myristic, palmitic and stearic acids examined.

Keywords: Adsorption, Free Energy of Adsorption, Langmuir Isotherm, Myristic, Palmitic, Stearic Acids, Rice Hull Ash, Fatty-Acids, Oil

İnel, O. and Tümsek, F. (2000), The measurement of surface areas of some silicates by solution adsorption. *Turkish Journal of Chemistry*, **24** (1), 9-19.

Full Text: [T\Tur J Che24, 9.pdf](T/Tur%20J%20Che24,%209.pdf)

Abstract: In this study, the adsorption from solution technique was used for the determination of surface areas of some silicate samples (bentonite, sepiolite, zeolitic tuff and kaolin). Methylene blue (MB), orthophenanthroline (OP) and p-nitrophenol (PNP) were selected as solutes.

The adsorption data was found to conform with the Langmuir equation within the concentration range studied, and Langmuir constants were determined for each of the samples.

The surface area values obtained were compared with those determined by nitrogen adsorption. Also the results were discussed with respect to the cation exchange capacities of the samples.

The specific surface area values of the samples were found to decrease in the following order:

Bentonite > Sepiolite > Zeolite > Kaolin (for MB and OP adsorption)

Sepiolite > Bentonite > Zeolite > Kaolin (for PNP and N-2 adsorption).

Keywords: Surface Area Determination, Solute Adsorption, Adsorption From Solution, Methylene-Blue, Cation-Exchange, Montmorillonite, Clays

Aktaş, Z. (2000), Effect of non-ionic reagent adsorption on zeta potential of fine coal particles. *Turkish Journal of Chemistry*, **24** (2), 117-129.

Full Text: [T\Tur J Che24, 117.pdf](T/Tur%20J%20Che24,%20117.pdf)

Abstract: The -5 μm size fractions of two low rank British coals were used in zeta potential measurements. The electrophoretic behaviour was described by the Helmholta-Smoluchowski equation. The non-ionic reagents used for the adsorption tests were of diacetone alcohol and 2-ethylhexanol. Zeta potentials of both coals at various pHs were significantly different in the absence of the non-ionic reagents. Negligible variations were observed on the zeta potential curves of both coal particles in the presence of the non-ionic reagents used. It was concluded that the pH of coal particles in slurry is a principle parameter controlling the value of zeta potentials. As the zeta potential for Bickershaw coal particles was zero at about pH 5, the point of zero zeta potential was not observed for Rawdon coal particles. This is attributed to the functionality and the extent of oxidation of the coal surface.

Keywords: Zeta Potential, Non-Ionic Reagents, Coal, Rank British Coals, Flotation, Homologs

Arpa, Ç., Say, R., Şatiroğlu, N., Bektaş, S., Yürüm, Y. and Genç, Ö. (2000), Heavy metal removal from aquatic systems by northern Anatolian smectites. *Turkish Journal of Chemistry*, **24** (2), 209-215.

Full Text: [T\Tur J Che24, 209.pdf](T/Tur%20J%20Che24,%20209.pdf)

Abstract: Competitive adsorption of the heavy metal ions Cu(II), Cd(II) and Pb(II) from aqueous media onto northern Anatolian smectites with a mean particle diameter of 200 μm, was investigated. The adsorption rate and capacity of the smectite for the selected heavy metal ions, containing different amounts of these ions (5-900 mg/L) at values ranging from pH 1.0 to 7.0 were studied. Very high adsorptions rates were observed at the beginning, and adsorption equilibria were then gradually achieved in about 30 minutes. The maximum adsorption of metal ions onto the smectite were found to be 41.46 mg Cd(II), 36.11 mg Pb(II) and 18.72 mg Cu(II) per gram of smectite. The order of affinity based on weight uptake by smectite was Cd(II)>Pb(II)>Cu(II). When the metal ions competed (in the case of adsorption from their mixture), the amounts of Cd(II), Pb(II) and Cu(II) ions adsorbed were 11.86 mg, 11.23 mg and 16.76 mg per gram of smectite, respectively Desorption of the metal ions from smectite was studied in 0.5 M HNO3 and very high desorption rates, greater than 95%, were achieved in all cases.

Keywords: Attached Poly(Egdma-Hema) Microbeads, Cadmium, Ions, Adsorption, Microspheres

Uzun, İ. and Güzel, F. (2000), Adsorption of some heavy metal ions from aqueous solution by activated carbon and comparison of percent adsorption results of activated carbon with those of some other adsorbents. *Turkish Journal of Chemistry*, **24** (3), 291-297.

Full Text: [T\Tur J Che24, 291.pdf](T/Tur%20J%20Che24,%20291.pdf)

Abstract: In this study, removal of some heavy metals ions (Mn2+, Fe2+, Ni2+ and Cu2+) from aqueous solution by adsorption was investigated. For this purpose, high-grade MnSO4.H2O, FeSO4. 7H2O, NiSO4. 7H2O and CuSO4. 5H2O were used as heavy metal samples. The commercial activated carbon (Merck 2514), chitosan and agar were used as adsorbents. The pH of each solution was not controlled. This is because the net interaction between the adsorbent and the heavy metal could be disturbed by the buffer solution. Therefore, all experiments were carried out in a pH range from 5.3 to 5.5. The equilibrium adsorption contact times were determined for M - 2514. The adsorption rate constants were determined from obtained kinetics curves suitable for first degree of rate kinetics. Adsorption isotherms of heavy metals on M - 2514 from aqueous solution were determined. These adsorption isotherms were seen to be consistent with Freundlich’s adsorption isotherm. k and n constants were determined from Freundlich’s linear equation. In addition, M - 2514, chitosan and agar were compared according to their percent uptake yields of the heavy metals.

Keywords: Heavy Metal Adsorption, Activated Carbon, Chitosan, Agar, Adsorption From Aqueous Solution, Adsorption Kinetics, Adsorption Isotherm, Swollen Chitosan Beads, Chemically-Modified Chitosan, Acid

Tokalioğlu, Ş., Şahin, U. and Kartal, Ş. (2001), Determination of fluoride and some metal ion levels in the drinking waters in Kayseri province. *Turkish Journal of Chemistry*, **25** (1), 113-121.

Full Text: [T\Tur J Che25, 113.pdf](T/Tur%20J%20Che25,%20113.pdf)

Abstract: Fluorine is one of the most common elements in the Earth’s crust. Fluoride is recognized to be the most effective caries-preventive agent. The main sources of fluoride for people are generally food and drinking water. For this reason, the fluoride and also the metal ion (Ca. Cr, Cu, Fe, K. Mg. Mn, Na, Ni, Pb and Zn) concentrations in the drinking waters collected from the city center of Kayseri and its counties were investigated. In the determination of fluoride and of Na and It. an ion-meter with a combination-fluoride electrode and a flame photometer were used, respectively. The levels of Cr, Cu, Fe, Mn, Ni and Pb in the drinking waters were determined bq flame atomic absorption spectrometry (FAAS) utilizing the method optimized previously, except for the Ca, Mg and Zn contents, which were measured directly by FAAS. According to the results obtained, the metal ion concentrations in the drinking waters in the studied area are within the safe drinking water regulation limits (TS 266) and also the fluoride levels las mean 0.17 mg L-1) are lower than the permissible limit for fluoride (0.8-1.7 mg L-1).

Keywords: Fluoride, Metal Ions, Drinking Water, Preconcentration, Atomic Absorption Spectrometry, Atomic-Absorption Spectrometry, Trace Amounts, Zinc Metal, Preconcentration, Cadmium, Samples, Alumina, Copper, Resin, Lead

Ceyhan, Ö. and Baybas, D. (2001), Adsorption of some textile dyes by hexadecyltrimethylammonium bentonite. *Turkish Journal of Chemistry*, **25** (2), 193-200.

Full Text: [T\Tur J Che25, 193.pdf](T/Tur%20J%20Che25,%20193.pdf)

Abstract: In this study, hexadecyltrimethylammonium (HDTMA) bentonite was synthesized by placing alkylammonium cation onto bentonite. Adsorption of some textile dyes such as Everdirect Supra Yellow PG, Everdirect Supra Orange 26 CG, Everdirect Supra Rubine BL, Everdirect Supra Blue 4BL and Everdirect Supra Red BWS on Na-bentonite and HDTMA-bentonite was investigated. While the Na-bentonite had no affinity for the dyes, the HDTMA-bentonite showed significant adsorption from aqueous solution. The Langmuir and Dubinin-Rasdushkevich (D-R) isotherm equations were applied to the data and 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 the D-R isotherm equation.

Keywords: Organoclay, Textile Dyes, Adsorption Isotherms, Langmuir Equation, Dubinin-Rasdushkevich (D-R) Equation, Sorption, Clay, Water, Adsorbent, Smectite

Qadeer, R. and Rehan, A.H. (2002), A study of the adsorption of phenol by activated carbon from aqueous solutions. *Turkish Journal of Chemistry*, **26** (3), 357-361.

Full Text: [T\Tur J Che26, 357.pdf](T/Tur%20J%20Che26,%20357.pdf)

Abstract: A commercial active carbon was tested as an adsorbent for the removal of phenol from aqueous solutions. The optimum conditions for maximum adsorption in terms of shaking time. amount of the adsorbent. and concentration of the adsorbate were identified. The adsorption data Fitted the Langmuir isotherm equation in the whole range of concentrations studied. The adsorption of picric acid, pyrogallol and salicylic acid at selected conditions for phenol was also studied. Elution studies to recover the adsorbed phenol from active carbon were performed with distilled water. NaOH and HCl solutions.

Keywords: Phenol, Active Carbon, Adsorption and Aqueous Solutions, Charcoal

Güzel, F. and Uzun, İ. (2002), Determination of the micropore structures of activated carbons by adsorption of various dyestuffs from aqueous solution. *Turkish Journal of Chemistry*, **26** (3), 369-377.

Full Text: [T\Tur J Che26, 369.pdf](T/Tur%20J%20Che26,%20369.pdf)

Abstract: In this study, some activated carbons prepared from sour cherry pits under various conditions were investigated, For comparison purposes, the commercial activated carbons Merck-2514 and Merck-2184 were used. The nitrogen adsorption isotherms at 77 K were used as reference for comparison. while p-nitrophenol, methylene blue, orange-II and victoria blue adsorptions were determined from aqueous solution at 298 K. It was clear from the specific surface area values obtained that the bust activated carbon was obtained by activation for 4 hours following the chemical activation. Its adsorption properties are closer to the levels of the Merck commercial carbons. It was concluded that the characterization of microporous structure, and the testing of the removal of organic impurities from aqueous solution for active carbons having high adsorption ability from the gas phase, can generally be carried out by adsorption of organic solutes whose molecular sizes are smaller than the micropore size (1.5 nm) of the adsorbent.

Keywords: Activated Carbon, Analysis of Pore Structure, Dyestuff Adsorption, N2 Adsorption

Yalçinkaya, Y., Arıca, M.Y., Soysal, L., Denizli, A., Genç, O. and Bektaş, S. (2002), Cadmium and mercury uptake by immobilized *Pleurotus sapidus*. *Turkish Journal of Chemistry*, **26** (3), 441-452.

Full Text: [T\Tur J Che26, 441.pdf](T/Tur%20J%20Che26,%20441.pdf)

Abstract: *Pleurotus sapidus* basidiospores immobilized onto Ca-alginate beads were used for the removal of cadmium and mercury ions from aqueous solutions. The biosorption of Cd(II) and Hg(II) ions on the alginate beads and both immobilized live and heat inactivated fungal mycelia of *Pleurotus sapidus* was studied from aqueous solutions in the concentration range of 30-500 mg L-1. The biosorption of Cd(II) and Hg(II) ions by the alginate and both live and heat inactivated immobilized preparations increased as the initial concentration of the ions increased in the medium. Maximum biosorption capacity for immobilized live and heat inactivated fungal mycelia of *Pleurotus sapidus* was found to be 96.57 mg g-1 (0.86 mmol g-1) and 127.12 mg g-1 (1.13 mmol g-1) for Cd(II) and 207.89 mg g-1 (1.04 mmol g-1) and 287.43 mg g-1 (1.43 mmol g-1) for Hg(II), respectively. The electronegativities and standard electrode potentials of the divalent ions of Group II elements show a definite trend with sorption capacity. Biosorption equilibria were established in about I h and were very well described by Langmuir isotherms. The temperature change between 1.5 and 4.5degreesC did not affect the biosorption capacity. The effect of pH was also investigated and the maximum uptake of metal ions on the alginate and both live and inactivated immobilized fungal mycelia were observed between pH 3.0 and 7.0. The alginate-fun.-us beads were regenerated using 10 mM HCl, with up to 97% recovery, the biosorbents were reused in three biosorption-desorption cycles without any considerable loss in the biosorption capacity.

Keywords: Heavy-Metal Biosorption, Adsorption, Alginate, Ions, Removal, Biotechnology, Exchange, Sorbents, Biomass, Algae

Akarsu, M., Sayilkan, H., Şener, A., Sayilkan, F. and Arpaç, E. (2003), Synthesis, characterization and applications of sol-gel derived zirconium oxide adsorbent powder: Removal from aqueous solution of phenol and p-chlorophenol. *Turkish Journal of Chemistry*, **27** (4), 477-486.

Full Text: [T\Tur J Che27, 477.pdf](T/Tur%20J%20Che27,%20477.pdf)

Abstract: Adsorbent powders were prepared from the uncatalysed hydrolysis-condensation reactions of different complexes that were synthesized by the reactions of Zr(OPrn)4 with different chelating ligands (such as allylacetic acid [AAH], vinylacetic acid [VAH] and citraconic acid [CAH]). The complex products were characterized by FT-IR, H-1-NMR and C-13-NMR spectra. The maximum combination ratios of AAH/Zr(OPrn)4, VAH/Zr(OPrn)4 and CAH/Zr(OPrn)4 were 1.7, 0.9 and 1.3, respectively. The hydrolysis-condensation products of these complexes were calcinated at 900 degreesC and half of them were coated with 3-glycidyloxypropyltrimethoxysilane (GLYMO). The surface area and average pore diameter of the powders were estimated by the analysis of adsorption/desorption BET isotherm data. The adsorption capacities of these powders for aqueous phenol and p-chlorophenol were calculated following spectrophotometric determination. Phenol and p-chlorophenol adsorption on all of the GLYMO-coated adsorbents were satisfactory, e.g., the adsorbent obtained from the hydrolyzed, calcinated and GLYMO-coated form of Zr(OPrn)(2.3)(AA)(1.7) adsorbed 63% of phenol while the uncoated form adsorbed only 10%. The adsorption isotherm has been determined and data have been analyzed according to the Freundlich model.

Keywords: Adsorbent, Adsorption, Coating Sol-Gel Process, Zirconium Idkoxides, Hydrolysis-Condensation Reactions, Activated Carbon, Adsorption, Products, Montmorillonite, Equilibrium, Alkoxides, Films, Dyes

Begum, S. (2003), Silver removal from ware by adsorption on concrete particles. *Turkish Journal of Chemistry*, **27** (5), 609-617.

Full Text: [T\Tur J Che27, 609.pdf](T/Tur%20J%20Che27,%20609.pdf)

Abstract: The ability of concrete to remove silver from its aqueous solutions was studied. Silver removal is favored by low concentration and high pH at room temperature. The intrinsic acidity constants, average pK*int a*1 and average pKint *a*2 were determined. The calculated pHPZC(5.4) is in agreement with the pHPZC values determined from zeta potential measurements, indicating that the concrete particulate behaves amphoterically.

The total acidity capacity for the negative and positive surface was 0.5(cm2)/(muC). A surface complex. 2 formation model (SCFM) was used to describe the adsorption of silver onto concrete particles. In general the equilibrium constants, the pK(i)S values, decrease as the silver loadings increase.

Keywords: concrete, equilibrium constants, intrinsic acidity constants, silver adsorption, surface acidity.

Chmielewská, E. (2003), Adsorption of arsenate and chromate from waters on hydrophobized zeolitic media. *Turkish Journal of Chemistry*, **27** (5), 639-648.

Full Text: [T\Tur J Che27, 639.pdf](T/Tur%20J%20Che27,%20639.pdf)

Abstract: A laboratory setup was used to examine the uptake of chromate and arsenate from aqueous solutions by octadecylammonium acetate [ODA]-modified inland clinoptilolite. In trials, a natural variety of montmorillonite was compared to organic, i.e. surfactant loaded clinoptilolite. and some inorganically substituted (Ag, Pb) monoforms. The arrangement of the surface-attached ODA chains was the important factor for differences in the adsorption states of the guest species (oxyanions). A novel nanostructure inorganic-organic composite was prepared and was characterized by SEM, thermogravimetry, HR TEM, UV-VIS diffuse reflectance and powder XRD spectral analytical methods. Finally, the adsorption isotherms of the studied system were expressed. An approach was proposed for the regeneration of exhausted surfactant-immobilized clinoptilolite with inorganic salt solutions under a dynamic regime.

Keywords: Octadecylammonium-Clinoptilolite, Adsorption, Anion-Exchange, Chromate and Arsenate Oxyanions, Montmorillonite

Sayilkan, F., Sayilkan, H., Erdemoğlu, S., Şener, Ş. and Akarsu, M. (2004), New adsorbents from Ti(OPrn)4 by the sol-gel process: Synthesis, characterization and application for removing some heavy metal ions from aqueous solution. *Turkish Journal of Chemistry*, **28** (1), 27-38.

Full Text: [T\Tur J Che28, 27.pdf](T/Tur%20J%20Che28,%2027.pdf)

Abstract: New adsorbents were synthesized by the sol-gel process from the product of a hydrolysis reaction and its coated form of titanium(IV)-n-propoxide for removing some heavy metal ions from aqueous solution. Titanium(IV)-n-propoxide was uncatalyst hydrolyzed with different amounts of water at room temperature and was found to react in a 1:1.6 ratio (mole of Ti:mole of H2O). It was found that the condensation following the hydrolysis reflection was alcohol condensation. The hydrolysis-condensation product was characterized in detail by GC. Karl-Fischer coulometric titrator, NIR-spectroscopy, FT-IR spectroscopy, TG-DTA and elemental analysis. The hydrolysis-condensation product of titanium(TV)-n-propoxide was calcinated at 900degreesC after drying at 100degreesC and some of this product was coated with hydrolyzed NH2-functional silanes [3-(2-aminoethylamino)ethylamino)propyl-trimethoxy silane] (Amino-and [3-(2-aminoethylamino)propylmethyldimetoxysilane] (Amino-2), separately. Adsorption capacities of uncoated and NH2-functional silane coated hydrolysis-condensation products for Fe3+, Cu2+ and Pb2+ ions in aqueous solution were investigated by FAAS. It was observed that the extent of adsorption was influenced significantly by the type and concentrations of coating materials, e.g., Amino-1 coated adsorbent prepared in methyl alcohol as 50% (w/w) and 100% (without methyl alcohol) adsorbed 90-67% and 100% of Fe3+, respectively. while the uncoated form adsorbed only 5%. The adsorption isotherm was determined and the data were analyzed according to the Freundlich model.

Keywords: Sol-Gel Process, Adsorption, Adsorbent, Waste Water, Heavy Metals, Coating, Adsorption, Water, Waste, Acid, Lead

Uzun, İ. and Güzel, F. (2004), External mass transfer studies during the adsorptions of some dyestuffs and p-nitrophenol onto chitosan from aqueous solution. *Turkish Journal of Chemistry*, **28** (6), 731-740.

Full Text: [T\Tur J Che28, 731.pdf](T/Tur%20J%20Che28,%20731.pdf)

Abstract: The effect of temperature on the adsorptions of some 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) from aqueous solution was investigated. The experimental data related to adsorption isotherms were applied to linear forms of the equations that they fitted, and isotherm constants were calculated. Since the isotherm curves obtained for the adsorptions of O-II and CV by chitosan fitted the Langmuir adsorption isotherm, the Langmuir constants (q*m* and b) related to the adsorption isotherms of these dyestuffs together with their kinetical data at different temperatures were applied to the equation of McKay et al., and external mass transfer coeffcients (k*f)*1 at these temperatures were calculated. In addition, kinetic data obtained for each dyestuff and PNP at different temperatures were applied to a further equation developed by Weber-Mathews, and (kf)2 constants at these temperatures were calculated.

Keywords: Chitosan, Dyestuff Adsorption, External Mass Transfer Coeffcient

? Şahin, E. (2005), Interpretation of sorption kinetics for mixtures of reactive dyes on wool. *Turkish Journal of Chemistry*, **29** (6), 617-625.

Full Text: [2005\Tur J Che29, 617.pdf](2005/Tur%20J%20Che29,%20617.pdf)

Abstract: The equilibrium sorption isotherms of 3 reactive dyes (C. I. Reactive Yellow 84, C. I. Reactive Red 141, C. I. Reactive Blue 160) and their binary mixtures adsorbed on prewetted wool fiber were investigated. The kinetic studies were carried out at pH <= 7 and 80°C in dye solutions containing 20 g/L NaCl. It was reported that binary mixtures of these reactive dyes have lower sorption values than the dyes alone, at the same dye concentration, pH and temperature. The isotherms obtained are Langmuir type. The rate parameters of adsorption kinetics decrease with increasing dye concentration.

Keywords: Adsorption, Adsorption Kinetics, Cotton, Dye, Dye Adsorption, Dyeing Systems, Dyes, Equilibrium, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Nylon, Part 1, pH, Reactive Dye, Reactive Dyes, Solutions, Sorption, Sorption Kinetics, Temperature

? Jayswal, A. and Chudasama, U. (2008), Synthesis and characterization of a novel metal phosphonate, zirconium(IV)-hydroxy ethylidene diphosphonate, and its application as an ion exchanger. *Turkish Journal of Chemistry*, **32** (1), 63-74.

Full Text: [2008\Tur J Che32, 63.pdf](2008/Tur%20J%20Che32,%2063.pdf)

Abstract: A novel hybrid ion exchange material, Zirconium-hydroxy ethylidene diphosphonate [ZrHEDP], of the class of tetravalent metal acid (TMA) salts has been synthesized by the sol-gel technique. The material was characterized with elemental analysis (ICP-AES), thermal analysis (TGA, DSC), and FT-IR and Xray diffraction studies. The chemical resistivity of the material in various media was evaluated. ZrHEDP was further investigated for its possible use as an ion exchanger. The Na+ ion-exchange capacity (IEC) of the material was determined, and kinetics and thermodynamics of exchange for the metal ions Cu(II), Ni(II), Zn(II), and Mn(II) towards ZrHEDP were studied. The sorption of the metal ions follow the order Zn(II) > Cu(II) > Mn(II) approximate to Ni(II).

Keywords: Inorganic Ion Exchanger, Metal Phosphonate, Tetravalent Metal Acid Salt, Zirconium-Hydroxy Ethylidene Diphosphonate, Zr(IV) Phosphonate, Aqueous-Solution, Chemistry, Sorption, Removal, Temperature, Adsorption, Arsenate, Copper

# Title: Turkish Journal of Engineering and Environmental Sciences

Full Journal Title: [Turkish Journal of Engineering and Environmental Sciences](http://mistug.tubitak.gov.tr/bdyim/sayilar.php?dergi=muh)

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: Impact Factor

? Kaya, S. and Oner, M.D. (1995), Sorption characteristics of fresh Gaziantep cheese. *Turkish Journal of Engineering and Environmental Sciences*, **19** (3), 263-267.

Full Text: Tur J Eng Env Sci19, 263.pdf

Abstract: Water activity of Gaziantep cheese prepared in the laboratory was determined as 0.95 by using the Proximity Equilibration Cell (PEC) method. Moisture sorption isotherms were obtained at 12, 20 and 30°C. Guggenheim-Anderson-deBoer and Halsey equations were used to evaluate the sorption data, and parameter estimation was carried out. Both equations fit to the data and gave reasonably good results, indicating that they can be used to represent Moisture Sorption Isotherms of Gaziantep cheese. The effect of temperature on sorption isotherms was investigated, and the heat of sorption was calculated as 2.02 kcal/mol at 1 g/100 g moisture content using the Clausius-Clapeyron equation.

Keywords: Isotherms, Parameter Estimation, Proximity, Sorption, Sorption Characteristics, Temperature, Water

? Sağ, Y., Açikel, Ü., Aksu, Z. and Kutsal, T. (1998), Competitive biosorption of chromium(VI), iron(III) and copper(II) ions from binary metal mixtures by *R. arrhizus* and *C. vulgaris*. *Turkish Journal of Engineering and Environmental Sciences*, **22** (2), 145-154.

Full Text: [1998\Tur J Eng Env Sci22, 145.pdf](1998/Tur%20J%20Eng%20Env%20Sci22,%20145.pdf)

Abstract: In this study, the simultaneous adsorption process of Cr(VI), Fe(III) by R. arrhizus and C. vulgaris and Cu(II) in pairs of metal mixtures were investigated and compared to single component systems. The capabilities of the fungal and the algal biomass to bind two metals simultaneously in solution are shown as a function of pH, metal combinations and levels of metal concentration. The effects of the co-presence of Cr(VI)-Fe(III) and Cr(VI)-Cu(II) ions together in aquatic solutions on the biosorption of Cr(VI). Fe(III) and Cu(II) ions were investigated in terms of initial rates of biosorption and equilibrium metal removal. Optimum pH for the biosorption of Cr(VI) and Fe(III) was determined as 2.0 whereas higher biosorptive uptake of Cu(II) was obtained at pH 4.0. Since the initial biosorption rates and equilibrium metal removal decreased with increasing concentration of the accompanying metal ion, the interactive effects of Cr(VI)-Fe(III) and Cr(VI)-Cu(II) on both microorganisms were found to be antagonistic.

Keywords: Adsorption, Biomass, Biosorption, Competitive, Copper(II), Cr(VI), Cu(II), Equilibrium, Metal, Metals, pH, Removal, Solutions

? Özer, A. and Özer, D. (1998), The removal of nickel(II) ions by *Cladophora crispata* in a two-staged batch reactor. *Turkish Journal of Engineering and Environmental Sciences*, **22** (4), 305-313.

Full Text: [1998\Tur J Eng Env Sci22, 305.pdf](1998/Tur%20J%20Eng%20Env%20Sci22,%20305.pdf)

Abstract: The effects of adsorption conditions on the adsorption of nickel(II) ions to inactivated Cladophora crispata, a green algae, were investigated in an agitated batch reactor. The optimum initial pH, temperature, initial metal ion concentration and microorganism concentration were found to be 5.0, 25°C, 200 mg/L and 1.00 g/L, respectively. The Freundlich and Langmuir adsorption isotherms were developed at different initial pH and temperature values. It was observed that the experimental data fitted both the Freundlich and Langmuir isotherm models. Under optimum adsorption conditions, the adsorption of nickel(II) ions to C. crispota was investigated in a two-stage batch reactor. For different ratios of algae concentration (X0) to volume water containing nickel(II) (V0), the residual nickel(II) ion concentrations at the equilibrium were calculated from models developed using the isotherm constants. Then, the experimental values were compared with the theoretical values.

Keywords: Adsorption, Adsorption Isotherms, Equilibrium, Freundlich, Freundlich and Langmuir Adsorption Isotherms, Isotherm, Isotherms, Langmuir, Langmuir Isotherm, Metal, Microorganism, Models, pH, Removal, Temperature, Water

? Akçin, G. (2001), Biosorption of heavy metals by biomass. *Turkish Journal of Engineering and Environmental Sciences*, **25** (3), 143-152.

Full Text: [2001\Tur J Eng Env Sci25, 143.pdf](2001/Tur%20J%20Eng%20Env%20Sci25,%20143.pdf)

Abstract: Wetland plants are successfully used in the biosorption of heavy metals in natural and constructed wetlands. In this study, the removal of heavy metals by water hyacinth (Eichhornia crassipes (Mart.)Solms)) were investigated. The plants were grown under control in the Turkish climate. The biosorption was dependent on factors such as metal concentration, constant temperature, pH and relative moisture. The plants were exposed to different metal concentrations of Chromium(III), Chromium(VI) and Copper(II) in the flow rate system. Water hyacinths are able to remove Chromium(III), Chromium(VI) and Copper(II) rapidly from the aqueous system by root biosorption, but Chromium(VI) in a low concentration had higher biosorption in leaves than in roots. Water hyacinth may be a good indicator because of these properties. Also in this study, regular and irregular periods of heavy metal biosorption were investigated.

Keywords: Aqueous, Biosorption, Biosorption of Heavy Metals, Chromium(VI), Copper(II), Heavy Metal, Heavy Metals, Metal, Metals, pH, Removal, System, Temperature, Water, Wetlands

? Oladoja, N., Aboluwoye, C. and Oladimeji, Y. (2008), Kinetics and isotherm studies on methylene blue adsorption onto ground palm kernel coat. *Turkish Journal of Engineering and Environmental Sciences*, **32** (5), 303-312.

Full Text: [2008\Tur J Eng Env Sci32, 303.pdf](2008/Tur%20J%20Eng%20Env%20Sci32,%20303.pdf)

Abstract: Palm kernel coat (PKC) was collected from an oil palm seed processing factory and the residual oil on the PKC was removed by saponification. The ability of the PKC to remove Methylene Blue (MB), a basic dye from waste stream, was studied by the method of continuous variation of 2 process variables: Initial MB concentration (mg/l) and PKC dosage (g/l). The amount of MB sorbed per gram of PKC (q(t) mg/g) increased with increasing initial MB concentration while a reverse trend was observed when the PKC dosage was increased. The experimental data were fitted into the following kinetic models: Lagergren pseudo-first order, the chemisorptions pseudo-second order, Elovich kinetic model, and the intraparticle diffusion model. It was observed that chemisorptions pseudo-second order kinetic model described the Sorption process with high coefficients of determination (r(2)) better than any other kinetic models. The equilibrium isotherms, for the sorption of MB oil PKC, were analyzed using 3 widely used isotherm models (Langmuir, Freundlich, and Temkin isotherm models). Error analysis, using the linear correlation coefficient’s (r(2)), showed that the Langmuir isotherm best fits the MB adsorption data on PKC. The monolayer coverage capacity of the PKC, obtained from the Langmuir isotherm studies, was 277.77 mg/g. Thermodynamics showed that the adsorption of MB on PKC was most favorable and spontaneous.

Keywords: Adsorption, Basic Dye, Capacity, Coverage, Diffusion, Dye, Elovich, Elovich Kinetic Model, Equilibrium, Freundlich, Intraparticle Diffusion, Isotherm, Isotherms, Kinetic, Kinetic Models, Kinetics, Langmuir, Langmuir Isotherm, Models, Monolayer Coverage, Pseudo Second Order, Pseudo-First Order, Pseudo-Second Order, Pseudo-Second-Order, Sorption, Temkin Isotherm, Thermodynamics

? Oladoja, N.A., Asia, I.O., Aboluwoye, C.O., Oladimeji, Y.B. and Ashogbon, A.O. (2008), Studies on the sorption of basic dye by rubber (Hevea brasiliensis) seed shell. *Turkish Journal of Engineering and Environmental Sciences*, **32** (3), 143-152.

Full Text: [2008\Tur J Eng Env Sci32, 143.pdf](2008/Tur%20J%20Eng%20Env%20Sci32,%20143.pdf)

Abstract: The present study investigated the ability of rubber seed shell (RSS) to abstract methylene blue (MB) from aqueous solution. The process of sorption of methylene blue from solution was analysed using 5 different isotherm models (Langmuir, Freundlich, Temkin, Harkins-Jura, and Halsey isotherm equations). The highest, values of r(2) were obtained when the experimental data were fitted into Freundlich and Halsey isotherm equations (0.999). The RSS/MB system was found to be affected by the sorbent dose and initial (lye solution. The kinetic data showed that the sorption capacity of RSS for the dye increased with increasing initial dye concentration, while a reverse trend was observed when the effect of sorbent dosage was, studied. Analysis of the data obtained from the different sorption studies revealed that the data fitted better to the pseudo-second order model than any other kinetic model, indicating that the sorption process will include chemisorptions of methylene blue dye on rubber seed shell.

Keywords: Abstract, Aqueous, Basic Dye, Capacity, Dye, Freundlich, Isotherm, Kinetic, Langmuir, Methylene Blue, Models, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Sorption, System

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? Aysan, E., Koroglu, G., Turkeli, V., Ozgonul, A., Ozyasar, A., Gulumser, C., Kilic, K., Erturk, T., Ozdemir, O., Alpaslan, A.H. and Bayrak, S. (2008), Resident physicians in Turkey: Results of a survey of 1069 residents from 11 provinces. *Turkish Journal of Medical Sciences*, **38** (1), 35-42.

Full Text: [2008\Tur J Med Sci38, 35.pdf](2008/Tur%20J%20Med%20Sci38,%2035.pdf)

Abstract: Aims: To determine the problems, expectations and objectives of resident physicians in Turkey and to provide a contribution to the development and amendment of the residency program. Background: Residency varies considerably in accordance with factors like teaching staff, the institution and government policies. If characteristics, problems, expectations and objectives of resident physicians are stated and known, development and amendment of residency programs will be both easier and faster. Materials and Methods: A 50-question survey was completed by a randomly selected 1069 resident physicians from 15 university and 12 teaching hospitals in 11 provinces (Istanbul-503, Ankara-116, lzmir-86, Erzurum-71, Sivas-60, Bolu-49, Bursa-49, Sanliurfa-46, Trabzon-38, Kocaeli-32, Van-20). The male/female ratio of the participants was 1.53, their mean age was 28.37 years (range, 23-48 years) and mean duration of residency was 19.7 months (1-66 months). Results: 83% of the participants were content with their current medical branch selection. The most common reason for preference of residency training was job satisfaction (80%). 84% of the participants had personal computers, 69% had personal internet connection and 90% had an e-mail address. 44% of them connected to the internet daily and 26% connected every other day. Knowledge of a foreign language was in English in 97%, and 5.6% of the assistants achieved competency in official examinations for their foreign language level. Regular departmental teaching meetings were reported by 78% of the participants, whereas 16% reported having no teaching meetings. The duration of the meetings was 1-2 hours per week in 53%, 3-4 hours per week in 34% and more than 4 hours in 13% of the hospitals. 67% of the resident physicians considered that the theoretical education level to be inadequate, whereas 33% considered the practical training inadequate. While 28% of the resident physicians were being evaluated by written examinations, 18% were evaluated orally, and 38% were never evaluated. 23% had no knowledge of Medline, 82% had no knowledge of Science Citation Index Expanded and 65% did not know how to prepare a specialty dissertation. 65% of them reviewed Medline at least once. 58% of them did not have any scientific publication, and only 3% had at least 10 scientific publications. 56% of them suggested that the duration of residency was adequate and 36% thought that it was long. 37% reported that the training during rotations in other sections was inadequate. 61% of junior residents reported having no communication problem with seniors and 65% of senior residents reported no communication problem with juniors. The most common complaints during training periods were excessive workload (56%), excessive number of on-duty shifts (45%), and economic problems (44%). When future objectives were considered, 30% wanted to work in private enterprise, 29% wanted an academic career, 22% wanted to work on their own and 19% wanted to work abroad. Conclusions: The percentage of residents with technological accessibility and use was relatively high, but reserved training time was low. Evaluation of education was low as well. Rotations of sections were not effective. Moreover, there were additional complaints like workload, on-duty shifts and economic difficulties. In conclusion, theoretical and practical information, competency in foreign languages and the number of scientific publications were not adequate. To prolong the duration of residency might increase displeasure and decrease motivation. More effective use of time by trainers might constitute a better approach.

Keywords: Career, Characteristics, Citation, Communication, Competency, Contribution, Development, Doctor, Economic, Education, English, Evaluation, Knowledge, Language, Medical, Medicine, Medline, Physician, Publication, Publications, Questionnaire, Resident, Residents, Science, Science Citation Index, Scientific Publication, Scientific Publications, Selection, Surgical Residents, Survey, Training, Turkey, University

? Çalik, Ş. and Gökengin, A.D. (2011), Human brucellosis in Turkey: A review of the literature between 1990 and 2009. *Turkish Journal of Medical Sciences*, **41** (3), 549-555.

Full Text: [2011\Tur J Med Sci41, 549.pdf](2011/Tur%20J%20Med%20Sci41,%20549.pdf)

Abstract: Aim: Brucellosis is a systemic infection, which may involve any organ or system of the body. The aim of this study was a review of the literature related to human brucellosis in Turkey. Materials and methods: In order to find the published reports on this subject, 3 national databases (TUBITAK-ULAKBIM Turkish Medical Literature database, http://www.turkishmedline.com, http://medline.pleksus.com.tr) and 2 international databases [Index Medicus and Science Citation Index (SCI)-expanded] were searched. In addition to the databases, abstracts of congresses held by the Turkish Clinical Microbiology and Infectious Diseases Association and the Antibiotic and Chemotherapy Association were searched for reports about brucellosis. Results: The most frequent type of involvement was osteoarticular, followed by hematological abnormalities and nervous system involvement. Conclusion: Brucellosis may present with a broad spectrum of clinical signs and symptoms. Primary health care physicians should be aware of the different clinical presentations of brucellosis.

Keywords: Brucella Infection, Brucellosis, Citation, Complications, Databases, Diagnosis, Health Care, Involvement, Involvement, Literature, Neurobrucellosis, Review, SCI, Science Citation Index, Turkey

? Tasbakan, M.I., Pullukcu, H., Sipahi, O.R., Yamazhan, T., Arda, B. and Ulusoy, S. (2011), A pooled analysis of the resistance patterns of Escherichia coli strains isolated from urine cultures in Turkey: A comparison of the periods 1997-2001 and 2002-2007. *Turkish Journal of Medical Sciences*, **41** (3), 557-564.

Full Text: [2011\Tur J Med Sci41, 557.pdf](2011/Tur%20J%20Med%20Sci41,%20557.pdf)

Abstract: Aim: To compare the resistance patterns of Escherichia colt strains reported to be isolated from urine cultures in published medical literature from Turkey in 1997-2001 and 2002-September 2007. Materials and methods: To find the published series, 3 national databases (Ulakbim Turkish Medical Literature database, http://www.turkishmedline.com, http://medline.pleksus.com.tr), and 2 international databases (Pubmed and Science Citation Index (SCI)) were searched. Results: Data for 25,577 E. colt strains were obtained from 53 articles (28 articles from 1997-2001,25 from 2002-2007). Of these strains 18,106 were isolated from outpatients, whereas 7471 were from inpatients. When the strains isolated from outpatients were evaluated, there was a significant increase in the ciprofloxacin resistance, whereas there was a significant decrease in amikacin, netilmicin, and co-trimoxazole resistance (P < 0.05). When the data of hospitalized patients were analyzed, there was significant decrease in amikacin, gentamicin, netilmicin, co-trimoxazole, and amoxicillin/clavulanate resistance, whereas a significant increase was observed in nitrofurantoin resistance (P < 0.05). The ESBL rate increased in both the inpatients and outpatients (P < 0.05). Conclusion: When looked at from Turkey's perspective, our data suggest that aminoglycosides and third-generation cephalosporins may be good choices in the treatment of inpatients. Fosfomycin/tromethamine, nitrofurantoin, and oral third-generation cephalosporins may be reasonable alternatives in the empirical treatment of uncomplicated outpatient cases. Policies to constrain resistance in both the community, and hospitals, such as antibiotic stewardship or restriction programs, should be implemented immediately.

Keywords: Antibiotic-Resistance, Antimicrobial Susceptibility, Ciprofloxacin, Citation, Databases, E.coli, Fosfomycin, In-Vitro Susceptibility, Literature, Medical, Pathogens, Pyelonephritis, SCI, Science Citation Index, Spectrum-Beta-Lactamases, Tract-Infections, Trimethoprim-Sulfamethoxazole, Turkey, Urinary Tract Infections

? Onat, A. (2011), A quantitative appraisal of the genuine contribution of Turkey and Turkish universities to science. *Turkish Journal of Medical Sciences*, **41** (5), 909-917.

Full Text: [2011\Tur J Med Sci41, 909.pdf](2011/Tur%20J%20Med%20Sci41,%20909.pdf)

Abstract: Aim: To assess quantitatively the cumulative and genuine contribution of Turkish universities to science in the main fields over the past 30 years. Materials and methods: In the Citation Reports section of the Web of Science, over 70 main scientific institutions were searched; and publications that received 60 or more citations by May 2010 were selected. Papers having more than a minor share by international authors were excluded. Results: Only 47 universities and 6 institutions generated articles that were cited >= 60 times. These publications, numbering 541, received a total of 51.215 citations. Eight universities (Istanbul University, Istanbul Technical University, Hacettepe University, Bilkent University, Middle-East Technical University, Bogazici University, Ankara University, and Ege University) acquired 62% of these citations. Primary authors were 335 individuals among whom 121 generated 70% of these citations. It is estimated that Turkish scientists produce about 1 per mil of the global scientific output, which indicates that about 40 such papers are produced annually in Turkey. A substantial variance was recorded across major universities in terms of the ratio of citations to highly-cited papers to the total citations. Engineering and geology had higher relative contributions, followed by agricultural sciences, ecology, pharmacy, chemistry and medicine, while physics, mathematics, and biology had less contributions. Conclusion: Along with research in general, research potentially to contribute to science needs specifically to be supported with a coherence, milieu creation and consistent long-term policy.

Keywords: Authors, Biology, Citation, Citations, Contribution, Contribution to Science, Fields of Science, Highly-Cited, Impact, Medicine, Papers, Pharmacy, Policy, Primary, Publications, Quantitative, Ratio, Research, Science, Sciences, Scientific Institutions, Scientific Output, Turkey, Turkish Universities, University, Web of Science

# Title: Turkiye Klinikleri Tip Bilimleri Dergisi

Full Journal Title: Turkiye Klinikleri Tip Bilimleri Dergisi

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ozgen, U., Egri, M., Aktas, M., Sandikkaya, A., Ozturk, O.F., Can, S. and Ozcan, C. (2011), Publication pattern of Turkish medical theses: Analysis of 22.625 medical theses completed in years 1980-2005. *Turkiye Klinikleri Tip Bilimleri Dergisi*, **31** (5), 1122-1131.

Full Text: [2011\Tur Kli Tip Bil Der31, 1122.pdf](2011/Tur%20Kli%20Tip%20Bil%20Der31,%201122.pdf)

Abstract: Objective: The objective of this study was to determine the conversion rates of Turkish residency theses to scientific articles. Material and Methods: 22.625 residency theses written at 28 university hospitals, nine state hospitals and two military hospitals’ residency programmes and recorded at the web of National Thesis Center were searched through Web of Science in order to evaluate their publication pattern in SCI-expanded journals in 1980-2005. Results: The number of published thesis at SCI expanded journals was found to be 1397 (6.2%) with the median number of citations received per paper ranging from 0.3 to 5.0. Publication percentage was highest for theses written at military hospitals and lowest for those written at state hospitals. Conclusion: Percentage of published thesis in Turkey is lower when compared to the remaining European Countries. Therefore, we need alternative practices to use our manpower, time and financial resources more effectively. The first alternative is to put an end to the obligation to write thesis in order to complete residency training in some types of hospitals or to convert this obligation to an option. Another alternative is to establish a National Thesis Advisory Center and make it essential to get approval from this center in order to conduct a thesis project.

Keywords: Academic Dissertations, Alternative, Citations, Education, Graduate, Hospitals, Journals, Medical, Methods, Publication, Publications, Residency, School, SCI, Science, Students, Thesis, Training, Turkey, University, Web of Science, Write

# Title: Turrialba

Full Journal Title: Turrialba

ISO Abbreviated Title: Turrialba

JCR Abbreviated Title: Turrialba

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Vanderde, J., Pino, N.I. and Baert, L. (1995), Kinetics of phosphate adsorption in a soil derived from volcanic ash. *Turrialba*, **23** (3), 291-296.

# Title: Tydskrif Vir Letterkunde

Full Journal Title: Tydskrif Vir Letterkunde

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? John, P. (2010), D. P. M. Botes, Marcel Duchamp, the avant-garde and a literary definition of plagiarism. *Tydskrif Vir Letterkunde*, **47** (2), 48-58.

Full Text: [2010\Tyd Vir Let47, 48.pdf](2010/Tyd%20Vir%20Let47,%2048.pdf)

Abstract: This article attempts to widen the literary critical perspective on plagiarism by focussing on an early example of plagiarism in Afrikaans literature associated with the name of D.P.M. Bates and the little magazine Worm. Botes’s supposed plagiarism is placed in the framework of the European avant-garde by comparing it with Marcel Duchamp’s Fountain of 1917. This comparison forms the basis on which other instances of plagiarism in Afrikaans are commented on, as well as on which a ‘literary’ definition of plagiarism is advanced.

Keywords: Avant-Garde, D.P.M. Bates, Literature, Marcel Duchamp, Plagiarism

# Title: Ugeskrift for Laeger

Full Journal Title: Ugeskrift for Laeger

ISO Abbreviated Title:

JCR Abbreviated Title: Ugeskr Laeger

ISSN: 0041-5782 (Print), 1603-6824 (Electronic)

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Nilsson, L.B., Jensen, T.U., Skovgaard, L.T. and Viby-Mogensen, J. (2001), Research in Danish departments of anesthesiology at the turn of the century. A bibliometric analysis. *Ugeskrift for Laeger*, **163** (44), 6121-6127.

Abstract: INTRODUCTION: This investigation was based on the surmise that the scientific activity in the specialty of anaesthesiology and intensive care medicine in Denmark is declining. MATERIAL AND METHODS: A quantitative and qualitative analysis of the development in Danish anaesthesiological research during the seven-year period of 1992-1998 was performed with bibliometrical methods and a count of the PhD and doctoral theses produced by Danish anaesthesiologists during that period. RESULTS: In the period investigated, a total of 906 scientific articles were published, of which 749 (83%) originated from university hospitals. Total production decreased by 15% between the two-year periods of 1992-1993 and 1997-1998, whereas the output from university hospitals alone decreased by 10%. The number of scientific publications per anaesthesiologist decreased by 34%, corresponding to 6.7% per year. The quality of the research published, as examined by the cumulative and average impact, showed a slight increase. The number of PhD and doctoral theses per year showed no change. DISCUSSION: Research activity in Danish anaesthesiology is declining, and the specialty seems to be losing scientific ground, both nationally and internationally.

Keywords: Anaesthesiology, Analysis, Anesthesiology, Bibliometric, Care, Cumulative, Denmark, Development, Hospitals, Impact, Intensive Care, Investigation, Medicine, Methods, Publications, Qualitative, Qualitative Analysis, Quality, Quality of, Research, Scientific Publications, Specialty, University

# Title: Ukrainian Journal of Physical Optics

Full Journal Title: [Ukrainian Journal of Physical Optics](http://www.ifo.lviv.ua/journal/index.html)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Vlokh, R.O. (2010), Bibliometric and statistical analyses of Ukrainian scientific journals. Physics journals. *Ukrainian Journal of Physical Optics*, **11**, S11-S25.

Full Text: [2010\Ukr J Phy Opt11, S11.pdf](2010/Ukr%20J%20Phy%20Opt11,%20S11.pdf)

Abstract: The present work is devoted to evaluation of the Ukrainian physics journals on the basis of Pareto distribution and a comparison of the present situation with that occurring five years ago. It is shown that about 20 journals may be qualified as principal ones, though the total number of the corresponding editions is equal to 63. The criteria for evaluation of Ukrainian scientific journals are formulated.

Keywords: Bibliometric, Bibliometry, Comparison, Evaluation, Impact Factor, Journals, Science, Science Citation Analysis, Scientific Journals, Ukrainian Physics Journals

# Title: Ukrainskii Khimicheskii Zhurnal

Full Journal Title: Ukrainskii Khimicheskii Zhurnal

ISO Abbreviated Title:

JCR Abbreviated Title: Ukr Khim Zh

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Loshkare, Y.M., Malaya, R.V. and Snetkova, L.P. (1971), Kinetics of cadmium electrodeposition and adsorption phenomena. *Ukrainskii Khimicheskii Zhurnal*, **37** (12), 1231-??.

? Oshkare, Y.M., Snetkova, L.P. and Malaya, R.V. (1972), Kinetics of cadmium electrodeposition and adsorption phenomena. *Ukrainskii Khimicheskii Zhurnal*, **38** (1), 38-??.

? Nazarok, V.I., Shmelev, A.S., Evseeva, D.I. and Galich, P.N. (1974), Diffusion kinetics of adsorption in systems with Langmuir isotherm. *Ukrainskii Khimicheskii Zhurnal*, **40** (6), 613-617.

? Kakaulina, T.N., Levchenko, T.M. and Koganovskii, A.M. (1976), Kinetics of organic matters adsorption from aqueous-solutions by active anthracites of different porous structure. *Ukrainskii Khimicheskii Zhurnal*, **42** (8), 873-874.

? Antonov, S.P., Gorodyskij, A.V. and Morozenko, E.S. (1976), Kinetics of contact exchange of metals with adsorption of organic matters. *Ukrainskii Khimicheskii Zhurnal*, **42** (11), 1123-1126.

? Zolotarev, P.P. and Marutovskij, R.M. (1977), Kinetics equations of 2 substances mixture adsorption for adsorbents with biporous structure. *Ukrainskii Khimicheskii Zhurnal*, **43** (6), 612-613.

? Koganovskij, A.M., Timoshenko, M.N., Grishchenko, A.E., Marutovskij, R.M. and Roda, I.G. (1977), Kinetics of adsorption from solutions by fine-grained active carbons. *Ukrainskii Khimicheskii Zhurnal*, **43** (7), 693-698.

? Goroshchenko, J.G., Soliev, L., Savchenko, L.T. and Mardanenko, V.K. (1977), Structure of phase complex of solution isotherm 100-degrees of Na+, K+, Mg2+ parallel to SO42-, Cl--H2O system. *Ukrainskii Khimicheskii Zhurnal*, **43** (12), 1277-1280.

? Gasanova, K.G. and Abduragimova, R.A. (1978), Isotherm of solubility of KVO3-K2SO4-K3PO4-H2O system at 35 and 60-degrees. *Ukrainskii Khimicheskii Zhurnal*, **44** (2), 158-163.

? Larina, A.A. and Alejnikov, V.G. (1978), Effect of reaction participants adsorption by oxidized coals on kinetic characteristic of sucrose inversion process. *Ukrainskii Khimicheskii Zhurnal*, **44** (5), 498-502.

? Litsov, N.I., Nikolaevskaja, V.I. and Kachan, A.A. (1978), Effect of medium reaction on kinetics and mechanism of methylene-blue adsorption on silicon dioxides. *Ukrainskii Khimicheskii Zhurnal*, **44** (12), 1275-1277.

? Rudenko, V.M. and Tarasevich, Y.I. (1979), Kinetics of aceton and dioxane adsorption by montmorillonite. *Ukrainskii Khimicheskii Zhurnal*, **45** (6), 528-530.

? Roda, I.G., Timoshenko, M.N. and Marutovsky, R.M. (1979), Adsorption of soluble substances by activated charcoal in the apparatus with intermixing (external diffusion mass exchange). *Ukrainskii Khimicheskii Zhurnal*, **45** (7), 603-609.

Keywords: Adsorption, Diffusion

# Title: Ultrapure Water

Full Journal Title: [Ultrapure Water](http://ultrapurewater.com/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Bigwood, M. (2004), Trends in high-purity water research: A bibliometric patent review. *Ultrapure Water*, **21** (1), 24-29.

Full Text: 2004\Ult Wat21, 24.pdf

# Title: Ultrasonics Sonochemistry

Full Journal Title: [Ultrasonics Sonochemistry](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5551&_auth=y&_acct=C000053193&_version=1&_urlVersion=0&_userid=1495547&md5=1bb8f11130b2ebe4e328f17d3238d84c)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Breitbach, M. and Bathen, D. (2001), Influence of ultrasound on adsorption processes. *Ultrasonics Sonochemistry*, **8** (3), 277-283.

Full Text: [2001\Ult Son8, 277.pdf](2001/Ult%20Son8,%20277.pdf)

Abstract: One of the most popular means for removal of organic water pollutants found in small concentrations is by adsorption. An important step in adsorption processes is the regeneration of the adsorbent as it does not only affect the adsorption–desorption cycle but also the expenses of the following process steps. State of the art regeneration of adsorbent resins is done by chemical methods. These require the use of organic solvents or inorganic chemicals and involve a difficult secondary separation step. Therefore, industry seeks for alternative methods to regenerate exhausted adsorbents. One of the discussed regeneration methods is desorption by ultrasound.

Ultrasound does not only promote desorption but also enhances the mass transfer of sorption processes. We discuss the arising problems and basic effects when applying ultrasound during sorption processes in order to show the potentials of this desorption process. The focus is laid in particular on the influence of ultrasound frequency and intensity.

Keywords: Adsorption, Desorption, Ultrasound, Mass Transfer, Intensity, Frequency

? Hamdaoui, O., Naffrechoux, E., Tifouti, L. and Pétrier, C. (2003), Effects of ultrasound on adsorption–desorption of p-chlorophenol on granular activated carbon. *Ultrasonics Sonochemistry*, **10** (2), 109-114.

Full Text: [2003\Ult Son10, 109.pdf](2003/Ult%20Son10,%20109.pdf)

Abstract: The aim of this work is the evaluation of the effects of ultrasound on p-chlorophenol adsorption–desorption on granular activated carbon. Adsorption equilibrium experiments and batch kinetics studies were carried out in the presence and the absence of ultrasound at 21 kHz. Results indicate that the adsorption of p-chlorophenol determined in the presence of ultrasound is lower than the adsorption observed in the absence of ultrasound. Desorption of p-chlorophenol from activated carbon with and without the application of ultrasound was studied. The desorption rates were favoured by increased ultrasound intensity. This rise is more noticeable as temperature increases. The addition of ethanol or NaOH to the system causes an enhancement of the amount of p-chlorophenol desorbed, especially in the presence of ultrasound. A synergetic enhancement of the desorption rate was observed when ultrasonic irradiation was coupled with ethanol chemical regeneration.

Keywords: Ultrasound, Adsorption, Desorption, Activated Carbon, P-Chlorophenol

? Entezari, M.H. and Pétrier, C. (2005), A combination of ultrasound and oxidative enzyme: sono-enzyme degradation of phenols in a mixture. *Ultrasonics Sonochemistry*, **12** (4), 283-288.

Full Text: [2005\Ult Son12, 283.pdf](2005/Ult%20Son12,%20283.pdf)

Abstract: Sono-degradation and sono-enzyme degradation of phenols were performed on the mixtures of double compounds (phenol, p-chlorophenol; phenol, p-cresol; phenol, p-nitrophenol; and p-chlorophenol, p-cresol) in aqueous medium. Sono-degradation of phenol and its substituted compounds individually behaved approximately the same, but in the case of mixture behaved differently. Sonodegradation of substituted phenols was easier than phenol in a mixture, but there was an exception in the combination of phenol and p-nitrophenol that the degradation of phenol was faster than substituted compound. This behavior was the same in sono-enzyme degradation, but with higher degradation rate. Between these mixtures, the combination of phenol and p-cresol presented a significant different behavior in case of single and double compounds solutions. In this system, the sono-degradation of phenol in mixture was more difficult than phenol alone but, the sono-degradation of p-cresol in mixture was easier in comparison with p-cresol alone. In sono-enzyme degradation, p-cresol as a more reactive compound facilitated the remove of phenol in mixture in compare of the individual case. (C) 2004 Elsevier B.V. All rights reserved.

Keywords: Sono-Degradation, Sono-Enzyme Degradation, Horseradish Peroxidase, Phenol, P-Cresol, P-Chlorophenol, P-Nitrophenol, Sonochemical Reactions, Horseradish-Peroxidase, Waste-Water, Frequency, Removal

? Bernardo, E.C., Fukuta, T., Fujita, T., Ona, E.P., Kojima, Y. and Matsuda, H. (2006), Enhancement of saccharin removal from aqueous solution by activated carbon adsorption with ultrasonic treatment. *Ultrasonics Sonochemistry*, **13** (1), 13-18.

Full Text: [2006\Ult Son13, 13.pdf](2006/Ult%20Son13,%2013.pdf)

Abstract: This study investigates the use of ultrasonication as a pretreatment process and its effect on the adsorption characteristics of saccharin onto activated carbon (AC). Ultrasonic decomposition of saccharin was performed at a frequency of 500 kHz under argon and O2/N2 (20/80 vol%) atmospheres. Adsorption was carried out using a commercial activated carbon. The behavior of total organic carbon (TOC) during ultrasonication was investigated. Saccharin removal after 180 min of ultrasonication under Ar and O2/N2 atmospheres are 38% and 26%, respectively, while the amount of saccharin removed by activated carbon adsorption without US pretreatment is 40% after 16 h. After 16 h of AC adsorption with 180 min of ultrasonic pretreatment under Ar and O2/N2 atmospheres, both removal ratios increased to 75%. These results indicated that the pretreatment of sonication under O2/N2 leads to the increase in the amount of saccharin adsorbed on AC. On the other hand, the TOC removal by decomposition by ultrasound is not more than 5% in both Ar and O2/N2 atmospheres after 180 min ultrasonication. However, the TOC removal increased to 54% and 69% after 16 h of adsorption of saccharin pretreated by ultrasonication for 180 min under Ar and O2/N2 atmospheres, respectively. About 13% and 16% TOC removal in Ar and in O2/N2, respectively, were achieved due to adsorption of the by-products. It is considered that the improvement in TOC removal is also brought about by the formation of the by-products that were adsorbed onto AC.

Keywords: Ultrasonication, Adsorption, Saccharin, Total organic carbon, Adsorption capacity

? Entezari, M.H., Mostafai, M. and Sarafraz-Yazdi, A. (2006), A combination of ultrasound and a bio-catalyst: removal of 2-chlorophenol from aqueous solution. *Ultrasonics Sonochemistry*, **13** (1), 37-41.

Full Text: [2006\Ult Son13, 37.pdf](2006/Ult%20Son13,%2037.pdf)

Abstract: Phenolic compounds have become a cause for worldwide concern due to their persistence, toxicity and health risks. This paper reports a three-step approach to remove 2-chlorophenol from dilute aqueous solution and compares each technique. The first step utilizes Horse Radish Peroxidase (HRP) in presence of hydrogen peroxide to oxidize this organic pollutant (enzyme treatment). For a more efficient removal of 2-chlorophenol, it is necessary to add the enzyme solution gradually to the contents of the reactor instead of rapid addition. The second step, involving ultrasonic waves eliminated 2-chlorophenol through hydroxyl radical generated by the cavitation process (sono-degradation). In the third step, a combination of ultrasonic waves and enzyme was used (sono-enzyme degradation). It should be mentioned that, the enzyme can be active in the presence of ultrasonic waves under the proper sonication. The degradation has been studied at different temperatures, intensities of irradiation, and concentrations of enzyme. The rate of degradation exhibited pseudo-first order behavior and the combination method was more effective than sonolysis and enzyme treatment individually. (c) 2004 Elsevier B.V. All rights reserved.

Keywords: 2-Chlorophenol, Cavitation, Horseradish Peroxides, Sonolysis, Degradation, Sonochemical Degradation, Phenol, Trichloroethylene, Chlorobenzene, Decomposition, Kinetics, Water

? Juang, R.S., Lin, S.H. and Cheng, C.H. (2006), Liquid-phase adsorption and desorption of phenol onto activated carbons with ultrasound. *Ultrasonics Sonochemistry*, **13** (3), 251-260.

Full Text: [2006\Ult Son13, 251.pdf](2006/Ult%20Son13,%20251.pdf)

Abstract: The effect of 48-kHz ultrasound on the adsorption and desorption of phenol from aqueous solutions onto coconut shell-based granular activated carbons was studied at 25 °C. Experiments were performed at different carbon particle sizes (1.15, 2.5, 4.0 mm), initial phenol concentrations (1.06–10.6 mol/m3), and ultrasonic powers (46–133 W). Regardless of the absence and presence of ultrasound, the adsorption isotherms were well obeyed by the Langmuir equation. When ultrasound was applied in the whole dsorption process, the adsorption capacity decreased but the Langmuir constant increased with increasing ultrasonic power. According to the analysis of kinetic data by the Elovich equation, it was shown that the initial rate of adsorption was enhanced after sonication and the number of sites available for adsorption was reduced. The effect of ultrasonic intensity on the initial rate and final amount of desorption of phenol from the loaded carbons using 0.1 mol/dm3 of NaOH were also evaluated and compared.

Keywords: Ultrasound, Adsorption, Desorption, Activated carbons, Phenol

? Entezari, M.H. and Al-Hoseini, Z.S. (2007), Sono-sorption as a new method for the removal of methylene blue from aqueous solution. *Ultrasonics Sonochemistry*, **14** (5), 599-604.

Full Text: [2007\Ult Son14, 599.pdf](2007/Ult%20Son14,%20599.pdf)

Abstract: The sorption of methylene blue as a basic dye onto cellulosic materials such as waste newspaper was examined kinetically in the presence of ultrasound (sono-sorption) and in its absence (conventional method). The effects of various experimental parameters such as the amount of sorbent, type of cellulosic sorbents, initial dye concentration, temperature, and contact time have been investigated using a batch sorption technique. The information obtained can be used for treating effluents from the dye industry which deals with this kind of dye. The results show that as the amount of sorbent is increased, the dye removal in conventional method increases accordingly. In case of sono-sorption, it was stopped at specific amount of sorbent. More than 98% removal of the dye could be achieved in a very short period of time of sonication with respect to the conventional method. This behavior is related to the cavitation process which facilitates the removal of dye from aqueous solution. The method mentioned could be employed as a low cost alternative to the commercial activated carbon currently used in wastewater treatment for the removal of dyes.

Keywords: Sono-Sorption, Methylene Blue, Cellulosic Materials, Cavitation

? Entezari, M.H., Al-Hoseini, Z.S. and Ashraf, N. (2008), Fast and efficient removal of Reactive Black 5 from aqueous solution by a combined method of ultrasound and sorption process. *Ultrasonics Sonochemistry*, **15** (4), 433-437.

Full Text: [2008\Ult Son15, 433.pdf](2008/Ult%20Son15,%20433.pdf)

Abstract: Removal of Reactive Black 5 (RB5) from aqueous solutions was carried by the sorption process in the presence and in the absence of ultrasound. Sorption of the dye on the solid phase was investigated in a series of batch sorption experiments to determine the influence of different parameters such as contact time, amount of sorbent and concentration of pollutant on the removal efficiency of RB5 with and without ultrasound. The experimental data were fitted properly to the Freundlich model and the isotherm constants were 28.2 and 7.4 for k(f) and 0.13 and 0.38 for lln in the presence and in the absence of ultrasound (20 kHz) respectively. The data were analyzed with different sorption kinetic models and were better fitted with a pseudo-second-order kinetic model. Two ultrasonic generators at 20 and 500 kHz were used for sonication of the system. This investigation also reveals that RB5 can be removed by higher frequency apparatus (500 kHz) without sorbent in about 60 min sonication. The rate of removal was higher at the higher frequency than at the lower one. (c) 2007 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Adsorption, Aqueous Solution, Aqueous Solutions, Azo-Dye, Black 5, Decolorization, Dye, Efficiency, Experimental, Experiments, Frequency, Freundlich, Freundlich Model, Investigation, Isotherm, Kinetic, Kinetic Models, Methylene-Blue, Mineralization, Model, Models, Reactive Black 5, Removal, Removal Efficiency, Rights, Solution, Sonication, Sonochemical Degradation, Sorption, Sorption Process, Ultrasonic, Ultrasound

? Li, M., Li, J.T. and Sun, H.W. (2008), Decolorizing of azo dye Reactive red 24 aqueous solution using exfoliated graphite and H2O2 under ultrasound irradiation. *Ultrasonics Sonochemistry*, **15** (5), 717-723.

Full Text: [2008\Ult Son15, 717.pdf](2008/Ult%20Son15,%20717.pdf)

Abstract: At its natural pH (6.95), the decolorization of Reactive red 24 in ultrasound, ultrasound/H2O2, exfoliated graphite, ultrasound/exfoliated graphite, exfoliated graphite/H2O2 and ultrasound/exfoliated graphite/H2O2 systems were compared. An enhancement was observed for the decolorization in ultrasound/exfoliated graphite/H2O2 system. The effect of solution pH, H2O2 and exfoliated graphite dosages, and temperature on the decolorization of Reactive red 24 was investigated. The sonochemical treatment in combination with exfoliated graphite/H2O2 showed a synergistic effect for the decolorization of Reactive red 24. The results indicated that under proper conditions, there was a possibility to remove Reactive red 24 very efficient from aqueous solution. The decolorization of other azo dyes (Reactive red 2, Methyl orange, Acid red 1, Acid red 73, Acid red 249, Acid orange 7, Acid blue 113, Acid brown 75, Acid green 20, Acid yellow 42, Acid mordant brown 33, Acid mordant yellow 10 and Direct green 1) was also investigated, at their natural pH. (C) 2007 Elsevier B.V. All rights reserved.

Keywords: Acid, Aqueous, Azo Dye, Decolorization, Degradation, Dye, Dyes, Elsevier, Exfoliated Graphite, H2O2, Oxidation, pH, Sorption, System, Temperature, Treatment, Ultrasound, Wastewater

? Milenković, D.D., Dašić, P.V. and Veljković, V.B. (2009), Ultrasound-assisted adsorption of copper(II) ions on hazelnut shell activated carbon. *Ultrasonics Sonochemistry*, **16** (4), 557-563.

Full Text: [2009\Ult Son16, 557.pdf](2009/Ult%20Son16,%20557.pdf)

Abstract: The present study was aimed to removal of Cu(II) ions from aqueous solution by ultrasound-assisted adsorption onto the granular activated carbon obtained from hazelnut shells. The attention was focused on modeling the equilibrium and kinetics of Cu(II) adsorption onto the granular activated carbon. The granular activated carbon was prepared from ground dried hazelnut shells by simultaneous carbonization and activation by water steam at 950°C for 2 h. Adsorption isotherm data were better fitted by the Langmuir model than the Freundlich model in both the absence and the presence of ultrasound. The maximum adsorption capacity of the adsorbent for Cu(II), calculated from the Langmuir isotherms, in the presence of ultrasound (3.77 mmol/g) is greater than that in the absence of ultrasound (3.14 mmol/g). The adsorption process in the absence and the presence of ultrasound obeyed to the pseudo second-order kinetics. The removal of Cu(II) ions was higher in the presence of ultrasound than in its absence, but ultrasound reduced the rate constant. The intraparticular diffusion model indicated that adsorption of Cu(II) ions on the granular activated carbon was diffusion controlled as well as that ultrasound promoted intraparticular diffusion. (c) 2008 Elsevier B.V. All rights reserved.

Keywords: Activated Carbon, Adsorption, Almond, Aqueous-Solutions, Cadmium, Cr(VI), Cu(II), Equilibrium, Equilibrium, Hazelnut Shell, Kinetics, Langmuir Isotherms, Modeling, Phenol, Removal, Sorption Process, Ultrasound, Ultrasound-Assisted Adsorption, Wood Sawdust

? Küncek, İ. and Şener, S. (2010), Adsorption of methylene blue onto sonicated sepiolite from aqueous solutions. *Ultrasonics Sonochemistry*, **17** (1), 250-257.

Full Text: [2010\Ult Son17, 250.pdf](2010/Ult%20Son17,%20250.pdf)

Abstract: The aim of the present study is to enhance the methylene blue (MB) adsorption of sepiolite by ultrasonic treatment. The natural sepiolite was pretreated by sonication to improve the surface characteristics and enhance the dye uptake capacity. Sonication process resulted in a significant increase in the specific surface area (SSA) of sepiolite. The FTIR spectrum of the sonicated sepiolite indicates that the tetrahedral sheet is probably distorted after sonication process. The effect of various parameters such as sonication, pH, initial dye concentration and temperature on dye adsorption has been investigated. The adsorbed amount of MB on sepiolite increased after sonication as well as with increasing pH and temperature. The experimental data were evaluated by applying the pseudo-first- and second-order, and the intraparticle diffusion adsorption kinetic models. Adsorption process of MB onto sepiolite followed the pseudo-second-order rate expression. The experimental data were analyzed by Langmuir and Freundlich isotherms, and found that the isotherm data were reasonably well correlated by Langmuir isotherm. Maximum monolayer adsorption capacity of sepiolite for MB increased from 79.37 to 128.21 mg/g after the sonication. Various thermodynamic parameters, such as ΔG(0), ΔH-0 and ΔS-0 were calculated. The thermodynamics of MB/sepiolite system indicated spontaneous and endothermic nature of the process. Adsorption measurements showed that the process was very fast and physical in nature. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: Acid, Activated Sepiolite, Adsorption, Adsorption Capacity, Adsorption Kinetic, Aqueous Solutions, Basic Dye, Capacity, Cationic Dyes, Characteristics, Concentration, Data, Diffusion, Dye, Dye Adsorption, Dye Removal, Endothermic, Experimental, Expression, Freundlich, FTIR, Intraparticle Diffusion, Isotherm, Isotherms, Kaolinite, Kinetic, Kinetic Models, Kinetics, Langmuir, Langmuir And Freundlich Isotherms, Langmuir Isotherm, MB, Methylene Blue, Model-Calculations, Models, Monolayer, Natural, Particle-Size, pH, Physical, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Pyrophyllite, Removal, Rights, Second Order, Second-Order, Sepiolite, Solutions, Sonication, Specific Surface, Specific Surface Area, Surface, Surface Area, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Treatment, Ultrasonic, Ultrasonic Treatment, Uptake

? Karimi, M., Entezari, M.H. and Chamsaz, M. (2010), Sorption studies of nitrate ion by a modified beet residue in the presence and absence of ultrasound. *Ultrasonics Sonochemistry*, **17** (4), 711-717.

Full Text: [2010\Ult Son17, 711.pdf](2010/Ult%20Son17,%20711.pdf)

Abstract: Kinetic and thermodynamic studies were carried out for the adsorption of nitrate ion from aqueous solutions onto modified beet residue and for desorption from the sorbent to the solution in batch experiments The beet residue was modified by epichlorohydrin in the presence of pyridine The experiments were conducted in the presence and absence of ultrasound The removal of this ion was examined by varying experimental conditions such as the amount of sorbent, contact time, concentration, and temperature It was found that more than 90% of nitrate ion was removed in less than 2 min from the solution Results indicate that the adsorption of nitrate in the presence of ultrasound was higher at lower temperature (10ºC) and it was lower at higher temperatures with respect to the control method (without ultrasound) In the case of desorption study, the amount of desorption was higher in the presence of ultrasound than its absence at different applied temperatures The Langmuir isotherm model fits adequately the experimental data for adsorption and desorption studies In point of kinetics. the secondorder kinetic model describes the sorption process for this ion The thermodynamic parameters such as ΔGº, ΔHº, and ΔSº were determined for the sorption of NO3- from the temperature dependence of the sorption process. (C) 2009 Elsevier B.V. All rights reserved.

Keywords: 2nd-Order Kinetic-Model, Adsorption, Adsorption, Aqueous Solutions, Batch, Batch Experiments, Concentration, Control, Data, Desorption, Desorption, Desorption Studies, Experimental, Experiments, Granular Activated Carbon, Groundwater, Isotherm, Isotherm Model, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Model, Modified, Modified Beet Residue, Nitrate, P-Chlorophenol, Polymeric Resin, Pyridine, Reduction, Removal, Rights, Solution, Solutions, Sorbent, Sorption, Sorption Process, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamic Studies, Time, Ultrasound, Water

? Şener, S. and Özyılmaz, A. (2010), Adsorption of naphthalene onto sonicated talc from aqueous solutions. *Ultrasonics Sonochemistry*, **17** (5), 932-938.

Full Text: [2010\Ult Son17, 932.pdf](2010/Ult%20Son17,%20932.pdf)

Abstract: The adsorption behavior of naphthalene onto naturally hydrophobic talc from aqueous solution was investigated in this study. The natural talc was first pretreated by sonication to improve the surface characteristics and enhance the uptake capacity by increasing the specific surface area (SSA) of talc. The naphthalene uptake of talc was found as 276 mg g-1, and increased to 359 mg g-1 after the sonication. Adsorption studies also showed that the adsorption of naphthalene onto the sonicated talc was not affected by changes in pH suggesting that the main driving forces for naphthalene adsorption onto talc was hydrophobic bonding rather than electrostatic force. The pseudo-first and pseudo-second orders and intraparticle diffusion equation were used to evaluate the kinetic data and the constants were determined. Adsorption process of naphthalene onto talc followed the pseudo-second-order rate expression for different initial naphthalene concentrations. The Langmuir and Freundlich isotherm models were used to model the isotherm data for their applicability. The Freundlich isotherm best fitted for the adsorption of naphthalene onto talc. (C) 2010 Published by Elsevier B.V.

Keywords: Adsorbents, Adsorption, Adsorption Behavior, Aqueous Solution, Aqueous Solutions, Behavior, Capacity, Changes, Characteristics, Data, Diffusion, Driving, Expression, First, Force, Freundlich, Freundlich Isotherm, Hocs, Hydrophobicity, Intraparticle Diffusion, Isotherm, Kinetic, Kinetic Data, Kinetics, Langmuir, Model, Models, Molecular-Weight, Naphthalene, Natural, Organic-Compounds, Particle-Size, pH, Polycyclic Aromatic-Hydrocarbons, Pseudo Second Order, Pseudo-First and, Pseudo-Second-Order, Pseudo-Second-Order Rate, Pyrophyllite, Removal, Solution, Solutions, Sonication, Sorption, Specific Surface, Specific Surface Area, Surface, Surface Area, Talc, Ultrasonic Treatment, Uptake

# Title: Ultrasound in Obstetrics & Gynecology

Full Journal Title: Ultrasound in Obstetrics & Gynecology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

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Subject Categories:

: Impact Factor

? Morris, R.K., Ruano, R. and Kilby, M.D. (2011), Effectiveness of fetal cystoscopy as a diagnostic and therapeutic intervention for lower urinary tract obstruction: A systematic review. *Ultrasound in Obstetrics & Gynecology*, **37** (6), 629-637.

Abstract: Objective To determine the effectiveness of fetal cystoscopy in the prenatal diagnosis of and intervention for congenital lower urinary tract obstruction. Methods This study was a literature search using MEDLINE, EMBASE, Cochrane Library, MEDION, Web of Science reference lists and contact with experts. All studies reporting on fetal cystoscopy in lower urinary tract obstruction with data for a 2 x 2 table were selected for review. No language restrictions were applied. There was independent selection of studies, data extraction and quality assessment by two reviewers. Peto odds ratios were calculated as a summary measure of effect. Results A total of 2071 citations were identified and 66 papers selected for detailed evaluation, from which four papers with a total of 63 patients were selected for inclusion. Two papers had results for the use of cystoscopy in diagnosis, showing that fetal cystoscopy altered the ultrasound diagnosis of the underlying pathology in 36.4 and 25.0% of fetuses, respectively. Compared to no treatment, fetal cystoscopic intervention demonstrated an odds ratio for improved perinatal survival of 20.51 (95% CI, 3.87-108.69). However, comparing vesicoamniotic shunt (VAS) with fetal cystoscopy there appeared to be no significant improvement in the perinatal survival odds ratio of 1.49 (95% CI, 0.13-16.97). These results had wide CIs and for cystoscopy vs. VAS, all results crossed the line of no effect. Conclusion There is little published evidence for the effectiveness of therapeutic fetal cystoscopy as an intervention for congenital lower urinary tract obstruction and the quality of this evidence is poor. It should thus be considered to be an ‘experimental intervention’ and subjected to further investigation. Copyright (C) 2011 ISUOG. Published by John Wiley & Sons, Ltd.

Keywords: Amniotic Shunt Tube, Antenatal Intervention, Assessment, Citations, Cochrane, Copyright, Diagnosis, Effectiveness, Evaluation, Experience, Fetal Cystoscopy, Intervention, Literature, Lower Urinary Tract, Lower Urinary Tract Obstruction, Management, Medline, Methods, Papers, Pathology, Patients, Percutaneous Cystoscopy, Perinatal, Posterior Urethral Valves, Ratio, Review, Science, Stent, Survival, Systematic, Systematic Review, Tract, Treatment, Ultrasound, Uropathy, Vesicoamniotic Shunt, Vesicocentesis, Web of Science

? Chan, Y.Y., Jayaprakasan, K., Tan, A., Thornton, J.G., Coomarasamy, A. and Raine-Fenning, N.J. (2011), Reproductive outcomes in women with congenital uterine anomalies: A systematic review. *Ultrasound in Obstetrics & Gynecology*, **38** (4), 371-382.

Full Text: [2011\Ult Obs Gyn38, 371.pdf](2011/Ult%20Obs%20Gyn38,%20371.pdf)

Abstract: Objective Congenital uterine anomalies are common but their effect on reproductive outcome is unclear. We conducted a systematic review to evaluate the association between different types of congenital uterine anomaly and various reproductive outcomes. Methods Searches were performed using MEDLINE, EMBASE, the Cochrane Library and Web of Science. The Newcastle-Ottawa Quality Assessment Scale was used for quality assessment. Uterine defects were grouped into arcuate uteri, canalization defects (septate and subseptate uteri) and unification defects (unicornuate, bicornuate and didelphys uteri). Pooled risk ratios (RR) with 95% confidence intervals (CI) were computed using random effects models. Results We identified nine studies comprising 3805 women. Meta-analysis showed that arcuate uteri were associated with increased rates of second-trimester miscarriage (RR, 2.39; 95% CI, 1.33-4.27, P = 0.003) and fetal malpresentation at delivery (RR, 2.53; 95% CI, 1.54-4.18; P < 0.001). Canalization defects were associated with reduced clinical pregnancy rates (RR, 0.86; 95% CI, 0.77-0.96; P = 0.009) and increased rates of first-trimester miscarriage (RR, 2.89; 95% CI; 2.02-4.14; P < 0.001), preterm birth (RR, 2.14; 95% CI, 1.48-3.11; P < 0.001) and fetal malpresentation (RR, 6.24; 95% CI, 4.05-9.62; P < 0.001). Unification defects were associated with increased rates of preterm birth (RR, 2.97; 95% CI, 2.08-4.23; P < 0.001) and fetal malpresentation (RR, 3.87; 95% CI, 2.42-6.18; P < 0.001). Conclusions Canalization defects reduce fertility and increase rates of miscarriage and preterm delivery. None of the unification defects reduces fertility but some are associated with miscarriage and preterm delivery. Arcuate uteri are specifically associated with second-trimester miscarriage. All uterine anomalies increase the chance of fetal malpresentation at delivery. Copyright. (C) 2011 ISUOG. Published by John Wiley & Sons, Ltd.

Keywords: 3-Dimensional Ultrasound, Assessment, Author, Clinical Implications, Cochrane, Confidence Intervals, Congenital Uterine Anomalies, Copyright, Diagnosis, Embase, England, Fetal, Hysteroscopic Metroplasty, Infertile Women, Infertility, Malformations, Malpresentation, Medline, Meta Analysis, Meta-Analysis, Metaanalysis, Methods, Miscarriage, Mullerian Anomalies, Mullerian Duct Anomalies, Outcome, Outcomes, Pregnancy, Preterm Birth, Quality, Review, Risk, Scale, Science, Septate Uterus, Systematic, Systematic Review, Web of Science, Women

# Title: The Umbrella Effect, Croatica Chemica Acta

Full Journal Title: The Umbrella Effect, Croatica Chemica Acta

ISO Abbreviated Title:

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Language:

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: Impact Factor

? Kovacevic, D., Kobal, I. and Kallay, N. (1998), Adsorption of organic acids on metal oxides. *The Umbrella Effect*, *Croatica Chemica Acta*, **71** (4), 1139-1153.

Abstract: Simultaneous interpretation of electrokinetic and adsorption data for organic ions at metal oxide surfaces is introduced. It is shown that, for the salicylic acid/hematite system, the singly charged salicylate ions react with surface-OH, groups releasing one water molecule. The salicylate ions, when bound to the surface, exhibit a pronounced >>Umbrella effect<<, i.e., each relatively large organic ion covers about four to six surface-OH, excluding them from the further adsorption process. Within the electrical interfacial layer, the salicylate ions are located in the plane near the onset of the diffuse layer. It is demonstrated that the interpretation of adsorption data solely may lead to erroneous conclusions regarding the mechanism of binding and the structure of the interfacial layer. Electrokinetic measurements provide useful information, enabling the solution of the above problem.

# Title: Unfallchirurg

Full Journal Title: [Unfallchirurg](http://springerlink.metapress.com/app/home/journal.asp?wasp=64t4f2c7pg6jqg5f497w&referrer=parent&backto=searchpublicationsresults,1,1;)

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Language:

Publisher: Springer Verlag, New York

Publisher Address:

Subject Categories:

: Impact Factor

Garfield, E. (1998), The Impact Factor and using it correctly. *Unfallchirurg*, **101** (6), 413-414.

Full Text: [1998\Unfallchirurg101, 413.pdf](1998/Unfallchirurg101,%20413.pdf)

# Title: Universitas Psychologica

Full Journal Title: [Universitas Psychologica](http://revistas.javeriana.edu.co/sitio/psychologica/sccs/num_ant.php?PHPSESSID=9e750ae85a9f28348783252ae4645616)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language: Chinese

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Rivera-Garzón, D.M. (2008), Caracterización de la comunidad científica de Psicología que publica en la revista *Universitas Psychologica* (2002-2008). *Universitas Psychologica*, **7** (3), 917-932.

Full Text: [2008\Uni Psy7, 917.pdf](2008/Uni%20Psy7,%20917.pdf)

? Rivera-Garzón, D.M. (2008), The psychological scientific community that publishes in the journal *Universitas Psychologica* (2002-2008). *Universitas Psychologica*, **7** (3), 917-932. (English)

Abstract: The bibliometric analysis is presented in the journal Universitas Psychologica of the Pontificia Universidad Javeriana during the period 2002-2008, to identify the scientific community in the area of Psychology that published in the journal and to know the communication networks used by the community. It works with bibliometric methods to characterize the scientific community that publishes a journal, for which information was structured as follows: citante information to identify the relationships inherent in the scientific community psychology, and the information cited, which refers to the identification of the types or communication channels, which are cited in articles identified in the information citante, namely the community that publishes a journal with respect to the international scientific community.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Bibliometric Methods, Colombia, Communication, Community, Growth of Literature, Identification, Information, International, Journal, Methods, Metric Studies of Information, Networks, Pontificia Universidad Javeriana, Psychology, Relationships, Respect, Scientific Communication, Scientific Community of Psychology

? García-Martínez, A.T., Guerrero-Bote, V., Hassan-Montero, Y. and Moya-Anegón, F. (2009), La Psicología en el dominio científico español a través del análisis de cocitación de revistas. *Universitas Psychologica*, **8** (1), 13-26.

Full Text: [2009\Uni Psy8, 13.pdf](2009/Uni%20Psy8,%2013.pdf)

? García-Martínez, A.T., Guerrero-Bote, V., Hassan-Montero, Y. and Moya-Anegón, F. (2009), Psychology in Spanish science through journal cocitation analysis. *Universitas Psychologica*, **8** (1), 13-26. (English)

Abstract: The intention in this article is to represent the ongoing intellectual structure of Psychology research (as domain of scientific knowledge) in Spain. To this end within the domain analysis the most suitable bibliometric method to reveal the intellectual structure of the discipline in Spain has been selected. This method is cocitation analysis, which is characterized by its objectivity, and in this case, with journals as the unit of measurement. Therefore the resulting representation permits us to group the journals according to the similarity of subject matter marked by the uses of Spanish researcher. This shows different research lines or fronts that shape the intellectual structure of Spanish Psychology.

Keywords: Cocitation Analysis, Domains, Information Visualization, Intellectual Structure, Journals, Knowledge, Maps, Networks, Pathfinder, Psychology Research, Research, Science, Science Maps, Spain

? López-López, W. (2009), Scientometrics and intellectual production assessment. *Universitas Psychologica*, **8** (2), 293-294. (English)

Full Text: [2009\Uni Psy8, 293.pdf](2009/Uni%20Psy8,%20293.pdf)

Keywords: Scientometrics

? Navarrete-Cortes, J., Fernández-López, J.A., López-Baena, A., Quevedo-Blasco, R. and Buela-Casal, G. (2010), Global psychology: A bibliometric analysis of Web of Science publications. *Universitas Psychologica*, **9** (2), 553-567.

Full Text: [2010\Uni Psy9, 553.pdf](2010/Uni%20Psy9,%20553.pdf)

Abstract: In this study, we carried a classification by country based on the analysis of the scientific production of psychology journals. We analyzed a total of 108,741 documents, published in the Web of Science. The indicators used were the Weighted Impact Factor, the Relative Impact Factor, the Citation Rate per article and the articles published in the top five journals of the Journal Citation Report (JCR). The results indicate that Spain has the highest percentage of articles in the top five journals in the JCR and Colombia is the second Latin American, Spanish- speaking country that has more citations per article. Countries like Hungary, Italy and USA had a higher Impact Factor and Citation Rate.

? Navarrete-Cortes, J., Fernandez-Lopez, J.A., Lopez-Baena, A., Quevedo-Blasco, R. and Buela-Casal, G. (2010), Global psychology: A bibliometric analysis of Web of Science publications. *Universitas Psychologica*, **9** (2), 553-567. (English)

Abstract: In this study, we carried a classification by country based on the analysis of the scientific production of psychology journals. We analyzed a total of 108,741 documents, published in the Web of Science. The indicators used were the Weighted Impact Factor, the Relative Impact Factor, the Citation Rate per article and the articles published in the top five journals of the Journal Citation Report (JCR). The results indicate that Spain has the highest percentage of articles in the top five journals in the JCR and Colombia is the second Latin American, Spanish - speaking country that has more citations per article. Countries like Hungary, Italy and USA, had a higher Impact Factor and Citation Rate.

Keywords: Descriptive Study Through Document Analysis, Scientific Productivity, Bibliometrics Indicators, Country Ranking, Impact Factor, Internationality Index, Transnational Analysis, University Professors, Research Performance, Scientific Journals, Indicators, Programs, Criteria, Spain

# Title: Uournal of Library and Information Sciences in Agriculture

Full Journal Title: [Uournal of Library and Information Sciences in Agriculture](http://e29.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=LYTS&NaviLink=%e5%86%9c%e4%b8%9a%e5%9b%be%e4%b9%a6%e6%83%85%e6%8a%a5%e5%ad%a6%e5%88%8a)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1002-1248

Issues/Year:

Journal Country/Territory:

Language: Chinese

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lin, Z. (2006), Study on mangrove forest special topic literature in China. *Uournal of Library and Information Sciences in Agriculture*, **18** (7), 139-143.

Full Text: [2006\Uou Lib Inf Sci Agr18, 139.pdf](2006/Uou%20Lib%20Inf%20Sci%20Agr18,%20139.pdf)

Abstract: On the basis of mangrove forest special topic literature collected by the China Journal Full-text Database and Chinese Scientific and Technological Journal Database (1989~2005), this paper has made a statistic analysis of data volume of mangrove forest researches and the year distribution of periodical categories, author and its core institution, periodical that published the paper, periodical category, bibliographic content, etc. by bibliometric method. From the angle of bibliographic study, it has reflected the current situation and development trend of mangrove forest research.

Keywords: Mangrove Forest, Bibliographic Study, Literature Source, Bibliometric Analysis, China

? Zhang, S.J. (2006), Study on the volume and quality of SCI-Tech papers of the university during 2001～2003. *Uournal of Library and Information Sciences in Agriculture*, **18** (7), 144-146.

Full Text: [2006\Uou Lib Inf Sci Agr18, 144.pdf](2006/Uou%20Lib%20Inf%20Sci%20Agr18,%20144.pdf)

Abstract: Through the bibliometric analysis of the academic paper volume and quality of the university during the period from 2001 to 2003, the paper has revealed the existing problems in research in the university, methods for solutions and future development orientation.

Keywords: SCI-Tech Papers, Productivity, Bibliometric Analysis

# Title: Urban Ecosystems

Full Journal Title: [Urban Ecosystems](http://www.springerlink.com/content/100227/?p=df677bf358204ba1a90753dcdeb92dca&pi=0)

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Issues/Year:

Journal Country

Language: Chinese

Publisher:

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Subject Categories:

: Impact Factor

? Young, R. and Wolf, S. (2006), Goal attainment in urban ecology research: A bibliometric review 1975-2004. *Urban Ecosystems*, **9** (3), 179-193.

Full Text: [2006\Urb Eco9, 179.pdf](2006/Urb%20Eco9,%20179.pdf)

Abstract: We analyze a core literature of urban ecology (all articles published in Urban Ecology and Urban Ecosystems from 1975-2004, n = 261) to support a reflexive analysis of the field. We structure this critical analysis based on criteria derived from programmatic statements made by scientific societies, research funding organizations and academic institutions regarding what urban ecology should be. Specifically, we assess the extent to which the literature reflects, and has evolved to reflect, a commitment tocenter dot strengthen and expand the discipline of ecologycenter dot create a transdisciplinary enterprise, andcenter dot contribute to social and ecological wellbeing through applied research and policy engagement.Findings indicate that the literature strongly reflects these commitments, as these three tenets usefully describe the field and its evolution. We do, however, identify a tendency over time toward a more strictly disciplinary orientation. Ecological science is increasingly dominant and threatens to crowd out other scientific perspectives. This trend suggests that the field is maturing in the institutional sense, but perhaps at the cost of intellectual diversity, which many believe to be the basis of innovative solutions.

Keywords: Analysis, Bibliometric, Commitment, Cost, Criteria, Diversity, Ecology, Evolution, Field, Funding, Institutions, Literature, Policy, Research, Research Funding, Review, Science, Social, Solutions, Structure, Support, Trend, Urban

? Dooling, S., Graybill, J. and Greve, A. (2007), Response to Young and Wolf: Goal attainment in urban ecology research. *Urban Ecosystems*, **10** (3), 339-347.

Full Text: [2007\Urb Eco10, 339.pdf](2007/Urb%20Eco10,%20339.pdf)

Abstract: Our critique focuses on the poorly defined key concepts, methodological inconsistencies, circular research design, and over-reaching substantive claims made by Young and Wolf. We suggest that Young and Wolf have provided an assessment of the Urban Ecosystems journal, not of urban ecology as a field. We conclude by identifying questions to guide a bibliometric analysis that focuses on a collaborative and interdisciplinary future of urban ecology (how are participating disciplines contributing to urban ecological research and scholarship; what theories and conceptual frameworks are being used, and how are these theories being tested and modified; and what mixed methodologies are being developed to collect data to address complex urban issues that are inherently interdisciplinary). We take seriously Young and Wolf’s call for a “fundamental discussion as to if and how the intentions of the field have been or need to be updated” and argue that such a discussion requires a more inclusive, rigorous, and meaningful identification of the “core” of urban ecology literature than provided.

Keywords: Analysis, Assessment, Bibliometric, Bibliometric Analysis, Data, Design, Ecology, Field, Identification, Interdisciplinary, Journal, Literature, Methodologies, Modified, Research, Research Design, Scholarship, Urban

? Young, R.F. and Wolf, S.A. (2007), Toward a pragmatic program for critical urban ecology. *Urban Ecosystems*, **10** (3), 349-354.

Full Text: [2007\Urb Eco10, 349.pdf](2007/Urb%20Eco10,%20349.pdf)

Abstract: Our essay responds to the critique of Dooling et al. (Urban Ecosystems in press, 2007) of our previously published article “Goal attainment in urban ecology research: a bibliometric review 1975-2004 (Young and Wolf, Urban Ecosystems, 9:179-193, 2006). We identify our critics’ concerns as rooted in a project of deconstruction of scientific inquiry and a redefinition of the boundaries separating academic disciplines from each other and science from society. While we identify important differences with our critics, we largely support this critical project, as evidenced by our previously published empirical research. In exploring the relationship between critical and positivist approaches to urban ecology research and how we might work toward an integration of nature and society in thought and action, we defend pragmatic approaches to empirical research as well as disciplinary projects as legitimate and essential elements of urban ecology research. We argue in favor of theoretical and methodological pluralism. Rather than define urban ecology through exclusionary projects that would limit the scope and significance of urban ecology research, we reaffirm our call for diverse sets of actors inside and outside university settings to engage and support each other in order to develop and strengthen analysis and pursuit of sustainability.

Keywords: Analysis, Bibliometric, Boundaries, Ecology, Integration, Research, Review, Science, Scope, Significance, Society, Support, Sustainability, University, Urban, Work

# Title: Urban Environment & Urban Ecology

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Issues/Year:

Journal Country/Territory:

Language: Chinese

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Publisher Address:

Subject Categories:

: Impact Factor (2003)

? Sun, Q.Y. and Yang, L.Z. (2002), Removal of chromium ion from aqueous solution using modified peat. *Urban Environment & Urban Ecology*, **15** (3), 5-8.

Full Text: Urb Env Urb Eco15, 5

Abstract: In order to overcome the problems in using the stuff peat to treat wastewater, the sulfuric acid was added to the stuff peat to prepare the modified peat, and then the modified peat was mixed with polyvinylalcohol (PVA) and formaldehyde (37%) to enhance the mechanical intensity of the modified peat. In this paper, we used the batch experimental system to investigate adsorption characteristics of modified peat on chromium ion from aqueous solution. The results show that the adsorption isotherm fit the Freundlich equation, and that the kinetic process of adsorption can be described by the pseudo - second order model. The adsorption process of modified peat on chromium ion was pH dependent, the optimum range being 1.5 similar to 3.0.

# Title: Urban Geography

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JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Wheeler, J.O. (1994), Achievers of influence - most-cited authors in *Urban Geography*, 1980-1986. *Urban Geography*, **15** (6), 503-504.

Full Text: [1994\Urb Geo15, 503.pdf](1994/Urb%20Geo15,%20503.pdf)

Keywords: Authors, Influence

? Harris, C.D. (1998), Diffusion of urban models: A case study. *Urban Geography*, **19** (1), 49-67.

Full Text: 1998\Urb Geo19, 49.pdf

Abstract: The analysis of diffusion through the academic landscape of models of internal patterns of cities, as published in ‘The Nature of Cities’ (Harris and Ullman, 1945) in simplified generalized, and comparative cartodiagrams of concentric zones, sectors, and multiple nuclei, is based on records of 128 citations of the basic article in periodicals and on 309 reproductions of the models in books. The half-life of periodical citations of the article was reached in 1974, 29 years after publication. The half-life of reproduction of the models in books occurred eight years later in 1982, but the peak year was 1995, with 20 new republications.

Keywords: Academic, Analysis, Case Study, Citation Classics, Citations, Cities, Diffusion, Geography, Half-Life, Landscape, Models, Periodicals, Publication, Reproduction, Urban

# Title: Urban Studies

Full Journal Title: Urban Studies

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0042-0980

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Matthiessen, C.W. and Schwarz, A.W. (1999), Scientific centres in Europe: An analysis of research strength and patterns of specialisation based on bibliometric indicators. *Urban Studies*, **36** (3), 453-477.

Full Text: [1999\Urb Stu36, 453.pdf](1999/Urb%20Stu36,%20453.pdf)

Abstract: This paper presents the first analysis of scientific strength by output (papers in the Science Citation Index 1994-96) produced by authors from the ‘greater’ urban regions of Europe. Top lists of European centres are indicated. Four agglomerations constitute the European super-league of science: London, Paris, Moscow and the Dutch urban agglomeration of Amsterdam, the Hague, Rotterdam and Utrecht. The next layer could be named the primary league and comprises 19 large research centres. A third group of 16 cities forms a secondary league of 16 smaller research centres. These upper-level research strongholds are categorised in the paper where patterns of specialisations by absolute and relative distribution of research disciplines for each city are identified and families of cities by research pattern are analysed and compared within the perspective of urban economic growth and change.

Matthiessen, C.W., Schwarz, A.W. and Find, S. (2002), The top-level global research system, 1997-99: Centres, networks and nodality. An analysis based on bibliometric indicators. *Urban Studies*, **39** (5-6), 903-927.

Full Text: [2002\Urb Stu39, 903.pdf](2002/Urb%20Stu39,%20903.pdf)

Abstract: The importance of the knowledge-base in regional and urban competition is generally recognised, although causal relations between urban and regional economic growth and knowledge level are far from clear. This paper presents the first analysis of the strength, interrelations and nodality of the global research centres. The data are records in the *Science Citation Index* 1997-99 of papers produced by authors from the 40 largest ‘greater’ urban regions of the world as measured by research output. The network of research co-operation depends on nationality, distance and other factors. The top-level nodes in the co-operation network of the world are London, Genève-Lausanne and the San Francisco Bay Area. In absolute number of co-authored papers, Los Angeles, Boston and New York constitute a second level and, when observed links are related to expected links, the second level combines Amsterdam-Hague-Rotterdam-Utrecht, Paris, Basel-Mulhouse-Freiburg and Copenhagen-Lund. As expected, the networks of citation are, by contrast, very independent of distance, but not of nationality. The primary categories of research centres for the *total* number of citings presented are San Diego, Seattle, Boston, New York and the San Francisco Bay Area. When we turn to the international data-set, it is Mannheim-Heidelberg, Genève-Lausanne, Basel-Mulhouse-Freiburg and Cambridge which are in the lead.

? Matthiessen, C.W., Schwarz, A.W. and Find, S. (2010), World cities of scientific knowledge: Systems, networks and potential dynamics. An analysis based on bibliometric indicators. *Urban Studies*, **47** (9), 1879-1897.

Full Text: [2010\Urb Stu47, 1879.pdf](2010/Urb%20Stu47,%201879.pdf)

Abstract: This paper is based on identification of the pattern of the upper level of the world city network of knowledge as published in a series of earlier papers. It is our aim to update the findings and relate to the general world city discussion. The structure of the world cities of knowledge network has changed over the past decade in favour of south-east Asian and south European cities and in disfavour of the traditional centres of North America and north-western Europe. The analysis is based on bibliometric data on the world’s 100 largest cities measured in terms of research output. The level of co-authorship between researchers in different cities is an indicator of links and respect, and the number of citations of papers produced by researchers located in each city is an indicator of respect. Finally, one research discipline is selected for an experiment in forecasting future hot spots of research.

Keywords: Bibliometric, Centers, Citations, City Network, Collaboration, Europe, Geographical Proximity, Indicators, Knowledge Network, Localization, Patterns, Research, Research Output

# Title: Urban Water

Full Journal Title: [Urban Water](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=14620758)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1462-0758

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Thirunavukkarasu, O.S., Viraraghavan, T., Subramanian, K.S. and Tanjore, S. (2002), Organic arsenic removal from drinking water. *Urban Water*, **4** (4), 415-421.

Full Text: [C:\0 YSHo\HO-reference\U\Urban Water.pdf](U/Urban%20Water.pdf)[2002\Urb Wat4, 415.pdf](2002/Urb%20Wat4,%20415.pdf)

Abstract: Arsenic occurs in both inorganic and organic forms in water. Although various methods have been adopted to remove inorganic species of arsenic from drinking water, not much emphasis has been given to the removal of organic species of arsenic. In the present study column studies were conducted using manganese greensand (MGS), iron oxide-coated sand (IOCS-1 and IOCS-2) and ion exchange resin in Fe3+ form, to examine the removal of organic arsenic (dimethylarsenic acid) spiked to required concentrations in tap water. Batch studies were conducted with IOCS-2, and the results showed that the organic arsenic adsorption capacity was 8 µg/g IOCS-2. Higher bed volumes (585 BV) and high arsenic removal capacity (5.7 µg/cm3) were achieved by the ion exchange resin among all the media studied. Poor performance was observed with MGS and IOCS-1.

Keywords: Adsorption, Batch Studies, Column Studies, Filtration, Ion Exchange Resin, Iron Oxide-Coated Sand, Manganese Greensand, Organic Arsenic Species, Water Treatment

# Title: Urologe

Full Journal Title: Urologe

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Labanaris, A.P., Krot, D., Schott, G.E., Helmschrott, P. and Zugor, V. (2007), Impact factors and publication time spans in urological journals. *Urologe*, **46** (3), 297-??.

Abstract: The impact factor, cited half-life, and immediacy index are three important methods that can be used to demonstrate how a journal’s articles are cited over the course of a specific time span. These three factors thus represent instruments for measuring the importance and reputation of a scientific magazine. The goal of our study was to evaluate the constancy of journals specialized in the field of urology and to analyze those listed in the 2005 Journal Citation Report (JCR) using the standardized methods specified by the Institute of Scientific Information (ISI) and JCR. Primarily we wanted to examine the different time spans needed for publication of original papers submitted to certain journals; in more exact terms: the time span from submission of an article or original paper to its publication and from the time of acceptance of an original paper or article to its publication in a urological journal. Furthermore, we wanted to investigate the dynamics of urological journals regarding their impact factors for the years 2000-2005. The study was performed using the ISI JCR and the library as well as the online library of the Friedrich Alexander University in Erlangen. A very satisfactory development can be observed in the field of urology with the standardized methods of the (ISI) JCR.

Keywords: Bibliometric Evaluation, Cited Half-Life, Course, Development, Dynamics, Goal, Half-Life, Immediacy Index, Impact, Impact Factor, Impact Factors, Importance, Index, ISI, Journal, Journals, Methods, Paper, Publication, Publication Time Span, Urology

# Title: Der Urologe A

Full Journal Title: [Der Urologe A](http://www.springerlink.com/content/100489/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1433-0563

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Labanaris, A.P., Krot, D., Schott, G.E., Helmschrott, P. and Zugor, V. (2007), Impact factors and publication time spans in urological journals. *Der Urologe A*, **46** (3), 297-300.

Full Text: [2007\Urology A46, 297.pdf](2007/Urology%20A46,%20297.pdf)

Abstract: The impact factor, cited half-life, and immediacy index are three important methods that can be used to demonstrate how a journal’s articles are cited over the course of a specific time span. These three factors thus represent instruments for measuring the importance and reputation of a scientific magazine. The goal of our study was to evaluate the constancy of journals specialized in the field of urology and to analyze those listed in the 2005 Journal Citation Report (JCR) using the standardized methods specified by the Institute of Scientific Information (ISI) and JCR. Primarily we wanted to examine the different time spans needed for publication of original papers submitted to certain journals; in more exact terms: the time span from submission of an article or original paper to its publication and from the time of acceptance of an original paper or article to its publication in a urological journal. Furthermore, we wanted to investigate the dynamics of urological journals regarding their impact factors for the years 2000-2005. The study was performed using the ISI JCR and the library as well as the online library of the Friedrich Alexander University in Erlangen. A very satisfactory development can be observed in the field of urology with the standardized methods of the (ISI) JCR.

Keywords: Bibliometric Evaluation, Cited Half-Life, Course, Development, Dynamics, Goal, Half-Life, Immediacy Index, Impact, Impact Factor, Impact Factors, Importance, Index, ISI, Journal, Methods, Paper, Publication, Publication Time Span, Urology

# Title: Urologe-Ausgabe A

Full Journal Title: Urologe A

ISO Abbreviated Title: Urologe A

JCR Abbreviated Title: Urologe A

ISSN: 0340-2592

Issues/Year: 6

Language: German

Journal Country/Territory: Germany

Publisher: Springer

Publisher Address: 233 Spring Street, New York, NY 10013

Subject Categories:

Urology & Nephrology: Impact Factor 0.558 (2004)

? Chaussy, C. and Fuchs, G. (1985), Experience with extracorporeal shock-wave lithotripsy after 5 years clinical use. *Urologe-Ausgabe A*, **24** (6), 305-309.

Full Text: 1985\Uro A24, 305.pdf

# Title: Urologia Internationalis

Full Journal Title: Urologia Internationalis

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Heidenreich, A., Albers, P., Classen, J., Graefen, M., Gschwend, J., Kotzerke, J., Krege, S., Lehmann, J., Rohde, D., Schmidberger, H., Uder, M. and Zeeb, H. (2010), Imaging studies in metastatic urogenital cancer patients undergoing systemic therapy: Recommendations of a multidisciplinary consensus meeting of the association of urological oncology of the German cancer society. *Urologia Internationalis*, **85** (1), 1-10.

Abstract: Introduction: Imaging studies are an integral and important diagnostic modality to stage, to monitor and follow-up patients with metastatic urogenital cancer. The currently available guidelines on diagnosis and treatment of urogenital cancer do not provide the clinician with evidence-based recommendations for daily practice. Objectives: To develop scientifically valid recommendations with regard to the most appropriate imaging technique and the most useful time interval in metastatic urogenital cancer patients undergoing systemic therapy. Methods: A systematic literature review was performed searching MEDLINE, EMBASE and Web of Science databases using the terms prostate, renal cell, bladder and testis cancer in combination with the variables lymph node, lung, liver, bone metastases, chemotherapy and molecular therapy, and the search terms computed tomography, magnetic resonance imaging and positron emission tomography were applied. A total of 11,834 records were retrieved from all databases. The panel reviewed the records to identify articles with the highest level of evidence using the recommendation of the US Agency for Health Care Policy and Research. Conclusions: Contrast-enhanced computed tomography remains the standard imaging technique for monitoring of pulmonary, hepatic and lymph node metastases. Bone scintigraphy is still the most widely used imaging technique for the detection and follow-up of osseous lesions. For clinical trials it might be replaced by either PET-CT or MRI of the skeletal axis. Response assessment for patients treated with cytotoxic regime is best performed by the RECIST/WHO criteria; treatment response to molecular triggered therapy is best assessed by CT evaluating decrease in tumor size and density. Cross-sectional imaging studies for response assessment might be obtained after each 2 cycles of systemic therapy to early stratify responders from non-responders. Copyright (C) 2010 S. Karger AG, Basel.

Keywords: Assessment, Axial Skeleton, Bladder, Bladder Cancer, Bladder-Cancer, Bone, Bone Metastases, Cancer, Care, Chemotherapy, Clinical Trials, Computed Tomography, Computed-Tomography, Copyright, CT, Databases, Diagnosis, Follow-up, Germ Cell Tumors, Guidelines, Health, Imaging, Literature, Literature Review, Magnetic Resonance Imaging, Methods, Molecular, Monitoring, MRI, Multidisciplinary, Oncology, Patients, PET-CT, Policy, Positron-Emission-Tomography, Practice, Prognostic-Factors, Prostate Cancer, Prostate-Cancer, Pulmonary Nodules, Renal Cell Cancer, Renal-Cell Carcinoma, Research, Review, Science, Skeletal Scintigraphy, Systematic, Systematic Literature Review, Testis Cancer, Therapy, Therapy Response Assessment, Treatment, US, Web of Science, Whole-Body-MRI

# Title: Urologic Oncology-Seminars and Original Investigations

Full Journal Title: Urologic Oncology-Seminars and Original Investigations

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mauri, D., Pentheroudakis, G., Tolis, C., Chojnacka, M. and Pavlidis, N. (2005), Inflammatory prostate cancer: An underestimated paraneoplastic clinical manifestation. *Urologic Oncology-Seminars and Original Investigations*, **23** (5), 318-322.

Full Text: 2005\Uro Onc-Sem Ori Inv23, 318.pdf

Abstract: Purpose: To identify the incidence of prostate cancer associated-systemic inflammatory syndrome (SIS), and to characterize further this entity, we searched our database as well as the medical literature. Methods: We retrospectively analyzed all patients with prostate cancer admitted to the Department of Medical Oncology of the Ioannina University Hospital during the last 3 years. Systematic review of peer-reviewed medical literature was further performed at 3 major libraries (i.e., MEDLINE, ISI Web of Science, and Cochrane Central Register of Controlled Trials). No publication year or language restriction was set in the literature search. Results: Retrospective analysis of our patient population identified 4 patients with a SIS (of 63 patients who were metastatic hormone resistant), in whom fever was a sign of disease progression. Inversely, only 4 cases of prostate cancer-related fever were found in the literature, in all of them at disease presentation. Consequently, the incidence of inflammatory syndrome in metastatic prostate cancer seems to be strongly underestimated. A SIS can be an early or late event during the course of the disease, and is generally associated with rapid progression and bad prognosis. Back pain, fatigue, night sweats, anemia, bone metastases, and bone marrow infiltration are the most commonly associated signs and symptoms. Because of occasional responses to hormonal or chemotherapeutic treatment, prompt differential diagnosis and therapy are required. Conclusions: The role of proinflammatory cytokines in biochemical pathways of neoplastic growth has been established in prostate cancer, along with evidence for high levels of interleukin (IL)-6 among patients with hormone refractory disease. However, little is known about the frequency of a SIS in patients with prostatic carcinoma. (c) 2005 Elsevier Inc. All rights reserved.

Keywords: Analysis, Back Pain, Bone, Cancer, Carcinoma, Cochrane, Diagnosis, Disease, Disease Progression, Fatigue, Fever, Frequency, Hospital, Incidence, Inflammatory Syndrome, Interleukin-6, ISI, Isi Web of Science, Literature, Medical, Medline, Methods, Oncology, Pain, Paraneoplastic Manifestation, Patients, Prognosis, Progression, Prostate Cancer, Publication, Review, Science, Signs, Symptoms, Systematic, Systematic Review, Therapy, Treatment, University, Web of Science

? Anderson, M.S. and Steneck, N.H. (2011), The problem of plagiarism. *Urologic Oncology-Seminars and Original Investigations*, **29** (1), 90-94.

Full Text: [2011\Uro Onc-Sem Ori Inv29, 90.pdf](2011/Uro%20Onc-Sem%20Ori%20Inv29,%2090.pdf)

Abstract: Plagiarism is a form of research misconduct and a serious violation of the norms of science. It is the misrepresentation of another’s ideas or words as one’s own, without proper acknowledgement of the original source. Certain aspects of plagiarism make it less straightforward than this definition suggests. Over the past 30 years, the U.S. Federal Government has developed and refined its policies on misconduct, and Federal agencies, as well as research institutions, have established approaches to responding to allegations and instances of plagiarism. At present, efforts to avert plagiarism focus on plagiarism-detection software and instructional strategies. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Federal Definition of Plagiarism, Plagiarism, Research, Research Misconduct, Scientific Misconduct, Self-Plagiarism

? Garner, H.R. (2011), Combating unethical publications with plagiarism detection services. *Urologic Oncology-Seminars and Original Investigations*, **29** (1), 95-99.

Full Text: [2011\Uro Onc-Sem Ori Inv29, 95.pdf](2011/Uro%20Onc-Sem%20Ori%20Inv29,%2095.pdf)

Abstract: About 3,000 new citations that are highly similar to citations in previously published manuscripts that appear each year in the biomedical literature (Medline) alone. This underscores the importance for the opportunity for editors and reviewers to have detection system to identify highly similar text in submitted manuscripts so that they can then review them for novelty. New software-based services, both commercial and free, provide this capability. The availability of such tools provides both a way to intercept suspect manuscripts and serve as a deterrent. Unfortunately, the capabilities of these services vary considerably, mainly as a consequence of the availability and completeness of the literature bases to which new queries are compared. Most of the commercial software has been designed for detection of plagiarism in high school and college papers; however, there is at least I fee-based service (CrossRef) and 1 free service (etblast.org), which are designed to target the needs of the biomedical publication industry. Information on these various services, examples of the type of operability and output, and things that need to be considered by publishers, editors, and reviewers before selecting and using these services is provided. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Biomedical, Biomedical Literature, Citation, Citations, Database, Literature, Papers, Plagiarism, Plagiarism Detection, Plagiarism Software, Publication, Publications, Review

? Fischer, B.A. and Zigmond, M.J. (2011), Educational approaches for discouraging plagiarism. *Urologic Oncology-Seminars and Original Investigations*, **29** (1), 100-103.

Full Text: [2011\Uro Onc-Sem Ori Inv29, 100.pdf](2011/Uro%20Onc-Sem%20Ori%20Inv29,%20100.pdf)

Abstract: Suggested approaches to reduce the occurrence of plagiarism in academia, particularly among trainees. These include (1) educating individuals as to the definition of plagiarism and its consequences through written guidelines, active discussions, and practice in identifying proper and improper citation practices; (2) distributing checklists that break the writing task into more manageable steps, (3) requiring the submission of an outline and then a first draft prior to the deadline for a paper; (4) making assignments relevant to individual interests; and (5) providing trainees with access to software programs that detect plagiarism. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Citation, Plagiarism, Writing

? Heitman, E. and Litewka, S. (2011), International perspectives on plagiarism and considerations for teaching international trainees. *Urologic Oncology-Seminars and Original Investigations*, **29** (1), 104-108.

Full Text: [2011\Uro Onc-Sem Ori Inv29, 104.pdf](2011/Uro%20Onc-Sem%20Ori%20Inv29,%20104.pdf)

Abstract: In the increasingly global community of biomedical science and graduate science education, many US academic researchers work with international, trainees whose views on scientific writing and plagiarism can be strikingly different from US norms. Although a growing number of countries and international professional organizations identify plagiarism as research misconduct, many international trainees come from research environments where plagiarism is ill-defined and even commonly practiced. Two research-ethics educators consider current perspectives on plagiarism around the world and contend that US research-training programs should focus on trainees’ scientific writing skills and acculturation, not simply on preventing plagiarism. (C) 2011 Elsevier Inc. All rights reserved.

Keywords: Acculturation, Biomedical, Education, International Trainees, Misconduct, Plagiarism, Professional, RCR Education, Research, Research Misconduct, Responsible Conduct, Scientific Writing, US, Writing, Writing Skills

# Title: Urologic Radiology

Full Journal Title: Urologic Radiology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0171-1091

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Chaussy, C. and Schmiedt, E. (1984), Extracorporeal shock-wave lithotripsy (ESWL) for kidney-stones - An alternative to surgery. *Urologic Radiology*, **6** (2), 80-87.

# Title: Urology

Full Journal Title: [Urology](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6105&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=cdc116fe27e848be7ae5c11396b773fc)

ISO Abbreviated Title: Urology

JCR Abbreviated Title: Urology

ISSN: 0090-4295

Issues/Year: 12

Journal Country/Territory: United States

Language: English

Publisher: Elsevier Science Inc

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

Subject Categories:

Urology & Nephrology: Impact Factor

? Chaussy, C., Schmiedt, E., Jocham, D., Schuller, J., Brandl, H. and Liedl, B. (1984), Extracorporeal shock-wave lithotripsy (ESWL) for treatment of urolithiasis. *Urology*, **23** (5), 59-66.

Full Text: [1984\Urology23, 59.pdf](1984/Urology23,%2059.pdf)

Abstract: We present our experience with extracorporeal shock wave lithotripsy (ESWL) and the new therapeutic aspects it has generated. The current state of technology also will be discussed.

Grasso, M., Loisides, P., Beaghler, M. and Bagley, D. (1995), The case for primary endoscopic management of upper urinary tract calculi: I. A critical review of 121 extracorporeal shock-wave lithotripsy failures. *Urology*, **45** (3), 363-371.

Full Text: [1995\Urology45, 363.pdf](1995/Urology45,%20363.pdf)

Abstract: Objectives. To define those patients with upper urinary tract calculi who are more likely to have an unsuccessful outcome from extracorporeal shock-wave lithotripsy (ESWL).

Methods. A critical prospective analysis of 121 patients, referred to two university centers after ESWL had been exhausted as a treatment modality for upper urinary tract calculi, was performed. Patients were subdivided into the following groups: failure to clear fragments, failure to fragment, difficulty in calculus localization, and failure due to inherent upper urinary tract obstruction. Other important variables include the type of extracorporeal lithotriptor used, number of treatment sittings before referral, calculus location, calculus composition, patient body habitus, and the imaging leading to and associated with extracorporeal therapy.

Results. Large renal calculi (mean, 22.2 mm) and those within dependent or obstructed portions of the collecting system were frequently referred for endoscopic management after failed ESWL. Steinstrasse can be an extremely morbid complication from ESWL and in this series was associated with irreversible loss of renal function and ureteral stricture disease. Extracorporeal lithotripsy of infectious calculi can be associated with severe septic complication. Inadequate preoperative and intraoperative imaging and morbid obesity were also associated with failure. Second- and third-generation lithotriptors were represented in greater numbers than the Dornier HM-3 in this group of ESWL failures.

Conclusions. ESWL remains the treatment of choice for moderately sized, uncomplicated renal calculi. Large calculi, those within obstructed or dependent portions of the collecting system, and those composed of calcium oxalate monohydrate, frequently fail ESWL. Training in the more technically challenging aspects of endoscopic lithotripsy must be encouraged.

Talic, R.F. (1996), Extracorporeal shock-wave lithotripsy monotherapy in renal pelvic ectopia. *Urology*, **48** (6), 857-861.

Full Text: [1996\Urology48, 857.pdf](1996/Urology48,%20857.pdf)

Abstract: Objectives. To determine the efficacy of extracorporeal shock-wave lithotripsy (ESWL) in the treatment of urinary stones in pelvic kidneys.

Methods. Fourteen male patients with renal pelvic ectopia and stones were treated with ESWL monotherapy using the unmodified Dornier HM3 lithotriptor with its original generator and ellipsoid. Twelve patients were treated in the prone position using cystoscopically placed ureteral catheters to aid in fluoroscopic localization, whereas 2 patients were treated in the supine position. A review of their stone disease, ESWL treatment, ancillary procedures, outcome, and complications is presented.

Results. All pelvic kidneys were free of infection and obstruction in this group. The mean stone burden was 30.2 ± 37.8. Most patients required a single session (9 of the 14 [64%]), 2 patients required two sessions, and 2 patients required multiple sessions. The average number of shock waves per session was 1689 (range 450 to 3500), with average kilovoltage of 21.5 (range 18 to 24). Eighty-two percent of the patients followed (9 of 11) were stone-free at 3 months. No ancillary endourologic procedures were required to deal with the presenting stones. Obstructive steinstrasse complicated treatment in only 2 patients (14%) and was successfully treated by further ESWL in both patients; in 1 of them, ureteroscopy was needed.

Conclusions. ESWL monotherapy of renal pelvic ectopia stones is very effective and should be considered as the first therapeutic option for these patients, provided that accurate localization of the stone treated and proper positioning of patients that ensures adequate delivery of shock-wave energy can be maintained.

? Chuaqui, R.F., Englert, C.R., Strup, S.E., Vocke, C.D., Zhuang, Z.P., Duray, P.H., Bostwick, D.G., Linehan, W.M., Liotta, L.A. and Emmertbuck, M.R. (1997), Identification of a novel transcript up-regulated in a clinically aggressive prostate carcinoma. *Urology*, **50** (2), 302-307.

Full Text: [1997\Urology50, 302.pdf](1997/Urology50,%20302.pdf)

Abstract: Objectives. To identify differentially expressed genes in tumor cells of patients with prostate cancer by means of tissue microdissection and targeted differential display. Methods. RNA was recovered from pure populations of microdissected normal epithelium and invasive tumor from frozen tissue sections of a radical prostatectomy specimen. Reverse transcriptian-polymerase chain reaction (PCR) using arbitrary and zinc finger PCR primers was performed. Results, A 130-base pair product was identified that appeared selectively in the tumor sample. DNA sequence analysis revealed it to be a clone from the expressed sequence tag database (GenBank accession R00504). Microdissection of normal epithelium and the corresponding invasive tumor was subsequently performed on a test panel of 10 prostate carcinoma specimens. Comparison of R00504 levels in normal epithelium and invasive carcinoma, using β-actin as an internal control, showed the transcript to be substantially overexpressed in 5 of 10 carcinomas. Northern blotting revealed R00504 to be a 2.6-kilobase gene. Conclusions. A navel transcript up-regulated in an aggressive prostate carcinoma was identified using degenerate zinc finger primers in microdissected tissue samples. The approach used in this study may be helpful in quantitative comparison of known genes and identification of novel gel?es in microdissected human tissue samples. (C) 1997, Elsevier Science Inc. All rights reserved.

Keywords: Human Breast-Cancer, Cloning

? Lu, C.M., Lan, S.J., Lee, Y.H., Huang, J.K., Huang, C.H. and Hsieh, C.C. (1999), Tea consumption: Fluid intake and bladder cancer risk in southern Taiwan. *Urology*, **54** (5), 823-828.

Full Text: [1999\Urology54, 823.pdf](1999/Urology54,%20823.pdf)

Abstract: Objectives. To determine whether tea consumption and intake of other beverages increases bladder cancer risk.

Methods, A case-control study was conducted in Kaohsiung, Taiwan between August 1996 and June 1997. Index patients studied were consecutive patients with histologically confirmed, newly diagnosed bladder cancer in two major hospitals. For each patient, 4 controls were selected from patients with non-neoplastic and nonurologic diseases undergoing surgical operations in the same hospital and individually matched by sex, age, and date of admission. Using a structured questionnaire, a trained interviewer interviewed 40 patients and 160 controls. Conditional logistic regression analysis adjusting for ethnicity, family history, and smoking status and matching variables were used to estimate the odds ratio (OR) and 95% confidence interval (CI).

Results. Tea consumption overall was associated with increased bladder cancer risk (OR 3.29, 95% CI 1.34 to 8.05). Compared with non-tea drinkers, the odds ratios of bladder cancer for oolong tea drinkers was 3.00 (95% CI 1.20 to 7.47); for non-oolong tea drinkers (black and/or other green tea), it was 14.86 (95% CI 2.13 to 103.83). The risk was greater among those who began to drink tea before age 40 (OR 9.50, 95% CI 2.39 to 37.75) and those who had been drinking tea for more than 30 years (OR 17.75, 95% CI 3.00 to 105.17). Coffee, tap water, and alcohol consumption were associated with a slightly increased risk, and both soy juice and rice juice consumption were associated with reduced risk; none of these odds ratio estimates were statistically significant, however.

Conclusions. Our results suggest that tea consumption is associated with an increased risk of bladder cancer. UROLOGY 54: 823-828, 1999. (C) 1999, Elsevier Science Inc.

Keywords: Dietary Factors, Drinking-Water, Smoking, Coffee, Polyphenols, Beverages, Selection, Area, Men

Hassan, I. and Zietlow, S.P. (2002), Acute pancreatitis after extracorporeal shock wave lithotripsy for a renal calculus. *Urology*, **60** (6), 1111iii-1111v.

Full Text: [2002\Urology60, 1111.pdf](2002/Urology60,%201111.pdf)

Abstract: Extracorporeal shock wave lithotripsy (ESWL) is currently considered the standard treatment for most renal and upper ureteral calculi. The complication rates with ESWL have been reported to be low, resulting in its widespread acceptance and use. However, as the technique has become more widely available, serious complications as a result of injury to the kidney and the surrounding organs have been recognized. We report on the development of severe acute pancreatitis in a patient after ESWL for a right-sided renal calculus. The patient history and chronologic clinical course strongly suggest a causal association between the ESWL and the development of pancreatitis.

? Brucker, P.S. and Cella, D. (2003), Measuring self-reported sexual function in men with prostate cancer. *Urology*, **62** (4), 596-606.

Full Text: [2003\Urology62, 596.pdf](2003/Urology62,%20596.pdf)

? Heldwein, F.L., Rhoden, E.L. and Morgentaler, A. (2010), Classics of urology: A half century history of the most frequently cited articles (1955-2009). *Urology*, **75** (6), 1261-1268.

Full Text: [2010\Urology75, 1261.pdf](2010/Urology75,%201261.pdf)

Abstract: To identify and characterize the most frequently cited articles published in Journals dedicated to Urology over the last 50 years. A Pubmed search was performed of all articles published in the 13 most cited urological journals between 1955 and 2009. Articles with more than 100 citations were identified as “classic”, and were analyzed further. Of 97 554 articles published during this time, 1239 articles were cited more than 100 times. The most common topic among classic articles was prostate cancer and prostate-specific antigen (33.5%), followed by bladder cancer and benign prostatic hyperplasia. A further analysis was performed for the 50 most frequently cited articles (“top-50”). UROLOGY 75: 1261-1268, 2010. (C) 2010 Elsevier Inc.

Keywords: Cancer, Citations, Continence Society, History, Journals, Prostatectomy, Renal-Cell Carcinoma, Standardization Sub-Committee, Terminology, Urinary-Tract Function

# Title: 2007 USDA-CSREES National Water Conference

Full Journal Title: [2007 USDA-CSREES National Water Conference](http://www.soil.ncsu.edu/extension/training/abstracts/proceed.php?num=4)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0171-1091

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kuo, S. and Bembenek, R. (2007), Removal of dissolved phosphorus using iron or aluminum oxide impregnated wood residues. *2007 USDA-CSREES National Water Conference*.

Abstract: Various products developed from agricultural waste materials or residues for removing contaminants from water or wastewater have been introduced. This study examined the feasibility of developing poplar (populus delfiodes) wood chips impregnated with Fe or Al oxide and the efficacy of the products to remove dissolved phosphrous (P) from water or waste water. Impregnation of the wood chip with Fe or Al oxide could be easily made by treating the chips with 1 M FeCl3 or AlCl3 solution, followed by exposure of the treated chips to NH3 vapor to facilitate Fe or Al precipitation as hydrous oxides. The impregnated wood chip contained an average of 1.10 mmole Fe g-1 or 0.91 mmole Al g-1 chip. The amount of P retained by the impregnated chip increased with increasing size (weight) of the chip, with the amount of P sorbed reaching a level equivalent to 5% or more of the impregnated Fe or Al. The rate of P sorption by the Fe or Al impregnated chip was rapid and increased with increasing size (weight) of the chip. It was well described by pseudo second-order rate equation. Greater than 81% of the sorbed P was readily desorbed in 0.1 M NaOH and the rate of desorption was also well described by the second-order equation. Ageing had no apparent effect on the desorption of the sorbed P in 0.1 M NaOH. The study demonstrated that wood could be easily activated to become an effective P sink after impregnation with Fe or Al oxide.

# Title: US Environmental Protection Agency Report EPA

(US Environ. Prot. Agency Report EPA)

Hallowwell, J.B., Shee, J.F., Smithson, G.R., Tripler, A.B. and Gonser, B.W. (1973), Water pollution control in the primary non-ferrous metal industry (copper, zine and lead industries). *US Environmental Protection Agency Report EPA*, (R2), **1**, 73-247a.

# Title: Use of Adsorbents for the Removal of Pollutants from Wastewaters

CRC Press, Boca Raton, New York, London and Tokyo

McKay, G. (1995), Design of adsorption contacting systems. in *Use of Adsorbents for the Removal of Pollutants from Wastewaters*, (Edited by McKay, G.), CRC Press, Boca Raton, New York, London and Tokyo, 99-132.

# Title: Uspekhi Fizicheskikh Nauk

Full Journal Title: Uspekhi Fizicheskikh Nauk

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0042-1294

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor 1.533, 25/121

Bolotovskiĭ, B.M., Vavilov, Y.N. and, Kirkin, A.N. (1998), Sergeĭ Ivanovich Vavilov as a man and a scientist: A view from the 21st century threshold. *Uspekhi Fizicheskikh Nauk*, **168** (5), 551-570.

Full Text: [1998\Usp Fiz Nau168, 551.pdf](1998/Usp%20Fiz%20Nau168,%20551.pdf)

# Title: Uspekhi Khimii

Full Journal Title: Uspekhi Khimii

Full Journal Title: Russian Chemical Reviews

ISO Abbreviated Title: Uspekhi Khimii

JCR Abbreviated Title: Usp Khim

ISSN: 0042-1308

Issues/Year: 12

Journal Country/Territory: Russia

Language: English

Publisher: Mezhdunarodnaya Kniga

Publisher Address: 39 Dimitrova UL., 113095 Moscow, Russia

Subject Categories:

Chemistry: Impact Factor 1.533, 25/121

Nikol’Skii, B.P. and Paramonova, V.I. (1939), Laws of exchange of ions between a solid phase and a solution. *Uspekhi Khimii*, **8**, 1535-1567.

? Zibareva, I.V., Teplova, T.N. and Nefedov, O.M. (2007), Bibliometric analysis of *Uspekhi Khimi*. *Uspekhi Khimii*, **76** (8), 747-751.

# Title: Virginia Medical Monthly

Full Journal Title: Virginia Medical Monthly

ISO Abbreviated Title: Va. Med. Mon.

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shanholtz, M. (1970), I. Drinking water in Virginia. *Virginia Medical Monthly*, **97** (11), 727-729.

# Title: Vaccine

Full Journal Title: [Vaccine](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5188&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=1fccb0e459d7586c3209d9f948c09fce)

ISO Abbreviated Title: Vaccine

JCR Abbreviated Title: Vaccine

ISSN: 0264-410X

Issues/Year: 20

Journal Country/Territory: England

Language: English

Publisher: Elsevier Sci Ltd

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

Subject Categories:

Immunology Medicine, Research & Experimental Veterinary Sciences: Impact Factor

Barzaga, B.N. (2000), Hepatitis A shifting epidemiology in South-East Asia and China. *Vaccine*, **18** (1), S61-S64.

Full Text: [2000\Vaccine18, S61.pdf](2000/Vaccine18,%20S61.pdf)

Abstract: A review of the epidemiology of hepatitis A virus (HAV) infection over the last 20 years shows shifting patterns in the prevalence of antibodies to HAV (anti-HAV) throughout South-East Asia and China. A number of countries have shifted from high to moderate and from moderate to low endemicity, with a corresponding increase in the age of exposure from childhood to early adulthood. The changes have resulted from improvements in hygiene, sanitation and the quality of drinking water, reflecting improvements in living standards and socioeconomic progress. In general in the late 1970s and early 1980s, 85-95% of the population of developing countries like the Philippines, Korea, China and Thailand were anti-HAV-positive by age 10-15 years, compared with only about 50% in the more affluent countries like Malaysia and Singapore. In the early 1990s, 85-95% of the population were immune by age 30-40 years in the Philippines, Korea, China and Thailand, and by 50 years of age and above in Malaysia and Singapore. Similar trends were noted in Hong Kong, Taiwan and Japan. Exposure to HAV at a later age may be associated with an increase in hepatitis A morbidity and a greater propensity for outbreaks.

? Bish, A., Yardley, L., Nicoll, A. and Michie, S. (2011), Factors associated with uptake of vaccination against pandemic influenza: A systematic review. *Vaccine*, **29** (38), 6472-6484.

Full Text: [2011\Vaccine29, 6472.pdf](2011/Vaccine29,%206472.pdf)

Abstract: Background: In June 2009 a global influenza pandemic was declared by the World Health Organisation. A vaccination programme against H1N1 influenza was introduced in many countries from September 2009, but there was low uptake in both the general population and health professionals in many, though not all, countries. Purpose: To examine the psychological and demographic factors associated with uptake of vaccination during the 2009 pandemic. Method: A systematic literature review searching Web of Science and PubMed databases up to 24 January 2011. Results: 37 articles met the study inclusion criteria. Using the framework of Protection Motivation Theory the review found that both the degree of threat experienced in the 2009 pandemic influenza outbreak and perceptions of vaccination as an effective coping strategy were associated with stronger intentions and higher uptake of vaccination. Appraisal of threat resulted from both believing oneself to be at risk from developing H1N1 influenza and concern and worry about the disease. Appraisal of coping resulted from concerns about the safety of the vaccine and its side effects. There was evidence of an influence of social pressure in that people who thought that others wanted them to be vaccinated were more likely to do so and people getting their information about vaccination from official health sources being more likely to be vaccinated than those relying on unofficial sources. There was also a strong influence of past behaviour, with those having been vaccinated in the past against seasonal influenza being more likely to be vaccinated against pandemic influenza. Demographic factors associated with higher intentions and uptake of vaccination were: older age, male gender, being from an ethnic minority and, for health professionals, being a doctor. Discussion: Interventions designed to increase vaccination rates could be developed and implemented in advance of a pandemic. Strategies to improve uptake of vaccination include interventions which highlight the risk posed by pandemic influenza while simultaneously offering tactics to ameliorate this risk (e.g. vaccination). Perceived concerns about vaccination can be tackled by reducing the omission bias (a perception that harm caused by action is worse than harm caused by inaction). In addition, interventions to increase seasonal influenza vaccination in advance of a future pandemic may be an effective strategy. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: A, H1N1 Vaccination, Acceptance, At Risk, Attitudes, Bias, Campaigns, Children, Databases, Disease, Ethnic Minority, Factors, Fear Appeals, Gender, H1N1, H1n1 Influenza, Health, Health-Care Workers, Hong-Kong, Influenza, Influenza Vaccination, Information, Interventions, Literature, Literature Review, Male, Pandemic, Pandemic Influenza, Perception, Perceptions, Pressure, Psychological, Psychological Factors, Pubmed, Review, Risk, Safety, Science, Side Effects, Social, Strategy, Swine Flu, Systematic, Systematic Literature Review, Systematic Review, Theory, Uptake, Vaccination, Vaccination Rates, Vaccine, Web of Science

? Robbins, S.C.C., Ward, K. and Skinner, S.R. (2011), School-based vaccination: A systematic review of process evaluations. *Vaccine*, **29** (52), 9588-9599.

Full Text: [2011\Vaccine29, 9588.pdf](2011/Vaccine29,%209588.pdf)

Abstract: Objective: School-based vaccination is becoming a more widely used method of vaccine delivery. However, evaluations of school-based vaccination program implementation have not been systematically reviewed. This paper describes the results of a systematic review of the literature on process (or implementation) evaluations of school-based vaccination delivery. Methods: Search terms: “school based vaccination” OR ((“schools” OR “school”) AND (“immunisation” OR “immunization” OR “vaccination”)). Limits: Humans; English language; Age: 6-18 (school-age children and adolescents); No editorials; No letters. Databases: PUBMED; Embase.com; Cochrane Database of Systematic Reviews; Cinahl; Web of Science; PsycINFO. Inclusions: Articles must have originated from an advanced economic ‘developed’ country, be peer-reviewed, available in English, randomised or non-randomised controlled design, published from 1970 to August 2010 and focused on vaccinations provided in the school setting and during school time which reported one or more outcomes. Exclusions: qualitative or descriptive papers without any evaluation component; papers that only reported on impact evaluation (i.e. number of students vaccinated); and those published before 1970. Results: A total of 14 articles were identified as including some element of a process evaluation of a school-based vaccination program. Nurses, parents, teachers, and adolescents were involved in measures of procedural factors related to school-based vaccination implementation. Outcomes included return rates of consent forms; knowledge about the specific vaccine offered; attitudes toward vaccination and school-based vaccination; reasons for non-vaccination; resources, support, and procedures related to implementation; and environmental factors within the school that may impact vaccination success. Vaccination coverage was also reported in the majority of papers. Conclusions: Many studies reported on the importance of ensuring all stakeholders (school nurses, parents, teachers, and adolescents) receive appropriate information and are involved in the vaccination program and implementation processes. Specific consent form dissemination procedures have demonstrated higher return rates. Further controlled studies are needed to determine the best practice approach to implementing these programs is a variety of contexts. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Adolescents, Age, Articles, Attitudes, Australia, Children, Cochrane, Controlled Studies, Coverage, Database, Databases, Design, Dissemination, English, Environmental, Evaluation, Hepatitis-B Vaccination, Human-Papillomavirus Vaccination, Humans, Immunization Program, Impact, Implementation, Implementation, Information, Knowledge, Literature, Methods, Nurses, Outcomes, Papers, Parents, Practice, Process, Process Evaluation, Processes, Program Evaluation, Publication Bias, Qualitative, Recommendations, Review, School-Based Vaccination, Science, Students, Success, Systematic, Systematic Review, Vaccination, Vaccinations, Vaccine, Vaccine Delivery, Web of Science, Web-of-Science

# Title: Vacuum

Full Journal Title: [Vacuum](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5552&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=030566d6867ada4d75033ec277ee5e58)

ISO Abbreviated Title: Vacuum

JCR Abbreviated Title: Vacuum

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Rudzinski, W., Narkiewicz, J. and Patrykiejew, A. (1977), Theoretical origin of Haul and Gottwald empirical isotherm for ultrahigh-vacuum adsorption. *Vacuum*, **27** (9), 545-547.

Full Text: Vacuum27, 545

? Jaroniec, M. (1978), Kinetics of monolayer mixed-gas adsorption on heterogeneous surfaces. *Vacuum*, **28** (1), 17-19.

Full Text: Vacuum28, 17

# Title: Vadose Zone Journal

Full Journal Title: [Vadose Zone Journal](http://vzj.geoscienceworld.org/archive/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1539-1663

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Goldberg, S. (2004), Modeling boron adsorption isotherms and envelopes using the constant capacitance model. *Vadose Zone Journal*, **3** (2), 676-680.

Full Text: [2004\Vad Zon J3, 676.pdf](2004/Vad%20Zon%20J3,%20676.pdf)

Abstract: Boron adsorption on 23 soil samples belonging to six different soil orders was investigated both as a function of solution B concentration (0 - 23.1 mmol L-1) and as a function of solution pH (4 - 11). Boron exhibited maxima at high solution B concentration. Boron adsorption increased with increasing solution pH, reached a maximum around pH 9, and decreased with further increases in solution pH. The constant capacitance model was able to describe B adsorption the soil samples as a function of both solution B concentration and solution pH simultaneously by optimizing three surface complexation constants. The ability to describe B adsorption as a function of pH represents an advancement over the Langmuir and Freundlich adsorptration isotherm approaches. Incorporation of these constants into chemical speciation transport models will allow simulation of soil solution B concentrations under diverse environmental and agricultural conditions.

Keywords: Layer Silicates Sesquioxides, Soil Materials, Retention, Parameters, Sorption, Oxide

? Decker, D.L., Papelis, C., Tyler, S.W., Logsdon, M.J. and Simunek, J. (2006), Arsenate and arsenite sorption on carbonate hosted precious metals ore. *Vadose Zone Journal*, **5** (1), 419-429.

Full Text: [2006\Vad Zon J5, 419.pdf](2006/Vad%20Zon%20J5,%20419.pdf)

Abstract: The societal impacts of As in water resources in the arid western USA are potentially acute as a consequence of the combined effects of limited water supplies and the pervasive occurrence of naturally occurring As in subsurface geologic formations, including the carbonate-hosted, disseminated gold-bearing formations of the Carlin Trend. The prevalence of As in secondary minerals in gold-bearing carbonate-hosted ores is of interest because of the potential for As release as a result of ore development. A key component to gold mining is the engineering and construction of large-scale heap-leach and waste-rock containment structures that are characterized by variably saturated hydrology. Estimating As release behavior from these structures with a variably saturated reactive flow and transport numerical model requires the quantification of the significant differences in the sorption behavior for the stable redox states for As. Therefore, the objective of this study was to quantify this sorption behavior and to represent the observed behavior with an isotherm formulation. The pH-dependent sorption behavior of arsenite, As(III), and arsenate, As(V), onto two carbonate-hosted gold ores is presented. The experimentally determined pH-dependent sorption behavior for both As(III) and As(V) is consistent with sorption on metal oxides as reported in studies on rock and soils with similar bulk mineralogical properties. The experimental sorption data are represented with two modified isotherm formulations. Modified formulations of the Langmuir isotherm and of the Sips isotherm are presented that include the pH of the sorbate solution as an additional model parameter. These formulations are applied to both As(III) and As(V) sorption data to generate an isotherm surface. The pH-dependent isotherm methodology can be incorporated readily into numerical models for the purposes of estimating As transport behavior in field-scale, variably saturated environments.

Keywords: Dependent Boron Adsorption, Nevada Test-Site, Surface Complexation, Competitive Adsorption, Zeolitized Tuffs, Water Interface, Ground-Water, Pit Lake, Arsenic(III), Soils

? Goldberg, S., Criscenti, L.J., Turner, D.R., Davis, J.A. and Cantrell, K.J. (2007), Adsorption - Desorption processes in subsurface reactive transport modeling. *Vadose Zone Journal*, **6** (3), 407-435.

Full Text: [2007\Vad Zon J6, 407.pdf](2007/Vad%20Zon%20J6,%20407.pdf)

Abstract: Adsorption-desorption reactions are important processes that affect the transport of contaminants in the environment. Various empirical approaches, such as the distribution coefficient and Freundlich and Langmuir isotherm equations, have been used to represent adsorption. The empirical approaches are not capable of accounting for the effects of variable chemical conditions, such as pH, on adsorption reactions. This can be done using chemical models such as surface complexation models. These models define specific surface species, chemical reactions, equilibrium constants, mass balances, and charge balances, and their molecular features can be given thermodynamic significance. Ion adsorption mechanisms and surface configurations for the surface complexation models can be established from independent experimental observations. These include both indirect measurements, such as point of zero charge shifts, ionic strength effects, and calorimetry, and direct spectroscopic techniques, including vibrational spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, and X-ray absorption spectroscopy. Surface complexation models were developed for single mineral phases but have now been applied to natural mineral assemblages using both component additivity (CA) and generalized composite (GC) approaches. Surface complexation models have been incorporated into subsurface transport models at several field sites, although simplifying assumptions are needed to deal with heterogeneous materials. Surface complexation models for contaminant adsorption have the potential to increase the confidence and scientific credibility of transport modeling by reducing the uncertainty in quantifying retardation and providing a means of quantifying that uncertainty.

Keywords: X-Ray-Absorption, Constant Capacitance Model, Oxide-Water Interface, Surface-Complexation Models, Electrical Double-Layer, Bond-Valence Determination, Hydrolyzable Metal-Ions, Density-Functional Calculations, Chromate Retention Mechanisms, Alumina Electrolyte Interface

? Flury, M. and Qiu, H.X. (2008), Modeling colloid-facilitated contaminant transport in the vadose zone. *Vadose Zone Journal*, **7** (2), 682-697.

Full Text: [2008\Vad Zon J7, 682.pdf](2008/Vad%20Zon%20J7,%20682.pdf)

Abstract: Subsurface colloids can enhance the movement of strongly sorbing contaminants’ a phenomenon called colloid-facilitated contaminant transport. In the presence of mobile subsurface colloids, contaminants may move faster and farther than in the absence of colloids, thereby bypassing the filter and buffer capacity of soils and sediments. Fate and transport models neglecting colloid-facilitated transport therefore often underpredict contaminant movement. Long-term predictions of contaminant fate and transport as well as risk assessment rely on an accurate representation of subsurface processes, and in the case of strongly sorbing contaminants, need to consider mobile colloids as potential contaminant carriers. The purpose of this review is to discuss the current knowledge and recent developments of modeling colloid-facilitated contaminant transport in the vadose zone. The main part of this review is devoted to the discussion of conceptual models used to describe colloid-facilitated contaminant transport in the vadose zone and their mathematical implementation. Modeling of colloid-facilitated contaminant transport involves various interactions, including colloid attachment to and detachment from the solid matrix and the air-water interface, contaminant adsorption to and desorption from colloids and transport with mobile colloids, and contaminant adsorption to and desorption from the solid matrix. Most of these processes in colloid-facilitated contaminant transport models have been described by first- or second-order kinetics. The unique feature of the vadose zone is the presence of an air phase, which affects colloid and contaminant transport in several ways. Colloids can be trapped in immobile water, strained in thin water films and in the smallest regions of the pore space, or attached to the air-water interface itself. The modeling of colloid-facilitated contaminant transport in the vadose zone has mostly been theoretical, and tested only with column experiments; field applications are still lacking.

Keywords: Adsorption, Air-Water Interfaces, Assessment, Capacity, Cation-Exchange, Colloid, Colloids, Column Experiments, Contaminant Transport, Desorption, Experiments, Feature, First, Hanford Sediments, Kinetics, Knowledge, Laboratory Column, Modeling, Models, Potential, Reactive Transport, Representation, Review, Risk, Risk Assessment, Second-Order Kinetics, Solute Transport, Subsurface Colloids, Transient-Flow Conditions, Transport, Unsaturated Porous-Media, Vadose Zone, Water

# Title: Vakuum-Technik

Full Journal Title: Vakuum-Technik

ISO Abbreviated Title:

JCR Abbreviated Title: Vakuum-Tech

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Gottwald, B.A., Haul, R. and Roth, W. (1973), Studies of adsorption kinetics by means of molecular flow experiments. *Vakuum-Technik*, **22** (1), 6-9.

? Besocke, K. and Berger, S. (1978), Influence of monoatomic steps on adsorption-kinetics of oxygen on tungsten. *Vakuum-Technik*, **27** (3), 66-70.

# Title: Value in Health

Full Journal Title: [Value in Health](http://www3.interscience.wiley.com/journal/118497680/home)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1098-3015

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ungar, W.J. and Santos, M.T. (2003), The Pediatric Quality Appraisal Questionnaire: An instrument for evaluation of the pediatric health economics literature. *Value in Health*, **6** (5), 584-594.

Full Text: [2003\Val Hea6, 584.pdf](2003/Val%20Hea6,%20584.pdf)

Abstract: Objectives: Currently there is no tool available to adequately appraise the quality of the pediatric health economics literature. A comprehensive pediatric-specific instrument would be valuable in informing allocation decisions related to pediatric interventions and services. The goal of this study was to develop the Pediatric Quality Appraisal Questionnaire (PQAQ). Methods: A draft instrument was constructed from published checklists and questionnaires. New questions pertaining to the pediatric population were incorporated. An expert panel reviewed the draft instrument and the proposed scoring scheme for face and content validity. A revised version was pilot tested by three independent appraisers. After addressing discrepancies in scores, a final version was created and subjected to interrater and test-retest reliability assessment. Results: The 57 items in the final PQAQ were mapped onto 14 domains: economic evaluation, comparators, tar-get population, time horizon, perspective, costs and resource use, outcomes, quality of life, analysis, discounting, incremental analysis, sensitivity analysis, conflict of interest, and conclusions. Among the 57 items, 46 have response options that are scored from 0 to 1. Interrater reliability was 0.75 (95% confidence interval [CI] 0.66-0.81) and test-retest reliability was 0.92 (95% CI 0.71-0.98). Conclusions: The PQAQ is a comprehensive instrument demonstrating face and content validity and strong interrater and test-retest reliability in the appraisal of pediatric economic evaluations. This tool will be valuable to health economists, methods researchers, and policy decision makers involved in allocation decisions for pediatric health care.

Keywords: Allocation, Analysis, Assessment, Care, Confidence, Conflict of Interest, Constructed, Costs, Decision, Economic, Economic Evaluation, Economics, Evaluation, Expert Panel, Health, Health Care, Health Economics, Interval, Interventions, Life, Literature, Methods, Options, Outcomes, Pediatric, Pilot, Policy, Policy Decision, Population, Quality, Quality of, Quality of Life, Questionnaires, Reliability, Resource Use, Sensitivity, Sensitivity Analysis, Services, Test-Retest, Validity, Version

? Neumann, P.J., Greenberg, D., Olchanski, N.V., Stone, P.W. and Rosen, A.B. (2005), Growth and quality of the cost-utility literature, 1976-2001. *Value in Health*, **8** (1), 3-9.

Full Text: [2005\Val Hea8, 3.pdf](2005/Val%20Hea8,%203.pdf)

Abstract: Purpose: Cost-utility analyses (CUAs) have become increasingly popular, although questions persist about their comparability and credibility. Our objectives were to: 1) describe the growth and characteristics of CUAs published in the peer-reviewed literature through 2001; 2) investigate whether CUA quality has improved over time; 3) examine whether quality varies by the experience of journals in publishing CUAs, or the source of external funding for study investigators; and 4) examine changes in practices in US-based studies following recommendations of the US Panel on Cost-Effectiveness in Health and Medicine (USPCEHM). This study updates and expands our previous work, which examined CUAs through 1997. Methods: We conducted a systematic search of the English-language medical literature for original CUAs published from 1976 through 2001, using MEDLINE and other databases. Each study was audited independently by two trained readers, who recorded the methodological and reporting practices used. Results: Our review identified 533 original CUAs. Comparing articles published in 1998 to 2001 (n = 305) with those published in 1976 to 1997 (n = 228), studies improved in almost all categories, including: clearly presenting the study perspective (73% vs. 52%, P < 0.001); discounting both costs and quality-adjusted life-years (82% vs. 73%, P = 0.0115); and reporting incremental cost-utility ratios (69% vs. 46%, P < 0.001). The proportion of studies disclosing funding sources did not change (65% vs. 65%, P = 0.939). Adherence to recommended practices was greater in more experienced journals, and roughly equal in industry versus non-industry-funded analyses. The data suggest an impact in methodological practices used in US-based CUAs in accordance with recommendations of the USPCEHM. Conclusions: Adherence to methodological and reporting practices in published CUAs is improving, although many studies still omit basic elements. Medical journals, particularly those with little experience publishing cost-effectiveness analyses, should adopt and enforce standard protocols for conducting and reporting CUAs.

Keywords: Analyses, Changes, Characteristics, Cost Effectiveness, Cost-Effectiveness, Cost-Utility, Costs, Credibility, Data, Databases, Experience, Funding, Growth, Impact, Journals, Literature, Medical, Medical Literature, P, Peer-Reviewed, Practices, Protocols, Publishing, Quality, Quality of, Recommendations, Reporting, Review, Source, Sources, Standard, US, Work

? Siegel, J.E., Byron, S.C. and Lawrence, W.F. (2005), Federal sponsorship of cost-effectiveness and related research in health care: 1997-2001. *Value in Health*, **8** (3), 223-236.

Full Text: [2005\Val Hea8, 223.pdf](2005/Val%20Hea8,%20223.pdf)

Abstract: Objectives: To describe recent federal sponsorship of cost-effectiveness and related health economics research to provide insight into the functioning of existing research support systems and assess the roles of federal health agencies. Methods: Using the PubMed database, we identified cost-effectiveness and related publications citing support from a US government entity and published during the period of 1997 through 2001, and audited them for information on funding sources, study type, and content focus. Results: Five Department of Health and Human Services agencies and centers and the Veterans Administration are cited as funders in 74% of 520 federally supported health economics publications we identified. Three-fourths of federally supported publications address five areas of high disease burden: infections, cancer, HIV/AIDS, cardiovascular disease, and substance abuse. Other high burden diseases, including mental health, diabetes, and injuries, receive less attention. Federal support of health economics studies of health education and care delivery-intervention types underexamined in the field-is relatively strong but most often focuses on substance abuse or mental health services. Each of the top federal funders has a distinct funding pattern, but there are substantial areas of overlap within which we could not identify content domains specific to one funder or another. Conclusions: Federal support of health economics research has paralleled growth in the field. Federal funders support projects consistent with their mission and focus on high-burden disease areas. However, overlapping funding areas, ambiguity concerning agency interests within overlapping content areas, and gaps in some disease and intervention areas suggest that the coordination of health economics research funding could be improved.

Keywords: Abuse, Burden, Cancer, Cardiovascular, Cardiovascular Disease, Care, Cost Effectiveness, Cost-Effectiveness, Database, Diabetes, Disease, Diseases, Economics, Education, Field, Funding, Growth, Health, Health Care, Health Economics, Health Education, Health Services, HIV, AIDS, Infections, Information, Intervention, Mental Health, Overlapping, Pattern, Publications, PUBMED, Research, Research Funding, Research Support, Services, Sources, Substance Abuse, Support, Systems, US

? Greenberg, D., Rosen, A.B., Palmer, J.A., Wacht, O. and Neumann, P.J. (2008), 30 years of cost-effectiveness analyses: A bibliometric review of articles published in the economic and medical literature: 1976-2005. *Value in Health*, **11** (3), A172.

Full Text: Val Hea11, A172.pdf

Keywords: Analyses, Bibliometric, Cost Effectiveness, Cost-Effectiveness, Economic, Literature, Medical, Medical Literature, Review

Au, F., Prahardhi, S. and Shiell, A. (2008), Reliability of two instruments for critical assessment of economic evaluations. *Value in Health*, **11** (3), 435-439.

Full Text: [2008\Val Hea11, 435.pdf](2008/Val%20Hea11,%20435.pdf)

Abstract: Objective: To assess the reliability of two instruments designed for critical appraisal of economic evaluations: the Quality of Health Economic Studies (QHES) scale and the Pediatric Quality Appraisal Questionnaire (PQAQ). Methods: Thirty published articles were chosen at random from a recent bibliography of economic evaluations in health promotion. The quality of each of these studies was assessed independently by two raters using each of the two instruments. Inter-rater reliability and the agreement between the instruments were measured using an intraclass correlation coefficient (ICC). Cronbach’s generalizability theory was also used to assess the sources of variation in quality scores of the studies and to indicate where improvements in reliability could best be made. Results: Inter-rater reliability was excellent for both instruments (ICC = 0.81 for the QHES and 0.80 for the PQAQ).Agreement between the instruments varied (ICC = 0.77 for rater 1 and 0.56 for rater 2). The biggest source of variation in the scores assigned to the articles was the quality of the study (56% of total variance). Conventional measurement error explained 31% of the total variance. Variation due to rater (< 0.1%) and measurement instrument (1.8%) was very low. Conclusions: The results suggest that the two instruments perform equally well. Choice of instrument can therefore be based on other criteria-simplicity and speed of application in the case of one, and detail in the information provided in the case of the other. There is little improvement in reliability to be gained from using more than one rater or more than one assessment of quality.

Keywords: Application, Assessment, Bibliography, Correlation, Correlation Coefficient, Economic, Error, Health, Health Promotion, Improvement, Information, Measurement, Promotion, Quality, Quality of, Reliability, Scale, Source, Sources, Theory

? Solans, M., Pane, S., Estrada, M.D., Serra-Sutton, V., Berra, S., Herdman, M., Alonso, J. and Rajmil, L. (2008), Health-related quality of life measurement in children and adolescents: A systematic review of generic and disease-specific instruments. *Value in Health*, **11** (4), 742-764.

Full Text: [2008\Val Hea11, 742.pdf](2008/Val%20Hea11,%20742.pdf)

Abstract: Objective: To identify currently available generic and disease-specific health-related quality of life (HRQOL) instruments for children and adolescents up to 19 years old, to describe their content, and to review their psychometric properties. Study Design: Previous reviews on the subject and a new literature review from 2001 to December 2006 (MEDLINE, the ISI Science Citation Index, HealthSTAR and PsycLit) were used to identify measures of HRQOL for children and adolescents. The characteristics (country of origin, age range, type of respondent, number of dimensions and items, name of the dimensions and condition) and psychometric properties (reliability, validity, and sensitivity to change) of the instruments were assessed following international guidelines published by the Scientific Committee of the Medical Outcomes Trust. Results: In total, 30 generic and 64 disease-specific instruments were identified, 51 of which were published between 2001 and 2005. Many generic measures cover a core set of basic concepts related to physical, mental and social health, although the number and name of dimensions varies substantially. The lower age limit for self-reported instruments was 5-6 years old. Generic measures developed recently focused on both child self-report and parent-proxy report, although 26% of the disease-specific questionnaires were exclusively addressed to proxy-respondents. Most questionnaires had tested internal consistency (67%) and to a lesser extent test-retest stability (44.7%). Most questionnaires reported construct validity, but few instruments analyzed criterion validity (n = 5), structural validity (n = 15) or sensitivity to change (n = 14). Conclusions: The development of HRQOL instruments for children and adolescents has continued apace in recent years, particularly with regard to disease-specific questionnaires. Many of the instruments meet accepted standards for psychometric properties, although instrument developers should include children from the beginning of the development process and need to pay particular attention to testing sensitivity to change.

Keywords: Adolescents, Characteristics, Children, Citation, Core, Core Scales, Health, Health-Related Quality of Life, Initial Validation, ISI, Juvenile Rheumatoid-Arthritis, Literature, Literature Review, Measurement, Measurement Model, Medline, Otitis-Media, Perceived Illness Experience, Preschool-Children, Psychometric Properties, Questionnaires, Reliability, Review, Science, Science Citation Index, Short-Form, Standards, Systematic Review, VSP-A

? Erntoft, S. (2011), Pharmaceutical priority setting and the use of health economic evaluations: A systematic literature review. *Value in Health*, **14** (4), 587-599.

Full Text: [2011\Val Hea14, 587.pdf](2011/Val%20Hea14,%20587.pdf)

Abstract: Objectives: To investigate which factors and criteria are used in priority setting of pharmaceuticals, in what contexts health economic evaluations are used, and barriers to the use of health economic evaluations at micro, meso, and macro health-care levels. Methods: The search for empirical articles was based on the MeSH index (Medical Substance Heading), including the search terms “economic evaluation,” “cost-effectiveness analysis,” “cost-utility analysis,” “cost-benefit analysis,” “pharmacoeconomic,” AND “drug cost(s),” AND “eligibility determination,” AND “decision-making,” AND “rationing,” AND formulary. The following databases were searched: PubMed, EconLit, Cochrane, Web of Science, CINAHL, and PsycINFO. More than 3100 studies were identified, 31 of which were included in this review. Results: The use of health economic evaluations at all three health-care levels was investigated in three countries (United States [US], United Kingdom [UK], and Sweden). Postal and telephone survey methods dominated (n = 17) followed by interviews (n = 13), document analysis (n = 10), and observations of group deliberations (n = 9). The cost-effectiveness criterion was most important at the macro level. A number of contextual uses of health economic evaluations were identified, including importantly the legitimizing of decisions, structuring the priority-setting process, and requesting additional budgets to finance expensive pharmaceuticals. Conclusion: Factors that seem to support the increased use of health economic evaluations are well-developed frameworks for evaluations, the presence of health economic skills, and an explicit priority-setting process. Differences in how economic evaluations are used at macro, meso, and micro levels are attributed to differences in the preconditions at each level.

Keywords: Analysis, Articles, Attitudes, Author, Barriers, Cochrane, Committees, Cost-Effectiveness, Cost-Effectiveness Analysis, Countries, Databases, Differences, Economic Evaluation, Evaluations, Factors, Formulary Decision-Making, Health, Health Care, Hospital Drug Formulary, Impact, Interviews, Literature, Literature Review, Managed Care Pharmacy, Management, Methods, Pharmaceutical, Pharmaceuticals, Pharmacoeconomic Data, Priority, Priority Setting, Process, Pubmed, Reimbursement, Review, S, Science, Survey, Systematic, Therapy, United Kingdom, United States, Web of Science, Web-of-Science

# Title: Vanderbilt Law Review

Full Journal Title: Vanderbilt Law Review

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0042-2533

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Dreyfuss, R.C. (2000), Collaborative research: Conflicts on authorship, ownership, and accountability. *Vanderbilt Law Review*, **53** (4), 1161-1232.

Keywords: Intellectual Property-Rights, Scientific Misconduct, Technology-Transfer, Silicon Valley, Copyright, Science, Law, Disputes, Lawyers, Contributors

# Title: Vascular Medicine

Full Journal Title: Vascular Medicine

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Anand, S.S. (2003), Vascular viewpoint - Quantifying effect of statins on low density lipoprotein cholesterol, ischaemic heart disease, and stroke: Systematic review and meta-analysis. Law MR, Wald NJ, Rudnicka AR. BMJ 2003; 326: 1407-408. *Vascular Medicine*, **8** (4), 289-290.

Abstract: Question: To determine by how much statins reduce serum concentrations of low density lipoprotein (LDL) cholesterol according to drug, dose, and duration of treatment. Population: Patients included in randomized, placebo-controlled trials of six statins (atorvastatin, fluvastatin, lovastatin, pravastatin, simvastatin, rosuvastatin). Design and methods: Meta analysis of 164 short-term, randomized trials including 24 000 drug-treated and 14000 placebo-treated patients. Studies were found by searching MEDLINE, the Cochrane Collaboration, Web of Science databases, and BMJ. com. All double-blind, placebo-controlled trials were considered eligible. Excluded trials were those with no placebo group, any which lasted less than 2 weeks, those that used titrated doses, those that used combination drugs to lower cholesterol, crossover trials, or those with chronic renal failure patients. The efficacy of each statin was defined as the reduction of LDL for a given dose of a statin expressed as the change in the treated group minus that in the placebo group. Results: The doses of atorvastatin, lovastatin, rosuvastatin and simvastatin used to lower LDL by an absolute amount of 1.8 mmol/l or 40% are shown in the table. Pravastatin and fluvastatin were a less effective treatment, with maximum doses (80 mg/day) lowering LDL by 1.58 mmol/l and 1.60 mmol/l, respectively. Statins increased high density lipoprotein cholesterol by 0.07 mmol/l on average with no dose effects observed. For safety outcomes, 1063/14 197 statin patients compared with 923/10 568 control patients reported one or more symptoms possibly associated with the drug. Rhabdomyolysis was observed in eight statin patients compared with five placebo patients. [GRAPHICS] Conclusion: Statins can lower the LDL cholesterol concentration by an average of 1.8 mmol/l, and the LDL lowering effect varies across statin type and dose: simvastatin, lovastatin, atorvastatin and rosuvastatin appearing more effective, and fluvastatin and pravastatin appearing less effective.

Keywords: Analysis, Cholesterol, Cochrane, Collaboration, Control, Databases, Disease, Drug, Drugs, Efficacy, Law, Ldl, Lipoprotein, Meta Analysis, Meta-Analysis, Outcomes, Patients, Review, Safety, Science, Statins, Stroke, Symptoms, Systematic, Systematic Review, Treatment, Web of Science

? Hruska, K. (2004), Research on paratuberculosis: Analysis of publications 1994-2004. *Veterinarni Medicina*, **49** (8), 271-282.

Abstract: The Web of Knowledge Results Analysis of papers published on paratuberculosis in 1994-2004 demonstrated the increasing interest in Mycobacterium avium subsp. para tuberculosis (MAP). In the analyzed period 1032 papers published by 2 519 authors affiliated with 738 institutions were indexed in the Web of Science database. The papers were published in 238 journals, 25 of which contained more than 55% of articles. The Top 50 authors, Top 50 institutions and Top 50 most frequently cited papers are listed in this review. The contribution of OIE Reference Laboratory for Paratuberculosis established in the Veterinary Research Institute, Brno, is assessed according to the number of publications (29), number of authors participating (79), number of institutions collaborating (41 from 17 countries) and their positions in the Top 50 lists. It is evident that the number of papers on Mycobacterium avium subsp. paratuberculosis, a species causing para tuberculosis in ruminants and possibly having a role in the development of Crohn’s disease in at least some humans is significantly increasing.

Keywords: Authors, Avium Subsp-Paratuberculosis, Bovine Tuberculosis, Contribution, Crohn’S Disease, Crohns-Disease, Development, Disease, Fragment-Length-Polymorphism, Humans, Interest, Journals, Knowledge, Mycobacterium-Paratuberculosis, Nucleotide-Sequence, Papers, Paratuberculosis, Passive Vectors, Peripheral-Blood, Polymerase Chain-Reaction, Publications, Research, Review, Science, Tuberculosis, Web of Knowledge, Web of Science, Wild Ruminants

? Franek, M. and Hruska, K. (2005), Antibody based methods for environmental and food analysis: A review. *Veterinarni Medicina*, **50** (1), 1-10.

Abstract: Antibodies have widely been used as analytical tools in various assays and techniques developed for clinical chemistry and endocrinology and for food and environmental research and risk control. Antibody development in the Veterinary Research Institute, Brno, and their application in ELISA and related techniques such as immunosensors has been directed especially to phenoxyacetic acid herbicides, s-triazine herbicides, sulfonylurea herbicides, polychlorinated biphenyls, surfactants (linear alkylbenzene sulphonates) and toxic metabolites (nonylphenol), and selected veterinary drugs (namely nitrofurans and sulfonamides). This paper provides an overview of progress achieved in the production of key immunoreagents in this laboratory (and in some cooperating laboratories) during the last 15 years. A comprehensive analysis of papers published on immunoassays and biosensors used in food and environmental research since 1980 demonstrates a rapid increase of publications on “ELISA and immunoassays” since 1991 (more than 500 papers were published each year since 1996). More than 200 papers on “biosensors” have been published each year since 2001. Atrazine was the most frequently found key word with ELISA and immunoassays: 438 papers were written by 971 authors from 308 institutions. The Web of Science(R) database is a useful tool for an assessment of the researcher’s and institution’s interest in the specific topics of research.

Keywords: 2,4-Dichlorophenoxyacetic Acid, Analysis, Antibodies, Antibody, Assay Optimization, Assessment, Authors, Biosensor, Biosensors, Control, Development, Drugs, Elisa, Environmental, Environmental Research, Enzyme-Immunoassays, Food Analysis, Immunoassay, Interest, Metabolites, Monoclonal-Antibodies, Overview, Papers, Piezoelectric Immunosensors, Polarization Fluoroimmunoassay, Polychlorinated-Biphenyls, Publications, Research, Review, Risk, S-Triazine, Soil Samples, Structural Aspects, Topics

? Hruska, K. (2006), Veterinary Research Institute, Brno, Czech Republic: Analysis of papers published from 1990 to 2005. *Veterinarni Medicina*, **51** (5), 161-167.

Abstract: The Web of Science database searched results for papers published from the Veterinary Research Institute, Brno, Czech Republic, were analysed. The Veterinary Research Institute has increased publication activity in 2001-2005; more than 4 times in comparison with the period 1990-2004. The impact factor of journals has increased 5.5 times. The collaboration with 31 foreign countries and 175 institutions resulted in the publication of 277 papers in 93 journals during the past five years. Positioning of the Veterinary Research Institute is now among the worldwide leading teams is evident in twelve research profiles. The Web of Science is an efficient tool for record analysis and researcher’s and institution’s publication activities.

Keywords: Activities, Analysis, Bibliometric Analysis, Collaboration, Hemorrhagic-Disease, Impact, Impact Factor, Journals, Papers, Paratuberculosis, Publication, Publication Activity, Publications, Publications, Rabbits, Research, Research Evaluation, Science, Standardization, Virus, Web of Science

? Kaevska, M. and Hruska, K. (2010), Mycobacteria in water, feedstocks and food: Analysis of publications. *Veterinarni Medicina*, **55** (12), 571-580.

Abstract: Papers on mycobacteria in food, feed and water, published between 1945 and 2010 and indexed in the database Web of Science (R) (Thomson Reuters) were ranked according to authors, institutions, countries and source titles. The total number of papers on mycobacteria and food and mycobacteria and water were 1486 and 1419, respectively. More than 40% of papers have been published in the last five years. In addition to publications in peer reviewed journals the archives of ProMED-mail and the Rapid Alert System for Food and Feed of the European Union were also searched. It is evident that much attention is being paid to mycobacteria in food, feed and water as they likely pose a public health risk.

Keywords: Analysis, Attention, Authors, Avium Subsp Paratuberculosis, Beef, Cheese, Complex, Disease, Environment, Fish, Food Safety, Fruits, Humans, Identification, Journals, Meat, Milk, Milk, Nontuberculous Mycobacteria, Papers, Period, Products, Public Health, Publications, Risk, Science, Thomson Reuters, Vegetables, Web of Science

# Title: Vegetatio

Full Journal Title: Vegetatio

ISO Abbreviated Title: Vegetatio

JCR Abbreviated Title: Vegetatio

ISSN: 0042-3106

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Markert, B. (1991), Inorganic chemical investigations in the forest biosphere reserve near Kalinin, USSR. 1. Mosses and peat profiles as bioindicators for different chemical-elements. *Vegetatio*, **95** (2), 127-135.

Abstract: To get a first impression of the degree of pollution in the Forest Biosphere Reserve 350 km northwest of Moscow, samples of Polytrichum commune and peat profiles were measured by ICP/MS after decomposition by high-pressure ashing. Comparing the results with data found in similar systems in Central Europe the Forest Biosphere Reserve can be described than ‘medium-polluted’ by heavy metals. Pb shows lower values as in comparable systems in Germany, due to the fact of lower traffic density in Sowjetunion. The status of the nutritional elements Ca, Mg and K is in the same order of magnitude as found in German forest ecosystems.

Keywords: Bioindication, Heavy Metals, Plant Analysis, Chemical Elements, Peat Profiles, Heavy-Metal Pollution, Hylocomium-Splendens, Atmospheric Deposition, Copper, Lead, Biomonitor, Plants, Soils, Zinc, He

# Title: Veliger

Full Journal Title: Veliger

ISO Abbreviated Title: Veliger

JCR Abbreviated Title: Veliger

ISSN: 0042-3211

Issues/Year: 4

Journal Country/Territory: United States

Language: English

Publisher: Calif Malacozoological Soc Inc

Publisher Address: Santa Barbara Museum Natural History, 2559 Puesta Del Sol Rd, Santa Barbara

Subject Categories:

Marine & Freshwater Biology Zoology: Impact Factor

? Haderlie, E.C. (1983), Long-term natural-resistance of some Central American hardwoods to attacks by the shipworm Bankia-Setacea (Tryon) and the gribble limnoria-quadripunctata holthuis in monterey harbor. *Veliger*, **25** (3), 182 et seq.

? Haderlie, E.C. (1983), Depth distribution and settlement times of the molluscan wood borers bankia-setacea (Tryon, 1863) and xylophaga-washingtona bartsch, 1921, in monterey bay. *Veliger*, **25** (4), 339 et seq.

? Kennedy, G.L. (1989), Status of penitella-gabbii (Tryon, 1863) in the eastern and western pacific, and description of the previously misidentified eastern pacific species (bivalvia, pholadidae). *Veliger*, **32** (3), 313-319.

# Title: Verhandlungen der Deutschen Pathologischen Gesellschaft

Verh. Deutsch. Physik. Ges.

V.1 (Sept. 1898)-v.31 (Sept. 1938)

Continued by: Verhandlungen der Deutschen Gesellschaft für Pathologie

Description based on: v.31 (Sept. 1938)

Supplement to: Zentralblatt fur Allgemeine Pathologie und Pathologische Anatomie

Suspended 1939-1947

Full Journal Title:

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher: Gustav Fischer

Publisher Address:

Subject Categories:

: Impact Factor

? Eucken, A. (1914), adsorptionspotential ??. *Verhandlungen der Deutschen Pathologischen Gesellschaft*, **16**, 345-??.

Notes: IIisotherm

Polányi, M. (1914), Über die adsorption vom standpunkt des dritten wärmesatzes. *Verhandlungen der Deutschen Pathologischen Gesellschaft*, **16** (23), 1012-1016.

Full Text: [-1959\Ver Deu Pat Ges16, 1012.pdf](-1959/Ver%20Deu%20Pat%20Ges16,%201012.pdf)

Polányi, M. (1914), Adsorption from the point of view of the third law of thermodynamics. *Verhandlungen der Deutschen Pathologischen Gesellschaft*, **16**, 1012-1016.

Notes: IIsotherm

? Polányi, M. (1916), ??. *Verhandlungen der Deutschen Pathologischen Gesellschaft*, **18**, 55-??.

# Title: Verhandlungen der Zoologisch Botanischen Wien

Full Journal Title: Verhandlungen der Zoologisch Botanischen Wien

ISO Abbreviated Title: Verh. Zool. Bot. Wien

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Löw, Fr. (1879), Beiträge zur Kenntniss der Milbengallen (Phytoptocecidien). *Verhandlungen der Zoologisch Botanischen Wien*, **xxviii**, 127-150.

Abstract: Describes, and in some cases figures, Phytoptus-galls found in Lower Austria on the following plants (those marked being new): Acer campestre, Achillea millefolium, A. moschata, Alnus incana, Artemisia vulgaris, Betula alba, Centaurea jacea, Daucus carota, Euphorbia cyparissias, Fraaeinus ornus, Galium mollugo, G. verum, Geranium palustre, Populus tremula, Prunus padus, P. spinosa, P. paradisiaca, Pyrus malus, Quercus coccifera, Salix alba, Sambucus ebulus, Saxifraga aizoidea, S. oppositifolia, Taxus baccata, Tilia argentea, T. grandiflora, Veronica chamadrys, and Viola sylvestris, The Phytopti themselves are in no case described; but identification with supposed fungoid growths are in some cases made.

# Title: Vestnik Akademii Meditsinskikh Nauk SSSR

Full Journal Title: Vestnik Akademii Meditsinskikh Nauk SSSR

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0002-3027

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Filippov, O.V. and Pravdyukov, N.I. (1984), A Possibility of using scientometric and expert methods in sampling scientific priorities. *Vestnik Akademii Meditsinskikh Nauk SSSR*, (6), 84-88.

Keywords: Scientometric

? Duplenko, Y.K. and Burchinsky, S.G. (1988), Use of scientometric analysis of developmental paths for biomedical-research. *Vestnik Akademii Meditsinskikh Nauk SSSR*, (3), 94-96.

? Karas, G.A. and Lazarev, V.S. (1991), Use of bibliometric techniques for operative assessment of scientific activity of research medicobiological institutes. *Vestnik Akademii Meditsinskikh Nauk SSSR*, (4), 61-65.

Abstract: Based on the analysis of the indices accepted for the evaluation of scientific work in research institutes, a suggestion was proposed that the putative instead of realized value of the scientific product should be evaluated. This implies employment of such bibliometric techniques of analysis of the volume and quality of the used information as: total number of references in scientific works, reference to the most recent publications and foreign sources, and the interdisciplinary index rated according to the subject-relation of the cited works. Studies of selected indices based on the analysis of one-year scientific journal publications and of manuscripts sent for print, as well as of reports made by the Kiev Research Institute of Otorhinolaryngology of UkrSSR Ministry of Health and by the Research Institute of Hematology of BSSR Ministry of Health, paralleled with a comprehensive consideration of the reference peculiarities and expert evaluation of the scientific material proper, allowed for making a conclusion on the importance of the role played by the bibliometric data in making the expert formal and objective and in operative evaluation of the activity of scientific communities and/or trends. This is of special significance for information and scientific policy making. Such investigations may be carried out by expert information workers.

# Title: Vestnik Akademii Nauk SSSR

Full Journal Title: Vestnik Akademii Nauk SSSR

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gusalov, A.A. and Propoi, A.I. (1973), First world-wide conference on informatics at state administration. *Vestnik Akademii Nauk SSSR*, (4), 73-74.

# Title: Vestnik Moskovskogo Universiteta Seriya 2 Khimiya

Full Journal Title: Vestnik Moskovskogo Universiteta Seriya 2 Khimiya

ISO Abbreviated Title: Vestn. Mosk. Univ. Seriya 2 Khimiya

JCR Abbreviated Title: Vestn Mosk U Khim+

ISSN: 0579-9384

Issues/Year: 6

Journal Country/Territory: Russia

Language: English

Publisher: Moscow State Univ

Publisher Address: Leninskie Gory, Moscow, Russia

Subject Categories:

Chemistry: Impact Factor 0.093, 115/121

? Chukhrai, E.S. and Poltorak, O.M. (1973), Adsorption isotherm of globular proteins on solid carriers. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **3**, 271-277.

? Aranovich, G.L. (1990), Derivation of the polymolecular adsorption-isotherm from the Ono-Kondo equation. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **31** (5), 440-445.

? Aranovich, G.L. and Tolmachiov, A.M. (1993), Analytical solution of the Ono-Kondo type equation. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **34** (3), 246-248.

? Aranovich, G.L., Levchenko, E.M. and Tolmachiov, A.M. (1993), On the analysis of methods of calculations of adsorption from solution. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **34** (5), 442-445.

? Aranovich, G.L., Levchenko, E.M., Trubnikov, O.I. and Tolmachiov, A.M. (1993), Analysis of polymolecular adsorption with accounting for 2-dimensional adsorbate stratification. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **34** (6), 549-552.

? Aranovich, G.L., Levchenko, E.M., Tolmachiov, A.M. and Drob, L.A. (1994), Dependence of adsorbate composition on the distance from adsorbent surface. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **35** (2), 155-157.

? Aranovich, G.L., Levchenko, E.M. and Tolmachiov, A.M. (1994), A new adsorption-isotherm for binary nonelectrolyte solutions. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **35** (3), 231-233.

? Aranovich, G.L., Drob, L.A. and Tolmachev, A.M. (1994), Model computations of adsorption in a bonded adsorption region. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **35** (5), 417-424.

? Khokhlova, T.D. and Nikitin, Y.S. (1996), Adsorption of protein and dye on natural alumosilicas and aerosil modified with aluminium. *Vestnik Moskovskogo Universiteta Seriya 2 Khimiya*, **37** (5), 464-468.

# Title: Vestnik Vysshyeĭ Shkoly

Full Journal Title: Vestnik Vysshyeĭ Shkoly

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Markusova, V.A. (2002), Who and how to measure science? *Vestnik Vysshyeĭ Shkoly*, **12**, 42-46.

# Title: Veterinaria - Mexico

Full Journal Title: Veterinaria - Mexico

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Nta, E., Rivera, J.A., Galina, C., Porras, A., Zarco, L. and Russell, J.M. (1989), An analysis of the information published in Mexico in relation to the reproductive efficiency of the cow I. Bibliometric study. *Veterinaria - Mexico*, **20** (1), 3-10.

# Title: Veterinarni Medicina

Full Journal Title: Veterinarni Medicina

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hruska, K. (2006), Veterinary Research Institute, Brno, Czech Republic: Analysis of papers published from 1990 to 2005. *Veterinarni Medicina*, **51** (5), 161-167.

Full Text: [2006\Vet Med51, 161.pdf](2006/Vet%20Med51,%20161.pdf)

Abstract: The Web of Science database searched results for papers published from the Veterinary Research Institute, Brno, Czech Republic, were analysed. The Veterinary Research Institute has increased publication activity in 2001-2005; more than 4 times in comparison with the period 1990-2004. The impact factor of journals has increased 5.5 times. The collaboration with 31 foreign countries and 175 institutions resulted in the publication of 277 papers in 93 journals during the past five years. Positioning of the Veterinary Research Institute is now among the worldwide leading teams is evident in twelve research profiles. The Web of Science is an efficient tool for record analysis and researcher’s and institution’s publication activities.

Keywords: Activity, Analysis, Bibliometric Analysis, Collaboration, Czech Republic, Hemorrhagic-Disease, Impact, Impact Factor, Institutions, Paratuberculosis, Profiles, Publication, Publications, Publications, Rabbits, Research, Research Evaluation, Standardization, Virus, Web of Science

# Title: Veterinary Anaesthesia and Analgesia

Full Journal Title: Veterinary Anaesthesia and Analgesia

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Love, E.J., Murrell, J. and Whay, H.R. (2011), Thermal and mechanical nociceptive threshold testing in horses: A review. *Veterinary Anaesthesia and Analgesia*, **38** (1), 3-14.

Abstract: Objective This review evaluates the thermal and mechanical nociceptive threshold testing techniques that have been used in horses and discusses them with reference to their applications, limitations and the factors which can influence both the testing procedure itself and the animal’s responses. Methods to optimise the reliability and repeatability of the testing procedures are suggested and the potential clinical applications discussed. Databases used Web of Science and MEDLINE. Conclusions Thermal and mechanical nociceptive threshold testing techniques have valuable roles in both the identification of altered nociceptive function and the pre-clinical evaluation of analgesics in horses.

Keywords: Analgesia, Analgesiometry, Buprenorphine, Cats, Conscious Horses, Databases, Duodenal Motility, Evaluation, Experimental Pain, Horse, Hyperalgesia, Induced Analgesia, Methods, Nociceptive Threshold Testing, Pain, Reliability, Review, Science, Sex-Differences, Somatic Nociception, Stimuli, Web of Science

# Title: Veterinary Dermatology

Full Journal Title: [Veterinary Dermatology](http://www3.interscience.wiley.com/journal/117989328/home)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Olivry, T., Foster, A.P., Mueller, R.S., Mcewan, N.A., Chesney, C. and Williams, H.C. (2010), Interventions for atopic dermatitis in dogs: A systematic review of randomized controlled trials. *Veterinary Dermatology*, **21** (1), 4-22.

Full Text: [2010\Vet Der21, 4.pdf](2010/Vet%20Der21,%204.pdf)

Abstract: The objective of this systematic review, which was performed following the guidelines of the Cochrane collaboration, was to assess the effects of interventions for treatment of atopic dermatitis (AD) in dogs. Citations identified from three databases (MEDLINE, Thomson’s Science Citation Index Expanded and CAB Abstracts) and trials published by December 2007 were selected. Proceedings books from the major veterinary dermatology international congresses were hand searched for relevant citations. The authors selected randomized controlled trials (RCTs), published from January 1980 to December 2007, which reported the efficacy of topical or systemic interventions for treatment or prevention of canine AD. Studies had to report assessments of either pruritus or skin lesions, or both. Studies were selected and data extracted by two reviewers, with discrepancies resolved by a third arbitrator. Missing data were requested from study authors of recently published trials. Pooling of results and meta-analyses were performed for studies reporting similar interventions and outcome measures. A total of 49 RCTs were selected, which had enrolled 2126 dogs. This review found some evidence of efficacy of topical tacrolimus (3 RCTs), topical triamcinolone (1), oral glucocorticoids (5), oral ciclosporin (6), subcutaneous recombinant gamma-interferon (1) and subcutaneous allergen-specific immunotherapy (3) to decrease pruritus and/or skin lesions of AD in dogs. One high-quality RCT showed that an oral essential fatty acid supplement could reduce prednisolone consumption by approximately half. Additional RCTs of high design quality must be performed to remedy previous flaws and to test interventions for prevention of flares of this disease.

Keywords: Acvd Task-Force, Antipruritic Agent, Books, Canine Atopy, Citation, Citations, Clinical-Trial, Collaboration, Cross-Over, Databases, Dermatology, Diagnostic-Criteria, Double-Blind, Evening Primrose Oil, Fish-Oil, Medline, Review, Science, Science Citation Index, Systematic Review, Tacrolimus Ointment, Treatment

# Title: Veterinary and Human Toxicology

Full Journal Title: Veterinary and Human Toxicology

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hammond, G.M., Loewen, M.E. and Blakley, B.R. (2004), Diagnosis and treatment of zinc poisoning in a dog. *Veterinary and Human Toxicology*, **46** (5), 272-275.

Abstract: Acute zinc poisoning has been observed in dogs following the ingestion of metallic zinc objects. A 11/2-y-old female miniature bull terrier exhibiting anorexia, vomiting, depression, fever (39.9C), icterus and intravascular hemolysis was diagnosed with acute zinc poisoning. Anemia, Heinz body production, azotemia and bilirubinemia were also evident. Abnormal pancreatic, hepatic and renal functions were also apparent. A radio opaque object was observed in the stomach. Based upon an elevated plasma zinc level of 28.6 ppm, a tentative diagnosis of zinc poisoning was made. Following surgical removal of the metallic zinc object, a blood transfusion and fluid therapy were given to restore the normal blood volume. Heparin, Cephazolin and Raniditine were also given, although chelation therapy was not provided. Zinc levels in the plasma declined in a steady fashion (half-life = 7.6 d). Complications, such as disseminated intravascular coagulation, chronic pancreatitis, renal or hepatic failure, were not observed. By 20 d post surgery, on mild elevation of liver enzymes was evident. Measurements of the half-life of zinc may provide a useful indication of prognosis and the success of treatment.

Keywords: Induced Hemolytic-Anemia, Ingestion, Toxicity, Toxicosis, Pennies

# Title: Veterinary Microbiology

Full Journal Title: [Veterinary Microbiology](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5190&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=6f60c3fff1352eabd056560886eedbf5)

ISO Abbreviated Title: Vet. Microbiol.

JCR Abbreviated Title: Vet Microbiol

ISSN: 0378-1135

Issues/Year: 14

Journal Country/Territory: Netherlands

Language: English

Publisher: Elsevier Science BV

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

Subject Categories:

Microbiology Veterinary Sciences: Impact Factor

Herrera, P., Burghardt, R.C. and Phillips, T.D. (2000), Adsorption of *Salmonella enteritidis* by cetylpyridinium-exchanged montmorillonite clays. *Veterinary Microbiology*, **74** (3), 259-272.

Full Text: [2000\Vet Mic74, 259.pdf](2000/Vet%20Mic74,%20259.pdf)

Abstract: Recent experiments in our laboratory have suggested that certain montmorillonite clays, when exchanged with the cationic surfactant cetylpyridinium (CP), may be useful in removing bacteria from aqueous solution. During an initial study, screening various CP-exchanged products for potential antibacterial activity, three CP-exchanged clays-CP\*AAM (acid-activated montmorillonite), CP\*STx-1 (Ca++-montmorillonite), and CP\*SWy-2 (Na+-montmorillonite), proved to be the most effective. Binding studies were performed using 1 mgeach of CP-exchanged AAM, STx-1, and SWy-2 with a standardized Salmonella enteritidis solution containing approximate to 40,000 colony forming units (CFU)/ml. The modified clays reduced bacterial numbers 98.1, 97.6, and 95.2%, respectively. In contrast, the parent clays only produced reductions of 39.8, 16.9, and 16.6%, respectively. Attempts were made to desorb CP from the modified clays by washing in sterile physiological saline for 24 h. The resulting wash solutions failed to produce any significant reduction in bacterial colony counts; while, the washed clays retained their full antimicrobial activity. These findings suggested that the antibacterial effect of the clays is localized on the clay surface and is not due to CP dissociating from the clay. Electron microscopy revealed that the bacteria adhered to the surface of the CP-exchanged clays, but not the parent clays. Results from timed binding studies showed that the antibacterial effect was stable over the period observed. Rates of binding were positively influenced by increasing temperature, not affected by changes in pH, and negatively influenced by the presence of organic contaminants. The mechanism by which bacterial counts are reduced may involve the enhanced hydrophobicity and affinity of the CP-exchanged clay for Salmonella and the antibacterial activity of CP. (C) 2000 Published by Elsevier Science B.V. All rights reserved.

Keywords: Broiler Carcasses, Water, Salmonella Enteritidis, Antimicrobials, Public Health

? Pereira, U.P., Oliveira, D.G.S., Mesquita, L.R., Costa, G.M. and Pereira, U. (2011), Efficacy of Staphylococcus aureus vaccines for bovine mastitis: A systematic review. *Veterinary Microbiology*, **148** (2-4), 117-124.

Abstract: Bovine mastitis is the main cause of economic loss in milk production worldwide and Staphylococcus aureus is the agent most frequently associated with the disease. The aim of this systematic review was to assess the efficacy of vaccines for bovine mastitis caused by S. aureus and suggest the immunotherapeutic protocols that have achieved the best and/or most promising results. An electronic search was made of the PUBMED and Web of Science databases in November 2009. Only studies that tested vaccines in vivo in cows were included. The experimental design, methodological quality, type of vaccine and results of the studies were analyzed. Twenty-four papers were selected for this review. In general, bacterin-toxoid vaccines, vaccines of DNA-recombinant protein and recombinant protein alone were investigated in the studies selected. This systematic review suggests that vaccines that employ new technologies (DNA and/or recombinant protein vaccines) and some long-standing bacterins have achieved good results, which supports their use in the prevention and control of bovine mastitis caused by S. aureus. However, methodological differences and in some cases, a lack of more severe scientific criteria (such as double blind protocols) hinder the assessment of the effectiveness of these vaccines. (C) 2010 Elsevier B.V. All rights reserved.

Keywords: Adjuvant, Antibody-Production, Assessment, Bovine, Bovine Mastitis, Cattle, Control, Dairy-Cows, Databases, Design, Disease, DNA, Effectiveness, Efficacy, Field Trial, Immune-Responses, Immunization, In Vivo, Mammary Epithelial-Cells, Milk, Papers, Prevention, Prevention and Control, Pubmed, Review, Science, Staphylococcus Aureus, Systematic, Systematic Review, Vaccination, Vaccine, Vaccines, Web of Science

# Title: Veterinary Quarterly

Full Journal Title: Veterinary Quarterly

ISO Abbreviated Title: Vet. Q.

JCR Abbreviated Title: Vet Quart

ISSN: 0165-2176

Issues/Year: 4

Journal Country/Territory: Netherlands

Language: English

Publisher: Royal Netherlands Veterinary Assoc

Publisher Address: PO Box 14031, 3508 Utrecht, Netherlands

Subject Categories:

Veterinary Sciences: Impact Factor

? Beckers, H.J. (1987), Public health aspects of microbial contaminants in food. *Veterinary Quarterly*, **9** (4), 342-347

Abstract: Food-borne diseases affect the health and welfare of hundred thousands of people and result in considerable economic loss. Salmonella and *Campylobacter* are by far the most important causes of food-borne illness. Raw foods of animal origin are the major sources of these pathogens. Mishandling of foods in kitchens contributes to food-borne disease outbreaks. More education is necessary. But because of the inevitable risk of recontamination of cooked foods in every kitchen, more emphasis should be placed on pathogen-free raising of food animals and good manufacturing practices during slaughter. This will minimise contamination of raw foods of animal origin, thus reducing the contamination pressure in the kitchen and more effectively controlling food-borne diseases.

? Mossel, D.A. (1987), Integrated microbiological safety assurance and monitoring of food and drinking water. Professor Kampelmacher’s contribution to postgraduate education in The Netherlands from the point of view of Veterinary Public Health. *Veterinary Quarterly*, **9** (4), 371-374.

Abstract: The history of academic education in food microbiology and hygiene in the Netherlands has largely been written by Prof. Kampelmacher. The first contribution in this field dates from 1961, and suggested a new approach to teaching Veterinary Public Health. His later research led to the conclusion that intervention would be the only way to control the food-transmitted diseases originating from slaughter animals and poultry, particularly Salmonellosis. This intervention should take place at the beginning of the contamination cycle. In the 1970’s, surveys showed that feed decontamination would no longer efficiently control the endemicity of Salmonellosis. The contamination cycles had become autonomous. Consequently, emphasis on terminal decontamination of food products was necessary. Besides his activities in teaching and research, Prof. Kampelmacher masterminded a modern view of the responsibilities of academic scientists. Moreover, he strongly promoted an interdisciplinary approach to scientific consultation and advice. In this respect, he has unfortunately not been successful in introducing radiation of dangerously contaminated food, having met strong opposition from various quarters. His efforts in multidisciplinary training and research programmes resulted in, among other things, fruitful cooperation between the Agricultural University at Wageningen and the Faculty of Veterinary Medicine at Utrecht University.

# Title: Veterinary Research Communications

Full Journal Title: Veterinary Research Communications

ISO Abbreviated Title: Vet. Res. Commun.

JCR Abbreviated Title: Vet Res Commun

ISSN: 0165-7380

Issues/Year: 8

Journal Country/Territory: Netherlands

Language: English

Publisher: Kluwer Academic Publ

Publisher Address: Spuiboulevard 50, PO Box 17, 3300 AA Dordrecht, Netherlands

Subject Categories:

Veterinary Sciences: Impact Factor

? Shane, S.M. and Montrose, M.S. (1985), The occurrence and significance of *Campylobacter* jejuni in man and animals. *Veterinary Research Communications*, **9** (3), 167-198.

Abstract: *Campylobacter* jejuni, which is now recognized as a discrete species, is a gram negative, microaerophilic, thermophilic, nalidixic acid sensitive, hippurate positive pathogen requiring special selective media for propogation. The organism is widely distributed in avian species, experimental and companion animals and in humans. Mammalian *Campylobacter*iosis is characterized by an enterocolitis of variable severity. The prevalence of the condition is relatively high in young individuals, in underdeveloped countries and in subjects with diarrhea. Food animals, especially poultry, are reservoirs of the organism and infection occurs following consumption of untreated surface water, unpasteurized milk, incompletely cooked meat or other contaminated food products. Close contact with infected immature companion animals is a significant cause of *Campylobacter*iosis in children and direct intrafamilial transmission and occupational infection have been documented. *Campylobacter*iosis attributable to C. jejuni is a condition of emerging significance which arises principally from deficiencies in hygiene inherent in the environment and in the food chain which extends from domestic animals to the consumer.

# Title: Virchows Archiv

Full Journal Title: Virchows Archiv

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Fritzsche, F.R., Dietel, M. and Kristiansen, G. (2008), Where we publish - An analysis of the publications of German institutes of pathology. *Virchows Archiv*, **452** (4), 363-368.

Full Text: [2008\Vir Arc452, 363.pdf](2008/Vir%20Arc452,%20363.pdf)

Abstract: Pathologists provide the link between the clinical and the natural science aspect of medicine and are often integrated in translational research projects. We wanted to analyse the spread and position of research led by pathologists in the scientific literature. Publications from institutes of pathology of 21 randomly chosen German university cities between 2004 and 2006 were analysed. To validate our findings we subsequently extended our analysis to 45 university cities from Italy, France and the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). We detected publications directed by pathologists in numerous biomedical journals, most of which not categorised as “pathology” journals. In the analyses from Germany and Italy, Virchows Archiv led the ranking in terms of absolute number of publications. Meanwhile, Anticancer Research and the International Journal of Cancer took the lead concerning publications from pathologists from the Nordic countries. Our results mirror the wide diversification in scientific pathology and the overlap with other medical subspecialties, especially oncology, cell biology and biochemistry. This explains the problem of defining “pathology” journals and deducting pathological research activity from these publications. However, the general notion that pathology journals are the most important communication medium of pathology research was affirmed.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Biology, Biomedical, Biomedical Journals, Countries, European-Union, Finland, France, Germany, Impact Factors, Italy, Journals, Journals, Literature, Medical, Medicine, Number of Publications, Oncology, Pathology, Productivity, Publications, Ranking, Research, Research Activity, Research Projects, Science, Scientific Literature, Sweden, Translational Research, University

# Title: Virchows Archiv fur Pathologische Anatomie und Physiologie und fur Klinische Medizin

Full Journal Title: Virchows Archiv fur Pathologische Anatomie und Physiologie und fur Klinische Medizin

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Boecker, E. (1910), Information on primary lung cancer. *Virchows Archiv fur Pathologische Anatomie und Physiologie und fur Klinische Medizin*, **202** (1), 38-56.

Full Text: [-1959\Vir Arc Pat Ana Phy Kli Med202, 38.pdf](-1959/Vir%20Arc%20Pat%20Ana%20Phy%20Kli%20Med202,%2038.pdf)

# Title: Virology Journal

Full Journal Title: Virology Journal

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Chen, E.Q., Wang, L.C., Lei, J., Xu, L. and Tang, H. (2009), Meta-analysis: Adefovir dipivoxil in combination with lamivudine in patients with lamivudine-resistant hepatitis B virus. *Virology Journal*, **6**, Article Number: 163.

Full Text: [2009\Vir J6, 163.pdf](2009/Vir%20J6,%20163.pdf)

Abstract: Background: Currently, there are no conclusive results on the efficacy of adefovir dipivoxil (ADV) plus lamivudine (LAM) in LAM-resistant patients with chronic hepatitis B (CHB). The aim of study was to evaluate the efficacy of rescue therapy with ADV plus LAM compared to ADV monotherapy in LAM-resistant CHB patients. Results: We searched PUBMED, EMBASE, Web of Science, CNKI (National Knowledge Infrastructure), VIP database, the Cochrane Central Register of Controlled Trials and the Cochrane Database of Systematic Reviews. Six eligible trials (442 patients in total) were included and evaluated for methodologic quality and heterogeneity. Greater virological response and lower emergence rate of ADV-associated mutants was observed in ADV plus LAM compared to ADV monotherapy (both P < 0.05). On the contrary, the rate of ALT normalization, HBeAg clearance and seroconversion were all similar between ADV plus LAM and ADV (all P > 0.05). Additionally, adding-on or switch-to ADV was both well tolerated. Conclusion: The combination of ADV with LAM was superior in inhibiting HBV replication and preventing drug resistance as compared to ADV alone for LAM-resistant CHB patients.

Keywords: Cochrane, Database, Drug, Drug Resistance, Efficacy, Embase, Failure, HBV, Knowledge, Meta Analysis, Meta-Analysis, Monotherapy, Mutants, Patients, Recommendations, Resistance, Science, Systematic, Therapy, Web of Science

? Zhao, S.S., Tang, L.H., Fan, X.G., Chen, L.Z., Zhou, R.R. and Dai, X.H. (2010), Comparison of the efficacy of lamivudine and telbivudine in the treatment of chronic hepatitis B: A systematic review. *Virology Journal*, **7**, Article Number: 211.

Full Text: [2010\Vir J7, 211.pdf](2010/Vir%20J7,%20211.pdf)

Abstract: Background: Chronic viral hepatitis B remains a global public health concern. Currently, several drugs, such as lamivudine and telbivudine, are recommended for treatment of patients with chronic hepatitis B. However, there are no conclusive results on the comparison of the efficacy of lamivudine (LAM) and telbivudine (LdT) in the treatment of chronic hepatitis B. Results: To evaluate the comparison of the efficacy of LAM and LdT in the treatment of chronic hepatitis B by a systematic review and meta-analysis of clinical trials, we searched PUBMED (from 1990 to April 2010), Web of Science (from 1990 to April 2010), EMBASE (from 1990 to April 2010), CNKI (National Knowledge Infrastructure) (from 1990 to April 2010), VIP database (from 1990 to April 2010), WANFANG database (from 1990 to April 2010), the Cochrane Central Register of Controlled Trials and the Cochrane Database of Systematic Review. At the end of one-year treatment, LdT was better than LAM at the biochemical response, virological response, HBeAg loss, therapeutic response, while less than at the viral breakthrough and viral resistance, but there was no significant difference in the HBeAg seroconversion and HBsAg response. LdT was better than LAM at the HBeAg seroconversion with prolonged treatment to two years. Conclusions: In summary, LdT was superior in inhibiting HBV replication and preventing drug resistance as compared to LAM for CHB patients. But LdT may cause more nonspecific adverse events and can lead to more CK elevation than LAM. It is thus recommended that the LdT could be used as an option for patients but adverse events, for example CK elevation, must be monitored.

Keywords: Adverse Events, Bias, Chinese Patients, Clinical Trials, Clinical-Trials, Cochrane, Database, Drug, Drug Resistance, Drugs, Efficacy, Embase, HBV, Knowledge, Lead, Meta Analysis, Meta-Analysis, Patients, Prevention, Public Health, Quality, Resistance, Review, Science, Systematic, Systematic Review, Treatment, Virus, Web of Science

? Zhao, S.S., Tang, L.H., Dai, X.H., Wang, W., Zhou, R.R., Chen, L.Z. and Fan, X.G. (2011), Comparison of the efficacy of tenofovir and adefovir in the treatment of chronic hepatitis B: A systematic review. *Virology Journal*, **8**, Article Number: 111.

Full Text: [2011\Vir J8, 111.pdf](2011/Vir%20J8,%20111.pdf)

Abstract: Chronic viral hepatitis B remains a global public health concern. Currently, several drugs, such as tenofovir and adefovir, are recommended for treatment of patients with chronic hepatitis B. tenofovir is a nucleoside analog with selective activity against hepatitis b virus and has been shown to be more potent in vitro than adefovir. But the results of trials comparing tenofovir and adefovir in the treatment of chronic hepatitis B were inconsistent. However, there was no systematic review on the comparison of the efficacy of tenofovir and adefovir in the treatment of chronic hepatitis B. To evaluate the comparison of the efficacy of tenofovir and adefovir in the treatment of chronic hepatitis B we conducted a systematic review and meta-analysis of clinical trials. We searched PUBMED, Web of Science, EMBASE, CNKI, VIP database, WANFANG database, the Cochrane Central Register of Controlled Trials and the Cochrane Database of Systematic Review. Finally six studies were left for analysis which involved 910 patients in total, of whom 576 were included in tenofovir groups and 334 were included in adefovir groups. At the end of 48-week treatment, tenofovir was superior to adefovir at the HBV-DNA suppression in patients[RR = 2.59; 95%CI(1.01-6.67), P = 0.05]. While there was no significant difference in the ALT normalization[RR = 1.15; 95%CI(0.96-1.37), P = 0.14], HBeAg seroconversion[RR = 1.32; 95%CI(1.00-1.75), P = 0.05] and HBsAg loss rate[RR = 1.19; 95%CI(0.74-1.91), P = 0.48]. More high-quality, well-designed, randomized controlled, multi-center trails are clearly needed to guide evolving standards of care for chronic hepatitis B.

Keywords: Analysis, Clinical Trials, Clinical-Trials, Cochrane, Database, Dipivoxil, Disoproxil-Fumarate, Drugs, Efficacy, Embase, HIV, Interferon, Lamivudine, Meta Analysis, Meta-Analysis, Metaanalysis, Patients, Public Health, Quality, Review, Science, Standards, Systematic, Systematic Review, Telbivudine, Treatment, Virus Infection, Web of Science

# Title: Vistas in Astronomy

Full Journal Title: [Vistas in Astronomy](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5310&_auth=y&_acct=C000047720&_version=1&_urlVersion=0&_userid=2007471&md5=9c2fef67972705d31f2c6d8ecd752a53)

ISO Abbreviated Title:

JCR Abbreviated Title:

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Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Vin, M.J. (1995), Variations of the impact of astronomical publications versus physics publications. *Vistas in Astronomy*, **39** (2), 276.

Full Text: [1995\Vis Ast39, 276.pdf](1995/Vis%20Ast39,%20276.pdf)

Abstract: Nowadays as credits for research become shorter and shorter, the impact of Astronomy is crucial. How can we define the impact of a science? and above all such a fundamental science as Astronomy? It is very high on the lay man who reacts emotively to each discovery which is, sometimes, badly explained. We don’t intend to measure this kind of impact, only try to give some hints on the curves of the scientific impact of astronomical publications versus other journals. For this purpose, we shall study the variations of two factors: the impact factor (IF) and the cited half-life (HL) for the main publications on stellar and extragalactic astronomy and for some publications of physics during the last 10 years.

In the first part, we describe the tool used, then we discuss the choice of the publications and plot the various curves. In conclusion, we give some explanations for the variations.

# Title: Vision Tecnologica

Full Journal Title: Vision Tecnologica

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1315-0855

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Aponte, G.M., Carrizo, M., Lamus, J.F., Marrero, C. and Rodriguez, S. (1997), Bibliometric and market analysis of Latin American oil companies. *Vision Tecnologica*, **5** (1), 49-58.

Abstract: Considering current transformation and integration process that Latin American oil companies are undergoing, present bibliometric analysis was carried out in order to measure the development of oil industry during 1990-1996. For the analysis, several publication indicators were used, i. e. publication evolution, research areas, information types and sources, etc., applied to articles and patents published by most important Latin American oil companies (Ecopetrol, PDVSA, Pemex, Petrobras, Petroperu, Trintoc, YPF; and YPFB, among others). Also, market indicators, both operational (reserves, production, refining capacity etc.), and financial (sales, profits, actives and research and development (R&D) expenses), and others such as number of employees, were applied. PDVSA shows an increasing trend in article publication, while Petrobras’s trend is directed towards patents publication. As to R & D, Petrobras is the company with greater efforts in exploration and production, and PDVSA in refining and petrochemistry. Concerning operational indicators, PDVSA appears as the first oil company of Latin America, and second among the 50 most important oil company worldwide in the oil sector.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Capacity, Development, Evolution, First, Indicators, Information, Integration, Latin America, Market, Patents, Publication, Research, Research and Development, Sector, Sources, Transformation, Trend

? Lamus, J.F. (1999), Trends in enhanced oil recovery. *Vision Tecnologica*, **6** (2), 113-126.

Abstract: Common objetive of most oil companies is to disminish high costs of exploration and explotation of existing oil fields, and increase their production and recoverable reserves. Several cooperations and integration mechanisms have been established among companies, especifically in enhanced oil recovery (EOR) area, aiming at not only increasing their reserves, but also to extend useful reservoir lifetime. Present article summarizes the evolution of oil production, and number of projects executed in the world in 1998, according to EOR method. In the study, USA case is analyzed from 1986 to the beginnings of 1998), since this is the country that has applied the most these techniques. Strategic associations recently formed worldwide in the period are also analyzed. Finally a bibliometric analysis (1986-first semester 1998) is performed, The analysis shows R&D tendencies of EOR method, oil companies, institutions and universities. The study also indicates that EOR methods applied worldwide increase oil and gas reserves and production, supported on technologies, such as: horizontal and multilateral wells, 3D-4D seismic techniques, nuclear magnetic resonance, simulators (streamline and streamtube 3D among others) materials (polymers, foams, nutrients, etc.), and equipment (coiled tubing), etc. These techniques have proved to be highly effective, since hey allow avail from the competitive advantages of patners (resources and technologies).

Keywords: 3D, Analysis, Bibliometric, Bibliometric Analysis, Costs, Country, Equipment, Evolution, Institutions, Integration, Magnetic, Magnetic Resonance, Mechanisms, Methods, Nutrients, Polymers, Recovery, Reservoir, Techniques, Technologies, Universities, USA, Wells, World

# Title: Visual Interfaces to Digital Libraries Lecture Notes in Computer Science

Full Journal Title: Visual Interfaces to Digital Libraries Lecture Notes in Computer Science

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0302-9743

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Buzydlowski, J.W., White, H.D. and Lin, X. (2002), Term co-occurrence analysis as an interface for digital libraries. *Visual Interfaces to Digital Libraries Lecture Notes in Computer Science*, **2539**, 133-144.

Abstract: We examine the relationship between term co-occurrence analysis and a user interface for digital libraries. We describe a current working implementation of a dynamic visual information retrieval system based on co-cited author maps that assists in browsing and retrieving records from a large-scale database, ten years of the Arts & Humanities Citation Index, in real time. Any figure in the arts or humanities, including scholars and critics, can be mapped, and the maps are live interfaces for retrieving co-citing documents.

Keywords: Information-Retrieval, Networks

# Title: Visualization and Data Analysis 2002

Full Journal Title: Visualization and Data Analysis 2002

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Zartl, A. and Schiebel, E. (2002), The combination of content maps by co-word analysis. *Visualization and Data Analysis 2002*, **4665**, 359-367.

Abstract: One of the well known relational bibliometric methods is the co-word analysis. The co-occurrence of words can be illustrated in a matrix. By the means of various mathematical methods like cluster analysis and others the matrix can be illustrated in a two-dimensional science-map that represents a well structured rendition of information. The key question of this paper is how can different objects e.g. key-words and authors or institutions be linked by co-word analysis. In bibliographic documents key-words, authors and institutions are elements of each document. Thus we can talk of a direct linkage between these objects according to the joint occur in one document. The properties of one author to appear with certain keywords in certain articles allows a linkage over the documents. Indirect linkage can be found if documents, raised from the connection between authors and key-words, are eliminated in the functional relationship and new networks are generated which show an indirect linkage of authors on the basis of keywords. This paper will show a method how different networks can be linked directly and indirectly by using co-word analysis. The combination of content maps by co-word analysis will be shown using a technology monitoring concerning fuel cells.

Keywords: Analysis, Authors, Bibliometric, Bibliometric Method, Bibliometric Methods, Cluster, Cluster Analysis, Co-Occurrence, Co-Word, Co-Word Analysis, Content Map, Fuel Cells, Information Visualization, Methods, Networks, Technology

# Title: Volunteered Paper 2nd International Conference International Humic Substances Society

(Volunteered papers 2nd Intern. Conff. IHSS)

Gosset, T., Trancart, J.L. and Thevenot, D.R. (1984), Preliminary report on kinetics of batch metal complexation by peat. *Volunteered Paper 2nd International Conference International Humic Substances Society*, (Birmingham UK), 214-219.

# Title: Vom Wasser

Full Journal Title: Vom Wasser

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0083-6915

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Subject Categories:

: Impact Factor

? Buschmann, H.J. (1995), The selective removal of dye stuffs and heavy metal ions from waste waters of the textile industry. *Vom Wasser*, **84**, 263-??.

# Title: Voprosy Filosofii

Full Journal Title: Voprosy Filosofii

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Marshakova-Shaikevich, I.V. (2007), Analysis of international journals in a sphere of philosophical and historical sciences, represented in database of social sciences SSCI. *Voprosy Filosofii*, (8), 79-90.

Abstract: On the basis of National Science Indicators for 1998-2002 the comparative statistics of research activity of 25 leading countries is given. The Russian indicators (number of publications and citation figures) in the fields of Economics, Sociology, History and Philosope are compared to the World indicators. Sixty five journals were chosen for more detailed analysis. They were drawn from three fields of knowledge: History (17 journals), History of Social Science (16 journals) and History & Philosophy of Science (33 journals). Some journals are common to 2 or more fields, thus History and History of Social Science share some journals with the field of Sociology, History of Social Science have common journals with ten fields (esp. Business, Economics). Journals in philosophy and historical sciences were analyzed along the lines, described in Scientometrics vol.35, No2 (1996), p.283-290. (Marshakova-Shaikevich, 1996). The ideas was to compare the traditional impact factor (Ip) of a journal, as indicated in JCR DB, with the average impact factor of the corresponding field of knowledge (Ig). The technique of calculation of the standard impact factor for a field (Ig) is an inherent part of a method, which allows a cross-field evaluation of scientific journals. For each field 5 journals with the highest Ip values were selected. If the total number of papers in those journals (for the two preceding years) was less than 500 for science and 300 for social sciences, the list was extended until the threshold of 500 (or 300) was reached. The ratio of the total number of current year citations (in ISI source journals) of articles in the list journals (for two preceding years) to the total number of source items in the list journals (in the same two years) represents the group standard impact factor of the field, i.e., Ig= R/S. Standard impact factors Ig is showed in table 3. To evaluate a particular journal we should always compare the traditional impact factor Ip with the standard impact factor of the corresponding field Ig. The most obvious and simple indicator would be the ratio of the two measures: K= (Ip/Ig)x100% - relative (or standard) impact factor of journal. If a journal belongs to two or more fields the arithmetic mean of the two or more Ig’s may be used. The relation of traditional impact factor (Ip) and relative factor (K) may be illustrated by 10 journals: Ip 2003 K 1994-98 K 2003 American Historical Review 0.833 163.8 137.97 Social Studies of Science 1.069 120.7 132.96 Biology & Philosophy 0.691 77.3 85.94 Technology & Culture 0.596 29.4 74.13 ISIS 0.576 97.6 71.64 Economic History Review 0.722 40.8 32.89 Past & Present 0.302 64.3 47.19 History of Psychiatry 0.531 17.8 16.13 Configurations 0.310 42.5 38.56 Journal of Historical Geography 0.554 74.9 35.47 In conclusion it should be stressed that in 1994-1998 American Historical Review and Social Studies of Science occupied 5th and 33rd place in the list of 1810 journals of DBs SSCI ranked by K.

Keywords: Activity, American, Analysis, Calculation, Citation, Citations, Database, Evaluation, Factors, Field, Group, Impact, Impact Factor, Impact Factors, Indicator, Indicators, International, ISI, Journal, Journals, Knowledge, Number Of Publications, Papers, Philosophy, Publications, Research, Russian, Science, Sciences, Scientific Journals, Scientometrics, Social, Social Sciences, Source, SSCI, Standard, Statistics, Technique, Values

# Title: Voprosy Onkologii (St. Petersburg)

Full Journal Title: Voprosy Onkologii (St. Petersburg)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Wagner, G. and Sandor, L. (1977), Significance of scientometrics and bibliometrics in cancer research. *Voprosy Onkologii (St. Petersburg)*, **23** (12), 39-47.

Abstract: Scientometrics and bibliometrics are defined and the results of human cancer research using bibliometric methods are presented. The SABIR-C information system is described and data are presented on the growth of its data base, including number of articles on oncornaviruses, frequency of publications on carcinogenic substances, cytostatics and radioisotopic diagnosis and therapy of tumors. A list of the 50 most important oncological journals in the world from 1969-1976 and the number of pertinent articles appearing in each during this period are included.

# Title: Vox Sanguinis

Full Journal Title: Vox Sanguinis

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Stainsby, D., Brunskill, S., Chapman, C.E., Doree, C. and Stanworth, S. (2010), Safety of blood donation from individuals with treated hypertension or non-insulin dependent type 2 diabetes: A systematic review. *Vox Sanguinis*, **98** (3), 431-440.

Abstract: Background and Objectives This systematic review was aimed at finding evidence for the safety of blood donation by individuals with treated hypertension or type 2 diabetes. It was undertaken as part of a wider project to re-evaluate exclusion criteria for UK blood donors with a view to increasing eligibility. Materials and Methods Searches were undertaken in the Cochrane Library to 2008, MEDLINE (1950 onwards), EMBASE (1974 onwards), CINAHL (1982 onwards), BNID (1994 onwards), the NHSBT SRI Handsearching Database and the Web of Science (all years) to February 2008. Planned analysis was largely descriptive. Results We identified only 16 relevant papers. None of the identified studies directly addressed the review questions and methodological appraisal highlighted a number of deficiencies. However all included papers provided contributory data and the findings were consistent. No study found any evidence of increased risk to homologous (allogeneic) or autologous blood donors with treated hypertension or with raised baseline systolic blood pressure up to 200 mmHg. We found very few data relating to blood donation by diabetic subjects. Conclusions No identified study indicated that raised baseline blood pressure level, treated hypertension or diabetes was predictive of increased adverse reactions in blood donors but the level of overall evidence was limited. This is the first attempt to systematically review a donor area as part of an approach to change longstanding practice recommendations, and may have implications for other recommendations for changes in donor acceptance criteria.

Keywords: Adverse Events, Analysis, Blood, Blood Donors, Blood Pressure, Cochrane, Database, Diabetes, Donors, Embase, Hypertension, Medline, Methods, Papers, Practice, Pressure, Review, Risk, Safety, Science, Systematic, Systematic Review, Type 2, Type 2 Diabetes, UK, Vasovagal Reactions, Web of Science

# Title: Vrachebnoe Delo

Full Journal Title: Vrachebnoe Delo

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0049-6804

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Nemirovich, L.I., Melman, N.Y. and Gorelova, N.R. (1990), Logometric analysis of the literature on the problem of nephrology with the purpose of determination of perspective scientific trends. *Vrachebnoe Delo*, **3**, 120-123.

# Title: Vysokomolekulyarnye Soedineniya Seriya A

Vysokomol. Soedin.

Full Journal Title: Vysokomolekulyarnye Soedineniya Seriya A

ISO Abbreviated Title:

JCR Abbreviated Title: Vysokomol Soedin Ser A

ISSN: 0083-6915

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Berestnev, V.A., Gatovskaya, T.V. and Kargin, V.A. (1960), ??. *Vysokomolekulyarnye Soedineniya Seriya A*, **2** (??), 916-??.

? Bogachev, E.K. and Eltekov, Y.A. (1974), Effect of temperature on kinetics and equilibrium of polystyrene adsorption by macroporous silica-gels. *Vysokomolekulyarnye Soedineniya Seriya A*, **16** (3), 617-621.

# Title: Waste Management

Full Journal Title: [Waste Management](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=0956053x); [Waste Management](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=6017&_auth=y&_acct=C000024058&_version=1&_urlVersion=0&_userid=4191814&md5=07669b5b6f28f053584db8f2d7322c31)

ISO Abbreviated Title: Waste Manage.

JCR Abbreviated Title: Waste Manage

ISSN: 0956-053X

Issues/Year: 8

Journal Country/Territory: United States

Language: English

Publisher: Pergamon-Elsevier Science Ltd

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

Subject Categories:

Engineering, Environmental: Impact Factor 0.395, 24/36 (2000); Impact Factor 2.433, 11/42 (2009)

Environmental Sciences: Impact Factor 0.260, 111/126 (1999); Impact Factor 0.395, 104/127 (2000); Impact Factor 2.433, 48/180 (2009)

Namasivayam, C., Kanchana, N. and Yamuna, R.T. (1993), Waste banana pith as adsorbent for the removal of Rhodamine-B from aqueous solutions. *Waste Management*, **13** (1), 89-95.

Full Text: [W\Was Man13, 89.pdf](W/Was%20Man13,%2089.pdf)

Abstract: The feasibility of waste banana pith for the removal of the dye Rhodamine-B was investigated at different initial dye concentrations, agitation time, adsorbent dosage, and pH. Adsorption of dye on banana pith follows both the Langmuir and Freundlich isotherm models. A maximum removal of 87% of the dye was observed at pH 4. Desorption studies show that the adsorption is mainly due to chemisorption.

Seshadri, S., Bishop, P.L. and Agha, A.M. (1994), Anaerobic/aerobic treatment of selected azo dyes in waste-water. *Waste Management*, **14** (2), 127-137.

Full Text: [W\Was Man14, 127.pdf](W/Was%20Man14,%20127.pdf)

Abstract: Azo dyes represent the largest class of dyes in use today. Current environmental concern with these dyes revolves around the potential carcinogenic health risk presented by these dyes or their intermediate biodegradation products when exposed to microflora in the human digestive tract. These dyes may build up in the environment, since many wastewater treatment plants allow these dyes to pass through the system virtually untreated.

The initial step in the degradation of these dyes is the cleavage of the Azo bond. This cleavage is often impossible under aerobic conditions, but has been readily demonstrated under anaerobic conditions. The focus of the study was to determine the feasibility of using an anaerobic fluidized-bed reactor to accomplish this cleavage. The effects of typical process variables such as hydraulic retention time (HRT), influent dye concentration levels, and degree of bed fluidization on removal efficiencies were also studied. The four dyes selected for this study were Acid-Orange 7, Acid-Orange 8, Acid-Orange 10, and Acid-Red 14. The effectiveness of using a bench-scale-activated sludge reactor as a sequenced second stage was also examined.

Results indicate that nearly complete cleavage of the Azo bond is easily accomplished for each of the four dyes under hydraulic retention times of either 12 or 24 h. Initial results indicate, though, that aromatic amine by-products remain. The sequenced second stage was able to remove the remaining Chemical Oxygen Demand (COD) load to acceptable levels. Work is presently underway to determine the fate of the anaerobic by-products in the aerobic second stage.

Husain, A. and Krasznai, J.P. (1994), Compaction of radioactive incinerator ash: Gas generation effects. *Waste Management*, **14** (6), 521-530.

Full Text: [W\Was Man14, 521.pdf](W/Was%20Man14,%20521.pdf)

Abstract: Radioactive incinerator ash is produced from the incineration of low level waste at Ontario Hydro. The presence of toxic metals in the ash requires that the ash be immobilized for disposal. Compaction of ash was investigated along with the use of various binders for immobilizing the ash and yielded waste forms with the highest ash loadings.

Sodium hydroxide and sodium silicate solutions were examined for wetting the ash prior to compaction. Based on ash loadings and waste form properties, compaction of sodium hydroxide wetted ash was found to be the preferred method for conditioning the ash. Significant volumes of hydrogen and methane gases were evolved during the wetting step as a result of reaction with aluminum present in the ash. Dissipation of these gases was crucial in obtaining good waste form properties and necessitated the addition of excess liquid. The excess liquid, however, can be reused.

Cohen, L.S. (1994), Creation and application of a universal hazardous-waste processing and incinerator feeding system. *Waste Management*, **14** (6), 549-553.

Full Text: [W\Was Man14, 549.pdf](W/Was%20Man14,%20549.pdf)

Abstract: One of the more serious problems, both technically and image-related, for organizations that incinerate mixed hazardous wastes is the processing and blending of these wastes in a safe and environmentally desirable manner. This paper documents efforts to address this problem through the development of a universal hazardous waste processing and incinerator feeding system. For safety, environmental and efficiency reasons, the system had to be one that was fully enclosed and truly air-locked and was capable of controlling fugitive emissions while performing numerous tasks on the waste, -that is, volume reducing, blending, and feeding-to prepare it for use as incinerator fuels. The system also had to operate economically to justify its purchase. Komar Industries, Inc. designed and developed such a system and was awarded several contracts to produce them. There are now several of these systems world-wide.

Khan, S.A., Riaz-ur-Rehman, and Khan, M.A. (1994), Sorption of cesium on bentonite. *Waste Management*, **14** (7), 629-642.

Full Text: [W\Was Man14, 629.pdf](W/Was%20Man14,%20629.pdf)

Abstract: Sorption of Cs on bentonite has been studied by using batch technique. Distribution coefficients (Kd) were determined for bentonite-cesium solution system as a function of contact time, pH, sorbent and sorbate concentration and temperature. Sorption data have been interpreted in terms of Freundlich, Langmuir and Dubnin-Radushkevich equations. Thermodynamic parameters far the sorption system have been determined at three different temperatures. The value of ΔH° = -32.29 KJ/mol and ΔG° = -13.16 KJ/mol at 298 K suggests that the sorption of cesium on bentonite is an exothermic and a spontaneous process. ΔG° becomes less negative at higher temperatures and therefore less cesium is sorbed at higher temperatures. The mean free energy E similar to 14.5 KJ/mol for cesium sorption shows that ion-exchange is the predominant mode of sorption at 0.01-0.5 molar cesium concentration. The presence of complementary cations depress the sorption of cesium on bentonite in the order of K+ > Ca2+ > Mg2+ > Na+. Some organic complexing agents and natural ligands also affect the sorption of cesium. The desorption studies with 0.01 M CaCl2 and ground water at low cesium loading on bentonite show that about 95% of the element is irreversibly sorbed probably due to the fixation of the cesium by isomorphous replacement in the crystal lattice of the sorbent.

Keywords: Clay

Namasivayam, C., Jeyakumar, R. and Yamuna, R.T. (1994), Dye removal from wastewater by adsorption on ‘waste’ Fe(III)/Cr(III) hydroxide. *Waste Management*, **14** (7), 643-648.

Full Text: [W\Was Man14, 643.pdf](W/Was%20Man14,%20643.pdf)

Abstract: Agricultural and industrial solid wastes can be recycled as nonconventional adsorbents if they are inert and harmless to reduce the cost of the wastewater treatments. Waste Fe(III)/Cr(III) hydroxide, generated in the treatment of Cr(VI) bearing wastewaters in a fertilizer industry, was used for the adsorption of Congo Red (direct dye) from aqueous solution. The parameters studied include agitation time, initial dye concentration, pH and adsorbent dosage. The adsorption capacity was evaluated by using both the Langmuir and Freundlich adsorption isotherm models. Removal of the dye was maximum, 91% at pH 3. Low desorption (9%) with water seems to indicate that the dye is mostly held by the adsorbent through ion-exchange.

Keywords: Aqueous-Solution, Natural Adsorbents, Color Removal, Congo Red, Acid Dye, Fly-Ash, Slurry, Equilibrium, Water

Chun, P. and Hall, M.J. (1994), Sorbents for the removal of airborne heavy-metals from incinerator effluent. *Waste Management*, **14** (8), 671-676.

Full Text: [W\Was Man14, 671.pdf](W/Was%20Man14,%20671.pdf)

Abstract: The effectiveness of inorganic alumine-silicate sorbents (alumina and kaolinite) to adsorb airborne lead and cadmium from the effluent stream of a simulated waste incinerator was studied. A 20 kW (68,000 BTU/h) flow reactor was used to achieve the temperature and residence times typical of a waste incinerator. Solutions containing lead or cadmium were introduced yielding airborne metals concentrations between 15 and 150 ppm. Gas samples were drawn into a particle impactor that collected the airborne particles and condensed phase metal aerosols, separating them into ten size ranges from 0.2 µm to greater than 10 µm. Metals to sorbent mass ratios between 0.03 and 1.56 were investigated. Scavenging efficiency increased as the ratio of sorbent to injected metal mass was increased. The scavenging efficiencies were as high as 76% for lead scavenged by kaolinite to as low as 14% for cadmium scavenged by alumina.

Namasivayam, C. and Ranganathan, K. (1994), Recycling of waste Fe(III)/Cr(III) hydroxide for the removal of nickel from wastewater: Adsorption and equilibrium studies. *Waste Management*, **14** (8), 709-716.

Full Text:[W\Was Man14, 709.pdf](W/Was%20Man14,%20709.pdf)

Abstract: Effects of Ni(II) concentration, agitation time, temperature and pH on adsorption of Ni(II) on Fe(III)/Cr(III) Cr(III) hydroxide, a waste by-product from fertilizer industry, have been investigated. The percent adsorption increased from 55 to 69% with increase in temperature from 20 to 40°C and from 32 to 77% with increase in pH from 3.7 to 7.5 and from 38 to 79% with decrease-in Ni(II) concentration from 100 to 25 mg/L. The equilibrium data fit well with the Langmuir isotherm and the adsorption capacity was found to be 21.0 mg/g at 30°C. Thermodynamic parameters such as free energy change (ΔG°), enthalpy change (ΔH°) and entropy change (ΔS°) were evaluated. The adsorption rate constant was higher at lower concentration of Ni(II) and at higher temperature. Desorption studies show that 70% of Ni(II) can be desorbed from the adsorbent at pH 4.0. The adsorbent was tested using-nickel plating industry wastewater and the maximum percent removal was 97.

Keywords: Water, Metals, Peat

Periasamy, K. and Namasivayam, C. (1995), Removal of nickel(II) from aqueous solution and nickel plating industry wastewater using an agricultural waste: Peanut hulls. *Waste Management*, **15** (1), 63-68.

Full Text: [W\Was Man15, 63.pdf](W/Was%20Man15,%2063.pdf)

Abstract: Activated carbon prepared from peanut hulls (PHC), an agricultural waste by-product, has been used for the adsorption of Ni(II) from aqueous solution. The process of uptake obeys both Freundlich and Langmuir adsorption isotherms. The applicability of Lagergren kinetic model has also been investigated. Quantitative removal of Ni(II) from 100 mt aqueous solution containing 20 mg/L Ni(II) by 85 mgPHC was peanut hull observed over a pH range of 4.0 to 10.0. The suitability of PHC for treating nickel plating industry wastewater was also tested. A comparative study with a commercial granular activated carbon (GAG) showed that PHC is 36 times more efficient compared to GAC based on Langmuir adsorption capacity (QO).

Keywords: Adsorption, Equilibrium, Carbon

Kinner, N.E., Lyons, W.B., Rice, P.H., Durling, D.B. and Gress, D.L. (1995), Geochemistry and metals concentrations in marine sediments exposed to solidified/stabilized municipal solid waste incinerator ash. *Waste Management*, **15** (3), 221-232.

Full Text: [W\Was Man15, 221.pdf](W/Was%20Man15,%20221.pdf)

Abstract: Solidified and stabilized (S/S) municipal solid waste incinerator ash specimens were placed in tubes filled with organic-rich marine sediments and incubated in seawater for 48 months. Initially, the S/S ash and concrete control (CC) specimens increased the pH of the sediment/porewater system due to the leaching of hydroxide. After 10 months, their porewater pH values approached those in the sediment controls as magnesium and calcium precipitates accumulated on the surface of the specimens and limited diffusion of hydroxide. Sulfate was initially abiotically removed from the porewater of the concrete controls, most probably due to precipitation as CaSO4 at high pH. Depletion of sulfate in the S/S ash sediments was due at least in part to microbial activity based on measured sulfate reduction rates. Cadmium, copper and lead, metals enriched in the ash relative to the sediments, were not found in higher concentrations in the lest sediments relative to the controls (confidence level = 90%), suggesting that metals dissolution from the S/S ash was minimal.

Keywords: Chemical Interactions, Sulfate Reduction, Bay, Distributions, Diagenesis, Chemistry, Seawater, Iron

Mao, Z.X. and Demirgian, J.C. (1995), Development of calibration standards for fourier-transform infrared spectrometer in continous monitoring of incinerator emissions. *Waste Management*, **15** (3), 233-241.

Full Text: [W\Was Man15, 233.pdf](W/Was%20Man15,%20233.pdf)

Abstract: Recent development of Fourier transform infrared spectroscopy greatly expands its potential as a continuous monitoring system for incinerator emissions. However, one of the key factors in ensuring success of this technology is obtaining a set of reliable calibration standards for the quantitation of target analytes. Experimental results in this study indicate that calibration should be conducted at the same cell condition as that used in the field monitoring. A static method is adequate in the calibrations of non-reactive compounds, but for a reactive compound, such as hydrogen chloride, a dynamic method must be used. The study also shows that single-component reference spectra collected in the calibration, combined with a partial least-squares method, are able to predict mixtures with strong spectral overlaps.

Khan, S.A., Riaz-ur-Rehman, and Khan, M.A. (1995), Adsorption of chromium(III), chromium(VI) and silver(I) on bentonite. *Waste Management*, **15** (4), 271-282.

Full Text: [W\Was Man15, 271.pdf](W/Was%20Man15,%20271.pdf)

Abstract: The sorption of Cr(III), Cr(VI) and Ag(I) from aqueous solutions on bentonite has been studied by a batch technique. Distribution coefficients (Kd) were determined for sorption systems as a function of contact time, pH, sorbent and sorbate concentration and temperature. Sorption data have been interpreted in terms of Freundlich, Langmuir and Dubinin-Raduskevich (D-R) equations. Thermodynamic parameters for the sorption systems have been determined at different temperatures. The sorption of Cr(III) and Ag(I) on bentonite is exothermic in nature while that of Cr(VI) is an endothermic process. The ΔH° values for Cr(III), Cr(VI) and Ag(I) were -51.94 kJ/mol at 298 K, 5.619 kJ/mol at 293 K and -7.64 kJ/mol at 303 K respectively. The mean free energy of sorption, E, for Cr(VI) is 10 kJ/mol which shows that chromate ions from aqueous solutions at 10-5 to 10-3 M are predominantly sorbed on bentonite by an ion-exchange process. The sorption data for Cr(III) and Ag(I) do not fit in the D-R equation. Negative values of ΔG° show the spontaneity of the sorption processes; ΔG° values for Cr(III) and Ag(I) become less negative at higher temperatures which shows that sorption is less favoured at higher temperatures, while the increase in the negative values of ΔG° for Cr(VI) with the increase in temperature indicates that sorption is favoured at higher temperatures.

Keywords: Aqueous-Solutions, Environmental-Pollutants, Sorption, Cr(VI), Clay, Removal, Lahore, Cesium, Blood, Waste

Silcox, G.D., Larsen, F.S., Owens, W.D. and Choroszy-Marshall, M. (1995), Kinetics of hydrocarbon and pesticide removal from clay soils during thermal treatment in a pilot-scale rotary kiln. *Waste Management*, **15** (5-6), 339-349.

Full Text: [W\Was Man15, 339.pdf](W/Was%20Man15,%20339.pdf)

Abstract: The kinetics of hydrocarbon removal from contaminated clay soils during thermal treatment in rotary kilns were studied experimentally, and kinetic parameters were obtained for simple first-order models. Results are given for seven hydrocarbons: toluene, naphthalene, n-hexadecane, lindane (gamma-HCH or 1,2,3,4,5,6-hexachlorocyclohexane), DDT (1,1’-(2,2,2-trichloroethylidene) bis [4-chlorobenzene]), DDD (1,1’-(2,2-dichloroethylidene) bis [4-chlorobenzene]), and DDE (1,1-dichloro-2,2-bis [p-chlorophenyl] ethylene). The activation energies ranged from 18 kJ/mol for toluene on wet soil, to 90 kJ/mol for the chlorinated pesticides. All the kinetic data were obtained in a 130 kW pilot-scale rotary kiln. The wall temperature of the kiln was 700°C for the pesticides. Three of the hydrocarbons, toluene, naphthalene and n-hexadecane, were studied on both wet soil (5.0 and 8.5 wt%) and on oven-dried soil at temperatures ranging from 300 to 650°C in order to understand better the effects of water on desorption rates, Water increases the rate of desorption of toluene but decreases the rates for the heavier compounds. The pilot-scale data and correlations should be useful to those who are operating and/or designing rotary kilns to remediate soils thermally. A methodology for taking pilot-scale results and using them to estimate full-scale performance is given.

Keywords: Heat-Transfer Model, Organic Vapors, Relative-Humidity, Desorption, Sorption, Contaminants, Temperature, Adsorption, Minerals, Motion

Kim, C.L., Cho, C.H. and Choi, H.J. (1995), Equilibrium concentration and diffusion controlled leaching model for cement-based waste forms. *Waste Management*, **15** (5-6), 449-455.

Full Text: [W\Was Man15, 449.pdf](W/Was%20Man15,%20449.pdf)

Abstract: A predictive model for nuclide leaching from cementitious waste form is developed based on diffusion, the sorption equilibrium concept in the waste form, and continuity boundary conditions of concentration and concentration gradient on the waste form surface. A concept to determine the equilibrium concentrations of radionuclides in pore water of the waste form is presented. Nuclide release unrelated to diffusive transport mechanism is reflected on the model as a wash-off fraction which depends on the surface conditions of the waste form. The double region model proposed in this paper gives much lower nuclide release rates than the single region model. This leaching model is calibrated by comparison with the results of a leaching experiment performed at JAERI.

? Fuhrmann, M., Aloysius, D. and Zhou, H.A. (1995), Permeable, subsurface sorbent barrier for 90Sr: Laboratory studies of natural and synthetic materials. *Waste Management*, **15** (7), 485-493.

Full Text: [1995\Was Man15, 485.pdf](1995/Was%20Man15,%20485.pdf)

Abstract: Laboratory studies were conducted to identify the optimum sorbent material to use in the construction of all-scale, in-situ sorbent barrier for intercepting a 90Sr plume within a surficial water-bearing sand and gravel layer. Evaluation of a set of materials for use as a passive sorbent wall was first approached through a series of batch sorption tests, using 85Sr. tracer, on a set of natural zeolites and metal oxides to determine their effectiveness for sorbing 90Sr. Selected materials, based on their sorption capability in the screening experiments, were further tested in flow-through columns to assess hydraulic performance and sorptive characteristics under dynamic flow conditions. Test data were incorporated into a one-dimensional finite difference model and estimates were made of in-situ performance over extended time frames with respect to 90Sr breakthrough and loading on the barrier material. Several natural zeolites were found to remove 85Sr effective from groundwater that contains 120 μg/ml of Ca, an element that can compete with Sr during sorption. A barrier wall of thickness 1.2 m was estimated to have a maximum life of about 10 years before replacement or regeneration of the sorbent bed is required. (C) 1996 Elsevier Science Ltd.

Keywords: Batch Sorption, Evaluation, Metal, Regeneration, Sorption

Khan, S.A., Riaz-ur-Rehman, and Khan, M.A. (1995), Sorption of strontium on bentonite. *Waste Management*, **15** (8), 641-650.

Full Text: [W\Was Man15, 641.pdf](W/Was%20Man15,%20641.pdf)

Abstract: Sorption of Sr on bentonite was studied using the batch technique. Distribution coefficients (Kd) were determined as a function of contact time, pH, sorbent and sorbate concentration and temperature. The data were interpreted in terms of Freundlich, Langmuir and Dubinin-Radushkevich isotherms. Thermodynamic parameters for the sorption system were determined at three different temperatures. The positive value of the heat of sorption, ΔH° = 30.62 kJ/mol at 298 K, shows that the sorption of strontium on bentonite is endothermic. The negative value of the free energy of sorption, ΔG° = -10.69 kJ/mol at 298 K, shows the spontaneity of the reaction. ΔG° becomes more negative with increasing temperature, which shows that the sorption process is more favorable at higher temperatures. The mean free energy for sorption, E similar to 9 kJ/mol, suggests that ion exchange is the predominant mode of sorption in the Sr concentration range studied, i.e. 0.01-0.3 mol/dm3. The presence of complementary cations depresses the sorption of strontium on bentonite in the order Ca2+>Mg2+>K+>Na+. Some organic complexing agents and natural ligands also affect the sorption of strontium. The desorption studies with ground water at low strontium loadings on bentonite show that about 90% of Sr is irreversibly sorbed on the bentonite. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Aqueous-Solutions, Adsorption, Cesium, Ions

Mayer, A. and Rey, T. (1996), Innovative HSR process to transform waste incinerator slag into useful mineral additives. *Waste Management*, **16** (1-3), 27-33.

Full Text: [W\Was Man16, 27.pdf](W/Was%20Man16,%2027.pdf)

Abstract: The Holderbank Smelting Redox-Process (HSR), which is patented world-wide, was born as a conse-quence of the general need for the reuse of waste and reduction of tipping fees for landfilling. Holderbank Management and Consulting Ltd (HMC) together with the Montan University of Leoben have developed a process to transform slags from municipal waste incineration into mineral additives. Laboratory and semi-industrial tests show its suitability as a mineral additive and the heavy metal compounds in the slag are transferred into usable heavy metal alloys separated from the molten slag. Preliminary estimates of the production costs are comparable with the costs of landfilling in Switzerland. Involved in the industrialisation of the HSR process is Von Roll Environmental Engineering Division, Zurich (specialised in environmental techniques). Moreover, the project is financially supported by the public authorities of Switzerland, comprising the Swiss Federal Ministry of Environment and several cantons. The HSR pilot plant (start-up in June 1995) will remain in operation for 2 years collecting all the relevant data required for planning the first industrial plant which should be in operation in 1998 with a capacity of about 20,000 t.p.a. Copyright (C) 1996 Elsevier Science Ltd

Johnson, C.A., Kersten, M., Ziegler, F. and Moor, H.C. (1996), Leaching behaviour and solubility: Controlling solid phases of heavy metals in municipal solid waste incinerator ash. *Waste Management*, **16** (1-3), 129-134.

Full Text: [W\Was Man16, 129.pdf](W/Was%20Man16,%20129.pdf)

Abstract: This paper highlights the uses and limitations of thermodynamic calculations in the planning of leach tests in the laboratory or for research in the field. Heavy metal solubility has been studied in leachate from Landfill Lostorf, AG, Switzerland. Also, the influence of pH on the solubility of Cu, Pb, Cd and Zn has been determined in the laboratory. The results have been compared with the maximum allowable heavy metal concentrations in equilibrium with the appropriate (hydr)oxides and carbonates. Copper is supersaturated with respect to Cu(OH)2 in both laboratory and field studies. Complexation with organic ligands is a probable explanation for this observation. Both Zn and Pb are undersaturated with respect to pure (hydr)oxides and carbonates, though agreement between calculations and measurements are close enough, that PbCO3 could be controlling the solubility in the laboratory experiments. The markedly lower concentrations of Pb in the field in comparison with the laboratory data could be explained by the affinity for Pb to bind to solids and the higher solid: solution ratio in field conditions. The solubility of Cd could be controlled by the formation of CdCO3. The relatively high concentrations of Mo (up to 10-5 M) in the landfill leachate could be limited by the precipitation of CaMoO4. Copyright (C) 1996 Elsevier Science Ltd

Uchida, T., Itoh, I. and Harada, K. (1996), Immobilization of heavy metals contained in incinerator fly ash by application of soluble phosphate: Treatment and disposal cost reduction by combined use of ‘high specific surface area lime’, *Waste Management*, **16** (5-6), 475-481.

Full Text: [W\Was Man16, 475.pdf](W/Was%20Man16,%20475.pdf)

Abstract: Evaluation results of combined application of ‘High Specific Surface Area Lime’ and soluble phosphate as heavy metals immobilizing agent for fly ash intermediate treatment can help to reduce output of incinerator fly ash amount and total fly ash treatment and disposal costs. ‘High Specific Surface Area Lime’ injection rate to achieve same outlet HCL concentration will be reduced to about 1/2 of the conventional lime injection rate. As the residual lime content in the fly ash is reduced, the treatment costs by soluble phosphate can be remarkably reduced. (C) 1997 Elsevier Science Ltd.

Nakamura, K., Kinoshita, S. and Takatsuki, H. (1996), The origin and behavior of lead, cadmium and antimony in MSW incinerator. *Waste Management*, **16** (5-6), 509-517.

Full Text: [W\Was Man16, 509.pdf](W/Was%20Man16,%20509.pdf)

Abstract: The Amendment to the Waste Disposal and Public Cleansing Law in Japan has introduced new regulation of waste requiring strict management. In this regulation, the fly ash generated in the Municipal Solid Waste (MSW) incinerator process was designated as specially controlled solid waste because of relatively high concentrations of lead, and cadmium. Furthermore, antimony is a regulated constituent within the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal and was designated a monitor item of environmental standards on water pollution. Thus, in order to understand where the problems lie, the behaviors of these heavy metals in the MSW incinerator was investigated. Also investigated were the kinds of products causing the fly ash to be contaminated. As a result, the amount of lead, cadmium and antimony in household waste was about 120, 3.5 and 7.6 g/T, respectively. The major origins of Pb, Cd and Sb from household waste are small sealed lead batteries, nickel-cadmium batteries and flame-proofed products such as curtains and plastic covers. By incineration treatment, these metals shifted to the fly ash (EP ash); the transfer ratio of Pb, Cd and Sb was about 33, 92 and 45%, respectively. The observed results indicated that the partitioning of metals in the MSW incinerator showed the influence of the vapor pressure of the elements and their compounds. Clearly, to produce precise estimates of this behavior, it will be necessary to determine not only the concentration of the elements in the waste but also the compounds used and the changes these would undergo in the furnace. Finally, several measures which will be helpful in solving these problems are introduced to discuss the future direction of environmentally-friendly social systems. (C) 1997 Elsevier Science Ltd.

Kida, A., Noma, Y. and Imada, T. (1996), Chemical speciation and leaching properties of elements in municipal incinerator ashes. *Waste Management*, **16** (5-6), 527-536.

Full Text: [W\Was Man16, 527.pdf](W/Was%20Man16,%20527.pdf)

Abstract: Different chemical properties of bottom ash and fly ash from municipal solid waste incinerators were compared based on the results of the five measuring techniques: (1) total contents and leaching amounts by regulatory leaching test in Japan; (2) leaching properties by pH-dependent leaching test; (3) modeling of pH-dependent leaching test using model compounds; (4) enriched chemical composition compared with bulk composition by an X-ray photoelectron spectrometer (XPS); (5) estimation of chemical states of elements by XPS analysis. The difference between bottom ash and EP ash was clearly found in element content, leaching behavior and release rate. The release rates of many elements in bottom ash were lower than in electrostatic precipitation (EP) ash even in an acidic condition of pH 3 as well as at the inherent pH of 12. Corresponding to the relatively complicated components in bottom ash, leaching patterns depending on pH were not simple. Comparison between the pH-dependent pattern of Ca in a sample and in model compounds resulted in the estimation of some Ca compounds in ash. The surface analysis by XPS showed results that Na, Cl, Zn, Pb and S were enriched in EP ash and Fe and Ti were rarely found in the surface of ash. Possible chemical states of Na, Ca, K, Cl and S were estimated by a new method of comparing binding energies of standard compounds and their mixtures. (C) 1997 Elsevier Science Ltd.

Kaneko, H. (1996), Evaluation of municipal waste incinerator fly ash toxicity and the role of cadmium by two aquatic toxicity tests. *Waste Management*, **16** (5-6), 555-559.

Full Text: [W\Was Man16, 555.pdf](W/Was%20Man16,%20555.pdf)

Abstract: Fly ash from a municipal solid waste incinerator in Japan is regulated under the hazardous waste regulation ‘Waste under Special Control’, according to the Amendment of the Waste Disposal and Public Cleansing Law, because it contains high concentrations of heavy metals which are available for leaching. To evaluate the toxicity of fly ash, a fly ash leachate was prepared according to the Japanese standard leaching procedure. The chemical analysis of the leachate showed that possibly one of the most toxic substances was cadmium. The toxicity of the leachate and the cadmium was determined by algal assay and a Daphnia acute toxicity test. The results showed that the leachate was about seven times more toxic to the growth of algae and 20 to 30 times more toxic to the survival of Daphnia than expected from its cadmium concentration. The toxicity interaction between cadmium and the other constituents in the leachate was also examined. The toxicity of cadmium showed an additive effect with the other constituents in the leachate in algal assay. In the Daphnia test, however, cadmium showed an antagonistic effect. (C) 1997 Elsevier Science Ltd.

Dutré, V. and Vandecasteele, C. (1996), An evaluation of the solidification/stabilisation of industrial arsenic containing waste using extraction and semi-dynamic leach tests. *Waste Management*, **16** (7), 625-631.

Full Text: [W\Was Man16, 625.pdf](W/Was%20Man16,%20625.pdf)

Abstract: Solidification/stabilisation of an industrial waste material containing large amounts of arsenic, as As2O3 (32wt%), was studied. The waste was treated using solidification/stabilisation (S/S) with cement (Ecobind50), lime and blast-furnace slags (Betogrid) in order to reduce the leachability of arsenic. In order to optimize the procedure for S/S, 10 different S/S samples, differing in amount and combination of the binder materials were prepared. On these samples, extraction tests were performed, showing that the arsenic concentration in the leachate is correlated with the pH and the calcium concentration due to the formation of slightly soluble CaHAsO3. A semi-dynamic leach test was performed in order to obtain quantitative information on the long term leachability of the contaminants (As, Sb, Pb) from monolithic S/S samples. A linear relationship between the cumulative fractions released and the square root of the leach time was observed, indicating that diffusion is the release mechanism. From the diffusion coefficient, the influence of the binder materials on the leachability of the contaminants could be deduced. All the elements considered have a low mobility in all samples. Ca has the highest mobility followed by As and Sb, whereas Pb has the lowest mobility. It appeared that increasing the amount of calcium in the S/S samples lowers the leachability of arsenic, addition of lime being more effective than addition of cement. This conclusion is in good qualitative agreement with the extraction tests. (C) 1997 Elsevier Science Ltd.

Keywords: Behavior

Derie, R. (1996), A new way to stabilize fly ash from municipal incinerators. *Waste Management*, **16** (8), 711-716.

Full Text: [W\Was Man16, 711.pdf](W/Was%20Man16,%20711.pdf)

Abstract: Heavy metals and toxic chlorinated organics, added to very low grain-size distributions, make fly ashes from municipal incinerators a very hazardous waste. For their disposal, the present general trend is, not only to stabilize chemically the ashes, i.e. to reduce the leachability of the toxic substances, but also to stabilize them mechanically, i.e. to convert them into massive, resistant, and unleachable solids. This paper describes various stabilization methods used on representative European fly ash samples, which led to the development of a new stabilization technique taking place in four stages: elimination of the alkali chlorides by dissolution; addition of a moderate quantity of phosphoric acid; calcination; and solidification with Portland clinker or cement. The principal advantages of the process are as follows: the polychlorodibenzodioxins-polychlorodibenzofurans are destroyed, the reactivity of the heavy metals is reduced drastically, the final solids have satisfactory mechanical properties, and the increase in weight of the waste to be disposed of does not exceed one fourth. Comparative results of TCLP extraction tests are presented. (C) 1997 Elsevier Science Ltd.

Baltpurvins, K.A., Burns, R.C. and Lawrance, G.A. (1996), Heavy metals in wastewater: Modelling the hydroxide precipitation of copper(II) from wastewater using lime as the precipitant. *Waste Management*, **16** (8), 717-725.

Full Text: [W\Was Man16, 717.pdf](W/Was%20Man16,%20717.pdf)

Abstract: The effect of effluent composition (Cl-, SO42- or CO32-) On the efficiency of the hydroxide precipitation of Cu(II) modelling lime (CaO) as the precipitant has been predicted using the solubility domain approach and has been experimentally validated. Solubility domains were based on the phases that were found to be solubility-limiting for systems representing potential effluent chemical composition limits. The generated solubility domains generally encompassed the experimentally observed solubilities, thereby providing effluent treatment quality assurance ranges for the hydroxide precipitation process. The presence of gypsum (CaSO4.2H2O) and calcite (CaCO3) as secondary precipitates had little effect on the observed residual Cu(II) solubilities, with Cu(II) mobility being governed by the least-soluble kinetically precipitated (rather than thermodynamically favoured) phase in the system under study. (C) 1997 Elsevier Science Ltd.

Keywords: Paratacamite, Stabilities, Atacamite, Minerals, Sorption, Calcite, Water

Stucki, S. and Jakob, A. (1997), Thermal treatment of incinerator fly ash: Factors influencing the evaporation of ZnCl2. *Waste Management*, **17** (4), 231-236.

Full Text: [W\Was Man17, 231.pdf](W/Was%20Man17,%20231.pdf)

Abstract: The efficiency of separation of Zn compounds from incinerator fly ash by evaporation at temperatures up to 1000°C depends on a number of factors and competing reactions. Model experiments with ZnCl2 and a number of oxide matrices of defined composition (silica, alumina, a silica-alumina-calcia glass, and heat treated fly ash) in moist air were carried out in order to identify the chemical reactions involved and to investigate the relative importance of temperature, ZnCl2 concentration, surface area and composition of the matrix oxide. Thermo-gravimetric analysis (TGA) and X-ray diffraction (XRD) were used as experimental techniques. The hydrolysis and subsequent immobilisation of ZnO in the matrix oxide dominates the process at low temperatures and low ZnCl2 concentrations, At high ZnCl2 concentrations evaporation becomes more dominant, The Zn evaporation is governed by the vapour pressure of ZnCl2 and limited by mass transfer to the purging gas stream. The development of new technologies for improved separation of Zn (and other heavy metals) from fly ash should focus on improving the mass transfer from particle grain to gas phase and avoid long residence times at temperatures below 600°C, (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy-Metals

Wang, S. and Viraraghavan, T. (1997), Wastewater sludge conditioning by fly ash. *Waste Management*, **17** (7), 443-450.

Full Text: [W\Was Man17, 443.pdf](W/Was%20Man17,%20443.pdf)

Abstract: Conditioning wastewater sludge from the City of Regina Wastewater Treatment Plant by fly ash from Boundary Dam Power Station, Saskatchewan, Canada, was studied. Toxicity characteristic leaching procedure (TCLP), equilibrium leach test (ELT), and long-term leaching test (LTLT) were used to investigate the leachability of heavy metals. Results from these leaching tests indicated that, on the basis of concentrations of microorganisms and heavy metals (Cd, Cr, Cu, Ni and Zn), the sludge produced at the Regina Wastewater Treatment Plant conditioned by the locally available fly ash can be disposed of in landfills and used as a soil conditioner for land application. Sorption, and silicate and hydroxide precipitations were considered to be the three important mechanisms in fixation of heavy metals. High pH conditions were considered to be the predominant mechanism in killing microorganisms.

Keywords: Soil Microbial Activity

Ramakrishna, K.R. and Viraraghavan, T. (1997), Use of slag for dye removal. *Waste Management*, **17** (8), 483-488.

Full Text: [W\Was Man17, 483.pdf](W/Was%20Man17,%20483.pdf)

Abstract: Adsorption techniques employing activated carbon have been found to be reasonably effective in the removal of some of the ionic impurities in water. However, economic considerations may require the use of inexpensive sorbents which are either naturally available or available as waste products from manufacturing processes. Slag is one such waste product obtained during the manufacture of steel, and the present study investigates dye removal characteristics of slag from colored waters. Aqueous solutions prepared from commercial grade acid, basic, and disperse dyes were used in this study, and batch pH, kinetic, and isotherm studies were undertaken on a laboratory scale. The data were evaluated for applicability to the Langmuir, Freundlich, and BET isotherm models, and the removal capacity of slag was compared with that of granular activated carbon. Results indicated approximately 94% removal of the disperse dye by slag, compared with a removal of approximately 49% achieved by activated carbon. Removal of acid dyes (dyes containing anionic groups) was reasonably good (approximately 47 and 74%), though not as good as obtained using activated carbon (approximately 100%). Column studies were conducted with a disperse dye (nonionic, slightly soluble in water), and analysis of data showed a sorption capacity of 1.3 mg of disperse dye per gram of slag. However, effluent dye concentrations were found to be higher than the permissible levels for discharge to receiving waters.

Keywords: Adsorbents

Gupta, V.K., Srivastava, S.K., Mohan, D. and Sharma, S. (1997), Design parameters for fixed bed reactors of activated carbon developed from fertilizer waste for the removal of some heavy metal ions. *Waste Management*, **17** (8), 517-522.

Full Text: [W\Was Man17, 517.pdf](W/Was%20Man17,%20517.pdf)

Abstract: Activated carbon, developed from fertilizer waste, has been used for the removal of Hg2+, Cr6+, Pb2+, and Cu2+. Mass transfer kinetic approach has been successfully applied for the determination of various parameters necessary for designing a fixed-bed absorber. Parameters selected are the length of the (PAZ) primary adsorption zone (delta), total time involved for the establishment of primary adsorption zone (tx), mass rate of flow to the absorber (Fm), time for primary adsorption zone to move down its length (t (delta)), amount of adsorbate adsorbed in PAZ from breakpoint to exhaustion (Ms), fractional capacity (f), time of initial formation of PAZ (tf) and per cent saturation of column at break point. Chemical regeneration has been achieved with 1 M HNO3.

Keywords: Slurry, Adsorption

Lo, I.M.C. and Yang, X.Y. (1998), Removal and redistribution of metals from contaminated soils by a sequential extraction method. *Waste Management*, **18** (1), 1-7.

Full Text: [W\Was Man18, 1.pdf](W/Was%20Man18,%201.pdf)

Abstract: The fate of heavy metals in a contaminated soil is dependent on both the total amount of metals and the chemical forms in which they exist. A widely applied sequential extraction method was used to study the metal speciation in soils. Sequential extraction for metal-contaminated individual soil components and synthetic soils was performed. The experimental results show that the specific reagents were effective for the extraction of metals from the corresponding individual soil components; but the impact of non-corresponding reagents on other soil components was also significant. The chemical forms in which metals exist in the synthetic soils were complicated and different. Metals in soils might be released and redistributed during the sequential extraction process, but knowledge about this behavior and the extent of metal redistribution is ambiguous. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Fractionation, Copper, Lead, Zinc

Lombardi, F., Mangialardi, T., Piga, L. and Sirini, P. (1998), Mechanical and leaching properties of cement solidified hospital solid waste incinerator fly ash. *Waste Management*, **18** (2), 99-106.

Full Text: [W\Was Man18, 99.pdf](W/Was%20Man18,%2099.pdf)

Abstract: A By ash coming from a hospital solid wastes incineration plant was solidified/stabilized in cementitious matrices. Owing to the high chloride, sulphate and alkali content and the low Si, Al and Fe values this By ash cannot be used in the formulation of blended cement. The objectives of solidification stabilization treatment were therefore to reduce the leachability of the heavy metals present in this material so as to permit its disposal in a sanitary landfill requiring only a low degree of environmental protection. The mechanical properties and leaching behaviour of solidified products were investigated. Fly ash and Portland Cement mixtures in ratios varying between 0.25 and 1.5 were tested for unconfined compressive strength after curing in tap water at 20°C. Leaching tests were performed both on By ash and solidified/stabilized products using an acetic acid standard leaching test and a modified version thereof (dynamic leaching test). (C) 1998 Elsevier Science Ltd. All rights reserved.

Clearfield, A., Bortun, A.I., Khainakov, S.A., Bortun, L.N., Strelko, V.V. and Khryaschevskii, V.N. (1998), Spherically granulated titanium phosphate as exchanger for toxic heavy metals. *Waste Management*, **18** (3), 203-210.

Full Text: [W\Was Man18, 203.pdf](W/Was%20Man18,%20203.pdf)

Abstract: Spherically granulated titanium phosphate of formula TiO1.25(OH)(0.47)(H2PO4)(0.77)(HPO4)(0.13) 2.3H2O (TiP) was synthesized by a gel method and its Na+, Ca2+ and Mg2+ ion substituted forms were prepared. Ion exchange of some divalent metal cations (Pb2+, Cu2+, Ni2+, Mn2+, Cd2+) by TiP-Na, Tip-Mg and TiP-Ca was studied in batch and column conditions. It was found that the ion exchange performance of TiP depends on the ion form it is converted into and decreases in the order: Tip-Na > Tip-Mg > Tip-Ca. All TiP samples exhibit a high affinity for copper and especially lead ion and are able to remove these ions quantitatively in the presence of excess of Ca, Mg and Na ions. Thus spherically granulated titanium phosphate can be recommended for separation and selective recovery of some toxic divalent cations from industrial wastes and contaminated environmental streams. (C) 1998 Elsevier Science Ltd. All rights reserved.

Magdy, Y.H. and Daifullah, A.A.M. (1998), Adsorption of a basic dye from aqueous solutions onto sugar-industry-mud in two modes of operations. *Waste Management*, **18** (4), 219-226.

Full Text: [W\Was Man18, 219.pdf](W/Was%20Man18,%20219.pdf)

Abstract: The ability of sugar industry mud to adsorb Basic Red-22 dye has been studied in two modes of operation. That is, in batch systems and continuous flow systems. Langmuir and Freundlich constants have been determined. In continuous flow system, the influence of varying parameters such as bed depth and solution flowrate has been studied. The bed depth service time (BDST) has been used to analyse the experimental data and identify design correlations. The feasibility of sugar-industry-mud in removal of Basic Red-22 dye from liquid waste streams was addressed.

Keywords: Fixed-Bed, Natural Adsorbents, Color Removal, Equilibrium, Hardwood, Peat, Diffusion, Systems, Adsorption, Fixed Bed, Color Removal, Dyes, Sugar-Industry-Mud, Industrial Wastewater

Lemieux, P.M., Ryan, J.V., French, N.B., Haas, Jr., W.J., Priebe, S. and Burns, D.B. (1998), Results of the September 1997 DOE/EPA demonstration of multimetal continuous emission monitoring technologies. *Waste Management*, **18** (6-8), 385-391.

Full Text: [W\Was Man18, 385.pdf](W/Was%20Man18,%20385.pdf)

Abstract: In September 1997, the U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA) co-sponsored a demonstration of several multimetal continuous emission monitors (CEMs). The demonstration, performed at the EPA National Risk Management Research Laboratory, Air Pollution Prevention and Control Division’s combustion laboratory in Research Triangle Park, NC, involved the side-by-side testing of seven multimetal CEMs at various stages of commercialization. A series of tests were performed to compare results from the multimetal CEMs to Method 0060, the EPA reference method (RM) for metals emission measurements, using the relative accuracy test audit (RATA) protocol. The EPA operated the test facility and performed the RM sampling, and each multimetal CEM was operated by the instrument’s respective developer. To accomplish these tests, an aqueous solution of six toxic metals (arsenic, beryllium, cadmium, chromium, lead, and mercury), along with flyash from a coal-fired utility boiler, was injected into the afterburner of the EPAs rotary kiln incinerator simulator facility to generate a combustor flue gas with realistic post-flue gas cleaning system particulate loadings and target metals concentrations of approximately 15 and 75 µg/m3, which constituted the low and high concentration test conditions. The multimetal CEMs that participated in the test included two laser-induced breakdown spectroscopy (LIBS) systems, two inductively coupled plasma (ICP) systems, a spark-induced breakdown spectroscopy (SIBS) system, a hazardous element sampling train with X-ray fluorescence (HEST/XRF), and a microwave plasma system. Ten RM-CEM sample pairs were taken at both the low and high concentration test conditions, and the relative accuracies of the multimetal CEMs were calculated. This test provided performance data that will be used to assess the current state of the art in multimetal CEMs. Published by Elsevier Science Ltd. All rights reserved.

Holbert, C. and Lighty, J.S. (1998), Trace metals behavior during the thermal treatment of paper-mill sludge. *Waste Management*, **18** (6-8), 423-431.

Full Text: [W\Was Man18, 423.pdf](W/Was%20Man18,%20423.pdf)

Abstract: The objective of the present study is to investigate trace metals (Cd, Cr, and Pb) behavior during thermal treatment of sludge wastes. Paper mill sludge enriched with Cd, Cr, and Pb was subjected to different thermal regimes using two different bench-scale reactors. Metals retention in the resultant ash is discussed as is the influence of structural modifying additives. Ash was characterized using leachability tests to determine the environmental availability of the trace metals and provide insight as to the extent of metals immobilization within the ash matrix. The bulk of the ash appears to be supermicron particles composed of individual fragments kept together by an irregular framework. Ash morphology appears unchanged throughout the temperature regime investigated with the exception of the 900°C ash which exhibited signs of localized melting. Cadmium and chromium partitioning behavior is similar for both reactors, with metal retention by the ash strongly influenced by treatment temperature. Lead behavior exhibits significant differences between the two reactors. Under oxidizing conditions, 95 to 100% of the lead is retained by the ash and occurs as an immobilized form resistant to leaching using a strong mineral acid (HNO3). Structural modifying additives did not increase metals retention or decrease metals leachability from the ash matrix. Alternatively, these additives appear to have a detrimental effect upon metals immobilization by the ash. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Incineration, Waste, Sorbents, Cadmium, Removal, Lead

Ho, T.C., Yang, P., Kuo, T.H. and Hopper, J.R. (1998), Characteristics of mercury desorption from sorbents at elevated temperatures. *Waste Management*, **18** (6-8), 445-452.

Full Text: [W\Was Man18, 445.pdf](W/Was%20Man18,%20445.pdf)

Abstract: This study investigated the dynamic desorption characteristics of mercury during the thermal treatment of mercury-loaded sorbents at elevated temperatures under fixed-bed operations. Experiments were carried out in a 25.4 mm ID quartz bed enclosed in an electric furnace. Elemental mercury and mercuric chloride were tested with activated carbon and bauxite. The experimental results indicated that mercury desoption from sorbents was strongly affected by the desorption temperature and the mercury-sorbent pair. Elemental mercury was observed to desorb faster than mercuric chloride and activated carbon appeared to have higher desorption limits than bauxite at low temperatures. A kinetic model considering the mechanisms of surface equilibrium, pore diffusion and external mass transfer was proposed to simulate the observed desorption profiles. The model was found to describe reasonably well the experimental results. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Mercury, Desorption, Mercury Loaded Sorbents, Thermal Treatment

Hawk, G.G. and Aulbaugh, R.A. (1998), High vacuum indirectly-heated rotary kiln for the removal and recovery of mercury from air pollution control scrubber waste. *Waste Management*, **18** (6-8), 461-466.

Full Text: [W\Was Man18, 461.pdf](W/Was%20Man18,%20461.pdf)

Abstract: In the mining industry, mercury is often associated with various ores, particularly copper and lead. To meet Environmental Protection Agency (EPA) and State air emission regulations, smelters must remove mercury vapors from hot exhaust gases, usually through the use of scrubbing solutions. Most of the mercury is precipitated out of the waste scrubbing solutions as the sulfide and the sludge dewatered in a filter press. SepraDyne Corporation (Denton, TX, USA) has conducted pilot-scale treatability studies of dewatered acid plant blowdown sludge generated by a copper smelter using its recently patented high temperature and high vacuum indirectly-heated rotary retort technology. This unique rotary kiln is capable of operating at internal temperatures up to 850°C with an internal pressure of 50 torr and eliminates the use of sweep gas to transport volatile substances out of the retort. By removing non-condensables such as oxygen and nitrogen at relatively low temperatures and coupling the process with a temperature ramp-up program and low temperature condensation, virtually all of the retort off-gases produced during processing can be condensed for recovery. The combination of rotation, heat and vacuum produce the ideal environment for the rapid volatilization of virtually all organic compounds, water and low-to-moderate boiling point metals such as arsenic, cadmium and mercury. Atmospheric oxygen can readily be reduced to very low concentrations within the kiln so that combustion does not take place. Initial concentrations of mercury in the waste ranged from 565 to 1260 mg/kg. The waste was processed in a 1.5 cubic foot capacity batch pilot unit at temperatures ranging from 427 to 649°C at a pressure of 76 torr. Total processing time ranged from 1.5 to 4.0 h. The processed material contained total mercury concentrations ranging from 0.065 mg/kg when processed at 649°C to an average of 2.2 mg/kg when processed at 427°C, The vaporized mercury was recovered as elemental mercury in a low temperature condenser. Mercury emissions averaged approximately 6.5 µg/M-3, significantly below the Maximum Achievable Control Technology (MACT) standard of 40 µg/M-3, Based upon the success of these tests, a contract was let and a commercial scale unit was built. The 2-ton per batch commercial unit was installed at the copper smelter and began operations in late June 1998. As of the end of October, approximately 500 tons of mercury-contaminated acid blowdown sludge had been processed to below the specified treatment criteria of 10 mg/kg total mercury. (C) 1999 Elsevier Science Ltd. All rights reserved.

Palfy, P., Vircikova, E. and Molnar, L. (1999), Processing of arsenic waste by precipitation and solidification. *Waste Management*, **19** (1), 55-59.

Full Text: [W\Was Man19, 55.pdf](W/Was%20Man19,%2055.pdf)

Abstract: As a consequence of more stringent environmental legislation being applied in Slovakia, traditional ways of arsenic waste treatment no longer became acceptable. For that reason it has been necessary to develop a cheap and effective method for processing of arsenic sludge which is accumulating in the reaction tower during the carbon dioxide refining in the VETROCOKE technology. A substantial part of the problem is to reach a compromise between reasonable operation costs of technology and sufficient long-term stability of the disposable product. The proposed method of arsenic stabilisation together with the other toxic elements present is based on progressive reduction of their solubility by a series of precipitation and solidification agents. The key factor of successful arsenic fixation is embedding of calcium and ferric arsenates/arsenites in the cement matrix. It is possible to reduce original arsenic solubility of 6430 mg/l from untreated waste to 0.823 mg/l from final solidificate by this technique. Leaching tests were conducted in distilled water at 25°C, without pH value control, solid to liquid ratio was 1: 10, mixing speed was 150 rpm. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Precipitation, Solidification, Leach Tests, Removal

Özer, A., Özer, D., Dursun, G. and Bulak, S. (1999), Cadmium(II) adsorption on *Cladophora crispata* in batch stirred reactors in series. *Waste Management*, **19** (3), 233-240.

Full Text: [W\Was Man19, 233.pdf](W/Was%20Man19,%20233.pdf)

Abstract: In this study, the adsorption of Cadmium(II) ions onto *Cladophora crispata* was investigated in a two-staged batch reactor. The sorption phenomenon was expressed by the Freundlich and Langmuir adsorption isotherms and these expressions were used for the calculation of the equilibrium value of the residual Cadmium(II) concentration at each stage. The experimental equilibrium values were compared with the values obtained from Freundlich and Langmuir isotherm equations. These results showed that the increase in biomass quantity or the increase of Xo/Vo ratios affected the quantities of cadmium removed from aqueous solution.

Keywords: *Rhizopus-arrhizus*, Biosorption, Uranium, Removal, Mechanism, Lead(II), Thorium, Adsorption, Isotherm, Waste Water, Multi-Staged Reactor

Kiyak, B., Özer, A., Altundoğan, H.S., Erdem, M. and Tümen, F. (1999), Cr(VI) reduction in aqueous solutions by using copper smelter slag. *Waste Management*, **19** (5), 333-338.

Full Text: [W\Was Man19, 333.pdf](W/Was%20Man19,%20333.pdf)

Abstract: The ability of Copper Smelter Slag (CSS) to reduce Cr(VI) in aqueous solutions has been investigated. The extent of reduction is dependent on the amounts of acid and reductant, contact time, Cr(VI) concentration, temperature of the solution and particle size of CSS. The amount of acid is the most important variable affecting the reduction process. When twice the amount of acid required with respect to Cr(VI) was used, Cr(VI) in 100 mi solution (100 mg/l) was completely reduced in a contact period less than 5 min by a 10 g/l dosage of CSS. Reduction efficiency increased with increase in temperature of solution, showing that the process is endothermic. Reduced chromium, and iron and other metals dissolved from CSS were effectively precipitated by using NaOH or calcinated carbonatation sludge from sugar plant. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Copper Smelter Slag, Carbonatation Sludge, Cr(VI) Reduction, Chromium Removal

Turner, D.R. and Pabalan, R.T. (1999), Abstraction of mechanistic sorption model results for performance assessment calculations at Yucca Mountain, Nevada. *Waste Management*, **19** (6), 375-388.

Full Text: [W\Was Man19, 375.pdf](W/Was%20Man19,%20375.pdf)

Abstract: Sorption onto minerals in the geologic setting may help to mitigate potential radionuclide transport from the proposed high-level radioactive waste repository at Yucca Mountain (YM), Nevada. An approach is developed for including aspects of more mechanistic sorption models into current probabilistic performance assessment (PA) calculations. Data on water chemistry from the vicinity of YM are screened and used to calculate the ranges in parameters that could exert control on radionuclide sorption behavior. Using a diffuse-layer surface complexation model, sorption parameters for Np(V) and U(VI) are calculated based on the chemistry of each water sample. Model results suggest that lognormal probability distribution functions (PDFs) of sorption parameters are appropriate for most of the samples, but the calculated range is almost five orders of magnitude for Np(V) sorption and nine orders of magnitude for U(VI) sorption. Calculated sorption parameters may also vary at a single sample location by almost a factor of 10 over time periods of the order of days to years due to changes in chemistry, although sampling and analytical methodologies may introduce artifacts that add uncertainty to the evaluation of these fluctuations. Finally, correlation coefficients between the calculated Np(V) and U(VI) sorption parameters can be included as input into PA sampling routines, so that the value selected for one radionuclide sorption parameter is conditioned by its statistical relationship to the others. The approaches outlined here can be adapted readily to current PA efforts, using site-specific information to provide geochemical constraints on PDFs for radionuclide transport parameters. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: High-Level Radioactive Waste Repository, Water Chemistry, Sorption, Radionuclide Transport, Surface Complexation, Adsorption, Components, Transport

Li, X.Z., Zhao, Q.L. and Hao, X.D. (1999), Ammonium removal from landfill leachate by chemical precipitation. *Waste Management*, **19** (6), 409-415.

Full Text: [W\Was Man19, 409.pdf](W/Was%20Man19,%20409.pdf)

Abstract: The landfill leachate in Hong Kong usually contains quite high NH4+-N concentration, which is well known to inhibit nitrification in biological treatment processes. A common pre-treatment for reducing high strength of ammonium (NH4+-N) is by an air-stripping process. However, there are some operational problems such as carbonate scaling in the process of stripping. For this reason, some technical alternatives for NH4+-N removal from leachate need to be studied. In this study, a bench-scale experiment was initiated to investigate the feasibility of selectively precipitating NH4+-N in the leachate collected from a local landfill in Hong Kong as magnesium ammonium phosphate (MAP). In the experiment, three combinations of chemicals, MgCl2. 6H2O+Na2HPO4. 12H2O, MgO + 85% H3PO4, and Ca(H2PO4)2. H2O + MgSO4. 7H2O, were used with the different stoichiometric ratios to generate the MAP precipitate effectively. The results indicated that NH4+-N contained in the leachate could be quickly reduced from 5618 to 112 mg/l within 15 min, when MgCl2. 6H2O and Na2HPO4. 12H2O were applied with a Mg2+: NH4+: PO43- mol ratio of 1: 1: 1. The pH range of the minimum MAP solubility was discovered to be between 8.5 and 9.0. Attention should be given to the high salinity formed in the treated leachate by using MgCl2. 6H2O and Na2HPO4. 12H2O, which may affect microbial activity in the following biological treatment processes. The other two combinations of chemicals [MgO+85% H3PO4 and Ca(H2PO4)2. H2O + MgSO4. 7H2O] could minimise salinity after precipitation, but they were less efficient for NH4+-N removal, compared with MgCl2. 6H2O and Na2HPO4. 12H2O. COD had no significant reduction during this precipitation. It was found that the sludge of MAP generated was easily settled within 10 min to reach its solids content up to 27%. The other characteristics including capillary suction time (CST) and dry density (DD) of the MAP sludge were also tested. The experimental results indicate that the settled sludge is quite solid and can be directly dumped at a landfill site even without any further dewatering treatment. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Ammonium (NH4+-N), Landfill Leachate, Precipitation, Magnesium-Ammonium-Phosphate (MAP), Phosphate, Nitrogen

Satyanarayana, J., Murthy, G.S. and Sasidhar, P. (1999), Adsorption studies of caesium on zirconium molybdoarsenate (ZrMAs). *Waste Management*, **19** (6), 427-432.

Full Text: [W\Was Man19, 427.pdf](W/Was%20Man19,%20427.pdf)

Abstract: The applicability of zirconium molybdoarsenate (ZrMAs) for efficient removal of Cs from aqueous solution by adsorption has been investigated. The kinetics of adsorption of caesium ions has been studied by using radioanalytical procedure over a concentration range (10-4)-10-2 mol dm-3) and in the temperature range (303-318 K). The results showed that the uptake follows the first order rate law with respect to caesium concentration and obeys Langmuir and Modified Freundlich adsorption isotherms in the concentration studied. The effect of temperature on adsorption equilibrium has been studied and the thermodynamic quantities (ΔH°, ΔG° and ΔS°) has been evaluated. They showed that the process is exothermic in nature. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Zirconium Molybdoarsenate, Caesium, Langmuir Isotherm, Modified Freundlich Isotherm, Adsorption

Barakat, M.A. (1999), Recovery of metal values from zinc solder dress. *Waste Management*, **19** (7-8), 503-507.

Full Text: [W\Was Man19, 503.pdf](W/Was%20Man19,%20503.pdf)

Abstract: Zinc solder dress containing 14.8% Sn, 16.3% Pb 0.41% Al and 64.5% Zn was leached with 3% H2SO4 at 45°C for 1 h. Zinc and aluminum went into solution, whereas lead and tin remained with the residue. Aluminum was selectively precipitated as calcium aluminum carbonate by treating the sulphate leachate with limestone at pH 4.8. Zinc sulphate solution was either evaporated to obtain zinc sulphate crystals or precipitated as basic zinc carbonate at pH 6.8. The undissolved lead and tin were leached with 5 M hot hydrochloric acid. The major part of lead chloride (congruent to 73%) was separated by cooling the leached products down to room temperature. From the soluble fraction, tin was recovered as hydrated tin oxide by alkylation with caustic soda at pH 2.4, while the remaining lead was separated at pH 8.5 as lead hydroxide. A process flowsheet had been suggested which involved two-stage hydrometallurgical treatment. Parameters affecting the recovery efficiency of the suggested method such as temperature, time, pH and acid: solid stoichiometric ratio were investigated. Results obtained revealed that the optimum leaching conditions were achieved by using 20 mi of 3% H2SO4 acid/g dress for 1 h at 45°C. Recovery efficiency of the metal salts was 99.1, 99.4, 99.6 and 99.5% for Zn, Al, Pb and Sn respectively. Recovery efficiency was related to the solubility of the concerned salts under the given experimental conditions. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Solder Dress, Acid Leaching, Zinc, Aluminum, Lead, Tin, Recovery, Separation, Lead

Ficarella, A. and Laforgia, D. (2000), Numerical simulation of flow-field and dioxins chemistry for incineration plants and experimental investigation. *Waste Management*, **20** (1), 27-49.

Full Text: [W\Was Man20, 27.pdf](W/Was%20Man20,%2027.pdf)

Abstract: The development of incineration units (kiln and afterburner) for hazardous wastes in terms of design and fluid-dynamic optimization has been carried out together with definition of a new design methodology. An extensive theoretical and experimental analysis has been carried out on a hazardous waste incineration pilot plant to test the methodologies and to optimize the entire system in terms of reduction of the polluting emissions and higher combustion efficiency. In particular, the combustion chamber and the afterburner have been thoroughly studied. A computer code for multiple chemical reactions occurring in an afterburner chamber of an incineration system was developed, based on the equations presented herein, to evaluate the decomposition rate of dioxins for different chamber geometries. The results of these analysis are presented herein. (C) 2000 Elsevier Science Ltd. All rights reserved.

Crannell, B.S., Eighmy, T.T., Krzanowski, J.E., Eusden, J.D., Shaw, E.L. and Francis, C.A. (2000), Heavy metal stabilization in municipal solid waste combustion bottom ash using soluble phosphate. *Waste Management*, **20** (2-3), 135-148.

Full Text: [W\Was Man20, 135.pdf](W/Was%20Man20,%20135.pdf)

Abstract: Heavy metal chemical stabilization with soluble PO43- was assessed for bottom ash from combustion of municipal solid waste. Bottom ash can contain heavy metals (e.g. Pb) that can leach. An experimental dose of 0.38 mols of soluble PO43- per kg of residue was used without optimizing the formulation for any one heavy metal. The reduction in the fraction available for leaching according to the total availability leaching test was 52% for Ca, 14% for Cd, 98% for Cu, 99% for Pb, and 36% for Zn. pH-dependent leaching (pH 4, 6, 8) showed that the treatment was able to reduce equilibrium concentrations by 0.5 to 3 log units for these heavy metals. Bulk and surface spectroscopies showed that both crystalline and amorphous precipitates were present as insoluble metal phosphate reaction products. Dominant reaction products were calcium phosphates, tertiary metal phosphates, and apatite family minerals. Observed phases included, beta-Ca3(PO4)2 (tertiary calcium phosphate); Ca5(PO4)3OH (calcium hydroxyapatite); Pb5(PO4)3Cl (lead chloropyromorphite); and Pb5(PO4)3OH (lead hydroxypyromorphite). These are considered to be very geochemically stable mineral phases. The geochemical thermodynamic equilibrium model MINTEQA2 was modified to include both extensive phosphate minerals and simple ideal solid solutions in order to better model pH-dependent leaching. Both end members [e.g, Pb5(PO4)3Cl, beta-Ca3(PO4)2] and ideal solid solutions [e.g. (Pb2, Ca)(PO4)2] were observed as controlling solids for Ca2+, Zn2+, Pb2+, and Cu2+. Controlling solids were not identified for Cd2+ because pH dependent concentrations were generally below detection limits. The divalent metal cations in bottom ash were effectively stabilized by treatment with soluble PO43-. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Municipal Solid Waste Combustion Bottom Ash, Lead, Heavy Metals, Phosphate, Stabilization, Lattice-Constant Measurements, Lead Immobilization, Hydroxyapatite, Surface, Sorption, Copper, Soils, Apatite, Cadmium, Cd2+

Haugsten, K.E. and Gustavson, B. (2000), Environmental properties of vitrified fly ash from hazardous and municipal waste incineration. *Waste Management*, **20** (2-3), 167-176.

Full Text: [W\Was Man20, 167.pdf](W/Was%20Man20,%20167.pdf)

Abstract: A process for vitrification of fly ash has been developed by the Swedish company ScanArc Plasma Technologies AB, and the Norwegian company Kvaerner Oil & Gas a.s. The process is named VITROARC(R). During 1996 the process was tested on different types of fly-ash under different process conditions, and the slag produced was tested for leaching behaviour in an extensive program at Netherlands Energy Reseaserch Foundation (ECN) in Holland. The project was supported by N.V. Afvalsverwerking Rijnmond (AVR) which also delivered most of the fly ash. Fly ash was also delivered from AVR Chemi and Roteb in Holland, Tiru in France and Borlange Energiverk in Sweden. The main target of the program was to verify that the produced slag fulfilled the requirements to category I material according to the Dutch regulation for building materials. During this particular program about 50 tonnes of fly ash have been vitrified individually and mixed in series of tests under different conditions. The tests have been performed in a pilot plant with capacity of processing one ton of flyash per hour. The main conclusions from this study are as follows: the VITROARC process does produce a slag material that qualifies directly for category 1 material for almost all elements. In most cases well below the crucial limit value. In the evaluation of the leaching behaviour of vitrified slag from fly ash antimony leaching proves to be the only crucial aspect in view of the Dutch regulatory requirements for building materials. The leachability of Sb varies around the limit value. It should be noted that compared with other materials, the leachability of the slag is largely surface related and almost surface limited. This implies that the leaching from VITROARC(R) slag in the long term will be far less than in most systems, meeting the criteria also for Sb, but showing a steady release of material due to solubility control. This benefit of the treatment cannot be evaluated in the current regulatory rules in Holland. It should also be noted that the Sb limit Value for N1 quality in the Dutch regulation for construction materials (0.054 mg/kg) is extremely low compared for instance to As (0.91 mg/kg), bearing in mind that As is regarded as being 10 times more poisonous than Sb is that leaching limits for Sb are not given in several other regulations. An overall conclusion from this is that the process represents a reliable, environment friendly and safe solution for stabilising and converting incinerator fly ash into useful products. The slag is also tested according to German, Austrian and Swiss regulations and fulfils their requirements for disposal of inert material. Also according to French and US regulations the leaching from the VITROARC(R) slag is below the regulatory limits. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Flyash, Vitrification, Leaching, Slag

Vandecasteele, C., Van den Broeck, K. and Dutré, V. (2000), ICP-MS, hydride generation-ICP-MS, and CZE for the study (analysis and speciation) of solidification/stabilisation of industrial waste containing arsenic. *Waste Management*, **20** (2-3), 211-216.

Full Text: [W\Was Man20, 211.pdf](W/Was%20Man20,%20211.pdf)

Abstract: Different analytical methods were applied to analyse the leachates obtained from leach tests on S/S industrial waste containing arsenic and the treated percolate water from a landfill. Inductively coupled plasma-mass spectrometry (ICP-MS) was used to determine total As and other elements, hydride generation-ICP-MS for the determination of As(III) and capillary zone electrophoresis (CZE) for As(III) and As(V). Interferences and matrix effects were studied in detail and corrected for. For the leachates, no corrections were required, for treated percolate water with lower As concentrations, in the case of ICP-MS important corrections were necessary. Results for different types of leach tests (extraction, static and semi-dynamic) and for treated percolate waters are presented. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Leach Tests, Arsenic, Solidification/Stabilization, Leach Tests

Sakai, S., Urano, S. and Takatsuki, H. (2000), Leaching behavior of PCBs and PCDDs/DFs from some waste materials. *Waste Management*, **20** (2-3), 241-247.

Full Text: [W\Was Man20, 241.pdf](W/Was%20Man20,%20241.pdf)

Abstract: Although it is well known that some waste materials and their incinerator residues contain persistent organic pollutants (POPs) such as PCBs and PCDDs/DFs, little attention has been paid to the leaching behavior of these chemicals because of their low solubility. Due to the coexistence of surfactants in wastes, however, leaching concentration of POPs may increase. Therefore, leaching tests with and without those substances were conducted in order to understand the influence of surfactant-like substances on POPs leaching. In those tests, linear alkylbenzene sulfonate (LAS) and humic acid were used as surfactant-like substances. Shredder residues from car/electrical goods recycling and fly ash from a municipal solid waste (MSW) incinerator were used in these leaching tests. Furthermore, an experiment was carried out to understand the influence of fine particles on the leaching concentration of POPs. The results indicate that surfactant-like substances increase the leaching concentration of POPs, and fine particles related closely to the transporting behavior of POPs. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Persistent Organic Pollutants (POPs), PCBs, PCDDs/Dfs, Surfactants, Leaching Tests, Fly-Ash, Soil

Sakai, S. and Hiraoka, M. (2000), Municipal solid waste incinerator residue recycling by thermal processes. *Waste Management*, **20** (2-3), 249-258.

Full Text: [W\Was Man20, 249.pdf](W/Was%20Man20,%20249.pdf)

Abstract: The melting technology makes incinerator residues, bottom ash and fly ash, stable and non-toxic. Moreover, this type of treatment allows the melted slag to be used as a resource again. In Japan, the melting process was developed in the 1980’s and has been in practical operation at around 24 municipal solid waste (MSW) incineration facilities including scheduled ones. By the melting process, PCDDs/PCDFs in residues are decomposed at a temperature of approximately 1400°C in the furnace and volatile heavy metals an concentrated in the fly ash of the melting process. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Melting Technology, Municipal Solid Waste Incinerator Residue, Heavy Metals, PCDDs/PCDFs, Sludge Melting Process, Furnace, System, Slag

Serclérat, I., Moszkowicz, P. and Pollet, B. (2000), Retention mechanisms in mortars of the trace metals contained in Portland cement clinkers. *Waste Management*, **20** (2-3), 259-264.

Full Text: [W\Was Man20, 259.pdf](W/Was%20Man20,%20259.pdf)

Abstract: This work aimed to assess the retention in the mortars of the heavy metals fed in a cement kiln with natural raw materials, fossil fuels or waste derived fuels. Industrial cement has been studied, along with laboratory samples enriched during clinkering with lead, zinc and chromium. The relevant mortars were tested for metal release through leaching studies in various chemical contexts. Zinc appeared to be insoluble in the pH range 7-13. Lead is released only in alkaline medium above pH 12.5. Hexavalent chromium, whose salts are usually very soluble, is retained though in an hydrated phase, that is stable in the chemical environment ensured by the cement matrix. Lead and chromium releases are linked to the metal levels in the mortars. The solubility studies of a chromium + sulfate ettringite revealed that chromium release is linked to its proportion in the crystal. A selective dissolution of the chromium part of ettringite has been pointed out. This leads to a lowering of the chromium level in such a solid contacted with water. Theses results improved the understanding of the release mechanisms of chromium by the mortar blocks. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metals, Leaching Studies, Cement, Mortar Blocks

Cudahy, J.J. and Helsel, R.W. (2000), Removal of products of incomplete combustion with carbon. *Waste Management*, **20** (5-6), 339-345.

Full Text: [W\Was Man20, 339.pdf](W/Was%20Man20,%20339.pdf)

Abstract: Carbon injection and carbon beds have been used in Europe for the control of incinerator polychlorinated dibenzo-p-dioxin (dioxin) and polychlorinated dibenzofuran (furan) emissions since the 1980s. In the April 1996 proposed Hazardous Waste Combustor Maximum Achievable Control Technology standards, the US Environmental Protection Agency identified carbon injection as Beyond-the-Floor control technology for dioxin emissions from hazardous waste incinerators. In addition to dioxins and furans, data from hazardous and municipal waste incinerators have shown that carbon injection or carbon bed control will also reduce emissions of other products of incomplete combustion (PICs). This paper will qualitatively discuss the theoretical aspects of the carbon adsorption of PICs at baghouse and electrostatic precipitator temperatures and flue gas concentrations of parts per million to billion or lower. A summary of data on PIC removal with carbon from hazardous and municipal waste incinerators is also presented. Most of the carbon-PIC data described is for non-dioxin PICs. The emphasis in this paper is on non-dioxin PICs. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Carbon Adsorption, Non-Dioxin Products of Incomplete Combustion (PICS), Hazardous and Municipal Waste Incinerators

Ryan, J.V., Lemieux, P.M., Pollard, K., Workman, R., Antley, B. and Yurk, J. (2000), Characterization of organic emissions from hazardous waste incineration processes under the new EPA draft Risk Burn Guidance: Measurement issues. *Waste Management*, **20** (5-6), 347-353.

Full Text: [W\Was Man20, 347.pdf](W/Was%20Man20,%20347.pdf)

Abstract: EPA’s recently published draft Risk Burn Guidance recommends that hazardous waste combustion facilities complete a mass balance of the total organics (TOs) that may be emitted from the combustor. TOs, consisting of three distinct fractions (volatile, semivolatile, and nonvolatile organic compounds) are determined using measurement techniques specific to the boiling point (bp) range of each component. Preliminary proof-of-concept tests have been performed to gain further knowledge of the total chromatographable organics (TCO) and gravimetric analysis (GRAV) procedures used to determine the semivolatile and nonvolatile organic fractions. A commercially prepared Method 8270 semivolatile organic standard solution, made up of 112 compounds containing a variety of halogenated, oxygenated, nitrogenated, and sulfonated hydrocarbons, in addition to those hydrocarbons containing only carbon and hydrogen, was used to examine measurement biases of the TCO and GRAV methods. The results indicate that, at least for this particular standard, both methods are accurate, exhibiting biases <±10%. However, these TCO results may be deceiving. TCO measurement biases observed for select individual semivolatile organic compounds are well in excess of the composite bias observed. The composite bias observed may be more a result of a relatively equal number of negative and positive biases that negate each rather than a true indication of TCO measurement bias. Further methods evaluation work is required to support this tenet. Additional tests were performed to verify that the semivolatile organic mass was not redundantly measured by the GRAV procedure. Experiments were also performed to expand the mass of nonvolatile organic material that could be quantified using the TCO procedure. Expanding the TCO working bp range may be a viable alternative to the GRAV technique. It must be cautioned that these results are not fully comprehensive in nature and, as a result, applications of these results are limited. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Risk Burn Guidance, Total Organics (TOS), Organic Emissions, Hazardous Waste Incineration

Johnson, E.A., Rudin, M.J., Steinberg, S.M. and Johnson, W.H. (2000), The sorption of selenite on various cement formulations. *Waste Management*, **20** (7), 509-516.

Full Text: [W\Was Man20, 509.pdf](W/Was%20Man20,%20509.pdf)

Abstract: Twenty-seven cementitious formulations containing three levels of water/solids ratio (0.45, 0.50, and 0.55), three concentrations of silica fume (0, 10, and 20%), and three concentrations of clay (0, 3, and 5%) were evaluated for their ability to effectively sorb selenite (SeO32-) from an alkaline solution. A batch sorption procedure was utilized to determine distribution coefficients (Kd) for selenite between water and each cement formulation. Experimental Kd values obtained ranged from 250 to 930 1 kg-1. The results indicated that varying the water and clay content of the mixes had little effect on selenite sorption, while adding increasing amounts of silica fume in a cement mix tended to decrease selenite sorption. A sorption/desorption study using several concentrations of selenium ranging from 6.5 to 1510 ppb was also conducted on cement formulations at one water/solids ratio (0.50), no silica fume, and three concentrations of clay (0, 3, and 5%). Freundlich isotherms were fitted to the sorption and desorption data. Results indicated that selenite sorption was irreversible under these conditions. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Selenite, Batch Sorption, Freundlich Isotherms, Cement, Soil, Adsorption, Goethite, Selenate

Marinin, D.V. and Brown, G.N. (2000), Studies of sorbent/ion-exchange materials for the removal of radioactive strontium from liquid radioactive waste and high hardness groundwaters. *Waste Management*, **20** (7), 545-553.

Full Text: [W\Was Man20, 545.pdf](W/Was%20Man20,%20545.pdf)

Abstract: Different sorbents were studied in terms of their full-scale applicability for radioactive strontium removal in low-level liquid radioactive waste (LLRW) management. The following types of sorbent/ion-exchange materials were investigated: natural zeolite-clinoptilolite, modified natural clinoptilolite, synthetic zeolites, new synthetic crystalline materials selective to strontium, ion-exchange resins, and modified fiber sorbents. Simulated solutions for experimental tests were prepared according to the composition of one of the facilities at the Hanford nuclear site (Richland, WA, USA). The following experiments were performed at different concentrations of strontium and competing elements (calcium, on the first hand): batch tests for determination of strontium distribution coefficients, sorbent/ion-exchanger selectivity to strontium in time presence of calcium, and kinetic measurements of strontium uptake. Modifications of Amberlite and Duolite ion-exchange resins (Rohm and Haas, USA) and new synthetic crystalline materials - silicotitanate IE-911 (UOP, USA) and sodium titanate (Allied Signal, USA) - showed the highest distribution coefficients of strontium (Kd similar to 2×104-4×105 ml/g). For all materials, the K-d decreased significantly with increased calcium concentration. On the other hand, each of these sorbents showed poor selectivity to strontium in the presence of calcium. Newly developed sorbents (Institute of Chemistry, Vladivostok, Russia) based on a fiber matrix (FM and FP) showed the best relative selectivity to strontium followed by the natural zeolite (clinoptilolite extracted and produced in the USA). Synthetic zeolites (IE-96, TIE-96) had moderate values of both parameters (distribution coefficient and selectivity). Fiber sorption materials were also absolute leaders in kinetic measurements removing 40% to 60% of the strontium from solution within a few minutes. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Low-Level Liquid Radioactive Waste, Radioactive Strontium, Sorbent/Ion-Exchange Materials

Vlyssides, A.G., Papaioannou, D., Loizidoy, M., Karlis, P.K. and Zorpas, A.A. (2000), Testing an electrochemical method for treatment of textile dye wastewater. *Waste Management*, **20** (7), 569-574.

Full Text: [W\Was Man20, 569.pdf](W/Was%20Man20,%20569.pdf)

Abstract: Wastewater from total dyeing and finishing stages (TDFW)and wastewater only from dyeing stage (DW) from a Textile cellulosic reactive azo dyeing process were treated separately by an electrochemical method using Ti/Pr as anode and Stainless Steel 304 as cathode. In this technique, sodium chloride was used as an electrolyte and the mixture was passed through an electrolytic cell. Due to the strong oxidizing potential of the chemicals produced (chlorine, oxygen, hydroxyl radicals and other oxidants) the GOD, BOD of the wastewaters were substantially decreased using this electrochemical technique. A number of experiments were run in a batch 5 litre apparatus and the results of the electrochemical treatment on the two kinds of wastewaters are reported here. The results indicate that the electrochemical method used is feasible for treatment of textile dyeing wastewaters. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Textile, Color Removal, Wastewater, Electrolysis Treatment, Water Treatment, Oxidation, Pollutants, Ozonation

Altundoğan, H.S., Altundoğan, S., Tümen, F. and Bildik, M. (2000), Arsenic removal from aqueous solutions by adsorption on red mud. *Waste Management*, **20** (8), 761-767.

Full Text: [W\Was Man20, 761.pdf](W/Was%20Man20,%20761.pdf)

Abstract: Use of red mud, which is a waste product from bauxite processing, has been explored as an alternate adsorbent for arsenic in this study. The tests showed that the alkaline aqueous medium (pH 9.5) favored the removal of As(III), whereas the pH range from 1.1 to 3.2 was effective for As(V) removal. The process of arsenic adsorption follows a first-order rate expression and obeys the Langmuir’s model. It was found that the adsorption of As(III) was exothermic, whereas As(V) adsorption was endothermic. It would be advantageous to use this residue as an adsorbent replacing polyvalent metal salts. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic Adsorption, Red Mud, Langmuir Isotherm, As(III) Removal, Hydroxide

Sivaraj, R., Namasivayam, C. and Kadirvelu, K. (2001), Orange peel as an adsorbent in the removal of Acid Violet 17 (acid dye) from aqueous solutions. *Waste Management*, **21** (1), 105-110.

Full Text: [W\Was Man21, 105.pdf](W/Was%20Man21,%20105.pdf)

Abstract: The effectiveness of orange peel in adsorbing Acid violet 17 from aqueous solutions has been studied as a function of agitation time, adsorbent dosage, initial dye concentration and pH. The adsorption follows both Langmuir and Freundlich isotherms. The adsorption capacity Q0 was 19.88 mg/g at initial pH 6.3. The equilibrium time was found to be 80 min for 10, 20, 30 and 40 mg/L, dye concentration respectively. A maximum removal of 87% was obtained at pH 2.0 for an adsorbent dose of 600 mg/50 ml of 10 mg/L dye concentration. Adsorption increases with increase in pH. Maximum desorption of 60% was achieved in water medium at pH 10.0. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Biogas Waste Slurry, Color Removal, Congo Red, Desorption, Dye, Equilibrium, Isotherms, Orange Peel, Peel, Pith, Water

? Jung, J., Lee, J.K. and Hahn, P.S. (2001), Development and application of a sorption data base for the performance assessment of a radwaste repository. *Waste Management*, **21** (4), 363-369.

Full Text: [2001\Was Man21, 363.pdf](2001/Was%20Man21,%20363.pdf)

Abstract: A sorption data base (SDB) provides readily available data for the performance assessment of a radwaste repository when site-specific and/or reference data are needed. The software developed at KAERI, SDB-21C, is a graphic user interface (GUI) program that provides efficient and user-friendly tools for evaluating large amount of sorption data. In addition, the most comprehensive sorption data base that contains about 11,000 NEA data and 2,000 KAERI data was compiled in the program. Besides the simple Kd approach, a parametric model and its compiled data sets are also included in the SDB-21C. In order to evaluate the versatility of SDB-21C, several applications were performed for relevant hypothetical situations. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Assessment, Cations, Data Base, Performance Assessment, Software, Sorption

Namasivayam, C., Radhika, R. and Suba, S. (2001), Uptake of dyes by a promising locally available agricultural solid waste: Coir pith. *Waste Management*, **21** (4), 381-387.

Full Text: [W\Was Man21, 381.pdf](W/Was%20Man21,%20381.pdf)

Abstract: The adsorption of rhodamine-B and acid violet by coir pith carbon was carried out by varying the parameters such as agitation time, dye concentration, adsorbent dose and pH. The adsorption followed both Langmuir and Freundlich isotherms. The adsorption capacity was found to be 2.56 mg and 8.06 mg dye per g of the adsorbent for rhodamine-B and acid violet, respectively. Adsorption of dyes followed first order rate kinetics. Acidic pH was favorable for the adsorption of acid violet and alkaline pH was favorable to rhodamine-B. Desorption studies showed that alkaline pH was favorable für the desorption of acid violet and acidic pH was favorable for the desorption of rhodamine-B. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Coir Pith, Dyes, Adsorption Dynamics, Isotherms, pH Effect, Fe(III)/Cr(III) Hydroxide, Aqueous-Solutions, Removal, Equilibrium, Adsorption, Slurry, Water

Lemieux, P.M., Lee, C.W., Ryan, J.V. and Lutes, C.C. (2001), Bench-scale studies on the simultaneous formation of PCBs and PCDD/Fs from combustion systems. *Waste Management*, **21** (5), 419-425.

Full Text: [W\Was Man21, 419.pdf](W/Was%20Man21,%20419.pdf)

Abstract: The presence of endocrine disrupting chemicals (EDCs) in the environment has wide-ranging potential ecological and health impacts on animals and humans. A significant amount of experimental and theoretical work has been performed the examining formation and control of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs), which account for only part of the EDCs being emitted from combustion devices. Generally accepted mechanistic theories for PCDD/F formation propose heterogeneous reactions in the cooler regions of the combustor involving gas-phase organic precursors (such as chlorobenzenes or chlorophenols), a chlorine donor [such as hydrogen chloride (HCl)], and a flyash-bound metallic catalyst (such as copper chloride). There is evidence that some other proposed EDCs, including polychlorinated biphenyls (PCBs), are formed through a similar mechanistic pathway as PCDD/Fs. In addition, there is evidence that certain important steps in the catalytic reaction between the copper catalyst and the organic precursors may suggest a common rate limiting step for the heterogeneous formation of the previously mentioned EDCs. This paper reports on a bench-scale experimental study to characterize a newly built reactor system that was built to: produce levels and distributions of PCDD/F production similar to those achieved by previous researchers; verify similar responses to changes in independent variables; examine the hypothesis that PCB formation rates exhibit trends similar to PCDD/F formation rates as reactor variables are changed; and begin to explore the dependence of PCB formation on temperature and precursor type. The reactor system has been built, and initial reactor characterization studies have been performed. Initial experiments yielded results that support the hypothesis of a similar formation mechanism of PCBs and PCDD/Fs in combustors. Initial experiments uncovered potential deficiencies with the reactor system and the experimental procedures and have suggested corrective action to improve the experimental system. Published by Elsevier Science Ltd.

Keywords: PCB, Reactor, Combustion, Heterogeneous, Dioxin, PCDD/F, Waste Combustion, Fly-Ash, Dioxin, Incinerators

Ho, T.C., Chuang, T.C., Chelluri, S., Lee, Y. and Hopper, J.R. (2001), Simultaneous capture of metal, sulfur and chlorine by sorbents during fluidized bed incineration. *Waste Management*, **21** (5), 435-441.

Full Text: [W\Was Man21, 435.pdf](W/Was%20Man21,%20435.pdf)

Abstract: Metal capture experiments were carried out in an atmospheric fluidized bed incinerator to investigate the effect of sulfur and chlorine on metal capture efficiency and the potential for simultaneous capture of metal, sulfur and chlorine by sorbents. In addition to experimental investigation, the effect of sulfur and chlorine on the metal capture process was also theoretically investigated through performing equilibrium calculations based on the minimization of system free energy. The observed results have indicated that, in general, the existence of sulfur and chlorine enhances the efficiency of metal capture especially at low to medium combustion temperatures. The capture mechanisms appear to include particulate scrubbing and chemisorption depending on the type of sorbents. Among the three sorbents tested, calcined limestone is capable of capturing all the three air pollutants simultaneously. The results also indicate that a mixture of the three sorbents, in general, captures more metals than a single sorbent during the process. In addition, the existence of sulfur and chlorine apparently enhances the metal capture process. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Metal Capture, Emission Control, Fluidized Bed, Sorbent, Adsorption, Chemisorption

Nishida, K., Nagayoshi, Y., Ota, H. and Nagasawa, H. (2001), Melting and stone production using MSW incinerated ash. *Waste Management*, **21** (5), 443-449.

Full Text: [W\Was Man21, 443.pdf](W/Was%20Man21,%20443.pdf)

Abstract: Most of the municipal solid waste (MSW) in Japan is incinerated and the generated ash is landfilled. However, environmental pollution problems have increased and Japan has decreased final disposal sites for landfills. With the application of a melting system, the volume of incinerated ash can be reduced and the effective use of melted slag is being developed for use in civil engineering works. However, the low strength of melted slag as a vitreous structure has limited its effective use. As a solution for this deficiency, a technology to crystallize melted slag into higher strength produced stones was developed. With the joint cooperation of Chiba Prefecture and Kamagaya City, a demonstration plant for melting and stone production with a capacity of 4.8 tons of incinerator ash per day was constructed. The demonstration test was conducted from May 1998 to June 1999 with satisfactory results stated below. Long-term stable operation and performance of the plant have been confirmed and effective applications of produced stones have been demonstrated on a commercial scale. The results are as follows.

1. A stable, continuous operation and good quality produced stones have been confirmed by treating more than 750 tons of MSW incinerated ash.

2. More than 99.9% of dioxins contained in the incinerated ash were decomposed, and the concentration of dioxins in produced stones were less than the detection limit set by Japanese environmental standards.

3. Leaching values of hazardous heavy metals of produced stones sufficiently met the environmental standard on soil pollution of the Environment Agency with superior leaching behavior for the Vitreous slag, thus confirming their safe applications.

4. The effective application of produced stones for aggregate was tested based on Japanese Industrial Standards and every figure of test results met the Japanese standard values. The use of produced stones as raw materials for permeable pavement blocks has been confirmed in commercial construction for a park in Chiba Prefecture. Asphalt use was also demonstrated by paving a commercial roadway in Kamagaya City. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Melting System, Ash Treatment, Msw, Incinerated Ash, Slag, Crystallization, Effective Use

Riley, C.E. (2001), Method development and implementation for co-planar polychlorinated biphenyls (PCBs). *Waste Management*, **21** (5), 465-470.

Full Text: [W\Was Man21, 465.pdf](W/Was%20Man21,%20465.pdf)

Abstract: The Emission Measurement Center (EMG) in the Environmental Protection Agency’s Office of Air Quality Planning and Standards was directed to conduct an emissions test program at a sewage sludge incinerator in support of a Maximum Achievable Control Technology (MACT) standard. One pollutant category of concern at these facilities was polychlorinated biphenyls, or PCBs. An objective of the test program was to measure co-planar PCBs in the incinerator emissions, the sewage sludge introduced to the incinerator, and the scrubber water effluent used in controlling the incinerator emissions. Co-planar PCB congeners are those having four or more chlorine atoms with only a few substitutions in the ortho positions, i.e. positions designated 2,2’,6, and 6’. Thirteen PCB compounds are sometimes referred to as the ‘WHO PCBs,’ because the World Health Organization (WHO) has derived toxic equivalency factors for these congeners. Studies have shown that these dioxin-like compounds can react with the aryl hydrocarbon receptor. This same reaction is believed to initiate adverse health effects for dioxin and furan congeners. In order to conduct the co-planer PCB testing, the EMG had to develop analytical methods that could measure the 13 co-planar PCBs. The purpose of the test program was to develop, evaluate, and implement analytical test methods capable of measuring co-planar PGBs in three matrices: incinerator stack gases, sewage sludge, and scrubber water effluents. The paper summarizes the initial development work that was performed in preparation of analytical test protocols that could measure co-planar PCBs in air, water, and sludge matrices. Following the method development, a MACT emissions test program was conducted at a sewage sludge facility in July 1999 and these data are also summarized in the paper. (C) 2001 Published by Elsevier Science Ltd.

Keywords: Polychlorinated Biphenyls (PCBs), Sewage Sludge, Incinerator, Analytical Tests

Hinshaw, G.D. and Trenholm, A.R. (2001), Hazardous waste incineration emissions in perspective. *Waste Management*, **21** (5), 471-475.

Full Text: [W\Was Man21, 471.pdf](W/Was%20Man21,%20471.pdf)

Abstract: There has been increasing concern over the stack emissions of toxic substances from hazardous waste incinerators, and with improved sampling and analytical technology, measurements are being made at lower and lower levels to support risk assessment and various types of decision-making. However, it is generally difficult to visualize these levels of emissions, which span many orders of magnitude. Data on stack emissions were compiled from various research and compliance testing programs, and representative examples of various types of emissions were plotted on a series of graphs that spans the entire range of concentrations that may be encountered. The result is an illustrative tool for communication as to what emissions from hazardous waste incinerators are actually like. (C) 2001 Published by Elsevier Science Ltd.

Keywords: Harzardous Waste Incinerators, Stack Emissions, MACT

Sørensen, M.A., Mogensen, E.P.B., Lundtorp, K., Jensen, D.L. and Christensen, T.H. (2001), High temperature co-treatment of bottom ash and stabilized fly ashes from waste incineration. *Waste Management*, **21** (6), 555-562.

Full Text: [W\Was Man21, 555.pdf](W/Was%20Man21,%20555.pdf)

Abstract: Bottom ashes from two Danish municipal solid waste incineration plants were heated at 900 degreesC with iron oxide stabilized air pollution control residues at actual mass flow ratios (9: 1), simulating a treating method for the residues. The two residues were cotreated, producing one combined stream that may be utilized as a secondary road construction material. Scanning electron microscope analysis and grain size distribution analysis indicated that sintering of the particles did not occur. Batch leaching tests at liquid/solid 10 I/kg at a range of pH-values (6-10) quantified with respect to Cd, Cr and Pb revealed significant positive effects of co-heating the ashes, although Pb showed slightly increased leaching. At a liquid/solid ratio of 10 I/kg the leachate concentrations were still low at pH 7-10 and the release of Pb was, thus, not expected to limit the utilization of the mixed ashes. The process, thus, fixates the metals in the solid residues without altering the leaching properties of the bottom ash too significantly. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Waste Incineration, Heavy Metals, Leaching, Thermal Treatment, Bottom Ash, APC Residues, Stabilization, Element Behavior, Metals

Rodriguez, A. and Hall, M.J. (2001), Removal of an airborne low volatility metal under fuel-rich and fuel lean conditions through condensation onto soot and/or sorbent particles. *Waste Management*, **21** (7), 589-607.

Full Text: [W\Was Man21, 589.pdf](W/Was%20Man21,%20589.pdf)

Abstract: The removal by a sorbent of a low volatility heavy metal, barium, from a combustor exhaust stream was investigated experimentally. The barium was introduced into the gas phase through a combustion process simulating incineration of waste materials. Sorbent- and metal-feed-rate, temperature and air intake were varied to study the impact on the gas-to-particle conversion and the metal condensation process. Peak temperature and subsequent temperature drop were found to be the dominant factors affecting the condensation process. Fuel-rich and fuel-lean conditions result in lower peak temperatures and a more rapid temperature drop relative to stoichiometric conditions. Since the metal vapor saturation pressure falls exponentially with temperature a larger condensation rate was observed, as long as nucleation was suppressed. Fuel-rich conditions promote the formation of soot particles. These particles function as sites for subsequent metal-species condensation. Chlorine was injected into the flow, to study the effect on metal vaporization. Chlorine promoted the volatilization of barium and therefore the subsequent condensation capture was made more effective. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Sorbent, Chlorine, Barium, Aerosol, Condensation Capture, Cl/Ba Ratio, Incinerator Fly-Ash, Heavy-Metals, Flame Incinerator, Aerosol Formation, Fluidized-Bed, Behavior, Growth, Vapor, Emissions, Dynamics

Ortiz, N., Pires, M.A.F. and Bressiani, J.C. (2001), Use of steel converter slag as nickel adsorber to wastewater treatment. *Waste Management*, **21** (7), 631-635.

Full Text: [W\Was Man21, 631.pdf](W/Was%20Man21,%20631.pdf)

Abstract: Magnetite, the main component of converter slag in the steel industry, can be used for the adsorption of Ni(II) from aqueous solutions, over a range of conditions: initial metal concentration (10-100 mg l-1), stirring times (2-240 min); adsorbent dosage (1 g for 0.5 1 of metal solution) and temperatures (20, 30 and 38 degreesC). The adsorption rate increased with initial concentration but decreased with increase in temperature, due to competition of the dissolution process. The adsorption process obeyed the Freundlich isotherm model. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metals, Adsorption, Converter Slag, Solid Residue, Magnetite Slag, Nickel Adsorption, Fe(III)/Cr(III) Hydroxide, Adsorption, Removal

Tenório, J.A.S. and Espinosa, D.C.R. (2001), Treatment of chromium plating process effluents with ion exchange resins. *Waste Management*, **21** (7), 637-642.

Full Text: [W\Was Man21, 637.pdf](W/Was%20Man21,%20637.pdf)

Abstract: The surface treatment industry deals with various heavy metals, including the elements Cr, Zn, Ni, Cd, and Cu. Conventional treatments of effluents generate class I solid residue. The aim of this investigation was to study the viability of ion exchange as an alternative process for treatment of rinse water and to determine the efficacy of two ion exchange systems, System 1: ‘strong’ cationic resin- ‘strong’ anionic resin and System 2: ‘strong’ cationic resin- ‘weak’ anionic resin. Commercial resins and solutions taken from rinse tanks of chromium plating companies were used in this investigation. A two-column system, one for the cationic resin and another for the anionic resin, both with 150 ml capacity was mounted. The solution was percolated at a rate of 10 ml/min. The following solutions were used for regeneration of the resins: 2% H2SO4 for the cationic and 4% NaOH for the anionic. The percolated solutions revealed chromium contents of less than 0.25 mg/l, independent of the system used. The ‘strong’ cationic resin- ‘weak’ anionic resin gave excellent regeneration results. The ‘strong’ cationic- ‘strong’ anionic resin presented problems during regeneration, and did not release the retained ions after percolation of 2000 ml of 4% NaOH solution. It is concluded that for this type of treatment, the system composed of ‘strong’ cationic resin and ‘weak’ anionic resin is more appropriate. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Chromium, Ion Exchange, Plating Industry Effluents

Cioffi, R., Maffucci, L., Santoro, L. and Glasser, F.P. (2001), Stabilization of chloro-organics using organophilic bentonite in a cement-blast furnace slag matrix. *Waste Management*, **21** (7), 651-660.

Full Text: [W\Was Man21, 651.pdf](W/Was%20Man21,%20651.pdf)

Abstract: The application of cement-based stabilisation/solidification treatment to organic-containing wastes is made difficult by the adverse effect of organics on cement hydration. The use of organophilic clays as pre-solidification adsorbents of the organic compounds can reduce this problem because of the high adsorption power of these clays and their compatibility with the cementitious matrix. This work presents an investigation of the effect on hydration kinetics, physico-mechanical properties and leaching behaviour of cement-based solidified waste forms containing 2-chlorophenol and 1-chloronapthalene adsorbed on organophilic bentonites. These were prepared by cation exchange with benzyldimethyloctadecylammonium chloride and trimethyloctadecylammonium chloride. The binder was a 30% pozzolanic cement, 70% granulated blast furnace slag mixture. Several binder-to-bentonite ratios and different concentrations of the organics on the bentonite were used. Kinetics of hydration were studied by measurement of chemically bound water and by means of thermal and calorimetric analyses. Microstructure and other physico-mechanical properties of the solidified forms were studied by means of mercury intrusion porosimetry, scanning electron microscopy and unconfined compressive strength measurement. Leaching was checked by two different leaching tests: one dynamic, on monolithic samples, and the other static, on powdered samples. This study indicates that the incorporation of the organic-loaded bentonite in the binder matrix causes modifications in the hardened samples by altering cement hydration. The effects of the two organic contaminants are differentiated. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Organophilic Bentonite, Chloro-Organics, Adsorption, Stabilization, Slag Cement, Hydrophobic Layer Silicates, Alcohol-Benzene Mixtures, Industrial-Wastes, Clay-Minerals, Adsorption, Solidification, Adsorbents, Isotherms, Sorption, Surface

Panayotova, M.I. (2001), Kinetics and thermodynamics of copper ions removal from wastewater by use of zeolite. *Waste Management*, **21** (7), 671-676.

Full Text: [W\Was Man21, 671.pdf](W/Was%20Man21,%20671.pdf)

Abstract: Natural Bulgarian zeolite was tested for its ability to remove Cu2+ from model wastewater. Influence of process variables was investigated. It was found that the optimum wastewater to zeolite ratio is 100: 1 and the optimum pH value of water to be treated is 5.5 to 7.5. Zeolite with finer particles shows a higher uptake capacity. The simultaneous presence of Ca2+ and Mg2+ in concentrations similar to their concentrations in Bulgarian natural water does not significantly influence the uptake of Cu2+. Zeolite modification by treating it with NaCl, CH3COONa and NaOH increases its uptake ability. Copper ions are strongly immobilized by modified zeolite and secondary pollution of water caused by its contact with preloaded zeolite is very low (1.5-2.5% of Cu2+ preliminary immobilized have been released back into acidified water). Contacting with 2 mol dm-3 NaCl can easily regenerate loaded zeolite; best results were obtained for zeolite modified with NaCl. Requirements of Bulgarian standards for industrial wastewater can be met by a one-stage process for an initial Cu2+ concentration of 10 mg dm-3, and by a two stage process for an initial Cu2+ concentration of 50 mg dm-3. Uptake of Cu2+ by zeolite from neutral wastewater has proved to be as effective as Cu2+ removal by precipitation of copper hydroxide. The process of Cu2+ uptake by natural zeolite is best described by the kinetic equation for adsorption. This fact, together with the correlation found between the Cu2+ uptake and the amount of Na+, Ca2+ and K+ released into solution by zeolite shows that the ion exchange sorption plays the basic role in Cu2+ uptake by natural zeolite. The value obtained for the apparent activation energy (26.112 kJ mol-1) implies that the process can be easily carried out with a satisfactory rate. The uptake equilibrium is best described by the Langmuir adsorption isotherm, with Langmuir constants KL = 6.4×10-2 dm3 mg-1 and M = 6.74 mg g-1. The apparent equilibrium constant found shows moderate affinity of zeolite for Cu2+. Values of ΔG° and ΔH° found show the spontaneous and endothermic nature of the process of Cu2+ uptake by natural zeolite. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Natural and Modified Zeolite, Wastewater Treatment, Copper Ions Removal, Adsorption, Bentonite, Exchange

Aksu, Z. and Yener, J. (2001), A comparative adsorption/biosorption study of mono-chlorinated phenols onto various sorbents. *Waste Management*, **21** (8), 695-702.

Full Text: [W\Was Man21, 695.pdf](W/Was%20Man21,%20695.pdf)

Abstract: The potential use of dried activated sludge and fly ash as a substitute for granular activated carbon for removing mono-chlorinated phenols (o-chlorophenol and p-chlorophenol) was examined. The pollutant binding capacity of the adsorbent/biosorbent was shown to be a function of substituted group, initial pH and initial mono-chlorinated phenol concentration. The working sorption pH value was determined as 1.0 and the equilibrium uptake increased with increasing initial mono-chlorinated phenol concentration up to 500 mg dm-3 for all the mono-chlorinated phenol-sorbent systems. The suitability of the Freundlich, Langmuir and Redlich-Peterson adsorption models to the equilibrium data were investigated for each mono-chlorinated phenol-sorbent system. The results showed that the equilibrium data for all the mono-chlorinated phenol-sorbent systems fitted the Redlich-Peterson model best within the concentration range studied. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: O-Chlorophenol, P-Chlorophenol, Adsorption/Biosorption, Dried Activated Sludge, Fly Ash, Granular Activated Carbon, Activated Carbon, Fly-Ash, Aqueous-Solutions, Waste-Water, Adsorption, Removal, Biosorption, Desorption, Pentachlorophenol, Chlorophenols

? Martin-Garin, A., Gaudet, J.P., Charlet, L. and Vitart, X. (2002), A dynamic study of the sorption and the transport processes of cadmium in calcareous sandy soils. *Waste Management*, **22** (2), 201-207.

Full Text: [2002\Was Man22, 201.pdf](2002/Was%20Man22,%20201.pdf)

Abstract: The interactions of Cd2+ with silica and calcite were observed through laboratory dynamic experiments. Cd2+ sorption processes were characterised as a function of reaction kinetics in aqueous solutions saturated or not with respect to calcite. Chromatographic column experiments show that Cd2+ sorption on silica can be considered as a reversible equilibrate reaction which depends on water composition and pH. For a porous medium composed by a mixture of silica and calcite, the Cd2+ migration behaviours are predominantly controlled by calcite. The amount and the reversibility of sorbed Cd on calcite are strongly affected by kinetic limitations. Stirred flow through reactor experiments provide an original method to separate and characterise the ‘fast’ and ‘slow’ Cd sorption on calcite processes. The ‘fast’ Cd reversible adsorption isotherms and the rate of Cd subsequent uptake by ‘slow’ reactions are determined. In addition, the inhibition of calcite dissolution is observed as a function of sorbed Cd in order to provide a complete mechanistic database for coupled transport-geochemistry models. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Isotherms, Cadmium, Calcite, Cd2+, Dissolution, Ion-Exchange, Isotherms, Kinetic, Kinetics, Migration, Soils, Solid-Solution, Sorption, Surface, Transport, Water

Kazi, F.K.M. and Cooper, P.A. (2002), Rapid-extraction oxidation process to recover and reuse copper chromium and arsenic from industrial wood preservative sludge. *Waste Management*, **22** (3), 293-301.

Full Text: [W\Was Man22, 293.pdf](W/Was%20Man22,%20293.pdf)

Abstract: Chromated copper arsenate (CCA) wood preservative can form insoluble sludges when the hexavalent chromium component is reduced by wood extractives, wood particles and preservative additives in the solution. This sludge accumulates in treating solution work tanks, sumps and in-line filters and must be disposed of as hazardous wastes by waste disposal companies at high costs. A number of commercial sludges were investigated and found to contain 18-94% copper, chromium and arsenic as oxides combined with sand, oil, wood particles, additives and wood extractives. We have developed a multi-stage recycling process whereby approximately 97% of the CCA components are recovered from the sludge. It involves extraction with sodium hypochlorite to remove and oxidize chromium (more than 90%) and extract most of the arsenic (approx. 80%) followed by extraction of the copper and remaining arsenic and chromium with phosphoric acid. The phosphoric acid extract contains some trivalent chromium, which is subsequently oxidized by sodium hypochlorite. The combined oxidized extract containing Cr-VI, Cu-II and As-v was compatible with CCA treating solutions and could be re-used commercially for treating wood without having a significant effect on the preservative fixation rate or the leach resistance of the treated wood. A cost analysis showed that the economic savings from recovery of CCA chemicals and reduced landfill costs exceeded the variable costs for materials and energy for the process by as much as Can $966 per tonne of sludge if sodium sulfite can be acquired in bulk quantities for the process. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Behavior, Cca Fixation, Chromium, Compatibility, Copper, Extraction, Fixation, Kinetic-Model, Leaching, Oxidation, Preservative, Reaction Zone, Recovery, Recycle, Sludge, Soils, Waste, Wood

? Ho, T.C., Kobayashi, N. and Lee, Y.K. (2002), Modeling of mercury sorption by activated carbon in a confined, a semi-fluidized, and a fluidized bed. *Waste Management*, **22** (4), 391-398.

Full Text: [2002\Was Man22, 391.pdf](2002/Was%20Man22,%20391.pdf)

Abstract: A process model was developed to simulate elemental mercury sorption by activated carbon in three distinct beds, namely a confined, a semi-fluidized, and a fluidized bed. The 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. For surface equilibrium, three different equilibrium laws were used in the model, namely the Henry’s Law, the Langmuir isotherm and the Freundlich isotherm. Literature mercury sorption data were used to determine the best-fit values of parameters for these equilibrium expressions, The parameter-fitted model was then used to simulate mercury sorption processes in the three distinct beds. The simulation parameters were mercury concentration, gas flow rate, adsorption temperature and the degree of semi-fluidization. The simulation results have indicated that the model is capable of describing the literature available mercury sorption data. All the three surface equilibrium laws appear to simulate the adsorption profiles equally well mainly because the sorption process occurs in an extremely low concentration range. The simulation results for the three distinct beds have suggested that the confined bed has the best mercury control performance; however, it generates the highest pressure-drop across the bed. A fluidized bed creates the least pressure drop; however, its sorption performance is poor. A semi-fluidized bed offers acceptable performance with affordable pressure-drops and can be a practical candidate for the process. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Carbon, Equilibrium, Isotherm, Kinetic, Langmuir Isotherm, Literature, Mass Transfer, Mechanisms, Mercury, Mercury Control, Pressure Drop, Semi-Fluidized, Sorption, Temperature

Johnson, P.D., Watson, M.A., Brown, J. and Jefcoat, I.A. (2002), Peanut hull pellets as a single use sorbent for the capture of Cu(II) from wastewater. *Waste Management*, **22** (5), 471-480.

Full Text: [W\Was Man22, 471.pdf](W/Was%20Man22,%20471.pdf)

Abstract: This paper investigates the ability of peanut hulls and peanut hull pellets to adsorb copper from dilute aqueous metal ion solutions in batch and fixed bed systems, The kinetics of copper uptake onto the media have been investigated in batch systems and the influence of pH and particle size on the rate and extent of copper capture determined. The Langmuir and Freundlich isotherm theories were determined; the Langmuir model was found to best represent the equilibrium isotherm data. In normalized kinetic tests at least 75% of copper removal occurred within the first 20 min; 92% removal was effected within the first 50 min. The rate of uptake was optimum within the pH range 5-7.5 and media capacities remained relatively constant at a pH above 4.0. Bench-scale column studies were performed using peanut hull pellets. The overall capacity of pelletized peanut hulls was higher than for unmodified peanut hulls. Due to their demonstrated ability for Cu(II) uptake and favorable structural characteristics, pelletized peanut hulls could gain use as a low-cost, once-through biomass filter medium for copper-bearing waste streams. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption Capacity, Adsorption Isotherms, Heavy Metals, Low-Cost Adsorbents, Rption, Cadmium, Water, Equilibrium, Adsorbent, Removal, Metals, Peat, Ions

Rengaraj, S., Moon, S.H., Sivabalan, R., Arabindoo, B. and Murugesan, V. (2002), Agricultural solid waste for the removal of organics: Adsorption of phenol from water and wastewater by palm seed coat activated carbon. *Waste Management*, **22** (5), 543-548.

Full Text: [W\Was Man22, 543.pdf](W/Was%20Man22,%20543.pdf)

Abstract: Adsorption studies for phenol removal from aqueous solution on activated palm seed coat carbon (PSCC) were carried out under varying experimental conditions of contact time. phenol concentration, adsorbent dose and pH. Adsorption equilibrium was reached within 3 h for phenolic concentrations 10-60 mg l-1. Kinetics of adsorption obeyed a first order rate equation. The percent removal remained constant over the pH range 4-9 for a phenolic concentration of 25 mg l-1. The equilibrium data could be described well by the Freundlich isotherm equation. The adsorption of phenol on PSCC follows the film diffusion process. A comparative study with a commercial activated carbon showed that PSCC is two times more effective than commercial activated carbon. The studies showed that the palm seed coat carbon can be used as an efficient adsorbent material for the removal of phenolics from water and wastewater. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Palm Seed Coat, Adsorption, Phenol, Isotherm, Kinetics, Wastewater, Bagasse Fly-Ash, Sugar-Industry

Mohan, S.V., Rao, N.C., Prasad, K.K. and Karthikeyan, J. (2002), Treatment of simulated Reactive Yellow 22 (Azo) dye effluents using *Spirogyra* species. *Waste Management*, **22** (6), 575-582.

Full Text: [W\Was Man22, 575.pdf](W/Was%20Man22,%20575.pdf)

Abstract: The potential of commonly available green algae belonging to *Spirogyra* species was investigated as viable biomaterials for biological treatment of simulated synthetic azo dye (Reactive Yellow 22) effluents. The results obtained from the batch experiments revealed the ability of the algal species in removing the dye colour and was dependent both on the dye concentration and algal biomass. Maximum dye colour removal was observed on the third day for all the system conditions. Monitoring of ORP values helped to understand the overlying biochemical mechanism of algal–dye system. Based upon the results, the dye–algal treatment mechanism was attributed to biosorption (sorption of dye molecules over the surface of algal cells), bioconversion (diffusion of dye molecules into the algal cells and subsequent conversion) and biocoagulation (coagulation of dye molecules present in the aqueous phase onto the biopolymers released as metabolic intermediates during metabolic conversion of dye and subsequent settlement).

Lin, S.H. and Cheng, M.J. (2002), Adsorption of phenol and m-chlorophenol on organobentonites and repeated thermal regeneration. *Waste Management*, **22** (6), 595-603.

Full Text: [W\Was Man22, 595.pdf](W/Was%20Man22,%20595.pdf)

Abstract: Experimental investigations were conducted on the adsorption characteristics of phenol and m-chlorophenol by organobentonites. The organobentonites were prepared by modifying natural bentonite with various quaternary ammonium salts including tetramethylammonium bromide, hexadecyltrimethylammonium bromide, benzyl-triethylammonium bromide, tetraethylamnionium bromide and cetylpyridinium bromide. The adsorption characteristics of phenol and chlorophenol by these organobentonites were examined in detail. The empirical Freundlich isotherm was found to describe well the equilibrium adsorption data. Thermal regeneration of spent organobentonites was also investigated and operating conditions of 200degreesC and 2 h heating were found to yield very good results. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Organobentonite, Phenol, M-Chlorophenol, Adsorption, Regeneration, Organo-Clays, Exchanged Clays, Sorption, Water, Pollutants, Cosorption, Bentonite, Oxidation

? Annadurai, G. and Juang, R.S., Lee, D.J. (2002), Microbiological degradation of phenol using mixed liquors of *Pseudomonas putida* and activated sludge. *Waste Management*, **22** (7), 703-710.

Full Text: [2002\Was Man22, 703.pdf](2002/Was%20Man22,%20703.pdf)

Abstract: This work investigated the biodegradation potential of phenol using mixed liquors of Pseudomonas putida (ATCC 31800) and activated sludge. Experiments were made as a function of solution pH (6-10), temperature (30-36°C), nitrogen source (NH4)2SO4 (0.5-0.8 g/l), and carbon source glucose (0.5-0.8 g/l). Response surface methodology by the Box-Behnken model was used to examine the role of four process factors on phenol degradation. It was shown that a second-order polynomial regression model could properly interpret the experimental data with an R-2-value of 0.9997 and an F-value of 3605.45, based on which the maximum degradation of phenol was estimated up to 80.1% within the range examined. Interactions between process parameters and each significance effect on phenol degradation were also discussed. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Fly-Ash, Adsorption, Biosorption, Temperature

Galiatsatou, P., Metaxas, M., Arapoglou, D. and Kasselouri-Rigopoulou, V. (2002), Treatment of olive mill waste water with activated carbons from agricultural by-products. *Waste Management*, **22** (7), 803-812.

Full Text: [W\Was Man22, 803.pdf](W/Was%20Man22,%20803.pdf)

Abstract: A series of activated carbons prepared by a two-step steam activation of olive stone and solvent extracted olive pulp (SEOP) have been used in an attempt to investigate the total phenol removal and chemical oxygen demand (COD) decrease in olive mill waste water (OMWW). The temperature of carbonization and activation were kept constant at 850 and 800 degreesC, respectively. One of the carbons was prepared by a single-step process at 800 degreesC. Activated carbons have been characterized by adsorption of N2 at 77 K and mercury porosimetry. Their iodine values were also determined. Surface oxides of activated carbons were determined using the Boehm’s method. The porosity development and the surface chemistry of carbons were correlated to increasing removal ability of organic molecules. Kinetics of adsorption was evaluated by applying the Lagegren model while adsorption isotherm data were fitted to Langmuir model. Mesoporosity seems to be the key factor for total phenol removal while micoporosity controls the adsorption of total organics as expressed by the COD decrease in OMWW. For carbons with similar structure, the adsorption of phenols or total organics might be affected by the presence of carbonyls. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Removal, Phenol

Rao, M., Parwate, A.V. and Bhole, A.G. (2002), Removal of Cr6+ and Ni2+ from aqueous solution using bagasse and fly ash. *Waste Management*, **22** (7), 821-830.

Full Text: [W\Was Man22, 821.pdf](W/Was%20Man22,%20821.pdf)

Abstract: Raw bagasse and fly ash, the waste generated in sugar mills and boilers respectively have been used as low-cost potential adsorbents. Raw bagasse was pretreated with 0.1N NaOH followed by 0.1N CH3COOH before its application. These low-cost adsorbents were used for the removal of chromium and nickel from an aqueous solution. The kinetics of adsorption and extent of adsorption at equilibrium are dependent on the physical and chemical characteristics of the adsorbent, adsorbate and experimental system. The effect of hydrogen ion concentration, contact time, sorbent dose, initial concentrations of adsorbate and adsorbent and particle size on the uptake of chromium and nickel were studied in batch experiments. The Sorption data has been correlated with Langmuir, Freundlich and Bhattacharya and Venkobachar adsorption models. The efficiencies of adsorbent materials for the removal of Cr(VI) and Ni(II) were found to be between 56.2 and 96.2% and 83.6 and 100%, respectively. These results were obtained at the optimized conditions of pH, contact time, sorbent dose, sorbate concentration of 100 mg/l and with the variation of adsorbent particles size between 0.075 and 4.75 mm. The order of selectivity is powdered activated carbon>bagasse>fly ash for Cr(VI) removal and powdered activated carbon>fly ash>bagasse for Ni(II) removal.

? Lusvardi, G., Malavasi, G., Menabue, L. and Saladini, M. (2002), Removal of cadmium ion by means of synthetic hydroxyapatite. *Waste Management*, **22** (8), 853-857.

Full Text: [2002\Was Man22, 853.pdf](2002/Was%20Man22,%20853.pdf)

Abstract: The reaction behaviour of synthetic hydroxyapatite [Ca-10(PO4)(6)(OH)(2)] (HAP) toward cadmium ion was investigated for the Cd/Ca molar ratio in the range 1-0.005, by means of ions, pH measurements and XRD, SEM, IR techniques. The reaction behaviour between HAP and cadmium ion could be explained by a formation of an amorphous phase and/or a sorption mechanism. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium, IR, Mechanism, SEM, Sorption

? Pagnanelli, F., Toro, L. and Veglio, F. (2002), Olive mill solid residues as heavy metal sorbent material: A preliminary study. *Waste Management*, **22** (8), 901-907.

Full Text: [2002\Was Man22, 901.pdf](2002/Was%20Man22,%20901.pdf)

Abstract: Biosorption of heavy metals is an innovative and alternative technology to remove these pollutants from aqueous solutions using inactive and dead biomasses such as agricultural and industrial wastes, algae and bacteria. In this study olive mill solid residue was used as heavy metal adsorbent material for its wide availability as agricultural waste and also for its cellulosic matrix, rich of potential metal binding active sites. Preliminary studies concerned with the removal of different heavy metals (Hg, Pb, Cu, Zn and Cd), the effect of pre-treatments by water and n-hexane and the regeneration possibility. Olive mill solid residue resulted able to remove heavy metals from aqueous solutions with an affinity series reflecting the hydrolytic properties of the metallic ions, but also a particular affinity for copper. It can be supposed that biosorption phenomenon occur by a general ion exchange mechanism combined with a specific complexation reaction for copper ions. Water pre-treatment is sufficient to reduce COD release in the effluent according to the law limit, while n-hexane pre-treatment strongly reduces also the adsorption properties of this material. Experimental isotherms obtained under different operating conditions were fitted using a nonlinear regression method for the estimation of the Langmuir parameters. Moreover a simple Scatchard plot analysis was performed for a preliminary investigation of the active sites, showing the presence of two different site affinities depending on the metal concentration, according to the previous hypothesis of two kinds of uptake mechanisms for copper biosorption, Regeneration tests gave good results in terms of yield of regeneration and also concentration ratios. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Properties, Binding, Biosorption, Complexation, Copper, Heavy Metal, Heavy Metals, Ion Exchange, Isotherms, Mechanism, Mechanisms, Metal, Metals, pH, Pomace, Regeneration, Removal, Waste, Water

? Mohan, S.V., Sistla, S., Guru, R.K., Prasad, K.K., Kumar, C.S., Ramakrishna, S.V. and Sarma, P.N. (2003), Microbial degradation of pyridine using Pseudomonas sp and isolation of plasmid responsible for degradation. *Waste Management*, **23** (2), 167-171.

Full Text: [2003\Was Man23, 167.pdf](2003/Was%20Man23,%20167.pdf)

Abstract: Pseudomonas (PI2) capable of degrading pyridine was isolated from the mixed population of the activated sludge unit which was being used for treating complex effluents, the strain was characterized. Aerobic degradation of pyridine was studied with the isolated strain and the growth parameters were evaluated. Pyridine degradation was further conformed by chromatography (HPLC) analysis. The process parameters like biomass growth and dissolved oxygen consumption were monitored during pyridine degradation. In order to conform with the plasmid capability to degrade pyridine, the requisite plasmid was isolated and transferred to DH 5alpha Escherichia coli. The subsequent biodegradation studies revealed the ability of the transformed plasmid capability to degrade the pyridine. (C) 2003 Elsevier Science Ltd. All rights reserved.

Keywords: Derivatives, Quinoline

Raposo, C., Windmöller, C.C. and Júnior, W.A.D. (2003), Mercury speciation in fluorescent lamps by thermal release analysis. *Waste Management*, **23** (10), 879-886.

Full Text: [W\Was Man23, 879.pdf](W/Was%20Man23,%20879.pdf)

Abstract: In this work, mercury speciation in phosphorus powder matrices and soda lime glass waste from new and spent fluorescent lamp wastes has been studied by thermo-desorption/atomic absorption spectrometry (TDAAS), X-ray diffraction (XRD), cold vapor-atomic absorption (CV-AAS) and atomic emission spectrometry/inductively coupled plasma (ICP/AES). TDAAS results show the presence of oxidized forms of mercury, i.e., Hg1+ and Hg2+, especially in wastes with high mercury concentration. Such forms are mobile, and therefore represent a potential hazard waste material. Glass TD profiles of spent fluorescent lamps suggested the presence of mercury strongly linked to the matrix, which desorbs only at high temperatures.

Gan, Q., Allen, S.J. and Matthews, R. (2004), Activation of waste MDF sawdust charcoal and its reactive dye adsorption characteristics. *Waste Management*, **24** (8), 841-848.

Full Text: [W\Was Man24, 841.pdf](W/Was%20Man24,%20841.pdf)

Abstract: This paper reports an experimental investigation of converting waste medium density fibreboard (MDF) sawdust into chars and activated carbon using chemical activation and thermal carbonisation processes. The MDF sawdust generated during the production of architectural mouldings was characterised and found to have unique properties in terms of fine particle size and high particle density. It also has a high content of urea formaldehyde resin used as a binder in the manufacturing of MDF board. Direct thermal carbonisation and chemical activation of the sawdust by metal impregnation and acid (phosphoric acid) treatment prior to pyrolysis treatment were carried out. The surface morphology of the raw dust, its chars and activated carbon were examined using scanning electron microscopy (SEM). Adsorptive properties and total pore volume of the materials were also analysed using the BET nitrogen adsorption method. Liquid adsorption of a reactive dye (Levafix Brilliant red E-4BA) by the derived sawdust carbon was investigated in batch isothermal adsorption process and the results compared to adsorption on to a commercial activated carbon (Filtrasorb F400). The MDF sawdust carbon exhibited in general a very low adsorption capacity towards the reactive dye, and physical characterisation of the carbon revealed that the conventional chemical activation and thermal carbonisation process were ineffective in developing a microporous structure in the dust particles. The small size of the powdery dust, the high particle density, and the presence of the urea formaldehyde resin all contributed to the difficulty of developing a proper porous structure during the thermal and chemical activation process. Finally, activation of the dust material in a consolidated form (cylindrical pellet) only achieved very limited improvement in the dye adsorption capacity. This original study, reporting some unexpected outcomes, may serve as a stepping-stone for future investigations of recycle and reuse of the waste MDF sawdust which is becoming an increasing environmental and cost liability. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Water, Carbon

Ko, D.C.K., Mui, E.L.K., Lau, K.S.T. and McKay, G. (2004), Production of activated carbons from waste tire: Process design and economical analysis. *Waste Management*, **24** (9), 875-888.

Full Text: [W\Was Man24, 875.pdf](W/Was%20Man24,%20875.pdf)

Abstract: The process design and economic analysis of process plants to produce activated carbons from waste tires and coal have been performed. The potential range of products from each process has been considered, namely for waste tire - pyro-gas, active carbon, carbon black and pyro-oil; for coal - pyro-gas and active carbons. Sensitivity analyses have been carried out on the main process factors; these are product price, production capacity, total production cost, capital investment and the tipping fee. Net present values for the two plants at various discount factors have been determined and the internal rates of return have been determined as 27.4% and 18.9% for the waste tire plant and the coal plant, respectively. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Tyre Pyrolysis Oil, Scrap Tires, Vacuum Pyrolysis, Automotive Tires, Spanish Coals, Bed Reactor, Temperature, Combustion, Rubber, Black

? Jang, M., Hong, S.M. and Park, J.K. (2005), Characterization and recovery of mercury from spent fluorescent lamps. *Waste Management*, **25** (1), 5-14.

Full Text: [2005\Was Man25, 5.pdf](2005/Was%20Man25,%205.pdf)

Abstract: Fluorescent lamps rely on mercury as the source of ultraviolet radiation for the production of visible light. Partitioning of mercury among vapor phase, loose phosphor powders produced during breaking and washing steps, glass matrices, phosphor powders attached on the glass and aluminum end caps was examined from simulated laboratory lamp recycling tests for different types of spent and new fluorescent lamps. Mercury concentrations in lamp glasses taken from commercial lamp recyclers were also analyzed for comparison with the simulated results of spent and new lamps of different types. The mercury content of the glass from spent lamps was highly variable depending on the lamp type and manufacturer; the median values of the mercury concentration in glasses for spent 26- (T8) and 38-mm (T12) diameter fluorescent lamps were approximately 30 and 45 μg/g, respectively. The average mercury concentration of samples taken from recycler A was 29.6 μg/g, which was about 64% of median value measured from the spent T12 lamps. Over 94% of total mercury in lamps remained either as a component of phosphor powders attached inside the lamp or in glass matrices. New T12 lamps had a higher partitioning percentage of elemental mercury in the vapor phase (0.17%) than spent T12 lamps (0.04%), while spent lamps had higher partitioning percentages of mercury resided on end-caps and phosphor powders detached from the breaking and washing steps. The TCLP values of simulated all lamp-glasses and samples obtained from recyclers were higher than the limit of LDR standard (0.025 mg/L). After investigating acid treatment and high temperature treatment as mercury reclamation techniques, it was found that heating provided the most effective mercury capture. Although the initial mercury concentrations of individual sample were different, the mercury concentrations after 1 h exposure at 100 °C were below 4 μg/g for all samples (i.e., <1% remaining). Therefore, it is recommended that heating be used for recovering mercury from spent fluorescent lamps.

? Antizar-Ladislao, B., Lopez-Real, J. and Beck, A.J. (2005), Laboratory studies of the remediation of polycyclic aromatic hydrocarbon contaminated soil by in-vessel composting. *Waste Management*, **25** (3), 281-289.

Full Text: [2005\Was Man25, 281.pdf](2005/Was%20Man25,%20281.pdf)

Abstract: The biodegradation of 16 polycyclic aromatic hydrocarbons (PAHs), listed as priority pollutants by the USEPA, present in a coal-tar-contaminated soil from a former manufactured gas plant site was investigated using laboratory-scale in-vessel composting reactors to determine the suitability of this approach as a bioremediation technology. Preliminary investigations were conducted over 16 weeks to determine the optimum soil composting temperature (38, 55 and 70°C). Three tests were performed; firstly, soil was composted with green-waste, with a moisture content of 60%. Secondly, microbial activity was HgCl2-inhibited in the soil green-waste mixture with a moisture content of 60%, to evaluate abiotic losses, while in the third experiment only soil was incubated at the three different temperatures. PAHs and microbial populations were monitored. PAHs were lost from all treatments with 38°C being the optimum temperature for both PAH removal and microbial activity. Calculated activation energy values (Ea) for total PAHs suggested that the main loss mechanism in the soil-green waste reactors was biological, whereas in the soil reactors it was chemical. Total PAH losses in the soil-green waste composting mixtures were by pseudo-first order kinetics at 38°C (k = 0.013 day-1, R-2 = 0.95), 55°C (k = 0.010 day-1, R-2 = 0.76) and at 70°C (k = 0.009 day, R-2 = 0.73). (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Activation, Activation Energy, Activity, Aromatic, Aromatic Hydrocarbon, Aromatic Hydrocarbons, Biodegradation, Bioremediation, Chemical, Composting, Contaminated Soil, Energy, Experiment, Hydrocarbon, Hydrocarbons, Investigations, Kinetics, Losses, Mechanism, Microbial, Microbial Activity, Mixture, Mixtures, Moisture, Moisture Content, Order, PAH, PAHS, Plant, Pollutants, Polycyclic Aromatic Hydrocarbon, Polycyclic Aromatic Hydrocarbons, Priority Pollutants, Pseudo-First Order, Remediation, Removal, Soil, Systems, Temperature, Temperatures, Tests, Waste

? Cartellieri, A., Thiesen, P.H. and Niemeyer, B. (2005), Development of a basic procedure to design sorption processes. *Waste Management*, **25** (9), 985-993.

Full Text: [2005\Was Man25, 985.pdf](2005/Was%20Man25,%20985.pdf)

Abstract: The intention of this work is to offer, within the shortest time, an appropriate sorption separation process for almost any odour problem. The development is based on the preparation and characterisation of new adsorbents, the strategy for the selection of the best adsorbent, the process engineering and the choice of a suitable regeneration procedure. In this context a new method for the characterisation of the adsorbents-the adsorption profile analysis-was developed. The classification of the adsorbents was carried out by means of a cluster analysis, which simplifies the selection of the most suitable adsorbent for a particular problem. The physical and chemical behaviour of silica-adsorbents could be tailored by silanisation of the surfaces. Methods for the determination of process engineering parameters were developed, established and used. Adsorption kinetics and isotherms were determined with a magnetic adsorption balance. In a laboratory-scale fixed bed adsorber, breakthrough curves of different support materials were investigated and compared. For the investigations of different regeneration procedures, four innovative methods were employed: microwave desorption, ultrasonic desorption, ultrasonic-water desorption and extraction with water. Of the four desorption methods examined, microwave desorption and ultrasonic-water desorption demonstrated the best results. (C) 2005 Published by Elsevier Ltd.

Keywords: Activated-Charcoal, Adsorption, Air, Charcoal Fixed-Beds, Classification, Desorption, Fixed-Bed, Isotherms, Kinetics, Regeneration, Silica-Surface, Sorption, Thermal Regeneration, Waste-Gas, Water

? Coleman, N.J., Brassington, D.S., Raza, A. and Mendham, A.P. (2006), Sorption of Co2+ and Sr2+ by waste-derived 11 Åtobermorite. *Waste Management*, **26** (3), 260-267.

Full Text: [2006\Was Man26, 260.pdf](2006/Was%20Man26,%20260.pdf)

Abstract: Newsprint recycling gives rise to significant volumes of waste sludge which can be de-watered and combusted for energy-recovery. The residual combustion ash, whose primary crystalline constituents are; gehlenite (Ca2Al2SiO7), åkermanite (Ca2MgSi2O7), β-dicalcium silicate (Ca2SiO4) and anorthite (CaAl2Si2O8), is currently consigned to landfill disposal. It is demonstrated herein that a mixed product of Al-substituted 11 Åtobermorite (Ca5Si6O18H2·4H2O) and katoite (Ca3Al2SiO12H8) can be synthesised from newsprint recycling combustion ash via a hydrothermal route. Batch sorption studies confirm that this mixed product is an effective sorbent for the exclusion of Co2+ and Sr2+ from acidic aqueous media. Kinetic sorption data are analysed in accordance with the pseudo-first- and pseudo-second-order models, and steady-state data is fitted to the Langmuir and Freundlich isotherms. The Langmuir and pseudo-second-order models are found to provide the most appropriate descriptions of the sorption processes. The maximum uptake capacities for Co2+ and Sr2+ at 20 °C are 10.47 and 1.52 mg g−1, respectively, and the respective apparent pseudo-second-order rate constants are estimated to be 5.08×10−3 and 6.96×10−3 g mg−1 min−1.

Keywords: Heavy-Metals Removal, Calcium Silicates, Ions, Exchange, Substitution, Adsorption, Hydration, Cations, Phase, Ash

? Sarkar, M. and Acharya, P.K. (2006), Use of fly ash for the removal of phenol and its analogues from contaminated water. *Waste Management*, **26** (6), 559-570.

Full Text: [2006\Was Man26, 559.pdf](2006/Was%20Man26,%20559.pdf)

Abstract: This work attempts to elucidate the effects of different operational variables affecting the mechanistic function of fly ash for removal of some priority organic pollutants viz. phenol and its analogues. Thermodynamic parameters like free energy change, enthalpy and entropy of the process, as well as the sorption isotherms for phenols on fly ash, were measured and the most suitable isotherm was determined. Results of the study indicate that the extent of solute removal is determined by the initial solute concentration, molecular size and molecular arrangement of the solute. At the fixed set of experimental conditions, a model equation can be developed from which the percent removal corresponding to the load of the particular solute is determined. It is assumed that the mechanism of adsorption is governed by the surface characteristics of fly ash; pH has a vital role in influencing the solute removal as both the ionizing power (acidity, pK(a)) of the solutes and the zero point charge of fly ash (pH(zpc)) depend on the solution pH. Isotherm pattern and the free energy change indicate that the process is favorable, as well as spontaneous. The information gathered from the study will serve as a predictive modeling procedure for the analysis and design of the removal of organic pollutants and decontamination of water. The leaching experiment indicates that the retained solutes do not release from fly ash. The retained solutes can be recovered and utilized as industrial raw material. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Aqueous-Solutions, Biodegradation, Chlorophenols, Degradation, Fly Ash, Hydrogen-Peroxide, Isotherm, Isotherms, Mechanism, Modeling, Priority Organic Pollutants, Removal, Solid-Phase Extraction, Solute, Sorption, Substituted Phenols, Water

? Ochs, M., Pointeau, I. and Giffaut, E. (2006), Caesium sorption by hydrated cement as a function of degradation state: Experiments and modelling. *Waste Management*, **26** (7), 725-732.

Full Text: [2006\Was Man26, 725.pdf](2006/Was%20Man26,%20725.pdf)

Abstract: To provide reliable K-d data for Cs required for the performance assessment of cement-based radioactive waste repositories, two complementary approaches were followed. First, Cs sorption was determined on a range of hydrated cement paste (HCP) and mortar samples of CEM I and CEM V for different degradation states and solution compositions, as well as on some single mineral phases. Second, a surface complexation-diffuse layer model previously developed by Pointeau et al. [Pointeau, L, Marmier, N., Fromage, F., Fedoroff, M., Giffaut, E.. 2001. Cs and Pb uptake by CSH phases of hydrated cement. Material Research Society Symposium Proceedings, 663, 105-113] for Cs sorption on synthetic CSH phases was simplified to facilitate its application to whole HCP and mortars or concrete, following re-assessment of the model parameters. All measurements were compared with model predictions. The sorption data obtained on the different solid phases as a function of conditions corroborate that CSH minerals are the main sorbing phase for Cs in HCP. The data also clearly show the important influence of pH and the dissolved concentration of Na, K and Ca on K-d. It is further suggested that a decrease of pH is concomitant with a decrease of the Ca/Si ratio and a corresponding increase in surface sites with high affinity for Cs and, thus, K-d. Elevated concentrations of cations able to compete with Cs for these sites lead to a decrease of K-d, on the other hand. The simplified model was applied to the sorption measurements performed within this study as well as to a variety of literature data, mainly K-d values for a variety of fresh HCP and mortar or concrete samples based on different samples of Ordinary Portland Cement as well as blended cements. The results show that the model can be applied reasonably well to a very large variety of conditions in terms of solid and solution compositions that cover a range of K-d values from 10-4 to ca. 3.2 m3/kg. The large scatter typically observed for Cs sorption, especially on fresh HCP samples prepared from different formulations, can be explained quantitatively by the variable concentrations of Na and K in the respective solutions, which compete with Cs for fixation sites. On the other hand, the comparatively uniform conditions in degraded HCP typically render the prediction of K-d values less uncertain than in case of fresh HCP. (c) 2006 Published by Elsevier Ltd.

Keywords: Assessment, Carbonation, Degradation, Diffusion, Lead, Research, Solubility, Sorption

? Kumpiene, J., Lagerkvist, A. and Maurice, C. (2008), Stabilization of As, Cr, Cu, Pb and Zn in soil using amendments - A review. *Waste Management*, **28** (1), 215-225.

Full Text: [2008\Was Man28, 215.pdf](2008/Was%20Man28,%20215.pdf)

Abstract: The spread of contaminants in soil can be hindered by the soil stabilization technique. Contaminant immobilizing amendments decrease trace element leaching and their bioavailability by inducing various sorption processes: adsorption to mineral surfaces, formation of stable complexes with organic ligands, surface precipitation and ion exchange. Precipitation as salts and co-precipitation can also contribute to reducing contaminant mobility. The technique can be used in in situ and ex situ applications to reclaim and re-vegetate industrially devastated areas and mine-spoils, improve soil quality and reduce contaminant mobility by stabilizing agents and a beneficial use of industrial by-products. This study is an overview of data published during the last five years on the immobilization of one metalloid, As, and four heavy metals, Cr, Cu, Pb and Zn, in soils. The most extensively studied amendments for As immobilization are Fe containing materials. The immobilization of As occurs through adsorption on Fe oxides by replacing the surface hydroxyl groups with the As ions, as well as by the formation of amorphous Fe(III) arsenates and/or insoluble secondary oxidation minerals. Cr stabilization mainly deals with Cr reduction from its toxic and mobile hexavalent form Cr(VI) to stable in natural environments Cr(III). The reduction is accelerated in soil by the presence of organic matter and divalent iron. Clays, carbonates, phosphates and Fe oxides were the common amendments tested for Cu immobilization. The suggested mechanisms of Cu retention were precipitation of Cu carbonates and oxyhydroxides, ion exchange and formation of ternary cation-anion complexes on the surface of Fe and Al oxy-hydroxides. Most of the studies on Pb stabilization were performed using various phosphorus-containing amendments, which reduce the Pb mobility by ionic exchange and precipitation of pyromorphite-type minerals. Zn can be successfully immobilized in soil by phosphorus amendments and clays. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Arsenic(III) Oxidation, Bioavailability, Chemical Immobilization, Fly-Ash, Groups, Heavy Metals, Heavy-Metal Immobilization, In-Situ Stabilization, Ion Exchange, Ligands, Mechanisms, Metals, Mine Spoil, Phosphates, Phosphorus, Precipitation, Sewage-Sludge, Sludge-Amended Soil, Smelter-Contaminated Soil, Soil Quality, Soils, Sorption, Stabilization, Surface Precipitation, X-Ray-Fluorescence

? Feller, C. and Bernoux, M. (2008), Historical advances in the study of global terrestrial soil organic carbon sequestration. *Waste Management*, **28** (4), 734-740.

Full Text: [2008\Was Man28, 734.pdf](2008/Was%20Man28,%20734.pdf)

Abstract: This paper serves two purposes: it provides a summarized scientific history of carbon sequestration in relation to the soil-plant system and gives a commentary on organic wastes and SOC sequestration.

The concept of soil organic carbon (SOC) sequestration has its roots in: (i) the experimental work of Lundegårdh, particularly his in situ measurements of CO2 fluxes at the soil-plant interface (1924, 1927, 1930); (ii) the first estimates of SOC stocks at the global level made by Waksman [Waksman, S.A., 1938. Humus. Origin, Chemical Composition and Importance in Nature, second ed. revised. Williams and Wilkins, Baltimore, p. 526] and Rubey [Rubey, W.W., 1951. Geologic history of sea water. Bulletin of the Geological Society of America 62, 1111–1148]; (iii) the need for models dealing with soil organic matter (SOM) or SOC dynamics beginning with a conceptual SOM model by De Saussure (1780–1796) followed by the mathematical models of Jenny [Jenny, H., 1941. Factors of Soil Formation: a System of Quantitative Pedology. Dover Publications, New York, p. 288], Hénin and Dupuis [Hénin, S., Dupuis, M., 1945. Essai de bilan de la matière organique. Annales d’Agronomie 15, 17–29] and more recently the RothC [Jenkinson, D.S., Rayner, J.H., 1977. The turnover of soil organic matter in some of the Rothamsted classical experiments. Soil Science 123 (5), 298–305] and Century [Parton, W.J., Schimel, D.S., Cole, C.V., Ojima, D.S., 1987. Analysis of factors controlling soil organic matter levels in great plains grasslands. Soil Science Society of America Journal 51 (5), 1173–1179] models.

The establishment of a soil C sequestration balance is not straightforward and depends greatly on the origin and the composition of organic matter that is to be returned to the system. Wastes, which are important sources of organic carbon for soils, are taken as an example. For these organic materials the following factors have to be considered: the presence or absence of fossil C, the potential of direct and indirect emissions of non-CO2 greenhouse gases (CH4 and N2O) following application and the agro-system which is being used as a comparative reference.

? Rao, M.M., Rao, G.P.C., Seshaiah, K., Choudary, N.V. and Wang, M.C. (2008), Activated carbon from *Ceiba pentandra* hulls, an agricultural waste, as an adsorbent in the removal of lead and zinc from aqueous solutions. *Waste Management*, **28** (5), 849-858.

Full Text: [2008\Was Man28, 849.pdf](2008/Was%20Man28,%20849.pdf)

Abstract: The ability of low-cost activated carbon prepared from Ceiba pentandra hulls, an agricultural waste material, for the removal of lead and zinc from aqueous Solutions has been investigated. In the batch tests experimental parameters were studied, including solution pH, contact time, adsorbent dose and initial metal ions concentration. The adsorbent exhibited good sorption potential at pH 6.0. Maximum removal of lead (99.5%) and of zinc (99.1%) with 10 g/l of sorbent was observed at 50 mg/L sorbate concentration. Removals of about 60-70% occurred in 10 min, and equilibrium was attained at around 50 min for both metals. The functional groups (C=O, S=O,-OH) present on the carbon surface were responsible for the adsorption of metal ions. The adsorption parameters were analysed using both the Freundlich and Langmuir models. The data are better fitted by the Freundlich isotherm as compared to Langnmir model, and the adsorption capacities for lead and zinc were 25.5 and 24.1 mg/g, respectively. Kinetics of adsorption obeyed a second order rate equation and the rate constant was found to be 2.71×102 and 2.08×102 g/mg/min for lead and zinc, respectively. The desorption studies were carried out using dilute HCl, and the effect of HCl concentration on desorption was studied. Maximum desorptions of 85% for lead and 78% for zinc were attained with 0.15 M HCl. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorbent Dose, Adsorption, Aqueous Solutions, Cadmium, Carbon, Cu(II), Desorption, Equilibrium, Experimental, Freundlich, Freundlich Isotherm, Heavy-Metals, Isotherm, Kinetics, Langmuir, Lead, Metal, Metal Ions, Metals, Model, Models, Pb(II), pH, Potential, Removal, Rights, Solution, Sorption, Sugarcane Bagasse Pith, Tree Fern, Zinc

? Qian, Q.R., Machida, M. and Tatsumoto, H. (2008), Textural and surface chemical characteristics of activated carbons prepared from cattle manure compost. *Waste Management*, **28** (6), 1064-1071.

Full Text: [2008\Was Man28, 1064.pdf](2008/Was%20Man28,%201064.pdf)

Abstract: Two activated carbons (ACs) prepared from cattle manure compost (CMC) by ZnCl2 activation were selected and out-gassed in a helium flow at various temperatures for 2 h. The pore structure and surface chemical properties of the two selected ACs and their out-gassing treated ACs were characterized using N2 adsorption-desorption, elements analysis, SEM and Boehm titration. A basic dye, methylene blue (MB), was chosen as an adsorbate to investigate the adsorption capacity for organic contaminant onto the activated carbons. It was found that the out-gassing treatment at 400°C had little effect on the textural characteristics of the carbons but significantly changed the surface chemical properties such as surface functional groups concentration, pH and pH(PZC). The CMC-based activated carbons exhibited excellent performance for MB adsorption due to their high surface area, large mesopore volume and high nitrogen content. The kinetics of MB adsorption onto the activated carbons followed a pseudo-second-order equation, and the equilibrium data agreed well with the Langmuir model under the experimental conditions. The highest adsorption rate constant of k(ad) and the largest adsorption capacity of q(m) were found be 1.44×10-4 g/mg min and 519 mg/g, respectively. The results suggested that the CMC-based activated carbons were effective adsorbents for the removal of methylene blue from aqueous solution. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbons, Activation, Adsorbents, Adsorption, Adsorption Performance, Analysis, Aqueous Solution, Aqueous-Solution, Basic Dye, Capacity, Compost, Dye, Dye Methylene-Blue, Equilibrium, Experimental, Kinetics, Langmuir, Langmuir Model, Mesopore, Methylene Blue, Model, pH, Removal, Rights, Sawdust, SEM, Sludge, Solution, Structure, Surface Area, Treatment, Waste-Water

? Chaspoul, F.R., Le Droguene, M.F., Barban, G., Rose, J.C. and Gallice, P.M. (2008), A role for adsorption in lead leachability from MSWI bottom ASH. *Waste Management*, **28** (8), 1324-1330.

Full Text: [2008\Was Man28, 1324.pdf](2008/Was%20Man28,%201324.pdf)

Abstract: Owing to its high porosity and large surface area, bottom ash from municipal solid waste incineration (MSWI) has been previously suggested as an adsorbent for removing heavy metals from wastewater. However, since lead leachability is not clearly understood, this study reports the behavior of lead for leaching from MSWI bottom ash, classified as NH, W and H. Leaching kinetics show a sorption/desorption mechanism producing equilibrium in the leachates. Adsorption experiments reveal a similarly high saturation coverage for NH, W and H bottom ash, demonstrating a considerable adsorption capacity. Adsorption mainly reflects an ion exchange mechanism. Successive leaching experiments prove that at least two species of lead can be stripped from bottom ash: one is Pb(OH)42- and the second, dentified by XAS, is a lead complex sorbed on the surface of Fe colloid or FeOOH polymers. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Capacity, Capacity, Complex, Coverage, Equilibrium, Extraction, Fly Ashes, Heavy Metals, Heavy-Metals, Incineration, Ion Exchange, Isotherms, Kinetics, Leachability, Lead, Mechanism, Metals, Municipal, Soils, Sorption, Speciation, Species, Surface, Surface Area, Waste Incineration Residues, Wastewater

? Chen, Q.Y., Tyrer, M., Hills, C.D., Yang, X.M. and Carey, P. (2009), Immobilisation of heavy metal in cement-based solidification/stabilisation: A review. *Waste Management*, **29** (1), 390-403.

Full Text: [2009\Was Man29, 390.pdf](2009/Was%20Man29,%20390.pdf)

Abstract: Heavy metal-bearing waste usually needs solidification/stabilization (s/s) prior to landfill to lower the leaching rate. Cement is the most adaptable binder currently available for the immobilisation of heavy metals. The selection of cements and operating parameters depends upon an understanding of chemistry of the system. This paper discusses interactions of heavy metals and cement phases in the solidification/stabilisation process. It provides a clarification of heavy metal effects on cement hydration. According to the decomposition rate of minerals, heavy metals accelerate the hydration of tricalcium silicate (C3S) and Portland cement, although they retard the precipitation of portlandite due to the reduction of pH resulted from hydrolyses of heavy metal ions. The chemical mechanism relevant to the accelerating effect of heavy metals is considered to be H+ attacks on cement phases and the precipitation of calcium heavy metal double hydroxides, which consumes calcium ions and then promotes the decomposition Of C3S. In this work, molecular models of calcium silicate hydrate gel are presented based on the examination of Si-29 solid-state magic angle spinning/nuclear magnetic resonance (MAS/NMR). This paper also reviews immobilisation mechanisms of heavy metals in hydrated cement matrices, focusing on the sorption, precipitation and chemical incorporation of cement hydration products. It is concluded that further research oil the phase development during cement hydration in the presence of heavy metals and thermodynamic modelling is needed to improve effectiveness of cement-based s/s and extend this waste management technique. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Accelerated Carbonation, C-S-H, Calcium Silicate Hydrate, CaO-SiO2-H2O System, Decomposition, Electron-Microscopy, Heavy Metal, Heavy Metals, Main Clinker Phases, Mechanism, Mechanisms, Metal, Metal Ions, Metals, Part Ii, Portland-Cement, Research, Solidified Waste Forms, Sorption, Thermodynamic, Tricalcium Silicate

? Lou, Z.Y., Chai, X.L., Niu, D.J., Ou, Y.Y. and Zhao, Y.C. (2009), Size-fractionation and characterization of landfill leachate and the improvement of Cu2+ adsorption capacity in soil and aged refuse. *Waste Management*, **29** (1), 143-152.

Full Text: [2009\Was Man29, 143.pdf](2009/Was%20Man29,%20143.pdf)

Abstract: Leachate was collected from all anaerobic lagoon at Shanghai Laogang refuse landfill, the largest landfill in China, and the sample was separated into six fractions using micro-filtration membranes, followed by ultra-filtration membranes. Several parameters of the samples were measured, including chemical oxygen demand (COD), total organic carbon (TOC), total solids (TS), pH, total phosphate (TP), total nitrogen (TN), fixed solids (FS), NH4+, orthophosphate, color, turbidity, and conductivity. These parameters Were then quantitatively correlated with the molecular weight cutoff of the membrane used. Organic matter in the dissolved fraction (MW < 1 kDa) predominated in the leachate, accounting for 65%) of TOC. Thermal infrared spectroscopy was used to characterize the filter residues. Asymmetric and symmetric stretching of methyl and methylene groups, and of functional groups containing nitrogen and oxygen atoms. were observed. In addition, the ability of two different samples to adsorb heavy metals was tested. Cu2+ was chosen its the representative heavy metal in this Study, and the samples were soil; aged refuse, which had spent 8 years in it conventional sanitary landfill: and samples of soil and aged refuse treated for 48 h with leachate in the ratio of 5 g of sample per 50 nil Of, leachate. Cu2+ uptake by the raw soil was similar to 4.60 μg/g, while uptake by the leachate-contacted soil and leachate-contacted aged refuse were 5.66 and 5.11 μg/g. respectively. These results show that the organic matter in the leachate enhanced the capacity of aqueous solutions to adsorb Cu2+. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Capacity, Capacity, Carbon, China, Cu2+, Groups, Heavy Metal, Heavy Metals, Heavy-Metals, Membrane, Membranes, Metal, Metals, Nitrogen, Phosphate, Sorption, Spectroscopy, Ultrafiltration, Water

? Cossu, R. (2009), Story of a success which must go on. *Waste Management*, **29** (4), 1235-1236.

Full Text: [2009\Was Man29, 1235.pdf](2009/Was%20Man29,%201235.pdf)

? Lin, C., Hong, Y.J. and Hu, A.H. (2010), Using a composite material containing waste tire powder and polypropylene fiber cut end to recover spilled oil. *Waste Management*, **30** (2), 263-267.

Full Text: [2010\Was Man30, 263.pdf](2010/Was%20Man30,%20263.pdf)

Abstract: The superior oil absorption capacity of recycled polypropylene (PP) fiber and waste tire powder were used to recover spilled engine oil. We used ASTM F726-99 method to evaluate oil adsorbing capability of PP fiber and found it to have a large, rapid oil sorption capacity. However, its lack of elasticity dramatically limited that capacity after repeated use. Tire powder, which absorbs less oil more slowly, is more elastic than PP fiber and can be used repeatedly up to a hundred times without losing its oil adsorption capability. We combined PP fiber and tire powder to develop a composite material capable of recovering greater amounts of oil than any of its components. This composite can be use repeatedly for at least 100 times. Thus, the material cost for recovering 1 ton of spilled oil is about USD $0.03, making it very competitive on the market. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Absorption, Adsorption, Capacity, Composite, Impact, Oil Sorption, Pyrolysis, Recycled Rubber, Sorption, Taiwan

? Fu, H.Z., Ho, Y.S., Sui, Y.M. and Li, Z.S. (2010), A bibliometric analysis of solid waste research during the period 1993–2008. *Waste Management*, **30** (12), 2410-2417.

Full Text: [2010\Was Man30, 2410.pdf](2010/Was%20Man30,%202410.pdf); [2010\Was Man-Fu.pdf](2010/Was%20Man-Fu.pdf); [2010\Was Man-Fu1.pdf](2010/Was%20Man-Fu1.pdf)

Abstract: This study is a bibliometric analysis of solid waste research to evaluate the current trends, using the literature in the Science Citation Index (SCI) database from 1993 to 2008. Analyzed aspects included document type, language, and publication output as well as distribution of journals, subject category, countries, institutes, title-words, author keywords, and ‘Keywords Plus’. An evaluating indicator, h-index, was applied to characterize the solid waste publications. The trend of publication outputs during 1993-2008 coincided with a power and an exponential model. Based on the exponential model during 2001-2008, the number of articles on solid waste in 2013 is predicted to be twice that in 2008. The most common subject category is environmental science and the most productive journal is Waste Management. The USA with most publications and China with the highest growth rate were compared. Finally, author keywords, words in title, and ‘Keywords Plus’ were analyzed to provide research emphasis. The results showed that mainstream research was centered on the following methods: recycling, landfilling, composting and waste-to-energy. Heavy metals, fly ash and sewage sludge were considered recent research hotspots. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Analysis, Author, Bibliometric, Bibliometric Analysis, China, Citation, Database, Diskette, Fly Ash, Growth, Growth Rate, h Index, h-Index, Heavy Metals, Index, Journal, Journals, Language, Li, Literature, Management, Metals, Model, Output, Plus, Publication, Publications, Recycling, Research, Research Hotspots, SCI, Science, Science Citation Index, Sciences, Sediment, Sewage Sludge, Trend, Trends, USA, Waste, Water

? Lu, W.S. and Yuan, H.P. (2011), A framework for understanding waste management studies in construction. *Waste Management*, **31** (6), 1252-1260.

Full Text: [2011\Was Man31, 1252.pdf](2011/Was%20Man31,%201252.pdf)

Abstract: During the past decades, construction and demolition (C&D) waste issues have received increasing attention from both practitioners and researchers around the world. A plethora of research relating to C&D waste management (WM) has been published in scholarly journals. However, a comprehensive understanding of the C&D WM research is somehow absent in spite of its proliferation. The aim of this paper is to develop a framework that helps readers understand the C&D WM research as archived in selected journals. Papers under the topic of C&D WM are retrieved based on a set of rigorous procedures. The information of these papers is then analyzed with the assistance of the Qualitative Social Research (QSR) software package NVivo. A framework for understanding C&D WM research is created based on the analytic results. By following the framework, a bibliometric analysis of research in C&D WM is presented, followed by an in-depth literature analysis. It is found that C&D generation, reduction, and recycling are the three major topics in the discipline of C&D WM. Future research is recommended to (a) investigate C&D waste issues in wider scopes including design, maintenance and demolition, (b) develop a unified measurement for waste generation so that WM performance can be compared across various economies, and (c) enhance effectiveness of WM approaches (e.g. waste charging scheme) based on new WM concepts (e.g. Extended Producer Responsibility). In addition to the above research findings, the approach for producing the research framework can be useful references for other studies which attempt to understand the research of a given discipline. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Bibliometric, Bibliometric Analysis, Concrete, Demolition Waste, Design, Generation, Hong-Kong, Industry, Information, Journals, Literature, Literature Analysis, Malaysia, Measurement, Minimization, Papers, Research

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? Marklund, S., Soderstrom, G., Ljung, K., Rappe, C., Kraft, M. and Hagenmaier, H. (1992), Parallel sampling for dioxins using various sampling techniques at a swedish municipal solid-waste incinerator. *Waste Management & Research*, **10** (1), 21-36.

Full Text: [1992\Was Man Res10, 21.pdf](1992/Was%20Man%20Res10,%2021.pdf)

Abstract: Parallel sampling was carried out in a Swedish municipal solid waste (MSW) incinerator, on two consecutive days, with five different sampling techniques. The samples were analysed for chlorinated dioxins (PCDDs) and chiorodibenzofurans (PCDFs) at two laboratories, one in Sweden and the other in Germany. Two different spiking protocols were used, both including pre-sampling or clean-up spikes from each homolog group of the tetra to octa CDDs and CDFs. Comparable results were obtained for all five sampling methods for the emission data and the recoveries for all pre-sampling spikes were above 50%. The agreement between the two laboratories was good. The different sampling methods resulted in very similar congener distributions (congener profiles) or isomer distributions (isomer patterns). However, the sampling techniques differ considerably in the distribution of PCDDs/PCDFs in various sampling compartments. The sampling techniques where large contribution of PCDDs and PCDFs could be found in the wash solvent may suffer from losses and/or cross-contamination problems unless the washing is carried out properly. The use of a cooled probe in combination with an adsorption (polyurethane foam plug) or absorption (ethoxyethanol) trap, where the main portion of the PCDDs and PCDFs were found in the condensate, is considered as a convenient and efficient sampling technique.

Keywords: Dioxin, PCDD, PCDF, Incineration, MSW, Municipal Solid Waste, Stack Gas, Sampling

? Wild, S.R., Mitchell, D.J., Yelland, C.M. and Jones, K.C. (1992), Arrested municipal solid-waste incinerator fly-ash as a source of polynuclear aromatic-hydrocarbons (PAHS) to the environment. *Waste Management & Research*, **10** (1), 99-111.

Full Text: [1992\Was Man Res10, 99.pdf](1992/Was%20Man%20Res10,%2099.pdf)

Abstract: Arrested fly ash samples from most currently operating municipal solid waste (MSW) incinerators on the U.K. mainland have been analysed for polynuclear aromatic hydrocarbons (PAHs). The ashes have a mean ΣPAH content of about 227 μg kg−. This is generally lower than concentrations observed in U.K. surface soils. Benzo[*ghi*] perylene was the most abundant individual compound, and the most frequently detected. The ΣPAH content of ashes does not appear to be related to incinerator type, but rather it is likely that poor gas phase combustion favours higher PAH levels. The significance of PAHs in ash residues and their possible fate following disposal to landfill are discussed.

Keywords: PAHs, Arrested Municipal Fly Ash, Sewage Sludge Fly Ash, Coal Fly Ash, Landfill

? Belevi, H., Stämpfli, D.M. and Baccini, P. (1992), Chemical behavior of municipal solid-waste incinerator bottom ash in monofills. *Waste Management & Research*, **10** (2), 153-167.

Full Text: [1992\Was Man Res10, 153.pdf](1992/Was%20Man%20Res10,%20153.pdf)

Abstract: A method is presented to predict the short-term (months to years) and long-term (> 30 years) chemical behaviour of bottom ash from municipal solid waste incinerators in monofills. It is based on bottom ash composition and laboratory kinetic studies of bottom ash with water. Bottom ash after the quench tank is a reactive mixture in which slow and fast acid/base reactions occur. These intrinsic acid/base reactions continue for at least several months, and the end point is not yet known. The heavy metal concentrations observed in the aqueous extracts reflect primarily the advance of these reactions. Consequently leaching tests based solely on short-term (hours to months) extraction procedures cannot predict the chemical behaviour of bottom ash in monofills. However, laboratory experiments with samples of bottom ash, in which the intrinsic acid/base reactions have proceeded differently, provide useful information on the nature of chemical reactions significant in the short- and long-term.

Keywords: Bottom Ash, Characterization, Chemical Behaviour, Elements, Final Storage, Incineration, Landfill, Leaching, Long-Term, Monofill, Municipal Solid Waste

? Pitea, D., Lasagni, M. and Bonati, L. (1992), The toxicity equivalency factor scheme applied to municipal incinerator PCDD PCDF emissions when specific congener information is lacking. *Waste Management & Research*, **10** (4), 329-343.

Full Text: [1992\Was Man Res10, 329.pdf](1992/Was%20Man%20Res10,%20329.pdf)

Abstract: The 2,3,7,8-TODD Toxicity EQuivalents (TEQ) approach provides a useful method for estimating the environmental risk of polychlorodibenzodioxin and polychlorodibenzofuran complex mixtures, thus making it possible to express their toxicological significance with only one number. Generally the conversion of the concentration units into those of TEQ requires an isomer-specific analysis and the appropriate Toxicity Equivalency Factors (TEF). In this paper we propose a ‘theoretical’ model for estimating TEQ values of PCDD + PCDF mixtures which, starting from the experimental value of the PCDD + PCDF concentration (μg Nm−3) and the theoretical value of PCDD and PCDF fingerprints in the emissions from municipal incinerators, to make an estimate of the global toxicity in terms of ng TEQ Nm−3. The TEQ values estimated for a number of samples are in good agreement with those calculated from the isomer and congener experimental data. Given the investment and running costs plus the time and the analytical complexity in determining the congeners and single isomer concentrations, it seems that the proposed ‘theoretical’ model is a reasonable tool for estimating the exposure hazard related to a complex mixture of PCDD/PCDFs emitted from municipal solid waste (MSW) incinerators. Another objective of this paper is to explore the consistency between scientific knowledge and the authority regulatory guidelines. This work shows that the Italian national emission standard (4 μg Nm−3) for the total PCDD+PCDF concentration is higher than the international target of 0.1 ng TEQ Nm−3. We suggest a value of 1 μg Nm−3 for TCDD + TCDF concentration if Italian regulators want to add a further constraint.

Keywords: Polychlorodibenzodioxins (PCDDs), Polychlorodibenzofurans (PCDFs), Municipal Solid Waste (MSW), Incinerators; Toxicity Equivalency Factors (TEF), Toxicity Equivalents (TEQ), Health risks

Stegemann, J.A., Schneider, J., Baetz, B.W. and Murphy, K.L. (1995), Lysimeter washing of MSW incinerator bottom ash. *Waste Management & Research*, **13** (2), 149-165.

Full Text: [W\Was Man Res13, 149.pdf](W/Was%20Man%20Res13,%20149.pdf)

Abstract: Stockpiled municipal waste incinerator bottom ash is frequently considered for utilization as a construction material. Two 360 kg lysimeter experiments were conducted to study percolation washing of contaminants from stockpiled MSW bottom ash. One lysimeter was leached with a concentrated sodium hydroxide solution, as a possible pre-treatment for improvement of the bottom ash characteristics prior to utilization, while the other was leached using distilled water. The lysimeter leachate was analysed, and at the end of the 2-year leaching period, the bottom ash from each lysimeter was subjected to several laboratory tests to assess the effect of the treatments. The laboratory tests showed that distilled water leachability of both treated ashes was an order of magnitude lower than that of fresh ash, but long-term contaminant leachability under acidic conditions had not changed. Although alkaline washing clearly resulted in greater contaminant removal than did distilled water washing, the chemical properties of the alkaline-leached bottom ash were not significantly different from those of the water-leached ash.

Keywords: Municipal Solid Waste, Incinerator Bottom Ash, Lysimeter, Column, Alkaline Washing, Leaching, Metals, Chlorides, Sulfate

Fängmark, I., Strömberg, B., Berge, N. and Rappe, C. (1995), The influence of fly-ash load and particle-size on the formation of PCDD, PCDF, PCBZ and PCB in a pilot incinerator. *Waste Management & Research*, **13** (3), 259-272.

Full Text: [W\Was Man Res13, 259.pdf](W/Was%20Man%20Res13,%20259.pdf)

Abstract: A laboratory-scale, fluidized bed reactor fuelled by a synthetic fuel was used to study the influence of fly ash load, particle size, temperature and residence time on the low-temperature formation of chlorinated aromatic compounds. Large fly ash particles were removed from the flue gases by means of a cyclone at the entrance to the cooling section of the reactor. The experimental variables were varied according to an experimental plan of full factorial design. Polychlorinated dibenzo-p-dioxins, dibenzo-furans, polychlorinated benzenes and biphenyls were analysed in the collected flue gas samples. Despite the fact that most of the fly ash load was removed by the cyclone, formation of chlorinated aromatics occurred to the same extent as in earlier experiments, without the cyclone. These results demonstrate the importance of small fly ash particles in the post-combustion formation of chlorinated aromatics.

Keywords: Incineration, Dioxin, Polychlorinated Dibenzo-p-Dioxins (PCDD), Polychlorinated Dibenzofurans (PCDF), Polychlorinated Benzenes (PCBZ), Polychlorinated Biphenyls (PCB), Fly Ash, Surface Area, Full Factorial Design

Hasselriis, F. (1995), National incinerator testing and evaluation program: The environmental characterization of refuse-derived fuel (RDF) combustion technology mid-connecticut facility, hartford, connecticut. *Waste Management & Research*, **13** (5), 499-500.

Full Text: [1995\Was Man Res13, 499.pdf](1995/Was%20Man%20Res13,%20499.pdf)

Abstract: The environmental characterization of refuse-derived fuel (RDF) semi-suspension burning technology was jointly undertaken by Environment Canada and the U.S. Environmental Protection Agency (U.S. EPA) as part of ongoing programmes of both agencies that assess municipal solid waste combustion technologies. The facility tested is located in Hartford, Connecticut and represents a ‘state-of-the-art’ technology, including a spray dryer/fabric filter air pollution control (APC) system for each unit.

Results were obtained for a variety of steam production rates, combustion conditions, flue gas temperatures, and acid gas removal efficiencies. All incoming wastes and each ash residue stream were weighed, sampled, and analysed. Key incinerator and APC system operating variables were monitored on a ‘real time’ basis. A wide range of analyses for acid gases, trace organics, and heavy metals was carried out on gas emissions and all the ash discharges.

Very low concentrations were observed of trace organics, heavy metals, and acid gases in stack emissions. High removal efficiencies were attained by the APC system for trace organics and metals in the flue gas. Trace organic contaminants in the ashes were not soluble in water, while only very small amounts of most trace metals present in the ashes were soluble in water. A significant reduction in metal mobility was achieved for fabric filter ash that was solidified using cement and waste pozzolanic materials. Mutli-variate correlations were found between trace organics at the furnace exit and indicators for combustion conditions, such as operating variables and easily monitored combustion gases. These parameters could potentially be used to control incinerator operating conditions to ensure minimal trace organics in the flue gas entering the APC system.

Lecuyer, I., Bicocchi, S., Ausset, P. and Lefevre, R. (1996), Physico-chemical characterization and leaching of desulphurization coal fly ash. *Waste Management & Research*, **14** (1), 15-28.

Full Text: [W\Was Man Res14, 15.pdf](W/Was%20Man%20Res14,%2015.pdf)

Abstract: Fly ash produced by coal combustion using two types of desulphurization process were studied: a conventional pulverized coal boiler equipped with lime injection (PCL ash), and a circulating fluidized bed combustion boiler with limestone injection (CFBC ash). The ashes were characterized completely: granulometry, morphology, mineralogy, chemical composition and behaviour to water contact.

Both PCL ash and CFBC ash present similar features: fine granulometry, presence of anhydrite phase and sulphate content. However, PCL ash also shows lots of spherical particles, unlike CFBC ash, and a much higher lime content, due to the lower desulphurization rate in PC boilers. Unlike CFBC ash, most of the trace elements in PCL ash show an inverse concentration-particle size dependence.

Leachates obtained from both samples are rich in soluble salts [CaSO4 and Ca(OH)2] and arsenic and selenium are prevented from solubilizing by high lime content.

In wetted PCL ash, the formation of ettringite crystals stabilizes calcium and sulphate ions. Simultaneously, arsenate, selenate and chromate anions are trapped in the crystal. CFBC ash does not really harden because the lime content is too low. However, the leached selenium concentration is cut down in wetted CFBC ash samples. (C) 1996 ISWA

Keywords: Fly Ash, Desulphurization, Trace Element, Leaching, Furnace Sorbent Injection, Circulating Fluidized Bed Combustion, Arsenic, Selenium, Chromate

Albino, V., Cioffi, R., Santoro, L. and Valenti, G.L. (1996), Stabilization of residue containing heavy metals by means of matrices generating calcium trisulphoaluminate and silicate hydrates. *Waste Management & Research*, **14** (1), 29-41.

Full Text: [W\Was Man Res14, 29.pdf](W/Was%20Man%20Res14,%2029.pdf)

Abstract: Two binding matrices based on blast furnace slag or fly ash/lime mixtures were studied in relation to the stabilization/solidification of a residue from a municipal solid waste incinerator. Their use is of interest because of the formation of calcium trisulphoaluminate and silicate hydrates.

Mixtures of the above matrices with up to 80% of the incinerator residue were paste-hydrated and cured for 28 days at 25°C and 100% relative humidity. The effect of added waste on the hydration phenomena was studied by means of differential thermal analysis and X-ray diffraction analysis. The effectiveness of these systems as stabilization/solidification matrices was checked by means of mechanical and leaching tests. Cured samples with up to 20-40% of added waste gave compressive strengths sufficiently high for reuse as building materials.

The U.S. Environmental Protection Agency leaching test has shown that disposal in a landfill in which no facilities for collecting and treating percolating waters are provided, is possible with 40-60% of waste content.

Finally, the American Nuclear Society dynamic leaching test has shown that the entrapment is mainly dependent on the physical binding potential of the matrices. (C) 1996 ISWA

Keywords: Stabilization Solidification, Toxic and Hazardous Waste, Municipal Solid Waste Incineration, Coal Fly Ash, Blast Furnace Slag, Chemical Gypsum, Ettringite, Compressive Strength, Leaching, Phosphogypsum

Egemen, E. and Yurteri, C. (1996), Regulatory leaching tests for fly ash: A case study. *Waste Management & Research*, **14** (1), 43-50.

Full Text: [W\Was Man Res14, 43.pdf](W/Was%20Man%20Res14,%2043.pdf)

Abstract: In many countries throughout the world, fly and bottom ashes originating from coal-fired thermal power plants are declared as wastes requiring special care during reuse and disposal. In this regard, a number of toxicity tests have been developed to assess the metal leaching potential of ash residues. In this study, fly ash samples obtained from the Catalagzi thermal power plant, located on the northwestern coast of Turkey, were subjected to toxicity tests such as the extraction (EP) and toxicity characteristic leaching (TCLP) procedures of the U.S. Environmental Protection Agency (U.S. EPA), and the so-called Method A extraction procedure of the American Society of Testing and Materials (ASTM). The results observed for the extracts were compared with each other and the selected tests were evaluated in terms of their use in representing leaching under natural held conditions. (C) 1996 ISWA

Keywords: Thermal Power Plants, Solid Wastes, Fly Ash, Metal Leaching, Leachate, Toxicity Testing

Lu, C.S. (1996), A model of leaching behaviour from MSW incinerator residue landfills. *Waste Management & Research*, **14** (1), 51-70.

Full Text: [W\Was Man Res14, 51.pdf](W/Was%20Man%20Res14,%2051.pdf)

Abstract: A mathematical model is presented to predict quantity and quality of leachate from incinerator residue landfills. The model is based on the unsaturated flow equation, the solute transport equation, the equation of chemical and microbial processes, and the water balance equation of the leachate collection system. Good agreement was obtained by comparing model simulation with data of laboratory column-leaching tests in the literature. The important parameters were evaluated in a sensitivity analysis to determine their respective effects. Five parameters were identified to strongly influence the model performance: saturated volumetric moisture content (θs), ultimate mass of leachable contaminant (Mo), maximum contaminant concentration (Cmax), saturated hydraulic conductivity of the drainage layer (Kd), and slope angle of the liner (φ). (C) 1996 ISWA

Keywords: Leachate Model, Msw Incinerator Residues, Fly Ashes, Leachate Collection System, Sensitivity Analysis, Solid-Waste Landfills, Metals, Ashes, Transport, Flow

Ouki, S.K. and Kavannagh, M. (1997), Performance of natural zeolites for the treatment of mixed metal-contaminated effluents. *Waste Management & Research*, **15** (4), 383-394.

Full Text: [W\Was Man Res15, 383.pdf](W/Was%20Man%20Res15,%20383.pdf)

Abstract: Two natural zeolites, clinoptilolite and chabazite, have been evaluated with respect to their selectivity and removal performance for the treatment of effluents contaminated with mixed heavy metals, namely Pb, Cd, Cu, Zn, Cr, Ni and Co. Parameters such as metal concentration, pH and presence of competing ions were examined and removal performance was determined in terms of the zeolites, ion-exchange capacity measured at room temperature. The study showed that at metal concentrations ranging from 1 mgl-1 to 10mgl-1 the zeolites exhibited an optimum removal efficiency at metals concentration of 10 mgl-1. Clinoptilolite and chabazite exhibited different selectivity profiles for all metals studied except for Pb for which both zeolites performed exceptionally well. The selectivity sequences for clinoptilolite and chabazite are summarized as follows: chabazite (Ph>Cd>Zn>Co>Cu>Ni>Cr); and clinoptilolite (Pb>Cu>Cd>Zn>Cr>Co>Ni). The study also showed that the chabazite exchange capacity is superior to that of clinoptilolite which is mainly due to the higher AI substitution of Si which provides chabazite with a negative framework favourable to higher exchange capability. Solution pH was found to have an effect on metal removal as pH can influence both the character of the exchanging ions and the zeolite itself. The metal removal mechanism was demonstrated to be controlled by ion exchange and precipitation was negligible. The results also showed that Ca was a major competing cation for ion exchange for both clinoptilolite and chabazite when concentrations exceeded 1000 mgl-1. Overall, chabazite and clinoptilolite removal efficiency was not affected by the presence of more than one heavy metal in solution which demonstrates their potential application in the treatment of effluents contaminated with mixed heavy metals. (C) 1997 ISWA.

Keywords: Chabazite, Clinoptilolite, Competing Cations, Effluent Treatment, Heavy Metal, Heavy Metals, Heavy-Metals, Ion Exchange, Metals, Natural Zeolites, Removal, Removal Efficiency, Selectivity, Zeolite, Zeolites

? Lo, I.M.C., Lee, S.C.H. and Mak, R.K.M. (1998), Sorption of nonpolar and polar organics on dicetyldimethylammonium-bentonite. *Waste Management & Research*, **16** (2), 129-138.

Full Text: [1998\Was Man Res16, 129.PDF](1998/Was%20Man%20Res16,%20129.PDF)

Abstract: Sorptions of four nonpolar, nonionic organic compounds (benzene, toluene, ethylbenzene and o-xylene (BTEX)), and four polar, ionizable phenolic compounds (phenol, 2-chlorophenol, 2,4-dichlorophenol and 2,4,6-trichlorophenol) on dicetyldimethylammonium (DCDMA) bentonite were determined in single-, binary-, ternary-and quaternary-solute systems. Uptake onto the DCDMA-bentonite increases in the order: benzene < toluene < ethylbenzene < o-xylene, which corresponds to the order of increasing hydrophobicity. The sorption isotherms in a single-solute system show that the uptake is highly linear, well correlated with solubility and pH independent, which suggests the sorption mechanism is perhaps due to partitioning. Therefore, the competition seen among other solutes in the uptake of BTEX is unexpected. By comparison, the uptake of phenolic compounds increases in the order: phenol < 2 chlorophenol < 2,4-dichlorophenol < 2,4,6-trichlorophenol. Moreover, sorption isotherms are nonlinear, pH dependent and competitive, which indicates that the uptake may be a result of both partitioning and site specific adsorption. The impact of solution pH on the sorption of phenolic compounds that can be protonated or deprotonated to various extents depending on their pK(a) is also observed.

Keywords: Hydrophobicity, Organophilic Clays, Partitioning, Site Specific, Sorption, Bentonite, Tetrachloromethane Sorption, Clay, Water, Adsorption, Smectite

Leinonen, H. and Lehto, J. (2001), Purification of metal finishing waste waters with zeolites and activated carbons. *Waste Management & Research*, **19** (1), 45-57.

Full Text: [2001\Was Man Res19, 45.PDF](2001/Was%20Man%20Res19,%2045.PDF)

Abstract: Sixteen zeolites and 5 activated carbons were tested for the removal of nickel, zinc, cadmium, copper, chromium, and cobalt from waste simulants mimicking effluents produced in metal plating plants. The best performances were obtained from 4 zeolites: A, X, L, and ferrierite types and from 2 carbon types made from lignite and peat. The distribution coefficients for these sorbents were in the range of 10,000-440,000 ml/g. Column experiments showed that the most effective zeolites for Zn, Ni, Cu, and Cd were A and X type zeolites. The activated carbons, Hydrodarco 3000 and Norit Row Supra, exhibited good sorption properties for metals in aqueous solutions containing complexing agents.

Keywords: Ion Exchange, Zeolite, Activated Carbon, Metal Plating, Wastewater Simulants, Effluent Treatment, WMR268-2, Exchangers

? Liu, S.Y., Gao, J., Qu, B., Yang, Y.J. and Xin, X. (2010), Kinetic models for the adsorption of lead ions by steel slag. *Waste Management & Research*, **28** (8), 748-753.

Full Text: [2010\Was Man Res28, 748.pdf](2010/Was%20Man%20Res28,%20748.pdf)

Abstract: Batch experiments were carried out to investigate the kinetics of adsorption of lead ions by steel slag on the basis of the external diffusion, intraparticle diffusion and adsorption reaction model (pseudo-first-order, pseudo-second-order). The results showed that the controlling step for the adsorption kinetics changed with experimental parameters varied. When the particle size of steel slag was larger than 120 mesh, intraparticle diffusion of Pb2+ was the controlling step; when the initial concentration of Pb2+ was less than 150 mg L-1 or the shaking rate was lower than 150 rpm, external diffusion of Pb2+ was promoted. Contrary to the former experimental conditions, the adsorption reaction was the controlling step, and the adsorption followed second-order kinetics, with an adsorption rate constant of 13.26 g mg-1 min-1. The adsorption isotherm of Pb2+ with steel slag followed the Langmuir model, with a correlation coefficient of 0.99.

Keywords: Adsorbents, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Adsorption Rate, Aqueous-Solution, Blast-Furnace Slag, Concentration, Correlation, Correlation Coefficient, Cu2+, Diffusion, Dye, Experimental, Experiments, Heavy Metal, Intraparticle Diffusion, Ions, Isotherm, Isotherms, Kinetic, Kinetic Models, Kinetics, Kinetics of Adsorption, L1, Langmuir, Langmuir Model, Lead, Model, Models, Particle Size, Pb2+, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Rate Constant, Removal, Second Order, Second Order Kinetics, Second-Order, Second-Order Kinetics, Size, Slag, Sorption, Sphagnum Moss Peat, Steel Slag

# Title: Waste Treatment and Disposal

The Royal Society of Chemistry, Cambridge

Try, P.M. and Price, G.J. (1995), Sewage and industrial effluents. in *Waste Treatment and Disposal*, (Edited by Hester, R.E. and Harrison, R.M.), The Royal Society of Chemistry, Cambridge, 17-41.

# Title: Wastewater Engineering: Collection and Pumping of Wastewater

McGraw-Hill, Inc., New York

Tchobanoglous, G. (1981), *Wastewater Engineering: Collection and Pumping of Wastewater*, McGraw-Hill, Inc., New York.

# Title: Wastewater Treatment

Prentice-Hall, Englewood Cliffs, London

Sundstrom, D.W. and Klei, H.E. (1979), *Wastewater Treatment*, Prentice-Hall, Englewood Cliffs, London.

# Title: Wastewater Treatment Evaluation and Implementation

Thomas Telford, London

Pentreath, P.J. (1994), Improving the quality of rivers and estuaries. in *Wastewater Treatment Evaluation and Implementation*, (Edited by Rofe, B.H.), Thomas Telford, London, 14-18.

Taylor, J.M. and Kwiecinski, J.V. (1994), Sewage sludge incineration in Yorkshire. in *Wastewater Treatment Evaluation and Implementation*, (Edited by Rofe, B.H.), Thomas Telford, London, 141-154.

# Title: Wastewater Treatment Technology

Ann Arbor Science Publishers, Ann Arbor, MI, USA

Patterson, J.W. (1975), *Wastwater Treatment Technology*, Ann Arbor Science Publishers. Ann Arbor Michigan, USA.

# Title: Water

Full Journal Title: [Water](http://www.mdpi.com/journal/water/)

ISO Abbreviated Title: Water

JCR Abbreviated Title: Water

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Subject Categories:

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? Chu, K.H., Feng, X., Kim, E.Y. and Hung, Y.T. (2011), Biosorption parameter estimation with genetic algorithm. *Water*, **3** (1), 177-94.

Full Text: [2011\Water3, 177.pdf](2011/Water3,%20177.pdf)

Abstract: In biosorption research, a fairly broad range of mathematical models are used to correlate discrete data points obtained from batch equilibrium, batch kinetic or fixed bed breakthrough experiments. Most of these models are inherently nonlinear in their parameters. Some of the models have enjoyed widespread use, largely because they can be linearized to allow the estimation of parameters by least-squares linear regression. Selecting a model for data correlation appears to be dictated by the ease with which it can be linearized and not by other more important criteria such as parameter accuracy or theoretical relevance. As a result, models that cannot be linearized have enjoyed far less recognition because it is necessary to use a search algorithm for parameter estimation. In this study a real-coded genetic algorithm is applied as the search method to estimate equilibrium isotherm and kinetic parameters for batch biosorption as well as breakthrough parameters for fixed bed biosorption. The genetic algorithm is found to be a useful optimization tool, capable of accurately finding optimal parameter estimates. Its performance is compared with that of nonlinear and linear regression methods.

Keywords: Heavy Metal, Wastewater, Modeling, Adsorption, Evolutionary Computation

# Title: Water Air and Soil Pollution

Full Journal Title: [Water Air and Soil Pollution](http://www.springerlink.com/content/1573-2932/); [Water Air and Soil Pollution](http://www.springerlink.com/content/100344/)

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Environmental Sciences: Impact Factor 0.971, 51/126 (1999); Impact Factor 0.632, 77/127 (2000); Impact Factor 0.772, 66/129 (2001); Impact Factor 0.526, 98/132 (2002); Impact Factor 0.883, 68/131 (2003); Impact Factor 1.058, 69/134 (2004); Impact Factor 1.258 63/140 (2005); Impact Factor 1.224, 88/160 (2007); Impact Factor 1.676, 79/181 (2009)

Meteorology & Atmospheric Sciences: Impact Factor 0.971, 23/38 (1999); Impact Factor 0.632, 31/40 (2000); Impact Factor 0.772, 34/43 (2001); Impact Factor 0.526, 26/46 (2002); Impact Factor 0.883, 31/46 (2003); Impact Factor 1.058, 29/45 (2004); Impact Factor 1.258 28/47 (2005); Impact Factor 1.224, 33/51 (2007); Impact Factor 1.676, 30/63 (2009)

Water Resources: Impact Factor 0.971, 14/46 (1999); Impact Factor 0.632, 21/47 (2000); Impact Factor 0.772, 18/50 (2001); Impact Factor 0.526, 28/53 (2002); Impact Factor 0.883, 17/55 (2003); Impact Factor 1.058, 14/55 (2004); Impact Factor 1.258 14/57 (2005); Impact Factor 1.224, 21/59 (2007); Impact Factor 1.676, 16/66 (2009)

Gatz, D.F. (1975), Pollutant aerosol deposition into southern lake Michigan. *Water Air and Soil Pollution*, **5** (2), 239-251.

Full Text: [1960-80\Wat Air Soi Pol5, 239.pdf](1960-80/Wat%20Air%20Soi%20Pol5,%20239.pdf)

Abstract: Current estimates of pollutant aerosol input to southern Lake Michigan are based on a single calculated emission inventory and various estimates of the fraction of emissions that enter the Lake. Alternative, but still crude, estimates of urban elemental emissions and their wet and dry deposition in the lake are made here. Observed elemental concentrations in urban air are used to calculate emissions and recently measured wet and dry deposition parameters are used to calculate deposition.

All available treatments conclude that atmospheric inputs of at least Fe, Pb, Ti, and V are sizable fractions of total lake input of these metals. This study suggests tentatively that 1) wet and dry inputs from the atmosphere are about equal, 2) between 3 and 15 % of elemental pollutant emissions from Chicago and NW Indiana enter the Lake, and 3) this fraction increases with particle size.

Grodzińvska, K. (1978), Mosses as bioindicators of heavy metal pollution in Polish national parks. *Water Air and Soil Pollution*, **9** (1), 83-97.

Full Text: [1960-80\Wat Air Soi Pol9, 83.pdf](1960-80/Wat%20Air%20Soi%20Pol9,%2083.pdf)

Abstract: The concentrations of heavy metals (Cd, Co, Cr, Ni, Cu, pH, Zn, Mn, Fe) and other elements (Mg, Na, K, Ca) were determined in the samples of Pleurozium schreberi and Hylocomium splendens from 12 Polish national parks. The significant differences in the concentrations of all heavy metals between particular parks were found. The lowest concentrations of these metals were recorded in the mosses from the national parks in northern Poland, the highest in southern Poland. Significant differences in the heavy metals contents of the mosses between central and peripheral park areas, between green and brown parts of mosses, as well as between moss species were also found.

Siegel, S.M. and Siegel B.Z. (1978), Mercury fallout in Hawaii. *Water Air and Soil Pollution*, **9** (1), 113-118.

Full Text: [1960-80\Wat Air Soi Pol9, 113.pdf](1960-80/Wat%20Air%20Soi%20Pol9,%20113.pdf)

Abstract: Mercury fallout was measured 10 m from the selected emission site, the Sulfur Banks fumarole area, Hawaii Volcanoes National Park; at stations on Maui and Oahu, respectively 200 km and 380 km distant from the Sulfur Banks; and at the Hawaii Geothermal Project drill site, only 40 km from source. Sulfur Banks and Oahu measurements were carried out on six occasions between 1972 and 1976, each time within the same 24 h period.

Gold foil was used for collection of elemental mercury (Hg°) and copper foil for both oxidized (Hgox) and elemental forms.

The rate of deposition at the Sulfur Banks was high – 800 μm m–2 day–1, or 300 kgkm–2 annually. The same figure applied to the relatively nearby geothermal project site. At both remote stations the fallout rate was approximately 10 fold lower.

At four measurement times out of six the ratio HgO/Hgox ranged from 0.195 to 0.463 at the Sulfur Banks source and from 1.80 to 5.15 at the remote stations. On two occasions, heavy rains selectively reduced Hgox at the emission site.

Model calculations compared Sulfur Banks fallout with rates of re-emission of Hg by vegetation, and the importance of the biotic factor in determination of mass balances and fluxes was emphasized. Aspects of the geochemistry and toxicology of Hg were considered briefly in relation to emission and deposition, and to the occurrence of Hg°.

McKay, G. (1979), Basic dye adsorption on activated carbon. *Water Air and Soil Pollution*, **12** (3), 307-317.

Full Text: [1960-80\Wat Air Soi Pol12, 307.pdf](1960-80/Wat%20Air%20Soi%20Pol12,%20307.pdf)

Abstract: The adsorption of Victoria Blue dye (Basic Blue 26) on carbon has been investigated. Equilibrium data have been found to obey the Langmuir isotherm. The effects of contact time, agitation, initial dye concentration and carbon particle size range were also studied.

McKay, G. and Sweeney, A.G. (1980), Principles of dye removal from textile effluent. *Water Air and Soil Pollution*, **14** (1), 3-11.

Full Text: [1960-80\Wat Air Soi Pol14, 3.pdf](1960-80/Wat%20Air%20Soi%20Pol14,%203.pdf)

Abstract: The initial rate of Disperse Blue 7 dye removal from textile effluent depends on the surface mass transfer coefficient. The effects of certain variables namely, agitation, initial dye concentration, particle size and solution temperature, on the dimensionless mass transfer term, Sh/Sc0.33, have been studied.

Slavek, J. and Pickering, W.F. (1981), The effect of pH on the retention of Cu, Pb, Cd and Zn by clay-fulvic acid mixtures. *Water Air and Soil Pollution*, **16** (2), 209-221.

Full Text: [1981\Wat Air Soi Pol16, 209.pdf](1981/Wat%20Air%20Soi%20Pol16,%20209.pdf)

Abstract: The addition of fulvic acid to clay suspensions (kaolinite, illite or montmorrillonite) resulted in increased uptake of Cu, Pb, Cd, and Zn ions over the pH range 3 to 6, due to the limited solubility of one of the metal-fulvate species formed. At higher pH values, residual metal ion was retained in solution, instead of precipitating as hydroxy species.

The amount of total metal ion found in solution at equilibrium was determined by the quantity and type of clay added; the amount of organic acid present; and to a lesser extent, pH. The behavior of the clay-fulvic acid systems differed from that observed using other organic materials such as gelatine, tannic acid or a humic acid.

Sadiq, M. and Zaidi, T.H. (1981), The adsorption characteristics of soils and removal of cadmium and nickel from wastewaters. *Water Air and Soil Pollution*, **16** (3), 293-299.

Full Text: [1981\Wat Air Soi Pol16, 293.pdf](1981/Wat%20Air%20Soi%20Pol16,%20293.pdf)

Abstract: The interactions between the adsorption characteristics of 27 experimental soils and the sorption of Cd and Ni from the municipal wastewaters were investigated in this study. The removal of these elements from soil solution was followed for 50 days.

All the adsorption characteristics, except cation exchange capacity and organic matter, were significantly correlated to the sorption of Cd after one day shaking. After 7 days of shaking, none of the soil adsorption characteristics except free CaCO3 was significantly correlated to Cd removal from wastewater. The soil saturated paste pH and suspension pH were strongly correlated to Cd sorption throughout this experiment.

The behavior of Ni in soils was different from that of Cd. Surface area, total Fe, and total Al were significantly correlated to Ni sorption. The correlation between Ni removal and pH was the strongest than any other parameter studied. After 7 days shaking, clay content and total Ca were not significantly correlated to Ni sorption.

The cation exchange capacity of the soils was not significantly correlated to Cd or Ni sorption in this experiment. It seems that in the experimental soils, concentration of Cd and Ni were probably not controlled by adsorption process. The precipitation process was probably playing a major role in the removal of these elements from the municipal wastewaters.

As observed in this experiment, the cation exchange capacity of experimental soils was a poor parameter to define sorption capacity of these soils for Cd and Ni. The guidelines for determining the soil sludge load, which are mainly based on the cation exchange capacity of soils, should be revised.

Nichols, D.S., Prettyman, D. and Gross, M. (1983), Movement of bacteria and nutrients from pit latrines in the boundary waters canoe area wilderness. *Water Air and Soil Pollution*, **20** (2), 171-180.

Full Text: [1983\Wat Air Soi Pol20, 171.pdf](1983/Wat%20Air%20Soi%20Pol20,%20171.pdf)

Abstract: In the Boundary Waters Canoe Area Wilderness, the movement of fecal bacteria, N, and P from pit latrines was studied, as well as the effectiveness of peat latrine liners in reducing this movement. When latrines are constructed where only a thin layer of permeable soil overlies bedrock or other impermeable material, fecal bacteria can be carried considerable distances by subsurface flow. Lining latrine pits with acid peat appears to reduce bacteria transport. Most soils strongly adsorb P and prevent its movement. In this study no movement of P from latrine pits was seen except at one site with very sandy soil. In such soil a peat liner appears to be of some value, if a peat with a high P adsorption capacity is used. A peat liner should be viewed as an additional protection against P and bacteria movement rather than as a substitute for proper soil conditions. Latrines should not be built in thin, rocky soils. Nitrogen appears to move readily from toilet pits, regardless of soil type or presence of peat liners. But, because of dilution, N is not likely to have a discernible impact on water quality.

Sadiq, M., Zaidi, T.H. and Mian, A.A. (1983), Environmental behavior of arsenic in soils: Theoretical. *Water Air and Soil Pollution*, **20** (4), 369-377.

Full Text: [1983\Wat Air Soi Pol20, 369.pdf](1983/Wat%20Air%20Soi%20Pol20,%20369.pdf)

Abstract: Thermodynamics data of As species were used to develop the solubility isotherms of As minerals and solution species. The effect of redox on the stability of As minerals and the distribution of As solution species was also simulated. In oxygenated and alkaline systems, Ca3(AsO4)2 was the most stable As mineral followed by Mn3(AsO4)2. It was postulated that in such environments Ca3(AsO4)2 and Mn3(AsO4)2 might precipitate. Arsenic(V) oxide was too soluble to become an important solid phase in the aqueous environment. Under reduced and acidic concitions (pe + pH < 8 and pH < 6), As(III) oxides were stable along with As sulfides. These minerals were unstable, above pe + pH of 8. In oxidized solutions (pe + pH > 8), arsenate species were important whereas in reduced systems (pe + pH < 8), As(III) species were in abundance. Arsine gas can only form if the system was very reduced and acidic. Below pH 2.2, H3AsO4° was in abundance. As pH increased, H2AsO4 – species was important, followed by AsO4 3– above pH 12. The results of thermodynamic stability and solubility models have been discussed in reference to soil environment.

McKay, G., Allen, S.J. and McConvey, I.F. (1984), The adsorption of dyes from solution: Equilibrium and column studies. *Water Air and Soil Pollution*, **21** (1-4), 127-139.

Full Text: [1984\Wat Air Soi Pol21, 127.pdf](1984/Wat%20Air%20Soi%20Pol21,%20127.pdf)

Abstract: The ability of several adsorbents to adsorb dyes from solution has been studied and the relative costs of dye removal are reported based on adsorption capacity only. The application of the results to batch scale commercial systems has been discussed. A detailed study of the adsorption of Telon Blue dye on carbon has been undertaken using fixed beds and the data correlated into a design model using the bed depth service time (BDST) method of analysis.

McKay, G., Otterburn, M.S. and Aga, J.A. (1985), Fuller’s earth and fired clay as adsorptions for dyestuffs: Equilibrium and rate studues. *Water Air and Soil Pollution*, **24** (3), 307-322.

Full Text: [1985\Wat Air Soi Pol24, 307.pdf](1985/Wat%20Air%20Soi%20Pol24,%20307.pdf)

Abstract: The ability of Fuller’s earth to adsorb a basic dye (Astrazone Blue — Basic Blue 69) and an acidic dye (Telon Blue - Acid Blue 25) has been studied. The equilibrium saturation adsorption capacities were 1200 mg dye g–1 Fuller’s earth and 220 mg dye g–1 Fuller’s earth for Astrazone Blue and Telon Blue, respectively.

The kinetics of the adsorption processes were studied in an agitated batch adsorber. The time to reach 90% equilibrium value was achieved in less than 1 h. The variables investigated were agitation, adsorbent mass, initial dye concentration and temperature.

A limited number of studies were undertaken using a fired clay but significantly lower saturation capacities were obtained, namely, 7 mg dye g–1 fired clay and 40 mg dye g–1 fired clay for Telon Blue and Astrazone Blue, respectively.

McKay, G., Otterburn, M.S. and Aga, J.A. (1985), Fuller’s earth and fired clay as adsorptions for dyestuffs external mass transport processes during adsorption. *Water Air and Soil Pollution*, **26** (2), 149-161.

Full Text: [1985\Wat Air Soi Pol26, 149.pdf](1985/Wat%20Air%20Soi%20Pol26,%20149.pdf)

Abstract: The kinetics of the adsorption of two dyestuffs, Astrazone Blue (Basic Blue 69) and Telon Blue (Acid Blue 25), onto fired clay and Fuller’s earth have been studied. The rate of adsorption is controlled initially by the boundary layer film and an external mass transfer coefficient has been determined for this process under the influence of a number of variables including agitation, initial dye concentration, adsorbent particle size, adsorbent mass and temperature.

Siegel, S., Keller, P., Galam, M., Lehr, H., Siegel, B. and Galum, E. (1986), Biosorption of lead and chromium by *Penicillium* preparation. *Water Air and Soil Pollution*, **27** (1-2), 69-75.

Full Text: [1986\Wat Air Soi Pol27, 69.pdf](1986/Wat%20Air%20Soi%20Pol27,%2069.pdf)

Abstract: *Penicillium* sp. mycelium can accumulate Pb from aqueous solutions of nitrate. Uptake of Pb by mycelial preparations after heat treatment was more rapid, but the maximum quantity bound remained unchanged. Chromium was not accumulated from solutions of potassium dichromate unless the mycelial preparation was first incubated in Pb nitrate. In the example given, 0.14 g of dry mycelium incubated in Pb nitrate (50 ppm, 2 hr) contained 850 gg of Pb and subsequently accumulated 120 μg of Cr in 5 min from 20 mL of 20 ppm dichromate solution.

We suggest that the binding of divalent Pb cations to negative fungal wall sites reverses their charge, enabling them to accumulate Cr anions.

? Panday, K.K., Prasad, G. and Singh, V.N. (1986), Use of wollastonite for the treatment of Cu(II) rich effluents. *Water Air and Soil Pollution*, **27** (3-4), 287-296.

Full Text: [1986\Wat Air Soi Pol27, 287.pdf](1986/Wat%20Air%20Soi%20Pol27,%20287.pdf)

Abstract: The adsorption technique using wollastonite has been applied for the removal of Cu(II) from aqueous solutions. The low concentration, high temperature and alkaline pH favor the removal of Cu(II). The Langmuir isotherm was used to represent the equilibrium data at different temperatures. The apparent heat of adsorption has been found to be 5.926 Cal mol–1. The uptake of Cu(II) is diffusion controlled and the mass transfer coefficient is 3.6×10–5 cm s–1. The maximum removal of Cu(II) in alkaline medium has been explained on the basis of the uptake of hydrolyzed adsorbate species by the active surface sites of adsorbent.

Keywords: Air, Netherlands, Soil, Treatment, Water

McKay, G., Ramprasad, G. and Pratapa Mowli, P. (1987), Equilibrium studies for the adsorption of dyestuffs from aqueous solutions by low-cost materials. *Water Air and Soil Pollution*, **29** (3), 273-283.

Full Text: [1986\Wat Air Soi Pol29, 273.pdf](1986/Wat%20Air%20Soi%20Pol29,%20273.pdf)

Abstract: A number of low-cost materials (teakwood bark, ricehusk, coal, bentonite clay, hair and cotton waste) have been used as adsorbents for dyestuffs in aqueous solutions. Four red and four blue dyes have been studied; each color group consisted of an acidic, a basic, a disperse and a direct dye. The equilibrium isotherm for each dye-adsorbent system was determined and adsorption capacities from zero to 200 mg dye g–1 of adsorbent was obtained. In general basic dyes adsorbed to a greater extent than the other dye classes but no single characteristic of the dye or adsorbent seemed responsible for such dye-adsorbent interactions and adsorption capacities.

McKay, G., Otterburn, M.S. and Aga, J.A. (1987), Two resistance mass transport model for the adsorption of dyes of fullers earth. *Water Air and Soil Pollution*, **33** (3-4), 419-433.

Full Text: [1987\Wat Air Soi Pol33, 419.pdf](1987/Wat%20Air%20Soi%20Pol33,%20419.pdf)

Abstract: A mass transfer model has been developed to describe the rate of adsorption of dyestuffs from aqueous solutions onto adsorbents, namely, Fuller’s earth, silica, activated C and fired clay. The model is based on external film mass transfer and solid phase internal diffusion. A computer program has been used to obtain the values of the two mass transfer parameters for each dye/adsorbent system.

McKay, G., Otterburn, M.S. and Aga, J.A. (1987), Intraparticle diffusion process occurring during adsorption of dyestuffs. *Water Air and Soil Pollution*, **36** (3-4), 381-390.

Full Text: [1987\Wat Air Soi Pol36, 381.pdf](1987/Wat%20Air%20Soi%20Pol36,%20381.pdf)

Abstract: The adsorption of a dyestuff, Telon Blue (Acid Blue 25) on Fuller’s earth and Astrazone Blue onto fired clay has been studied. An intraparticle diffusion rate parameter has been defined characteristic of the rate of diffusion after the early stages of the adsorption. The rate parameter has been determined for a number of variables including adsorbent mass, initial dye concentration, and particle size.

Gupta, G.S., Prasad, G., Panday, K.K. and Singh, V.N. (1988), Removal of chrome dye from aqueous solutions by fly ash. *Water Air and Soil Pollution*, **37** (1-2), 13-24.

Full Text: [1988\Wat Air Soi Pol37, 13.pdf](1988/Wat%20Air%20Soi%20Pol37,%2013.pdf)

Abstract: The ability of fly ash to remove Omega Chrome Red ME (a chrome dye, mostly used in textile industries) from water has been studied. It has been found that low adsorbate concentration, small particle size of adsorbent, low temperature, and acidic pH of the medium favor the removal of chrome dye from aqueous solutions. The dynamics of adsorbate transport from bulk to the solid phase has been studied at different temperatures in light of the adsorption of dye on the outer surface as well as diffusion within the pores of fly ash. The applicability of Langmuir isotherm suggests the formation of monolayer coverage of dye molecules on the outer interface of adsorbent. The thermodynamics of chrome dye-fly ash system indicates spontaneous and exothermic nature of the process. The pronounced removal of chrome dye in the acidic range may be due to the association of dye anions with the positively charged surface of the adsorbent.

McLellan, J.K. and Rock, C.A. (1988), Pretreating landfill leachate with peat to remove metals. *Water Air and Soil Pollution*, **37** (1-2), 203-215.

Full Text: [1988\Wat Air Soi Pol37, 203.pdf](1988/Wat%20Air%20Soi%20Pol37,%20203.pdf)

Abstract: In this investigation, the capacity of peat to treat two different landfill leachates was determined. Freundlich isotherms showed that, for the tested metals (Cd, Cr, Cu, and Pb), an increased time of contact increased the level of adsorption over the entire range of influent values studied. In addition, metal interaction may play an important role in the adsorption of metals from leachate, as the various metal ions compete for the available adsorption sites on the peat. Column studies using two leachates, one from a municipal refuse fill (Al, Ca, Cd, Fe, Mg, Na, and Pb), and one from a fill which receives mainly oil and fly ash (Al, Ca, Cr, Fe, Mg, Mn, Na, Pb, and V), were conducted to establish design parameters for full-scale design. The efficiency of treatment was evaluated as a function of factors important for developing filter design criteria. Further considerations were given to filter longevity and ease of replacement, as well as for the ultimate disposal of the peat from the filters. For the municipal leachate a compaction density of 0.12 g mL–1 gave the best results as clogging occurred at higher densities, whereas 0.18 g mL–1 provided the best removal for the industrial leachate. While peat is incapable of adequately removing metals to acceptable levels for direct discharge, peat can provide substantial removal as a pretreatment process at low hydraulic loadings. Desorption of up to 50% was found when deionized water was applied to spent columns so ultimate disposal of the peat would require a dry environment.

McKay, G., El-Geundi, M.S. and Abdul Wahab, M.Z. (1988), Two resistance mass transfer model for the adsorption of dyes onto bagasse pith. *Water Air and Soil Pollution*, **42** (1-2), 33-46.

Full Text: [1988\Wat Air Soi Pol42, 33.pdf](1988/Wat%20Air%20Soi%20Pol42,%2033.pdf)

Abstract: The adsorption of four dyestuffs onto bagasse pith has been studied. A method has been presented for the prediction of concentration decay vs time. The model is based on external mass transfer and pore diffusion and enables the external transport coefficients and the effective diffusivities to be determined. Constant mass transport. coefficients were obtained for each dye-pith system to correlate the effects of varying the initial dye concentration and pith mass. The external mass transfer coefficients are 1.4×10–2, 1.24×10–2, 1.5×10–3, and 2.5×10–3 cm s–1 and the effective diffusivities are 6.5×10–6, 2.6×10–6, 4.5×10–7, and 5.7×10–7 cm2 s–1 for Basic Blue 69, Basic Red 22, Acid Blue 25, and Acid Red 114, respectively.

Singh, D.B., Prasad, G., Rupainwar, D.C. and Singh, V.N. (1988), As(III) removal from aqueous solution by adsorption. *Water Air and Soil Pollution*, **42** (3-4), 373-386.

Full Text: [1988\Wat Air Soi Pol42, 373.pdf](1988/Wat%20Air%20Soi%20Pol42,%20373.pdf)

Abstract: The removal of As(III) from aqueous solutions at different concentrations, pH and temperatures by haematite has been carried out successfully. The maximum removal was found to be 96 % at concentration 13.34 μmol L–1, temperature 20 °C and pH 7.0. The process of uptake follows first-order adsorption rate expression and obeys the Langmuir’s model of adsorption. The removal of As(III) by haematite is also partially diffusion controlled and mass transfer coefficients, diffusion coefficients and thermodynamic parameters have been determined to explain the results.

Chaturvedi, A.K., Yadava, K., Pathak, K.C. and Singh, V.N. (1990), Defluoridation of water by adsorption on fly ash. *Water Air and Soil Pollution*, **49** (1-2), 51-61.

Full Text: [1990\Wat Air Soi Pol49, 51.pdf](1990/Wat%20Air%20Soi%20Pol49,%2051.pdf)

Abstract: The ability of fly ash to remove fluoride from water and wastewaters has been studied at different concentrations, times, temperatures and pH of the solution. The rate constants of adsorption, intraparticle transport, mass transfer coefficients and thermodynamic parameters have been calculated at 30, 40, and 50 °C. The empirical model has been tested at various concentration for the present system. The removal of fluoride is favorable at low concentration, high temperature and acidic pH.

Keywords: Soil, Water

Sharma, Y.C., Gupta, G.S., Prasad, G. and Rupainwar, D.C. (1990), Use of wollastonite in the removal of Ni(II) from aqueous solutions. *Water Air and Soil Pollution*, **49** (1-2), 69-79.

Full Text: [1990\Wat Air Soi Pol49, 69.pdf](1990/Wat%20Air%20Soi%20Pol49,%2069.pdf)

Abstract: The ability of wollastonite to adsorb Ni(II) from water has been carried out. A removal of 92% of Ni(II) with 20 g L–1 of adsorbent was observed at 50 mg L–1 adsorbate concentration, 6.5 pH and 30 °C. The process follows a first order rate kinetics with diffusion controlled nature and the data fits the Langmuir adsorption isotherm. Removal of Ni increases from 10 to 92% with the rise of pH from 3.0 to 8.0 and thereafter it remains almost unchanged. This change has been explained on the basis of aqueous-complex formation and the subsequent acid base dissociation at the solid-solution interface.

Keywords: Soil, Water

Markert, B. and Thornton, I. (1990), Multielement analysis of an English peat bog soil. *Water Air and Soil Pollution*, **49** (1-2), 113-123.

Full Text: [1990\Wat Air Soi Pol49, 113.pdf](1990/Wat%20Air%20Soi%20Pol49,%20113.pdf)

Abstract: Nineteen elements were quantitatively determined by atomic emission spectroscopy with inductively coupled plasma in peat profiles in Ringinglow Bog, Derbyshire, England. For the elements Ba, Ca, Cd, Co, Cr, Fe, La, Mn, Ni, Ti, and Zn an enrichment in the upper 5 cm of the peat bogs was found probably caused by anthropogenic influences. The elements Al, Be, Cu, and Pb showed a different distribution pattern with maximum concentration in the 5 to 15 cm layer. The elements Mg, Na, and Sr showed no enrichment in the upper 55 cm of the peat reflecting the constant input of these elements from the sea during the last few centuries. Upper parts (leaves and stems) of the plants investigated (*Calluna vulgaris* and *Eriophorum vaginatum*) only represent higher values of Pb compared with the normal element content in other plants. Compared with the results of peat profiles in a Norwegian bog, the concentrations of the comparable elements (Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn) are much higher in the English peat. Ringinglow Bog seem to be very suitable for further investigations within the scope of a global monitoring programme.

Heathwaite, A.L. (1990), The effect of drainage on nutrient release from fen peat and its implications for water-quality: A laboratory simulation. *Water Air and Soil Pollution*, **4****9** (1-2), 159-173.

Full Text: [1990\Wat Air Soi Pol49, 159.pdf](1990/Wat%20Air%20Soi%20Pol49,%20159.pdf)

Abstract: The effect of peat moisture status on N, S, Ca, and Mg release to drainage waters was examined using a constant temperature laboratory incubation. Peat samples originating from drained and undrained sites in West Sedgemoor, Somerset Levels, SW England were compared. Three treatments: long term waterlogging, aeration, and fluctuating aeration and waterlogging were imposed on all peat samples. These treatments resulted in different rates and total amounts of N, S, Ca, and Mg release, with waterlogging resulting in highest solute release. The total amounts and rates of release of S, Ca, and Mg from peat that was undrained prior to incubation always exceeded that from drained site peat samples regardless of peat moisture status. Although the degree of waterlogging or aeration affected the rate and total amount of watersoluble N released during incubation, there was no difference between peat that was drained, and peat that was undrained, prior to incubation. Drainage of currently undrained and waterlogged peat in West Sedgemoor will result in the transfer of high concentrations of S, Ca, and Mg from the peat to the drainage ditch.

McKay, G. and Bino, M.J. (1990), Simplified optimization procedure for fixed-bed adsorption systems. *Water Air and Soil Pollution*, **51** (1-2), 33-41.

Full Text: [1990\Wat Air Soi Pol51, 33.pdf](1990/Wat%20Air%20Soi%20Pol51,%2033.pdf)

Abstract: The adsorption of phenol, p-chlorophenol and mercuric ions onto activated carbon in fixed beds has been studied. The effects of process variables such as bed height and residence have been studied. The results have been used to predict optimum conditions for the systems based on the *C* exhaustion rate and the empty bed residence time (EBRT).

? Smith, E.H. and Weber, Jr., W.J. (1990), Comparative-assessment of the chemical and adsorptive characteristics of leachates from a municipal and an industrial landfill. *Water Air and Soil Pollution*, **53** (3-4), 279-295.

Full Text: [1990\Wat Air Soi Pol53, 279.pdf](1990/Wat%20Air%20Soi%20Pol53,%20279.pdf)

Abstract: Leachates from two landfills, one municipal and one industrial, were compared with respect to their chemical and adsorptive characteristics. Concentrations of most inorganic constituents were as much as an order of magnitude higher for the industrial leachate. The concentration of organic matter in that leachate, measured as total organic carbon (TOC), was more than two orders of magnitude greater than that of the municipal leachates, but specific priority pollutants identified were different. The adsorptive characteristics of the waste samples with respect to activated carbon were evaluated using TOC as a lumped parameter expression of organic matter concentration. Adsorption equilibria and rates for the municipal leachate system were reasonably well described by treating TOC as a single component for modeling purposes. The industrial leachate required a multicomponent approach. Ideal adsorbed solution theory was used in this case to characterize the behavior of a set of hypothetical TOC components. The approach was able to account, to some degree, for the competitive interactions evident among organic solutes comprising the mixture.

Keywords: Activated Carbon, Activated Carbon Adsorption, Equilibria, Gac, Humic Substances, Kinetics, Mixtures, Organic Matter, Organic-Matter

Siegel, S.M., Galun, M. and Siegel, B.Z. (1990), Filamentous fungi as metal biosorbents: A review. *Water Air and Soil Pollution*, **53** (3-4), 335-344.

Full Text: [1990\Wat Air Soi Pol53, 335.pdf](1990/Wat%20Air%20Soi%20Pol53,%20335.pdf)

Abstract: Common filamentous fungi (e.g. *Penicillium* spp, *Rhizopus* spp) serve as sources of highly effective heavy metal biosorbents. Derivatives of fungal biomass range from purified cell wall fractions to whole, heat killed mycelium otherwise unmodified. Limited trials suggest a moderate degree of regenerability. When compared with commercial ion-exchange resins, carbons and metal oxides, fungal derivatives generally perform well. Fungal systems offer considerable versatility with respect to metals taken up and bound including the cations Fe, Ni, Cu, Zn, Ag, Cd, La, Pb, Th, and U as well as Cr and Mo anions. Versatility also extends to physico-chemical conditions such as pH and heat tolerance. A deterrent to the application of these materials to waste water management has been a lack of standardized conditions along with the inability to make interspecies comparisons. However, potentials for use of filamentous fungi as biosorbents and their tailoring by genetic techniques to meet specific needs, recommend them for further research and development.

Keywords: *Rhizopus-arrhizus*, *Penicillium* Biomass, Biosorption, Uranium, Mechanism, Thorium, Ions

? Osteen, A.B. and Bibler, J.P. (1991), Treatment of radioactive laboratory waste for mercury removal. *Water Air and Soil Pollution*, **56**, 63-74.

Full Text: [1991\Wat Air Soi Pol56, 63.pdf](1991/Wat%20Air%20Soi%20Pol56,%2063.pdf)

Abstract: Routine analyses of Savannah River Laboratory wastes at the Savannah River Site occasionally reveal Hg concentrations in the waste in excess of the 0.200 mg L-1 RCRA limit. An ion exchange resin was demonstrated to be effective for the removal of dissolved Hg from experimental waste in a special, permitted decontamination project. The ion exchange material is Duolite(TM) GT-73, a polystyrene/divinylbenzene resin with thiol (S-H) functional groups. As a result of the resin’s demonstrated effectiveness in that decontamination project, it has been placed in use or is under consideration for use with several other Site radwaste streams as a reliable medium for Hg removal.

Sawhney, B.L. and Frink, C.R. (1991), Heavy-metals and their leachability in incinerator ash. *Water Air and Soil Pollution*, **57-8**, 289-296.

Full Text: [1991\Wat Air Soi Pol57-8, 289.pdf](1991/Wat%20Air%20Soi%20Pol57-8,%20289.pdf)

Abstract: Samples of ash from municipal refuse incenrators in six Connecticut towns as well as samples of incinerated sewage sludge were collected during 1988 and 1989. The samples were analyzed for pH, metal content by HNO3 + H2O2 digestion, extractable metals by solvents including NaOAc, DTPA, H2CO3 and H2O. Two samples were examined for metals that could be leached by H2O from laboratory columns. Most ash samples were highly alkaline and their pH changed slowly, decreasing by about two pH units over a 6-week period. The variability in metal content of ash from different incinerators was similar to that observed in samples obtained from the same facility at different times. Only a portion of the metals were extracted by the solvents in the order NaOAc > DTPA > H2CO3 > H2O. The relative amounts of the total metals in the ash that could be extracted with specific solvents varied widely, suggesting different chemical forms in different ashes. After the initial removal of large concentrations of metals in the leachates from laboratory columns over 2 to 3 days, leaching of metals continued at extremely low concentrations that were generally below drinking water standards.

Keywords: Refuse

? Kuo, S. and Jellum, E.J. (1991), Affinity constants and behavior of Cd sorption in some acid soils. *Water Air and Soil Pollution*, **57-8**, 369-376.

Full Text: [1991\Wat Air Soi Pol57-8, 369.pdf](1991/Wat%20Air%20Soi%20Pol57-8,%20369.pdf)

Abstract: Cadmium sorption was studied in several acidic soils in a pH range from 4.5 to 6.5. The soils had two classes of surfaces with acidity constants (pKa1 = 4.09 and pKa2 = 6.39) similar to those for weakly and very weakly acidic carboxyls, and N-containing groups in fulvic acid. Titratable H+ and acidity constants were used to estimate the number of exchange sites at each pH level. Sorption of Cd was closely related to Cd concentration, pH, and soil type. Although the inclusion of pH and organic C contents in a regression accounted for some variations in the Cd distribution coefficient defined as the ratio of the quantity of Cd sorbed to the solution Cd concentration, the number of sorption sites was a more appropriate factor to explain the variability. Because of a negligible contribution to the number of exchange sites from Fe oxides, the sorption of Cd at pH = 4.5 was considered to be of a one-surface Langmuir type. A two-surface Langmuir equation was considered to model sorption at higher pH values. The average affinity constants (log K) were 3.61 and 4.89 for Cd sorption by the two classes of surfaces. [Author abstract; 18 Refs; In English]

Keywords: Adsorption, Binding, Cadmium, Distribution Coefficient, Metals, Model, Oxide, pH, Phosphate, Sewage-Sludge, Sorption, Two-Surface Langmuir, Zinc

McKay, G. (1991), Two solutions to adsorption equations for pore diffusion. *Water Air and Soil Pollution*, **60** (1-2), 117-133.

Full Text: [1991\Wat Air Soi Pol60, 117.pdf](1991/Wat%20Air%20Soi%20Pol60,%20117.pdf)

Abstract: Two solutions for the prediction of concentration vs time decay curves in agitated batch adsorbers, based on external mass transfer and pore diffusion, are presented and these enable mass transfer coefficients and pore diffusivities to be estimated by fitting to experimental data. Solutions have been developed for predicting concentration vs time decay curves for the adsorption of pollutants from water. The first solution, Model 1, applies a polynomial curve fit equation to the experimental concentration-time data and then differentiates the equation to yield dC/dt values at various time values. Certain problems were encountered in its application and therefore Model 2 was developed; this model uses an exponential curve fit equation and yielded results which were in better agreement with experimental data. Consequently a more rigorous program was developed to apply Model 2 to the experimental data. The solutions enable theoretical data to be compared with experimental results and ‘best fit’ external mass transfer coefficients and pore diffisivities to be determined for various systems.

Keywords: Model

Namasivayam, C. and Yamuna, R.T. (1992), Removal of Rhodamine-B by biogas waste slurry from aqueous solution. *Water Air and Soil Pollution*, **65** (1-2), 101-109.

Full Text: [1992\Wat Air Soi Pol65, 101.pdf](1992/Wat%20Air%20Soi%20Pol65,%20101.pdf)

Abstract: The ability of biogas waste slurry to adsorb a basic dye (Rhodamine-B) has been investigated. The parameters include agitation time, initial dye concentration, pH and adsorbent dosage. The rate controlling step is mainly intraparticle diffusion. The adsorption rate constant was found to be 2.9×10-2 min-1 at 20 mg L-1 initial dye concentration. The adsorption conforms with Freundlich isotherm. Removal of the dye was at least 90% in the entire pH range from 2.3 to 11.2. Desorption of the dye in 50% (v/v) acetic acid to the extent of 69.7% indicates that most of the dye is held by the adsorbent by chemisorption.

Keywords: Equilibrium, Dyes

? Sen, A.K. and Bhattacharyya, M. (1994), Studies of uptake and toxic effects of Ni(II) on Salvinia-Natans. *Water Air and Soil Pollution*, **78** (1-2), 141-152.

Full Text: [1994\Wat Air Soi Pol78, 141.pdf](1994/Wat%20Air%20Soi%20Pol78,%20141.pdf)

Abstract: The uptake of Ni(II) and toxic effects of the metal on some biochemical parameters in Salvinia natans L. were studied. The uptake of Ni(II) by the plants gradually increased with increase in concentration of Ni(II) in the culture medium. Maximum accumulation of Ni(II) was noted within a day and maximum removal (about 90%) was recorded up to 20 μg mL-1 of Ni(II). Accumulation of the metal in roots (14.75 μg mL-1) is greater than that of shoots (5.25 μg mL-1). Ni(II) > 10 μg mL-1 promoted senescence of Salvinia plants by decreasing chlorophylls, protein, amino acid, Hill activity, dry weight and by inducing necrosis. In the absence of other pollutants, Salvinia plants may be used for removal of Ni(II) from effluents and also as an indicator of Ni pollution.

Keywords: Accumulation, Copper, Hg(II), Injury, Nickel, Ozone, Pistia-Stratiotes, Plants, Pollution, Roots, Tomato

? Girault, L., Lemaire, P., Boudou, A. and Dufourc, E.J. (1995), Inorganic mercury interactions with lipid components of biological-membranes - P-31-NMR study of Hg(II) binding to headgroups of micellar phospholipids. *Water Air and Soil Pollution*, **80** (1-4), 95-98.

Full Text: [1995\Wat Air Soi Pol80, 95.pdf](1995/Wat%20Air%20Soi%20Pol80,%2095.pdf)

Abstract: Phosphatidylethanolamine (PE), phosphatidylserine (PS) and phosphatidylcholine (PC) in micellar phase in water have been studied by high resolution phosphorus-31 nuclear magnetic resonance (P-31-NMR), in order to follow inorganic mercury Hg(II) binding to the lipid headgroups. Decrease of the NMR peak area is observed upon HgCl2 addition? pith greater effect on PE and PS compared to PC. This is interpreted by Hg(II) binding to several phospholipid headgroups, linking different micelles together and forming by extension a large ‘insoluble’ phospholipid-mercury network that is undetectable by high-resolution P-31-NMR. The extent of phospholipid aggregation depends on the mercury-to-lipid molar ratio, and apparent Hg(II) affinities to phospholipid headgroups are in the order: PE>PS>>PC, When HgCl2 is added to mixed micelles prepared with two lipids (PE/PC or PS/PC), co-precipitation is observed for both components in similar proportions.

Keywords: Chloride, Hg2+, Model, Cell

? Persicani, D. (1995), Analysis of leaching behavior of sludge-applied metals in 2 field soils. *Water Air and Soil Pollution*, **83** (1-2), 1-20.

Full Text: [1995\Wat Air Soi Pol83, 1.pdf](1995/Wat%20Air%20Soi%20Pol83,%201.pdf)

Abstract: Two different field soils were treated with a single dose of liquid sludge having a high heavy metals concentration. Two years later, a soil sampling was made to determine the trace metals concentration profiles. No significant distribution difference was measured between soils, whereas significant leaching differences were observed among heavy metals so that the following decreasing mobility order was observed: Zn greater than or equal to Cd greater than or equal to Cu greater than or equal to Pb. A physically-based model (HYDRUS) was used, with some approximations of the infiltrating water input, to simulate heavy metals movement through both soil profiles. Linear and nonlinear adsorption coefficients were estimated form literature data in which the respective values were obtained by three different approaches. Simulations carried out by means of Freundlich isotherm parameters gave unrealistic predictions for both soils and all the metals. On the contrary, the use of linear sorption parameters enabled HYDRUS to yield acceptable simulations, particularly when the lowest Kd values were used.

Keywords: Municipal Sewage-Sludge, Treated Soils, Heavy-Metals, Cadmium, Retention, Sorption, Movement, Copper, Adsorption, Elements.

Asami, T., Kubota, M. and Orikasa, K. (1995), Distribution of different fractions of cadmium, zinc, lead and copper in unpolluted and polluted soils. *Water Air and Soil Pollution*, **83** (3-4), 187-194.

Full Text: [1995\Wat Air Soi Pol83, 187.pdf](1995/Wat%20Air%20Soi%20Pol83,%20187.pdf)

Abstract: McLaren and Crawford’s method for fractionating soil Cu was modified and used to fractionate soil Cd, Zn, Pb and Cu in 38 soil samples from 11 soil profiles from industrially polluted and nearby unpolluted areas. Pollutant metals, especially Cd and Zn, were more soluble than the native soil metals. On average, approximately 45% of Cd was present in the CaCl2 soluble (CA) fraction, whereas corresponding values for the other metals were below 10%. The percentages of each metal in the CA fraction followed the order Cd > Zn > Pb > Cu. The same order was observed for the acetic acid soluble (AAC) fraction. Approximately 30% of total Pb and Cu were present in the pyrophosphate soluble (PYR) fraction and only 10% of total Cd and Zn. Approximately 20% of total Zn or Pb and 10% of Cd or Cu were present in the free oxide (OX) fraction. Only 20% of Cd and between 40-50% of the other 3 metals were present in the residual (RES) fraction. The results show that Cd is more labile than the other 3 metals.

Aber, J.D., Magill, A., Mcnulty, S.G., Boone, R.D., Nadelhoffer, K.J., Downs, M. and Hallett, R. (1995), Forest biogeochemistry and primary production altered by nitrogen saturation. *Water Air and Soil Pollution*, **85** (3), 1665-1670.

Full Text: [1995\Wat Air Soi Pol85, 1665.pdf](1995/Wat%20Air%20Soi%20Pol85,%201665.pdf)

Abstract: Results from four intensive site-level manipulations acid one extensive field survey in northern temperate and boreal forests show a consistent set of responses to chronic N additions. These include 1) initial and often large increase in net N mineralization followed by decreases, 2) increases in net nitrification. 3) increases in N concentration in foliage and 4) decreased Mg: N and Ca: Al ratios and declining tree growth and vigor in all evergreen stands. These results are synthesized into a set of proposed summary relationships that define the temporal pattern of responses of N-limited systems to N additions.

Brown, M., Dyke, H., Wright, S.M., Wadsworth, R.A., Bull, K.R., Farmer, A., Bareham, S., Metcalfe, S.E., Whyatt, D. and Powlesland, C. (1995), Estimating the impact of air pollution on environmentally valuable sites. *Water Air and Soil Pollution*, **85** (4), 2589-2594.

Full Text: [1995\Wat Air Soi Pol85, 2589.pdf](1995/Wat%20Air%20Soi%20Pol85,%202589.pdf)

Abstract: Concern about the environmental effect of air pollution on areas of high conservation value in the UK has prompted the statutory agencies to initiate an investigation on these areas. For this, critical loads maps have been used together with predicted air pollution data, monitored air pollution data and remotely sensed land cover information within a geographic information system (GIS). Additional information on designated Sites of Special Scientific interest (SSSI) for England and Wales have also been incorporated. This provides the framework for examining potential impacts to these sites under various current and future scenarios. The approach allows for the investigation of the impacts of individual point sources as well as complete national scenarios. Preliminary results are provided from analysis of a single pollutant (sulphur). These indicate that nationally up to 52% of the area of SSSI’s (5000 km2) are at risk from soil acidification. Using this approach it has been possible to apportion the load on any SSSI, thereby enabling the ecological impacts of each point source to be identified. This information can then be used to assess priorities for regulatory controls.

Sadiq, M. and Alam, I. (1996), Arsenic chemistry in a groundwater aquifer from the Eastern Province of Saudi Arabia. *Water Air and Soil Pollution*, **89** (1-2), 67-76.

Full Text: [1996\Wat Air Soi Pol89, 67.pdf](1996/Wat%20Air%20Soi%20Pol89,%2067.pdf)

Abstract: Groundwater samples were collected from shallow aquifers underneath an industrial complex in the Eastern Province of Saudi Arabia. Arsenic (As) concentrations in the groundwater samples varied between 10(-8.6) and 10(-6.8) M (0.18 and 11.14 µg L-1), with an average of 10(-7.5) M (2.19 µL-1). The analysis of variance for the analytical data showed that sampling locations had significantly affected As concentrations in the groundwater samples. Analytical and thermodynamic calculations showed that H2AsO4- was the most predominant As species in acidic groundwater samples, and HAsO42- was the most abundant species in alkaline groundwater samples. Concentrations of H3AsO4 degrees and AsO43- were too low to be important in this study. Reduced As chemical forms were also expected to be very low. All the groundwater samples were undersaturated with respect to the thermodynamic solubility isotherms of Ca3(AsO4)2(c), Fe3(AsO4)2(C), and Mn3(AsO4)2(c) minerals. Lack of reliable thermodynamic data for these arsenates could be responsible for differences between the theoretical and measured concentrations of As in the shallow groundwater samples. The general trend in the distribution of HAsO42-activities in the groundwater samples was parallel to that of the Ca3(AsO4)2 solubility isotherm but different from those of Fe3(AsO4)2(c), and Mn3(AsO4)2(c). These data suggest that As concentrations in the groundwater samples were probably controlled by the precipitation and dissolution of Ca3(AsO4)2 type mineral. A three step hypothesis for As interactions in groundwater/soil system is proposed that combines both solid phase formation and adsorption of As onto the solid colloidal surfaces. This hypothesis is expected to better represent As behavior in groundwater/soil environment.

Keywords: Arsenic Forms, Arsenic Concentrations, Solubility Isotherms, Groundwater Aquifers, Soils, Solubility, Sorption

Papapetropoulou, M. and Moschopoulos, H. (1996), Detection of Salmonella spp in estuarine waters by using both the conventional culture. *Water Air and Soil Pollution*, **89** (1-2), 159-165.

Full Text: [1996\Wat Air Soi Pol89, 159.pdf](1996/Wat%20Air%20Soi%20Pol89,%20159.pdf)

Abstract: The presence of Salmonella spp in estuarine waters was investigated along the Patras harbor where pipes containing urban sewage terminate. Salmonellae detection was performed by a conventional culture and a DNA probe technique (Gene-Trak Salmonella assay-Gene Trak Systems, Framingham). The Gene Trak colorimetric Salmonella assay uses the ribosomal hybridization format followed by a colorimetric detection system. Salmonellae were detected in 3 out of 102 water samples (2.9%) when the culture tehnique was used and in 7 out of 102 samples (6.8%) when the DNA probe technique was used. All DNA probe positive samples were confirmed by culture of the pre-enrichment Gram-negative broth and biochemical tests according to the manufacturers instructions. Culture positive samples were confirmed by serological tests in the National Salmonella-Shigella Center (National Institute of Public Health). The data demonstrate that the colorimetric hybridization method and the conventional culture method are equivalent in their ability to detect Salmonellae in estuarine waters (chi (2) = 0.33 < 2.43). Both methods have the disadvantage of giving false negative results. However, the Gene Trak assay saves time by lessening the response time in the case of a contamination problem.

Sadiq, M. (1997), Arsenic chemistry in soils: An overview of thermodynamic predictions and field observations. *Water Air and Soil Pollution*, **93** (1-4), 117-136.

Full Text: [W\Wat Air Soi Pol93, 117.pdf](W/Wat%20Air%20Soi%20Pol93,%20117.pdf)

Abstract: Published information, both theoretical and experimental, on As chemical behavior in soils is reviewed. Because of many emission sources, As is ubiquitous. Thermodynamic calculations revealed that As(V) species (HAsO42-> H2AsO4-at pH 7) are more abundant in soil solutions that are oxidized more than pe+pH>9. Arsenic is expected to be in As(III) form (HAsO2 = H3AsO3>AsO2-= H2AsO3-at pH 7) in relatively anoxic soil solutions with pe+pH<7.

Adsorption on soil colloids is an important As scavenging mechanism. The adsorption capacity and behavior of these colloids (clay, oxides or hydroxides surfaces of Al, Fe and Mn, calcium carbonates, and/or organic matter) are dependent on ever-changing factors, such as hydration, soil pH, specific adsorption, changes in cation coordination, isomorphous replacement, crystallinity, etc. Because of the altering tendencies of soil colloids properties, adsorption of As has become a complex, empirical, ambiguous, and often a self contradicting process in soils. In general, Fe oxides/hydroxides are the most commonly involved in the adsorption of As in both acidic and alkaline soils. The surfaces of Al oxides/hydroxides and clay may play a role in As adsorption, but only in acidic soils. The carbonate minerals are expected to adsorb As in calcareous soils. The role of Mn oxides and biogenic particles in the As adsorption in soils appears to be limited to acidic soils. Kinetically, As adsorption may reach over 90% completion in terms of hours.

Precipitation of a solid phase is another mechanism of As removal from soil solutions. Thermodynamic calculations showed that in the acidic oxic and suboxic soils, Fe-arsenate (Fe3(AsO4)2) may control As solubility, whereas in the anoxic soils, sulfides of As(III) may control the concentrations of the dissolved As in soil solutions. In alkaline acidic oxic and suboxic soils, precipitation of both Fe-and Ca-arsenate may limit As concentrations in soil solutions.

Field observations suggest that direct precipitation of discrete As solid phases may not occur, except in contaminated soils. Chemisorption of As oxyanions on soil colloid surfaces, especially those of Fe oxide/hydroxides and carbonates, is believed to a common mechanisms for As solid phase formation in soils. It is suggested that As oxyanions gradually concentrate on colloid surfaces to a level high enough to precipitate a discrete or mixed As solid phase.

Arsenic volatilization is another As scavenging mechanism operating in soils. Many soil organisms are capable of converting arsenate and arsenite to several reduced forms, largely methylated arsines which are volatile. These organisms may generate different or similar biochemical products. Methylation and volatilization of As can be affected by several biotic (such as type of organisms, ability of organism for methylation, etc.) and abiotic factors (soil pH, temperature, redox conditions, methyl donor, presence of other ions, etc.) factors. Information on the rate of As biotransformations in soils is limited. In comparison to the biologically assisted volatilization, the chemical volatilization of As in soils is negligible.

Keywords: As Chemical Forms, As Solid Phase, As Solubility, Biotransformation of As, As Adsorption, Chemisorption, Surface-Chemistry, Solubility Relationships, Iron Hydroxide, Adsorption, Sorption, pH, Trimethylarsine, Ferrihydrite, Environment, Oxidation

Gao, S.A., Walker, W.J., Dahlgren, R.A. and Bold, J. (1997), Simultaneous sorption of Cd, Cu, Ni, Zn, Pb, and Cr on soils treated with sewage sludge supernatant. *Water Air and Soil Pollution*, **93** (1-4), 331-345.

Full Text: [W\Wat Air Soi Pol93, 331.pdf](W/Wat%20Air%20Soi%20Pol93,%20331.pdf)

Abstract: Disposal of sewage sludge creates the potential for heavy metal accumulation in the environment. This study assessed nine soils currently used as Dedicated Land Disposal units (DLDs) for treatment and disposal of municipal sewage sludge in the vicinity of Sacramento, California. Adsorption characteristics of these soils for Cd, Cu, Ni, Zn, Pb, and Cr were studied by simultaneously mixing these elements in the range of 0-50 μmol L-1 with sludge supernatant and reacting with the soil using a soil: supernatant ratio of 1: 30, pH = 4.5 or 6.5, and constant ionic strength (0.01 M Na-acetate). The concentration of metals in the supernatant was determined after a 24 hr equilibration period. Adsorption isotherms showed that metal sorption was linearly related to its concentration in the supernatant solution. The distribution coefficient Kd (Kd = concentration on solid phase/concentration in solution phase) was computed as the slope of the sorption isotherm. The distribution coefficients were significantly correlated to soil organic matter content for Ni, Cu, Cd, and Pb at pH 4.5 and for Ni, Cu, Zn, and Cd at pH 6.5. There was also a correlation between Kd and soil specific surface area but no relationship to other soil properties such as CEC, clay content, and noncrystalline Fe and Al materials. Therefore, soil organic carbon and surface area appear to be the most important soil properties influencing metal adsorption through formation of organo-metal complexes. The K-d values for all elements were higher at pH 6.5 than at 4.5. Selectivity between metals resulted in the following metal affinities based on their Kd values: Pb>Cu>Zn>Ni>Cd approximate to Cr at pH 4.5 and Pb>Cu approximate to Zn>Cd>Ni>Cr at pH 6.5.

Keywords: Metal Sorption, Sewage Sludge, Sorption Isotherms, Competitive Sorption, Organo-Metal Complexes, Organic-Ligands, Zinc, Complexation, Adsorption, Cadmium, Copper, Acid, Reduction, Behavior, Chromium.

Marsh, A.S. and Siccama, T.G. (1997), Use of formerly plowed land in New England to Monitor the vertical distribution of lead, zinc and copper in mineral soil. *Water Air and Soil Pollution*, **95** (1-4), 75-85.

Full Text: [W\Wat Air Soi Pol95, 75.pdf](W/Wat%20Air%20Soi%20Pol95,%2075.pdf)

Abstract: In this study, we used once-plowed lands that have returned to forest for over 50 years to study the vertical distribution of meteorologically-deposited lead. These mineral soils were an essentially homogeneous 20 cm-thick layer when last plowed. As such, they were effectively a ‘clean slate’ upon which pollutants deposited since the last plowing can be measured without the confounding aspects of well-developed natural soil horizons and the spatial heterogeneity of native forest soils. The concentration and amount of lead as well as copper and zinc, biologically active metals, were measured at five sites in New England. In the mineral soil, copper content ranged from 25 mgcm depth-1m-2 at 0-2 cm depth to 37 mgcm depth-1m-2 at 6-8 cm depth, but showed no consistent pattern with depth at all sites. Zinc concentrations and amounts increased with depth in the mineral soil to 14 µgg-1 and 167 mgcm depth-1m-2, respectively. In contrast, lead showed a decrease with depth from 350 mgcm depth-1m-2 at 0-2 cm depth to 102-108 mgcm depth-1m-2 between 10 and 20 cm depth. At all five sites, decreases in lead concentration with depth were correlated with decreases in the amount of organic mater. Amounts of total lead deposited since the abandonment from plowing have been estimated at 1.4 gm-2 in rural sites. Thirty-five percent of this presumably anthropogenically-derived lead was in the forest floor; the remaining 65 % was in the upper mineral soil.

Beverland, I.J., Crowther, J.M. and Srinivas, M.S.N. (1997), Episodic nature of wet deposition of acidic material at a site in south-east England. *Water Air and Soil Pollution*, **96** (1-4), 73-91.

Full Text: [W\Wat Air Soi Pol96, 73.pdf](W/Wat%20Air%20Soi%20Pol96,%2073.pdf)

Abstract: The causal factors for episodic deposition of acidic material in rainfall cannot be fully understood from conventional daily network data. A brief review of the meteorological conditions leading to episodes is given. A definition of ‘episodicity’ was considered and applied to a 6 month data set collected at high temporal resolution using a microprocessor based acid rain monitor at a site in south-east England. The deposition was highly episodic for all of the measured variables when data from individual rain events were considered. Combining the data into daily averages resulted in changes of episodicity classification for several chemical species. A large percentage of the total deposition recorded during the field experiment occurred in a 5 day period when there was an independent report of ecological damage at other locations in England. Nitrate deposition showed the highest degree of episodicity with 51% of the 6 month total occurring during the 5 day episode. Meteorological details of the transport and wet deposition processes during this period were examined. Back trajectory analysis indicated that the episode was the result of pollutant loading in eastern and central Europe of the air masses reaching the site together with an absence of upwind precipitation scavenging.

Lacerda, L.D. (1997), Global mercury emissions from gold and silver mining. *Water Air and Soil Pollution*, **97** (3-4), 209-221.

Full Text: [W\Wat Air Soi Pol97, 209.pdf](W/Wat%20Air%20Soi%20Pol97,%20209.pdf)

Abstract: Mercury has been used in gold and silver mining since Roman times. With the invention of the ‘patio’ process in Spanish colonial America, silver and gold were produced in large scale, mostly in the Americas hut also in Australia, Southeast Asia and even in England. Mercury released to the biosphere due to this activity may have reached over 260,000 t from 1550 to 1930, when silver reserves in Spanish colonial America were nearly exhausted and Hg-amalgamation was replaced by the mon efficient cyanidation process. Exceptional increases in gold prices and the worsening of social-economic conditions in the third world in the 1970’s resulted in a new gold rush in the southern hemisphere, involving over 10 million people in all continents. Presently, Hg amalgamation is used as a major technique for gold production in the South America especially the Amazon, China, Southeast Asia and in some African countries. Mercury inputs to the environment from this activity may reach up to 460 t.yr-1. Compared with other anthropogenic Hg sources, gold mining is presently responsible for approximately 10% of the global anthropogenic Hg emissions, but has never been included in global models of Hg cycling in the biosphere. Further; most of the Hg released to the biosphere through gold and silver mining during the last 500 years, roughly 300,000 t, may still participate in the global Hg cycle through remobilization from abandoned tailings and other contaminated areas.

Chen, X.B., Wright, J.V., Conca, J.L. and Peurrung, L.M. (1997), Evaluation of heavy metal remediation using mineral apatite. *Water Air and Soil Pollution*, **98** (1-2), 57-78.

Full Text: [W\Wat Air Soi Pol98, 57.pdf](W/Wat%20Air%20Soi%20Pol98,%2057.pdf)

Abstract: The current study investigated the sorption and desorption of dissolved lead (Pb), cadmium (Cd) and zinc (Zn) from aqueous solutions and a contaminated soil by North Carolina mineral apatite. Aqueous solutions of Pb, Cd, and Zn were reacted with the apatite, followed by desorption experiments under a wide variety of pH conditions ranging from 3 to 12, including the extraction fluids used in the Toxicity Characteristic Leaching Procedure (TCLP) of the United States Environmental Protection Agency (US EPA). The sorption results showed that the apatite was very effective in retaining Pb and was moderately effective in attenuating Cd and Zn at pH 4-5. Approximately 100% of the Pb applied was removed from solutions, representing a capacity of 151 mg of Pb/g of apatite, while 49% of Cd and 29% of Zn added were attenuated, with removal capacities of 73 and 41 mgg-1, respectively. The desorption experiments showed that the sorbed Pb stayed intact where only 14-23% and 7-14% of the sorbed Cd and Zn, respectively, were mobilized by the TCLP solutions. The apatite was also effective in removing dissolved Pb, Cd, and Zn leached from the contaminated soil using pH 3-12 solutions by 62.3-99.9, 20-97.9, and 28.6-98.7%, respectively In particular, the apatite was able to reduce the metal concentrations in the TCLP-extracted soil leachates to below US EPA maximum allowable levels, suggesting that apatite could be used as a cost-effective option to remediating metal-contaminated soils, wastes, and/or water. The sorption mechanisms are variable in the reactions between the apatite and dissolved Pb, Cd, and Zn. The Pb removals primarily resulted from the dissolution of the apatite followed by the precipitation of hydroxyl fluoropyromorphite. Minor otavite precipitation was observed in the interaction of the apatite with aqueous Cd, but other sorption mechanisms, such as surface complexation, ion exchange, and the formation of amorphous solids, are primarily responsible for the removal of Zn and Cd.

Keywords: Inorganic Cation-Exchangers, Synthetic Hydroxyapatites, Lead Orthophosphates, Immobilization, Soils, Ions, Solubility, Adsorption, Sorption, Surface, Acid Mine Drainage, Desorption, Phosphate Rock, Pollution Control, Remediation Technology, Soil and Groundwater Contamination, Sorption, TLCP, Toxic Metals, Waste Management

Tanjore, S. and Viraraghavan, T. (1997), Effect of oxygen on the adsorption of pentachlorophenol by peat from water. *Water Air and Soil Pollution*, **100** (1-2), 151-162.

Full Text: [W\Wat Air Soi Pol100, 151.pdf](W/Wat%20Air%20Soi%20Pol100,%20151.pdf)

Abstract: Pentachlorophenol (PCP), a versatile biocide has been extensively used in industry and agriculture. PCP has been designated as a priority organic pollutant by the United States Environmental Protection Agency (USEPA) and its use in consumer products has been banned since 1984. Extensive use of PCP as a wood preservative has led to soil, surface water and groundwater pollution. Batch adsorption studies using peat at various dissolved oxygen (DO) levels in water showed that higher PCP removals can be attained at elevated DO levels. This effect can be quantified by a comparison of the adsorption capacities of pear from linearized Freundlich isotherms developed for different oxygen levels. An increase of approximately 300% in adsorption was observed for an increase in the DO level from 2 to 26 mg L-1. Thus, molecular oxygen was found to significantly impact the removals of PCP by pear. The increase in adsorptive capacity of peat was not very significant for an increase in DO level from 2 mg L-1 to 10 mg L-1. However a rapid increase in adsorptive capacity was observed for an increase in DO level from 10 to 26 mg L-1.

Keywords: Pentachlorophenol, Peat, Molecular Oxygen, Adsorption Isotherm, Dissolved-Oxygen, Molecular-Oxygen, GAC Adsorbers, Capacity

Wilkins, B.J., Brummel, N. and Loch, J.P.G. (1998), Influence of pH and zinc concentration on cadmium sorption in acid, sandy soils. *Water Air and Soil Pollution*, **101** (1-4), 349-362.

Full Text: [W\Wat Air Soi Pol101, 349.pdf](W/Wat%20Air%20Soi%20Pol101,%20349.pdf)

Abstract: Batch adsorption experiments were carried out with samples from an A-, Bh- and C-horizon of contaminated sandy soil of podzolic character from the Kempen region at the Dutch-Belgian border. Cadmium sorption was studied on 3 soil samples at 3 different pH-levels (3.6, 4.3 and soil buffered pH) and 3 different additions of zinc (0-40 mg l-1).

Adsorption of cadmium by acid sandy soils can be fitted by a Freundlich adsorption isotherm. Although zinc competes with cadmium for the sorption sites, we observe a two to three times stronger competition effect of the proton cation, which is explained by the chemical properties of both ions. The cadmium adsorption coefficient KF decreases considerably by an increase of the proton activity used in the sorption experiments. Organic matter content explains for a large part the variation of KF of re three soil samples. Desorption data do not fit the proposed regression model for adsorption. Not all the cadmium, intitially present in the polluted soil, will fylly desorb reversibly. Thus, part of the cadmium may be irreversible bound.

Keywords: Heavy-Metals, Adsorption, Cd, Mobility, Time, Zn

Galvez-Cloutier, R. and Dubé, J.S. (1998), An evaluation of fresh water sediments contamination: The Lachine Canal sediments case, Montréal, Canada. Part II: Heavy metal particulate speciation study. *Water Air and Soil Pollution*, **102** (3-4), 281-302.

Full Text: [W\Wat Air Soi Pol102, 281.pdf](W/Wat%20Air%20Soi%20Pol102,%20281.pdf)

Abstract: Over the last century, discharge of industrial effluents and municipal wastewater have contaminated the Lachine Canal sediments. This study investigated the associations between heavy metals and natural sediment constituents. X-ray Diffraction, Transmission Electron Microscopy and geochemical analysis revealed that the sediments consisted mainly of silt and clay size fractions composed of: feldspar, illite, kaolinite, chlorite, calcite and dolomite as well as minor amounts of Fe minerals. Organic matter and amorphous metal oxides were also identified. Each of these constituents bound heavy metals at varying degrees as assessed by a sequential chemical extraction (SCE) protocol. The associations with each geochemical phase were (in order of decreasing significance): 1) residual phase, 2) oxide phase, 3) carbonate phase, 4) organic phase and 5) exchangeable phase. According to the cation exchange capacity (CEC), carbonate and oxide content measurements, the heavy metals occupied a minor fraction of the total capacity of the sediments to retain metals by these mechanisms. The SCE results revealed that the partition patterns varied with pH. The phases associated to the carbonate and the exchangeable phases were the most sensitive to a change in pH with the residual phase being almost unchanged. The Zn and Cd were sensitive to release when the conditions drifted to acidic conditions. The partition patterns for various grain size fractions (<53 µm, 53-75 µm, 75-175 µm and > 175 µm) revealed that no particular fraction accumulated a certain heavy metal. Finally, from protocols, techniques and results interpretation in this study, various engineering applications such as the technical choice of clean-up scenarios, screening of remediation techniques and the development of remediation quality criteria were proposed within the framework of the management of contaminated sediments.

Keywords: Sequential Extraction, Sewage-Sludge, Trace-Metals, Adsorption, Soils, Fractionation, Lead, Cd, Cu, Zn, Heavy Metals, Particulate Speciation, Sequential Chemical Extractions

Gombert, S. and Asta, J. (1998), The effect of refuse incinerator fumes on the lead and cadmium content of experimentally exposed corticolous lichens. *Water Air and Soil Pollution*, **104** (1-2), 29-40.

Full Text: [W\Wat Air Soi Pol104, 29.pdf](W/Wat%20Air%20Soi%20Pol104,%2029.pdf)

Abstract: Nine corticolous lichens have been used to detect the lead (Pb) and cadmium (Cd) given off by a municipal solid waste incinerator. This bioindication study involved lichens gathered from unpolluted sites around Grenoble (Isere, France) to three conditions: the first batch was set up down wind of the waste incinerator fumes, the second one was set up in the ambient atmosphere of the plant, and the third was kept in a non polluted place. After one month of exposure, the batches were compared. The lichens from the first and second batches did not show any appreciable thallus change. Pb and Cd concentrations have shown that lichens accumulate heavy metals in variable ways according to the species and to the conditions of pollution.

Keywords: Bioaccumulation, Cadmium, Incineration, Lead, Lichens, Epiphytic Lichens, Heavy-Metals, Waste Incinerator, Genus Peltigera, Air-Pollution, Vicinity, Foliage

Karadağ, E., Saraydin, D., Güven, O. (1998), Removal of some cationic dyes from aqueous solutions by acrylamide/itaconic acid hydrogels. *Water Air and Soil Pollution*, **106** (3-4), 369-378.

Full Text: [W\Wat Air Soi Pol106, 369.pdf](W/Wat%20Air%20Soi%20Pol106,%20369.pdf)

Abstract: Acrylamide/itaconic acid (AAm/IA) hydrogels prepared by irradiating with gamma radiating were used in experiments on the uptake of some cationic dyes such as basic red 5 (BR-5), basic violet 3 (BV-3) and brilliant cresyl blue (BCB). The removal of the cationic dyes to AAm/IA hyrogels is studied by batch adsorption technique. In the experiments of the adsorption, L3 type (Langmiur) adsorption in Giles classification system was found. Adsorption studies indicated that monolayer coverages of AAm/IA hydrogel by these dyes were increased with following order; BCB > BR-5 > BV-3.

Keywords: Adsorption, Cationic Dyes, Hydrogel, Poly(Acrylamide/Itaconic Acid), Swelling, Bovine Serum-Albumin, Adsorption, Biocompatibility, Behaviors

Ramachandran, V. and D’Souza, T.J. (1999), Adsorption of cadmium by Indian soils. *Water Air and Soil Pollution*, **111** (1-4), 225-234.

Full Text: [W\Wat Air Soi Pol111, 225.pdf](W/Wat%20Air%20Soi%20Pol111,%20225.pdf)

Abstract: Adsorption behaviour of cadmium (Cd) in soils is an important process which exerts a major influence on its uptake by plant roots. Thirteen soils from various parts of India (tropical region), their pH ranging from 4.2 to 8.4, were subjected to Cd treatment at various concentrations (1 to 100 μg ml-1) and equilibrated at room temperature (25±1°C). The Cd adsorbed by each soil was calculated as the difference between the amount of Cd present in the solution initially and that remaining after equilibration. Results indicated that the adsorption capacity of the soils for Cd increased with an increase in the pH or alkalinity of the soils. The rate of adsorption was, however, found to decrease with increased pH. All the 13 soils used in this study followed linear and Freundlich adsorption isotherms with highly significant positive correlations (r). The neutral and alkaline soils also followed the Langmuir adsorption isotherm, the adsorption maxima being lowest for the neutral soil and highest for the alkaline soil. The adsorption data, in general, indicated that Cd was in a fixed form at higher pH levels. The results are generally similar to those of the temperate regions; however, Cd adsorption capacity of tropical vertisols was comparatively higher than those of temperate vertisols.

Keywords: Adsorption, Cadmium, Freundlich, Isotherm, Langmuir, Linear, Indian Soils, Sorption, Solubility, Copper, Metals, pH

Robles, E., Ramírez, P., González, E., Sáinz, D.G., Martínez, B., Durán, A. and Martínez, E. (1999), Bottled-water quality in metropolitan Mexico City. *Water Air and Soil Pollution*, **113** (1-4), 217-226.

Full Text: [W\Wat Air Soi Pol113, 217.pdf](W/Wat%20Air%20Soi%20Pol113,%20217.pdf)

Abstract: Bacteriological and physico-chemical parameters of 265 samples from 39 brands sold in 5-gallon plastic and glass bottles and 2-5 L plastic containers were analyzed to determine the quality of bottled water distributed in Mexico City. Tests included fecal and total coliform counts, alkalinity, total hardness, chloride, calcium and magnesium concentrations, pH and conductivity. Correlation and cluster analyses and ANOVA were carried out, and a comparison made of the averages with the maximum permissible levels established in the Official Mexican Norms. Concerning the investigated parameters no differences (p > 0.05) between the brands were found. Physico-chemical parameters were studied and all the samples were within the permissible limits. Most samples taken from the 5-gallon containers exceeded the maximum bacteriological limits. It was concluded that the bacteriological quality of the brands studied was extremely variable. Appropriate sanitary measures, should be established to control this aspect.

Keywords: Bottled Water, Bacteriological Quality and Physico-Chemical Quality, Microbiological Quality, Canada, Sold

Namasivayam, C. and Yamuna, R.T. (1999), Studies on chromium(III) removal from aqueous solution by adsorption onto biogas residual slurry and its application to tannery wastewater treatment. *Water Air and Soil Pollution*, **113** (1-4), 371-384.

Full Text: [W\Wat Air Soi Pol113, 371.pdf](W/Wat%20Air%20Soi%20Pol113,%20371.pdf)

Abstract: Adsorption studies of Cr(III) on biogas residual slurry (BRS) were caried out under varying conditions of shaking time (5-180 min), metal ion concentration (10-40 mg L-1), adsorbent concentration (1.0 to 8.0 g L-1) and initial pH (1.5-5.0). Adsorption follows Langmuir isotherm, being endothermic in nature. For a Cr(III) concentration of 10 mg L-1, a maximum removal of 85% by 4 g L-1 of adsorbent was obtained at an initial pH greater than or equal to 3.0. Desorption of Cr(III) from the spent adsorbent has also been investigated. Removal of Cr(III) from tannery wastewater by BRS was testified.

Keywords: Adsorbent, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Bark, Biogas Residual Slurry, Chromium, Color, Cr(III) Adsorption, Desorption, Langmuir, Metal, Moss, Peat, pH, pH Effect, Removal, Wastewater Treatment, Water

Qafoku, N.P., Kukier, U., Sumner, M.E., Miller, W.P. and Radcliffe, D.E. (1999), Arsenate displacement from fly ash in amended soils. *Water Air and Soil Pollution*, **114** (1-2), 185-198.

Full Text: [W\Wat Air Soi Pol114, 185.pdf](W/Wat%20Air%20Soi%20Pol114,%20185.pdf)

Abstract: Arsenic (As) is the biggest environment contaminant in most of the soils where fly ash is applied. Usually, it is not mobile and strongly adsorbed on to soil particles. However, in gypsum and phosphorus amended soils As may be much more mobile. A study in repacked columns was conducted to determine whether or not As becomes mobile when Ca (H2PO4)2 and CaSO4 are used as leaching solutions, and to compare the competitive interactions between PO4-AsO4 and SO4-AsO4. Arsenic concentration in leachate was found to be approximately ten times greater when Ca (H2PO4)2 was used to leach the columns as compared to CaSO4 A maximum concentration of 800 µg As L-1 was found in the leachate in this case, which is much higher than the groundwater limit of 50 µg L-1 for drinking water established by the United States Environmental Protection Agency. In fly ash, the portion of arsenate non-specifically adsorbed is believed to be much lower than that of specifically adsorbed. Sulfate anions were able to displace only non-specifically adsorbed arsenate. In this case the concentration of As in leachate was found to be within acceptable limits. On the other hand, phosphate can compete with arsenate for all available adsorption sites, non-specific and specific. Phosphate displacement of both forms of arsenates increases As mobility in both control and fly ash treatments.

Keywords: Oxide Minerals, Adsorption, Ecosystems, Transport, Phosphate, Residues, Arsenate Mobility, PO4-AsO4 and SO4-AsO4 Interactions, Fly Ash, Re-Packed Columns

Al-Asheh, S. and Duvnjak, Z. (1999), Sorption of heavy metals by canola meal. *Water Air and Soil Pollution*, **114** (3-4), 251-276.

Full Text: [Wat Air Soi Pol114, 251](W/Wat%20Air%20Soi%20Pol114,%20251.pdf)

Abstract: The results from this research indicate that canola meal (CM) can be used for adsorption of Zn2+, Cd2+, Cu2+, Pb2+ and Ni2+ from aqueous solutions. The order of sorption for these metals in single metal systems was as follows (molar basis): Zn2+ > Cu2+ > Cd2+ > Ni2+ > Pb2+. It was noted that a decrease in the concentration of CM caused a higher metal loading on the meal. Increases in the metal concentration, temperature or pH resulted in increased sorption of the metals by the meal. The systems with identical ratios of CM to Zn2+ concentrations, regardless of their levels, resulted in the same amount of metal adsorbed per unit weight of meal. The Freundlich isotherm type model was used in this study and was found to fit the experimental equilibrium concentration data of Zn2+ and Cd2+; however, the Langmuir isotherm model fit only the equilibrium data of Zn2+. Scanning Electron Microscopy (SEM) and Energy-Dispersive X-ray (EDX) microanalyses revealed that the metal ions were sorbed mainly at the cell wall and only small amounts of ions diffused into the cytoplasm of the CM cells. The Electron Spin Resonance (ESR) tests were inconclusive regarding the direct participation of free radicals in copper sorption.

Keywords: Accumulation, Adsorbents, Adsorption, Biosorption, Canola, Canola Meal, Cd2+, Cell Wall, Cells, Concentration, Concentrations, Copper, Cu2+, EDX, Energy Dispersive X-Ray, Equilibrium, Esr, Free Radicals, Freundlich, Freundlich Isotherm, Heavy Metals, Ions, Isotherm, Langmuir, Langmuir Isotherm, Levels, Loading, Mechanism, Metal, Metal Ions, Metals, Model, Participation, Pb2+, pH, Radicals, Removal, Research, Rhizopus-Arrhizus, Scanning Electron Microscopy, SEM, Sorbed, Sorption, Temperature, Tests, Vulgaris, Waste-Water, Zn2+

McKay, G., Porter, J.F. and Prasad, G.R. (1999), The removal of dye colours from aqueous solutions by adsorption on low-cost materials. *Water Air and Soil Pollution*, **114** (3-4), 423-438.

Full Text: [W\Wat Air Soi Pol114, 423.pdf](W/Wat%20Air%20Soi%20Pol114,%20423.pdf)

Abstract: The ability of five low cost adsorbents-rice husk, cotton, bark, hair and coal-to adsorb two basic dyes, namely, Safranine and Methylene Blue, has been studied. Equilibrium isotherms have been determined and analysed using the Langmuir equations. The monolayer saturation capacities for Safranine are 1119, 838, 875, 190 and 120 mgg-1 adsorbent and for Methylene Blue are 914, 312, 277, 158 and 250 mgg-1 adsorbent for bark, rice husk, cotton waste, hair and coal respectively. A limited number of fixed bed column studies have been performed and the bed depth service time for each dye-adsorbent system has been determined.

Keywords: Acid Dye, Adsorbent, Adsorbents, Adsorption, Bark, Coal, Dye, Dye Sorption, Dyes, Equilibrium, Equilibrium Isotherms, Fixed Bed, Fly-Ash, Langmuir, Low-Cost Sorbents, Natural Adsorbents, Removal, Waste

Wasay, S.A., Barrington, S. and Tokunaga, S. (1999), Efficiency of GAC for treatment of leachate from soil washing process. *Water Air and Soil Pollution*, **116** (3-4), 449-460.

Full Text: [W\Wat Air Soi Pol116, 449.pdf](W/Wat%20Air%20Soi%20Pol116,%20449.pdf)

Abstract: Granular activated carbon (GAC), granular activated alumina (GAA) and a ferric chloride solution (FCS) were tested for the treatment of leachate contaminated by heavy metals. The leachate was collected following the remedation of soils using weak organic acids and/or their salts, EDTA and DTPA. Only GAC was found to effectively remove heavy metals (Cd, Cu, Cr, Hg, Mn, Pb and Zn as chelates) from the leachate. At optimum pH ranging from 5.4 to 6.9, 97% of Hg was removed while at optimum pH ranging from 6.9 to 7.7, 78 to 96% of Cd, Cu, Mn, Pb and Zn were removed. Some 77% of the Cr was removed at optimum pH of 5.4. Adsorption rate constant and Langmuir adsorption capacity of GAC were found to be 0.01 min-1 and 19 mg metal chelate g-1 of GAC, respectively. Freundlich constants, k and n were found to be 21 mg g-1 and 2.778, respectively. The brown color of the leachate turned colorless after GAC treatment.

Keywords: GAC, Heavy Metal, Leachate, Soil Washing, Treatment, Adsorption Characteristics, Heavy-Metals, Chelating-Agents, Organic-Acids, Remediation, Complexes

Lo, I.M.C. and Alok, P.A. (2000), Computerized methodology for evaluating drinking water treatment technologies: Part I. *Water Air and Soil Pollution*, **117** (1-4), 61-81.

Full Text: [W\Wat Air Soi Pol117, 61.pdf](W/Wat%20Air%20Soi%20Pol117,%2061.pdf)

Abstract: A computer based system, Best Available Technology Evaluator (BATE), has been developed for the evaluating cost and performance of the best available technologies for removing volatile organic chemicals (VOCs) from drinking water. The treatment processes considered are air stripping tower (AST), and air stripping with off-gas control by gas phase granular activated carbon (GPGAC) and liquid phase granular activated carbon (LPGAC). BATE is unique in its ability to model multicomponents, optimise total cost for different process configurations and yield the best process design for a given VOC scenario. This paper, the first in a two-part series, highlights a new cost optimization method for the AST with GPGAC system and a technique for combining mathematical models for efficient process design of AST and GPGAC processes. Discussion of LPGAC simulation results and comparison of an LPGAC system with AST and GPGAC processes for a variety of VOC scenarios will follow in the next paper.

Keywords: Design, Adsorption, Adsorbers, Vocs, GAC, Air Stripping, Gas Phase Activated Carbon Adsorption, Multicomponent, Off-Gas Control, Optimization

Lo, I.M.C. and Alok, P.A. (2000), Computerized methodology for evaluating drinking water treatment technologies: Part II. *Water Air and Soil Pollution*, **117** (1-4), 83-103.

Full Text: [W\Wat Air Soi Pol117, 83.pdf](W/Wat%20Air%20Soi%20Pol117,%2083.pdf)

Abstract: The previously described computer based system, Best Available Technology Evaluator (BATE), is used for least cost comparison of AST and AST with GPGAC and LPGAC processes. The underlying LPGAC cost and process dynamics simulation models are complex and need to be modified and coupled in an efficient manner in order to yield useful preliminary design data. This paper discusses a technique for such model combination and a method for finding the LPGAC least cost. Sensitivity analysis of LPGAC cost and performance with respect to common operating parameters such as empty bed contact time (EBCT), hydraulic loading rate (HL), and process configuration is discussed in light of this efficient model combination and least cost finding technique. This study shows that there is an optimal combination of EBCT and LPGAC process configuration for which its cost is comparable to that of AST alone and AST with GPGAC. Such optimal combinations are discussed for some VOC scenarios.

Keywords: Adsorption, Adsorber, Removal, Design, GAC, Adsorber Configuration, Least Cost, Multicomponent, Liquid Phase Granular Activated Carbon Adsorption, Multicomponent

Khaodhiar, S., Azizian, M.F., Osathaphan, K. and Nelson, P.O. (2000), Copper, chromium, and arsenic adsorption and equilibrium modeling in an iron-oxide-coated sand, background electrolyte system. *Water Air and Soil Pollution*, **119** (1-4), 105-120.

Full Text: [W\Wat Air Soi Pol119, 105.pdf](W/Wat%20Air%20Soi%20Pol119,%20105.pdf)

Abstract: The adsorption of copper, chromate, and arsenate (CCA) onto iron-oxide-coated sand (IOCS) was examined in single-metal and mixed-metalsystems. Copper and arsenate were strongly adsorbed or formed inner-sphere surface complexes with the IOCS surface while chromate was weakly adsorbed or formed an outer-sphere surface complex with the IOCS surface. Copper adsorption by IOCS slightly increased in the presence of arsenate but was not affected by the presence of chromate. Arsenate adsorption was not affected by the presence of copper and/or chromate. Chromate adsorption increased in the presence of copper by the combination of electrostatic effects and possible surface-copper-chromate ternary complex formation. The presence of arsenate significantly decreased chromate adsorption due to competition for adsorption sites and electrostatic effects. Using inner-sphere surface complexation constants for copper and arsenate and outer-sphere surface complexation constants for chromate, the triple-layer model (TLM) was successful in describing adsorption of copper, chromate, and arsenate in single-solute systems. The model indicated that each metal uses a different number of adsorption sites. For CCA metals-IOCS systems, the equilibrium constants determined from single-solute systems were not able to predict adsorption from multi-solute systems. The TLM does not currently account for the heterogeneity of oxide surface sites and the formation of ternary complexes and/or solid phases that do not exist in single-solute systems.

Keywords: Competitive Adsorption, Oxyhydroxide, Goethite, Hydroxide, Chromate, Complexation, Manganese, Interface, Aluminum, Metals, Adsorption, Arsenic, Chromium, Copper, Iron-Oxide-Coated Sand, Modeling

Doğan, M., Alkan, M. and Onganer, Y. (2000), Adsorption of Methylene blue from aqueous solution onto perlite. *Water Air and Soil Pollution*, **120** (3-4), 229-248.

Full Text: [W\Wat Air Soi Pol120, 229.pdf](W/Wat%20Air%20Soi%20Pol120,%20229.pdf)

Abstract: Adsorption of Methylene blue from aqueous solutions onto unexpanded and expanded perlite samples activated by H2SO4 and NaCl solutions has been investigated, to assess the possibility of using perlite for removing cationic dyes from aqueous solutions. The effects of pH and temperature of dye solution on the adsorption capacities have been evaluated. The experimental data were correlated reasonably well by the Langmuir adsorption isotherm and the isotherm parameters (Qm and K) have been calculated. The removal efficiency (P) and dimensionless separation factor (R) have shown that perlite can be used for removal of Methylene blue from aqueous solutions, but unexpanded perlite is more effective.

Keywords: Adsorption Isotherms, Dye, Methylene Blue, Perlite, Basic-Dyes, Fly-Ash, Equilibrium, Removal

Khattri, S.D. and Singh, M.K. (2000), Colour removal from synthetic dye wastewater using a bioadsorbent. *Water Air and Soil Pollution*, **120** (3-4), 283-294.

Full Text: [W\Wat Air Soi Pol120, 283.pdf](W/Wat%20Air%20Soi%20Pol120,%20283.pdf)

Abstract: Removal of dyes (Crystal Violet, Methylene Blue, Malachite Green and Rhodamine B) from aqueous solutions at different concentrations, pH and temperatures by Neem sawdust has been carried out successfully. The percentage of the dye adsorbed by Neem sawdust decreased from 91.56 to 78.94 and 84.93 to 71.25 for Crystal Violet and Malachite Green, respectively, when the concentration of the dye was increased from 6 to 12 mgL-1 at a temperature 30±1°C and pH 7.2. Adsorption of other dyes (Methylene Blue and Rhodamine B) also decreased with increasing concentration of the dye in solutions. The values of the rate constant of adsorption (kad) of Crystal Violet at 25, 35 and 45°C were found to be 10.80, 10.52 and 10.25×10-2 min-1, respectively. The values of the Langmuir constant for adsorption capacity (Qo) of Crystal Violet on the adsorbent varied from 4.44 to 3.99 mgg-1, respectively, with the increase of temperature between 25 to 45°C. The equilibrium data followed the Langmuir model of adsorption. The variation in the extent of removal with pH has been explained on the basis of surface ionisation and complexation. Thermodynamic parameters (ΔG, ΔH and ΔS) have also been determined to explain the results.

Keywords: Aqueous-Solutions, Chrome Dye, Fly-Ash, Adsorbents, Adsorption, Cost, Adsorption, Dye Removal, Wastewater Treatment

Ho, Y.S. and McKay, G. (2000), Batch sorber design using equilibrium and contact time data for the removal of lead. *Water Air and Soil Pollution*, **124** (1-2), 141-153.

Full Text: [W\Wat Air Soi Pol124, 141.pdf](W/Wat%20Air%20Soi%20Pol124,%20141.pdf)

Abstract: The two-stage batch sorption design of the sorption of lead ions onto peat has been studied based on a Langmuir isotherm type equation obtained from different contact time studies. A model has been developed to predict the optimised minimum operating time to determine a specified amount of lead removal. The sorption capacity at any contact time has been evaluated with an equation also based on the mathematical form of the Langmuir equation.

Keywords: Batch Sorption, Contact Time Optimisation, Langmuir Equation, Lead Ions, Two-Stage, Aqueous-Solutions, Fly-Ash, Hexavalent Chromium, Waste-Water, Adsorption, Peat, Sorption, Cadmium, Ions, Kinetics

Ku, Y. and Chiou, H.M. (2002), The adsorption of fluoride ion from aqueous solution by activated alumina. *Water Air and Soil Pollution*, **133** (1-4), 349-360.

Full Text: [W\Wat Air Soi Pol133, 349.pdf](W/Wat%20Air%20Soi%20Pol133,%20349.pdf)

Abstract: The adsorption of fluoride ion in aqueous solution by using alumina was studied in this research. The experimental results indicated that the removal efficiency was influenced significantly by solution pH and the optimum operating pH was found to be in the range of 5 to 7. For neutral and acidic solutions, the adsorption capacities of fluoride by alumina was interfered by the presence of sulfate. The Langmuir and Freundlich isotherms can well describe the equilibrium behaviors of the adsorption processes. The experimentally determined low values of activation energy indicate nonspecific adsorption is the predominant mechanism. The surface reaction-limiting batch kinetic model can adequately describe the removal behaviors of fluoride ion by alumina adsorption in the batch system.

Keywords: Adsorption, Alumina, Fluoride, Removal, Water

López, A., Lázaro, N., Morales, S. and Marqués, A.M. (2002), Nickel biosorption by free and immobilized cells of *Pseudomonas* *fluorescens* 4F39: A comparative study. *Water Air and Soil Pollution*, **135** (1-4), 157-172.

Full Text: [W\Wat Air Soi Pol135, 157.pdf](W/Wat%20Air%20Soi%20Pol135,%20157.pdf)

Abstract: The biosorption of nickel ions on *Pseudomonas* *fluorescens* 4F39 free cells or immobilized cells in beads of agar (biobeads) has been studied in batch experiments to determine the effect of cell immobilization on the metal accumulation properties of both systems. Bacterial cells were immobilized in agar beads following the interphase technique. When free cells were used, the sorption equilibrium was reached in 5 min but with biobeads it took 24 hr as a consequence of metal diffusion. The pH of the Ni2+ solution was found to be critical for Ni2+ accumulation, the optimum being 8, although the magnitude of this effect was lower in immobilized cells. The equilibrium data have been analysed using the Langmuir adsorption model. The qmax of free cells, immobilized cells and biobeads was 145, 37 and 7.6 mg Ni2+/g dry sorbent, respectively. The removal capacity of free cells and immobilized cells increased when the cell concentration decreased. The maximum removal efficiency of biobeads was obtained when the cell concentration was 1.43 mg dry cells/mL Ni2+ solution. The agar concentration in biobeads affected the Ni2+ accumulation, the optimum being 2%. Desorption of Ni2+ with 0.5 mM dipicolinic acid was efficient. Cycles of accumulation/desorption resulted in a loss of non immobilized cells. An increase of the removal efficiency from the first cycle of accumulation/desorption was observed with biobeads.

Keywords: Biobeads, Desorption, Free Cells, Immobilized Cells, Langmuir Isotherm, Ni2+ Heavy-Metals, Marine-Algae, Toxic Metals, Removal, Biomass, Accumulation, Cadmium, Bacteria, Cobalt

Bayat, B. (2002), Combined removal of zinc(II) and cadmium(II) from aqueous solutions by adsorption onto high-calcium Turkish fly ash. *Water Air and Soil Pollution*, **136** (1-4), 69-92.

Full Text: [W\Wat Air Soi Pol136, 69.pdf](W/Wat%20Air%20Soi%20Pol136,%2069.pdf)

Abstract: The aim of this work is the investigation of possible use of fly ash in the removal of zinc (Zn2+) and cadmium (Cd2+) contained in aqueous solutions. Batch adsorption experiments were performed in order to evaluate the removal efficiency of lignite-based fly ash. The parameters studied include contact time, pH, temperature, initial concentration of the adsorbate and fly ash dosage. The contact time necessary to attain equilibrium was found to be two hours. Maximum adsorption occurred in the pH range of 7.0 to 7.5. The percent adsorption of Zn2+ and Cd2+ increased with an increase in concentration of Zn2+ and Cd2+, dosage of fly ash and temperature. The applicability of Langmuir isotherm suggests the formation of monolayer coverage Zn2+ and Cd2+ ions at the outer surface of the adsorbent. Thermodynamic parameters suggested the endothermic nature of the adsorption process. The fly ash was found to be an metal adsorbent as effective as activated carbon.

Keywords: Adsorption, Cadmium, Fly Ash, Freundlich, Langmuir, Zinc, Low-Cost Adsorbents, Waste-Water, Activated Carbon, Natural Adsorbents, Acid Dye, Effluents, Cu(II), Cr(VI)

Singh, K.S. and Viraraghavan, T. (2002), Effect of temperature on bio-kinetic coefficients in UASB treatment of municipal wastewater. *Water Air and Soil Pollution*, **136** (1-4), 243-254.

Full Text: [W\Wat Air Soi Pol136, 243.pdf](W/Wat%20Air%20Soi%20Pol136,%20243.pdf)

Abstract: Upflow anaerobic sludge blanket (UASB) reactors were used to treat municipal wastewater at temperatures of 6, 11, 15, 20 and 32 degreesC and at hydraulic retention times (HRTs) ranging from 48 to 3 h over an operational period of approximately 860 days. The Monod model was used to evaluate substrate utilization. The Arrhenius model was used to calculate the activation energies from which temperature coefficients were determined. It was found that the maximum specific substrate utilization rate constant (k) decreased from 0.387 d-1 (at 32 degreesC) to 0.041 d-1 (at 6 degreesC). The decay rate constant (k(d)), yield coefficient (Y-g), half velocity constant (K-s) and maximum specific growth rate (mu(m)) were also impacted by temperature in the UASB treatment of municipal wastewater.

Keywords: UASB Treatment, Municipal Wastewater, Bio-Kinetic Parameters, Temperature, Anaerobic Treatment, Water Treatment, Reactors, Sewage

Jain, C.K. and Sharma, M.K. (2002), Adsorption of cadmium on bed sediments of river Hindon: Adsorption models and kinetics. *Water Air and Soil Pollution*, **137** (1-4), 1-19.

Full Text: [W\Wat Air Soi Pol137, 1.pdf](W/Wat%20Air%20Soi%20Pol137,%201.pdf)

Abstract: The adsorption characteristics of cadmium on bed sediments of river Hindon in western Uttar Pradesh (India) have been studied. The effect of various operating variables, viz., initial concentration, solution pH, sediment dose, contact time, particle size and temperature has been studied. The optimum equilibration time was found to be 60 min, which was independent of initial concentration of cadmium ions. The adsorption curves were smooth and continuous leading to saturation, suggesting the possible monolayer coverage of cadmium ions on the surface of the adsorbent. The adsorption of cadmium increased with an increase in pH. Furthermore the adsorption of cadmium increased with increasing adsorbent concentration and decreased with adsorbent particle size. The important geochemical phases, iron and manganese oxide, support the adsorption of cadmium ions. The adsorption data were analysed using the Langmuir and Freundlich adsorption models to determine the mechanistic parameters related to the adsorption process. Thermodynamic parameters, viz., free energy change, enthalpy change and entropy change, were also determined. The negative values of free energy change (DeltaGdegrees) indicated the spontaneous nature of the adsorption and positive values of enthalpy change (DeltaGdegrees) suggested the endothermic nature of the adsorption process. The intraparticle diffusion of cadmium through pores in the adsorbent was found be the main rate-limiting step

Keywords: Adsorbent, Adsorption, Bed Sediments, Cadmium, Chromium, Clay, Heavy-Metals, Intraparticle Diffusion, Ions, Kinetics, Lead, Removal, Sawdust, Soil, Solids, Sorption, Waste-Water, Water

Chang, T.W., Wang, M.K. and Lin, C. (2002), Adsorption of copper in the different sorbent/water ratios of soil systems. *Water Air and Soil Pollution*, **138** (1-4), 199-209.

Full Text: [W\Wat Air Soi Pol138, 199.pdf](W/Wat%20Air%20Soi%20Pol138,%20199.pdf)

Abstract: While sorbate/sorbent, sorbate/water, and sorbent/water (S/W) ratios in a batch system are known to affect the adsorption of sorbate, the effect of different S/W ratios on the adsorption of inorganic sorbates has seldom been addressed. This study investigates the adsorption phenomena of Cu2+ in different sorbate/sorbent/water ratios in a batch system. Batch experiments are performed to examine the adsorption, and the linear (K-D), Langmuir (K-L), and Freundlich (K-F) adsorption coefficients of Cu2+ in lateritic soil. These experiments are conducted using solutions with initial concentrations of 0.5 to 50 mg Cu2+ L-1 equilibrated with an appropriate amount of soil to give S/W ratios of 0.1 to 2 g mL-1. Although the variations in the sorbed amount and adsorption coefficients apparently originate from a change in the sorbate/sorbent/water ratio, only the equilibrium concentration significantly affects adsorption. On the other hand, the linear and Langmuir isotherm cannot adequately describe the adsorption data. In this study, the Freundlich equation gave an excellent fit to the adsorption data with a goodness-of-fit (R2) > 0.984. However, adsorption isotherms should be regarded as only a curve-fitting model or a mathematical tool and cannot be employed to interpret any particular adsorption mechanism. Meanwhile, the solids effect reveals that K-F and maximum adsorption (b) of the Langmuir equation increase when S/W ratio decreases. The sorbate in the stagnant phase must be considered as part of the equilibrium concentration in the solid phase to avoid underestimating the sorbed amount at a lower S/W ratio and/or a higher sorbate concentration level.

Keywords: Adsorption, Adsorption Coefficients, Sorbent/Water Ratio, Stagnant Phase, Organic-Chemical Sorption, Sediment Concentration, Partition-Coefficient, Water Systems, Cadmium, Montmorillonite, Batch, pH

Kannan, N. and Meenakshisundaram, M. (2002), Adsorption of Congo Red on various activated carbons. A comparative study. *Water Air and Soil Pollution*, **138** (1-4), 289-305.

Full Text: [W\Wat Air Soi Pol138, 289.pdf](W/Wat%20Air%20Soi%20Pol138,%20289.pdf)

Abstract: Studies on the removal of Congo Red (CR) by adsorption on various activated carbons [commercial activated carbon (CAC) and indigenously prepared activated carbons(IPACs) from raw materials like bamboo dust, coconut shell, groundnut shell, rice husk, and straw] have been carried out with an aim to obtain information on treating effluents from dye/textile industries. The effect of various experimental parameters has been investigated by following batch adsorption technique at 30±1°C. The percentage removal of dye increased with the decrease in initial concentration, initial pH of the dye solution and particle size of IPACs and increase in contact time and dose of adsorbent. Adsorption data were modelled with the Freundlich and Langmuir adsorption isotherms and first order kinetic equations such as Natarajan and Khalaf, Lagergren, Bhattacharya and Venkbachar equations and intra-particle diffusion model and the models were found to be applicable. The kinetics of adsorption is observed to be first order with intra-particle diffusion as one of the rate determining steps. Removal of dye using IPACs is found to be favourable and hence, IPACs could be considered as alternatives to CAC for the treatment of textile effluents, especially for the removal of dye(s).

Keywords: Adsorption, Comparison, Congo Red, First Order Kinetic Equations, Freundlich and Langmuir Isotherms, Indigenously Prepared Activated Carbons (IPACs), Intra-Particle Diffusion Process, Removal of Dye/Colour, Low-Cost Adsorbents, Aqueous-Solution, Equilibrium, Dyestuffs, Removal

Cheng, S.F. and Hseu, Z.Y. (2002), *In-situ* immobilization of cadmium and lead by different amendments in two contaminated soils. *Water Air and Soil Pollution*, **140** (1-4), 73-84.

Full Text: [W\Wat Air Soi Pol140, 73.pdf](W/Wat%20Air%20Soi%20Pol140,%2073.pdf)

Abstract: Different soil amendments, including 1% zeolite, 1% bentonite, 5% Penghu soil (PHS), 5% Penghu soil + 1% manganese oxide (PHS + MO), 1% MO, and 1.5% silicate slag (SS), were used to immobilize Cd and Pb in two contaminated soils evaluated by single and sequential extractions and by uptake of Chinese cabbage (Brassica Chinensis L.). Results indicated that the PHS and MO significantly (p < 0.05) reduced the 0.1 M HCl extractable Cd and Pb in the two contaminated soils. All amendment treatments did not change the organic and residual amounts of Cd and Pb in soils A and B, but the PHS and PHS + MO treatments significantly reduced the exchangeable amounts of Cd and Pb in the two soils as measured by sequential extraction. The combination of PHS and MO amendments was associated with a high pH value and negative soil surface charge showed the best immobilizing efficiency of Cd and Pb in this study. All soil amendments investigated did not increase the dry matter weight of the plant, and most of them decreased the uptake of Cd and Pb, especially for the PHS and MO. The PHS and MO treatments reduced the extractability of Cd and Pb in two soils and their uptake by the plant, but only the Pb content in Chinese cabbage from the amended soils was less than the background levels of heavy metals in leaf vegetables of Taiwan.

Keywords: Adsorption, Amendment, Availability, Cadmium, Contamination, Copper, Heavy Metal, Heavy Metals, Hydrous Ferric-Oxide, In Situ Immobilization, Lead, Metals, Remediation, Sequential Extraction, Sorption, Speciation, Zeolite, Zinc

Seuntjens, P. (2002), Field-scale cadmium transport in a heterogeneous layered soil. *Water Air and Soil Pollution*, **140** (1-4), 401-423.

Full Text: [W\Wat Air Soi Pol140, 401.pdf](W/Wat%20Air%20Soi%20Pol140,%20401.pdf)

Abstract: Heavy metals such as Cd and Zn that have been deposited on soils in the surroundings of non-ferrous industries, are often observed in soil water and groundwater in concentrations above groundwater clean-up values. The present study addresses the field-scale migration of Cd in a heterogeneous 1 m deep layered sandy soil profile. Numerical calculations of field-scale Cd leaching are performed using probability density functions of chemical and physical transport variables in a stream-tube convective-dispersive model approach. The performance of the stochastic model is evaluated by comparing measured and predicted Cd profiles for two types of sorption isotherms. The first isotherm is linear, containing a field-based Cd soil-water distribution coefficient. The second is a nonlinear adsorption isotherm obtained from laboratory batch experiments, which is adapted to field conditions of pH, organic matter content and pore water composition. Numerical calculations made using the nonlinear isotherm better predicted the measured Cd depth profiles than did the linear isotherms. The stochastic simulations further showed that chemical heterogeneity (i.e., due to variations in sorption constant) largely affects the position and the shape of the Cd plume, resulting in an early Cd breakthrough at the bottom of the soil profile and a long-term leaching in concentrations above groundwater clean-up values due to tailing of the breakthrough curve. When calculations were made to investigate the effect of amendment of the topsoil layers, the results indicated that the average time to reach groundwater clean-up values is significantly reduced from approximately 230 to 80 yr.

Keywords: Cadmium, Monte-Carlo, Solute Transport, Spatial Varability, Stream-Tube, Models, Uncertainty Adsorbing Solute Transport, Heavy-Metal Displacement, Sandy Soil, Sorption, Calcium.

Ho, Y.S., Porter, J.F. and McKay, G. (2002), Equilibrium isotherm studies for the sorption of divalent metal ions onto peat: Copper, nickel and lead single component systems. *Water Air and Soil Pollution*, **141** (1-4), 1-33.

Full Text: [W\Wat Air Soi Pol141, 1.pdf](W/Wat%20Air%20Soi%20Pol141,%201.pdf)

Abstract: The sorption of three divalent metal ions - copper, nickel and lead - from aqueous solution onto peat in single component systems has been studied and the equilibrium isotherms determined. The experimental data have been analysed using the Langmuir, Freundlich, Redlich-Peterson, Tóth, Temkin, Dubinin-Radushkevich and Sips isotherm models. In order to determine the best fit isotherm for each system, six error analysis methods were used to evaluate the data: the coefficient of determination, the sum of the errors squared, a hybrid error function, Marquardt’s percent standard deviation, the average relative error and the sum of absolute errors. The error values demonstrated that the Sips equation provided the best model for the three sets of experimental data overall.

Keywords: Copper, Isotherm, Lead, Nickel, Peat, Sorption, Dilute Aqueous-Solutions, Heavy-Metals, Adsorption-Isotherms, Organic Pollutants, Activated Carbon, Removal, Biosorption, Thermodynamics, Exchange, Equation

Elifantz, H. and Tel-Or, E. (2002), Heavy metal biosorption by plant biomass of the Macrophyte *Ludwigia stolonifera*. *Water Air and Soil Pollution*, **141** (1-4), 207-218.

Full Text: [W\Wat Air Soi Pol141, 207.pdf](W/Wat%20Air%20Soi%20Pol141,%20207.pdf)

Abstract: *Ludwigia stolonifera* biomass of roots, floating roots and leaves were tested for their performance as heavy metal biofilters. Cadmium (Cd) and nickel (Ni) (50 ppm) solutions were filtered through 0.5–1.5 g packed columns with each biomaterial, to determine their metal removal efficiency. Root column was more efficient in removing Ni (as low as 6 ppb in the effluent) than of Cd (as low as to 22 ppb in the effluent). This tendency was also observed upon treatment of a mixed solution of both metals. Floating roots column reduced Cd content to the same level as the root column, but its metal binding capacity was higher; 93 mg Cd g-1 DW in floating roots in comparison to 43 mg Cd g-1 DW in the roots biofilter. Leaf biomass column demonstrated the best metal binding capacity; 128 mg Cd g-1 DW, and Cd concentration in the effluent was 17 ppb. Pectin content was 5, 8 and 10% W/W in roots, leaves and floating roots biofilters, respectively. It seems that ion exchange is the major mechanism by which the metal is biosorbed. Evidence for the exchange of the bound heavy metal ions against the discharge of light metal ions such as calcium (Ca), magnesium (Mg), potassium (K) and sodium (Na) was provided.

Keywords: Biofilter, Biosorption, Cadmium, *Ludwigia stolonifera*, Metal Binding Capacity, Nickel, Pectin

Thirunavukkarasu, O.S., Viraraghavan, T. and Subramanian, K.S. (2003), Arsenic removal from drinking water using iron oxide-coated sand. *Water Air and Soil Pollution*, **142** (1-4), 95-111.

Full Text: [W\Wat Air Soi Pol142, 95.pdf](W/Wat%20Air%20Soi%20Pol142,%2095.pdf)

Abstract: This article describes experiments in which iron oxide-coated sand (IOCS) was used to study the removal of both As(V) and As(III) to a level less than 5 μg L-1 in drinking water. Iron oxide-coated sand 2 (IOCS-2) prepared through high temperature coating process was used in batch and column studies to assess the effectiveness and suitability. The isotherm study results showed that the observed data fitted well with the Langmuir model, and the adsorption maximum for IOCS-2 at pH 7.6 was estimated to be 42.6 and 4 1.1 μg As g-1 I OCS-2 for As(V) and As(III), respectively. In the fixed bed column tests to study arsenic removal from the tap water, good performance of IOCS-2 was observed in respect of bed volumes achieved and arsenic removal capacity. Five cycles of column tests were conducted to evaluate the performance of IOCS-2, and arsenic was successfully recovered from the media through regeneration and backwash operations. High bed volumes (860 to 1403) up to a breakthrough concentration of 5 μg L-1 were achieved in the column studies with tap water, and the bed volumes achieved in the studies with natural water (containing arsenic) were 1520. The results of both the batch and column studies showed that iron oxide-coated sand filtration could be effectively used to achieve less than 5 μg L-1 As in drinking water.

Keywords: Adsorption, Arsenic Removal, Batch Studies, Column Tests, Drinking Water, Iron Oxide, Speciation, Ground-Water, Adsorption, Coagulation, Hydroxide, Ferrihydrite, Filtration, North

Ulmanu, M., Marañón, E., Fernández, Y., Castrillón, L., Anger, I. and Dumitriu, D. (2003), Removal of copper and cadmium ions from diluted aqueous solutions by low cost and waste material adsorbents. *Water Air and Soil Pollution*, **142** (1-4), 357-373.

Full Text: [W\Wat Air Soi Pol142, 357.pdf](W/Wat%20Air%20Soi%20Pol142,%20357.pdf)

Abstract: The sorption of copper and cadmium ions using activated carbon, kaolin, bentonite, diatomite and waste materials such as compost, cellulose pulp waste and anaerobic sludge as sorbents is reported. Equilibrium isotherms were obtained for the adsorption of these metals in single and binary solutions. Bentonite presented the highest adsorption capacities for both copper and cadmium. A competitive uptake was observed when both metals are present; copper being preferentially adsorbed by all materials with the exception of anaerobic sludge. Equilibrium data were fitted to Langmuir and Freundlich models, with satisfactory results for most of the adsorbent-metal systems studied. Of all the adsorbents studied, bentonite and compost presented the highest removal efficiencies, reaching 99% for copper when cadmium is also present, for initial solution concentrations of up to 100 mg L-1. Anaerobic sludge has a greater preference for cadmium, even in the presence of copper, with removal efficiencies of 98% for similar concentrations to those mentioned above.

Keywords: Activated Carbon, Adsorbents, Adsorption, Bentonite, Cadmium, Cellulose, Copper, Heavy-Metal Binding, Isotherms, Kinetics, Peat, Removal, Sawdust, Sorption, Thermodynamics, Waste Materials, Water, Zinc

? Ghosh, U.C., Dasgupta, M., Debnath, S. and Bhat, S.C. (2003), Studies on management of chromium(VI) - Contaminated industrial waste effluent using hydrous titanium oxide (HTO). *Water Air and Soil Pollution*, **143** (1-4), 245-256.

Full Text: [2003\Wat Air Soi Pol143, 245.pdf](2003/Wat%20Air%20Soi%20Pol143,%20245.pdf)

Abstract: The anion exchange behaviour of hydrous titanium oxide (HTO) has been exploited for the management of industrial waste effluents contaminated with chromium(VI). The adsorption of chromium(VI) by HTO (74.0-140.0 micron) in the pH range 0.5-8.0 has been studied. It is found that the adsorption of chromium(VI) by HTO is at a maximum in the pH range 1.5-2.0. The interference of diverse foreign ions such as nitrate, chloride, sulfate, phosphate, calcium, magnesium, nickel, iron(III), barium etc. on the adsorption of chromium(VI) by HTO at optimum pH has been investigated by a batch-operation technique. Break-through capacity, adsorption and elution of chromium(VI) using HTO have been studied. It is found that HTO could be reused as an adsorbent for chromium(VI). Finally, chromium(VI) was recovered as insoluble chromate compound from waste effluent of Hindustan Motor Limited (HML) of Hooghly, West Bengal, India.

Keywords: Adsorbent, Chromium(VI), Hydrous Titanium Oxide (HTO), Ion-Exchange, Recovery, Waste Effluent

Solé, M., Casas, J.M. and Lao, C. (2003), Removal of Zn from aqueous solutions by low-rank coal. *Water Air and Soil Pollution*, **144** (1), 57-65.

Full Text: [W\Wat Air Soi Pol144, 57.pdf](W/Wat%20Air%20Soi%20Pol144,%2057.pdf)

Abstract: The ability of an immature coal (leonardite) to remove zinc from aqueous solutions was studied as a function of pH, contact time and concentration of metal solutions. Effective removal of Zn2+ was demonstrated at pH values of 5–6. Kinetic study showed that the adsorption of Zn2+ occurs in two phases: a rapid phase followed by a quasi-equilibrium state attained within the first two hours. The adsorption isotherm was measured at 25 °C, using adsorptive solutions at the optimum pH value to determine the adsorption capacity.

Keywords: Adsorption, Leonardite, Removal, Wastewater Treatment, Zn2+

Lazaridis, N.K. (2003), Sorption removal of anions and cations in single batch systems by uncalcined and calcined Mg-Al-CO3 hydrotalcite. *Water Air and Soil Pollution*, **146** (1-4), 127-139.

Full Text: [W\Wat Air Soi Pol146, 127.pdf](W/Wat%20Air%20Soi%20Pol146,%20127.pdf)

Abstract: In this study, the sorption removal of two anions (phosphates, thiocyanates) and three cations (cadmium, lead, nickel), in single batch systems, was investigated from aqueous solutions. The process involves the sorption of the ions by hydrotalcite, which is a double-layered mixed-metal hydroxide and belongs to the family of anionic clays. The sorbent used was Mg-Al-CO3 hydrotalcite in two forms: uncalcined and calcined at 500 degreesC. The calcined material showed the higher sorption capacity, for all the ions, than the uncalcined. The approximate sorption capacity of calcined material was: phosphates 250 mg g-1, thiocyanates 80 mg g-1, nickel/lead 100 mg g-1 and cadmium 70 mg g-1. The kinetic results of the anions were fitted satisfactory with the Lagergren equation. Since the sorption capacity is relatively high, hydrotalcite can be considered as a potential material for sorption of both anions and cations in wastewater treatment systems.

Keywords: Cadmium, Hydrotalcite, Lead, Nickel, Phosphates, Sorption, Thiocyanates, Phosphate Removal, Waste-Water, Metal-Ions, Adsorption, Cadmium, Equilibrium, Decomposition, Biosorption, Effluents, Sorbents

? Chantawong, V., Harvey, N.W. and Bashkin, V.N. (2003), Comparison of heavy metal adsorptions by Thai Kaolin and Ballclay. *Water Air and Soil Pollution*, **148** (1-4), 111-125.

Full Text: [2003\Wat Air Soi Pol148, 111.pdf](2003/Wat%20Air%20Soi%20Pol148,%20111.pdf)

Abstract: The adsorption characteristics of heavy metals: cadmium(II), chromium(III), copper(II), nickel(II), lead(II), and zinc(II) ions by kaolin (kaolinite) and ballclay (illite) from Thailand were studied. This research was focussed on the pH, adsorption isotherms of single-metal solutions at 30–60 °C by batch experiments, and on ion selectivityin mixed and binary combination solutions. It was found that, except Ni, metal adsorption increased with increased pH of the solutions and their adsorption followed both Langmuir and Freundlich isotherms. Adsorption of metals in the mixture solutions by kaolin was: Cr > Zn > Cu ≈ Cd ≈ Ni > Pb, and for ballclay was: Cr > Zn > Cu > Cd ≈ Pb > Ni. The adsorption of metals was endothermic, with the exception of Cd, Pb and Zn for kaolin, Cu and Zn for ballclay. Kaolin and ballclay exhibited relatively hard Lewis base adsorption site. The presence of other metals may reduce or promote the adsorption of heavy metals. The presence of Cr3+ induced the greatest reduction of metal adsorptiononto kaolin, as did the presence of Cu2+ for ballclay.

Keywords: Adsorption Isotherm, Cadmium, Chromium, Copper, Counter-Ion, Lead, Nickel, Zinc

Gebremedhin-Haile, T., Olguin, M.T. and Solache-Ríos, M. (2003), Removal of mercury ions from mixed aqueous metal solutions by natural and modified zeolitic minerals. *Water Air and Soil Pollution*, **148** (1-4), 179-200.

Full Text: [W\Wat Air Soi Pol148, 179.pdf](W/Wat%20Air%20Soi%20Pol148,%20179.pdf)

Abstract: Research works on the removal of mercury from water by zeolitic mineral show that small quantities of this element are sorbed. In this work the mercury sorption from aqueous solutions in the presence and absence of Cu(II), Ni(II) and Zn(II) onto a Mexican zeolitic mineral unmodified and modified with cysteamine hydrochloride or cystamine dihydrochloride was investigated in acidic pH. The zeolitic minerals were characterized by thermogravimetric analysis, scanning electron microscopy, X-ray diffraction and FTIR. The sorption kinetics behavior and the retention isotherms for mercury were determined in the natural and treated zeolitic mineral samples. It was found that the amounts of sulfur on the modified zeolitic minerals were 0.375 (cysteamine hydrochloride) and 0.475 (cystamine dihydrochloride) mmol g-1, which were not saturated to their total capacities of adsorption for the maximum concentration used (0.310 mM). Under the experimental conditions, the retention of mercury was the highest for the zeolitic minerals treated with the organic compounds, with adsorption capacities ranging from 0.0107 to 0.0509 mmol Hg g-1. The retention was not affected by the presence of others heavy metals studied in this work as expected.

Keywords: Adsorption, Cysteamine HCl, Cystamine HCl, Mercury, Modified Zeolites, Natural Zeolites, Heavy-Metals, Mexican Erionite, Adsorption, Sorption, Clinoptilolite, Surfactant, Microscopy, Exchange, Water

Oğuz, E., Gürses, A. and Yalcin, M. (2003), Removal of phosphate from waste waters by adsorption. *Water Air and Soil Pollution*, **148** (1-4), 279-287.

Full Text: [W\Wat Air Soi Pol148, 279.pdf](W/Wat%20Air%20Soi%20Pol148,%20279.pdf)

Abstract: In this study, the adsorption of phosphate on gas concrete from aqueous solutions has been studied as functions of temperature, mixing rates and suspension pH. Over 99% of phosphate removal was found. The chemical composition of the gas concrete has been defined by X-ray analysis. Experimental data was fitted to the Langmuir equation in order to Langmuir coefficients. After calculating Langmuir coefficients, adsorption free energy (DeltaG(ads.)(0)) has been determined. In order to gather information about adsorption mechanism, electrophoretic mobilites of particles were measured at various pHs by using Zeta meter 3.0+. It has been found that the adsorption is driven by the interactions between the ionizations of CaO and Al2O3 and the formation of AlPO4. According to the BET (N2) measurements, the specific surface area of gas concrete was found as 22 m2 g-1. The surface area after adsorption has been found as 17 m2 g-1. The surface area covered by adsorbate has been found as 5.23 m2 g-1 by using a(s) = n(m)(s) . a(m) . N-A. These two areas determined by BET and Langmuir model were close to each other (BET: 22 m2 g-1-17 m2 g-1).

Keywords: Gas Concrete, Removal of Phosphate, Adsorption Isotherm, Variables, TNSAC

Vinod, V.P. and Anirudhan, T.S. (2003), Adsorption behaviour of basic dyes on the humic acid immobilized pillared clay. *Water Air and Soil Pollution*, **150** (1-4), 193-217.

Full Text: [W\Wat Air Soi Pol150, 193.pdf](W/Wat%20Air%20Soi%20Pol150,%20193.pdf)

Abstract: In this work, the adsorption of three basic dyes, namely Methylene blue (MB), crystal violet (CV) and rhodamine B (RB) on the humic acid (HA) immobilized pillared clay (PILC) (HA-PILC) was studied. The adsorption capacity of dyes at 30degreesC using HA-PILC was found to be 2.6, 2.0 and 2.3 times greater than that using PILC for the removal of MB, CV and RB, respectively for an initial concentration of 250 μmol dm-3. The adsorption process was pH dependent. The maximum dye adsorption on HA-PILC was observed at a pH of 5.0-7.0 (removal of 95.2-99.2% for MB, 92.7-97.3% for CV and 83.4-91.0% for RB) with no significant increase in removals beyond a pH of 7.0. The adsorption process could be best described by the Urano and Tachikawa model showing that particle diffusion controlled adsorption. Equilibrium adsorption data were analyzed using the Langmuir, Freundlich and Redlich-Peterson isotherms. Dye adsorption was best described by the Freundlich model. The monolayer adsorption capacities of HA-PILC calculated using the Langmuir isotherm were 608.4, 484.7 and 413.1 mumol g-1 for MB, CV and RB, respectively. The linear Sheindorf-Rebhun-Sheintuch equation (Multicomponent Freundlich-type), was applied to the isotherm data obtained for each binary-solute combination of MB, CV and RB. The study showed that HA-PILC was an excellent media for the removal of basic dyes from aqueous solutions, based on adsorption kinetics and capacity.

Keywords: Adsorption Kinetics, Competitive Coefficients, Dye Adsorption, Equilibrium Isotherms, Pillared Clay, Low-Cost Materials, Aqueous-Solutions, Activated Carbon, Metal-Ions, Removal, Sorption, Phenol, Montmorillonite, Equilibrium, Isotherms

Darbi, A., Viraraghavan, T., Butler, R. and Corkal, D. (2003), Column studies on nitrate removal from potable water. *Water Air and Soil Pollution*, **150** (1-4), 235-254.

Full Text: [W\Wat Air Soi Pol150, 235.pdf](W/Wat%20Air%20Soi%20Pol150,%20235.pdf)

Abstract: Biological processes can achieve nitrate removal from groundwater. The sulfur/limestone autotrophic denitrification by Thiobacillus denitrificans was evaluated with three laboratory-scale column reactors. The optimum sulfur/limestone ratio was determined to be 2: 1 (mass/mass). Different hydraulic retention times were used during the column tests to examine nitrate removal efficiencies. Under an HRTs of 13 h, nitrate concentration of 60 mg NO3-N L-1 was reduced to less than 5 mg NO3-N L-1. On a higher HRT of 26 h the nitrate removal efficiency was close to 100% for all nitrate-nitrogen loading rates. Different initial nitrate-nitrogen concentrations (30, 60, and 90 mg NO3-N L-1) were used in the study. Column tests showed that the nitrate-nitrogen loading rate in this study was between 50 to 100 g NO3-N m-3 d-1 to obtain a removal efficiency of 80-100%. It was found that approximately 6 mg SO42- was produced for 1 mg NO3-N removed. Nitrite-nitrogen in all cases was less than the maximum allowable concentration of 1 mg NO2-N L-1. Effluent pH was stable in the range of 7 to 8; the effluent dissolved oxygen was less than 0.15 mg L-1 and the oxidation-reduction potential in all columns was in the range of -110 to -250 mV.

Keywords: Autotrophic Bacteria, Column Studies, Denitrification, Drinking Water, Groundwater, Limestone, Nitrate Removal, Sulfur, Thiobacillus Denitrificans, Autotrophic Denitrification Processes, Thiobacillus-Denitrificans, Elemental Sulfur, Drinking-Water, Systems, Batch

Vazquez, M.D., Wappelhorst, O. and Markert, B. (2004), Determination of 28 elements in aquatic moss Fontinalis antipyretica Hedw. and water from the upper reaches of the River Nysa (Cz, D), by ICP-MS, ICP-OES and AAS. *Water Air and Soil Pollution*, **152** (1-4), 153-172.

Full Text: [W\Wat Air Soi Pol152, 153.pdf](W/Wat%20Air%20Soi%20Pol152,%20153.pdf)

Abstract: The concentrations of 28 elements in samples of the bryophyte F. antipyretica Hedw collected from various sites on the upper reaches of the River Nysa and its main tributaries were determined. These results were compared with similar analyses of water samples collected at the same sites. So, it was possible to determine the elemental composition of the water both directly and indirectly, using a bioindicator organism. Analyses were carried out using different instrumental techniques (ICP-MS, ICP-OES, AAS), some elements being analysed by both ICP-MS and ICP-OES. Functional regression analysis showed that for some of these elements, namely Al, Ba, Fe, Sr and Ti in moss, and Ba, Ca and Zn in water samples, there was no significant difference (p<0.05) in the concentrations determined by both techniques. The coefficients of correlation moss/water for each element were calculated, but they were in general low. However the coefficients of correlation between different elements were in general good. Finally, the elemental concentrations in the aquatic moss were also used to assess the level of contamination in the area of study, through the calculation of CF (Contamination Factor) values.

Keywords: AAS, Aquatic Moss, Bioaccumulation, Contamination Factor, Fontinalis Antipyretica, ICP, Multielement Analysis, River Nysa, Heavy-Metals, Multielement Analysis, Seasonal-Variations, Accumulation, Bryophytes, Germany, Samples

Martinson, L. and Alveteg, M. (2004), The importance of including the pH dependence of sulfate adsorption in a dynamic soil chemistry model. *Water Air and Soil Pollution*, **154** (1-4), 349-356.

Full Text: [W\Wat Air Soi Pol154, 349.pdf](W/Wat%20Air%20Soi%20Pol154,%20349.pdf)

Abstract: Sulfate adsorption is an important process when modeling the dynamics of recovery from acidification. In the dynamic soil chemistry model SAFE sulfate adsorption is modeled by a pH and sulfate concentration dependent isotherm. This isotherm has been parameterized by fitting it to data from batch experiments on soil samples using multiple linear regression. The soil samples were from the B-horizon from three sites, two from the Lake Gardsjon area in south-west Sweden and one from southern Poland. The pH dependency of sulfate adsorption is important. The batch experiments show that the adsorbed amount, at a specific sulfate concentration, increases considerably with decreasing pH. This implies that the adsorbed pool of anthropogenic sulfate in soils may remain fairly high during the recovery phase. Although a decrease of sulfate concentration is commonly seen, the modeled pH increase is often slow, and thus delays in the modeled desorption of anthropogenic sulfate can be expected.

Keywords: Acidfication, Dynamic Modeling, Recovery, SAFE, Acid Deposition, Forest, Catchments

Zhao, X.K., Yang, G.P. and Wang, Y.J. (2004), Adsorption of dimethyl phthalate on marine sediments. *Water Air and Soil Pollution*, **157** (1-4), 179-192.

Full Text: [W\Wat Air Soi Pol157, 179.pdf](W/Wat%20Air%20Soi%20Pol157,%20179.pdf)

Abstract: Experiments were performed to investigate the sorption behaviors of dimethyl phthalate on marine sediments. The sorption of dimethyl phthalate on marine sediments reached equilibrium within 10 h. The sorption behavior of dimethyl phthalate on HCl-treated and untreated sediments accorded well with the linear sorption isotherm. The sorption occurred primarily via partition function of organic carbon of marine sediments. The sorption behavior of dimethyl phthalate on H2O2-treated sediment was nonlinear and conformed to Freundlich isotherm. Sorption of dimethyl phthalate on H2O2-treated sediment was chiefly through surface function of clay in marine sediments. Salinity of seawater had an important effect on the sorption of dimethyl phthalate. As the salinity of seawater increased, both the partitioning coefficients Kd and empirical constant K would increase.

Keywords: Dimethyl Phthalate, Marine Sediment, Sorption, Partition, Linear Isotherm, Freundlich Isotherm

Ho, Y.S. and McKay, G. (2004), Sorption of copper(II) from aqueous solution by peat. *Water Air and Soil Pollution*, **158** (1), 77-97.

Full Text: [W\Wat Air Soi Pol158, 77.pdf](W/Wat%20Air%20Soi%20Pol158,%2077.pdf)

Abstract: The use of peat for removal of copper(II) from aqueous solution has been investigated at various initial copper ion concentrations and masses of peat. The equilibrium sorption study can be described by the Langmuir equation and defined in terms of the operating lines for each batch contacting system. The mechanisms of the rate of sorption of copper(II) were analysed using the Elovich equation and a pseudo-second-order model. Both rate mechanisms provided a very high degree of correlation of the experimental sorption rate data suggesting either model could be used in design applications.

Keywords: Copper, Kinetics, Peat, Sorption

? Dey, S., Goswami, S. and Ghosh, U.C. (2004), Hydrous ferric oxide (HFO) - A scavenger for fluoride from contaminated water. *Water Air and Soil Pollution*, **158** (1), 311-323.

Full Text: [2004\Wat Air Soi Pol158, 311.pdf](2004/Wat%20Air%20Soi%20Pol158,%20311.pdf)

Abstract: Groundwaters contaminated with excess fluoride (above 1.5 mg, L) posed some risks to the public health in India. Methods available for fluoride contaminated water treatment are cogaulation filtration using alum+lime+bleaching powder (Nalgonda technique) and adsorption using activated alumina. Use of aluminium compounds for water treatment purpose needs replacement on neurological health problem. Objective to this, the synthesis and fluoride adsorption behavior of hydrous ferric oxide (HFO) are reported here. It is seen that fluoride adsorption density varies as a function of pH, contact time, aging time, drying temperature and particle size of HFO. Highest adsorption density for fluoride is found to be at pH 4.0. Effects of competing anions in removing fluoride from solution were tested. Arsenite, arsenate, phosphate and sulfate show strong interfering effect at high anions to fluoride molar ratio in solution. Adsorption of fluoride on HFO follows the Freundlich isotherm and the Lagergren first-order kinetic model. It was also determined that HFO is a better adsorbent in removing fluoride from high fluoride groundwater than some other adsorbents. Regeneration of fluoride-rich HFO results showed that 1.0 M NaOH solution could be used up to a maximum of 75% regeneration.

Keywords: Adsorbent, Fluoride, Groundwater, Hydrous Ferric Oxide, Ions, Isotherm, Regeneration

? El-Shafey, E.I. (2005), Behaviour of reduction-sorption of chromium(VI) from an aqueous solution on a modified sorbent from rice husk. *Water Air and Soil Pollution*, **163** (1-4), 81-102.

Full Text: [W\Wat Air Soi Pol163, 81.pdf](W/Wat%20Air%20Soi%20Pol163,%2081.pdf)

Abstract: A carbonaceous sorbent produced from rice husk via sulphuric acid treatment was used to remove Cr(VI) from aqueous solutions varying contact time, pH, Cr(VI) concentration and sorbent status (wet and dry). Cr(VI) was removed from the aqueous solution via reduction to Cr(III) and sorption. Reduction and sorption processes were investigated in terms of kinetics and equilibrium. The rate of reduction removal of Cr(VI) at pH 2 followed a pseudo first-order model while the rate of sorption of total chromium followed pseudo second-order model. Chromium sorption was highly dependent on the initial pH value with reduction taking place in solution with pH up to 7 showing sorption maxima in the pH range 1.8-2.8 for concentration range 100-500 mg/l with an increase in the equilibrium pH. Carbon dioxide evolved from the sorption media was determined. Reduction-sorption mechanism was investigated via physicochemical tests including cation exchange capacity, base neutralization and sorbent acidity in addition to FTIR studies for sorbent samples before and after sorption reaction.

Keywords: Carbon, Chromium(VI), Reduction, Rice Husk, Sorption, Surface Functional-Groups, Activated Carbon, Hexavalent Chromium, Removal, Adsorption, Peat, Adsorbent, Kinetics, Water

? Ahmad, R. (2005), Sawdust: Cost effective scavenger for the removal of chromium(III) ions from aqueous solutions. *Water Air and Soil Pollution*, **163** (1-4), 169-183.

Full Text: [2005\Wat Air Soi Pol163, 169.pdf](2005/Wat%20Air%20Soi%20Pol163,%20169.pdf)

Abstract: Cr(III) ions sorption onto sawdust of spruce (*Picea smithiana*) has been studied thoroughly using radiotracer technique. Maximum sorption (94%) of Cr(III) ions (8.98×10−5 M) onto sorbent surface is achieved from deionized water in 20 min agitation time using 200 mg of sawdust. The sorption data followed the Freundlich, Dubinin-Radushkevich (D-R) and Langmuir isotherms. Freundlich constants *l*/*n* = 0.86 ± 0.07 and *C*e = 85.0 ± 25.8 mmole g−1 have been estimated. Sorption capacity, *X*m = 0.82± 0.3 mmole g−1, β = −0.00356± 0.00017 kJ2 mole−2 and energy, *E* = 11.9± 0.3 kJ mole−1 have been evaluated using D-R isotherm. The Langmuir constants *Q* = 5.8± 0.2 μmole g−1 and *b* = (7.4± 0.5)×104 dm3 mole−1 have been calculated. The variation of sorption with temperature yields thermodynamic parameters Δ *H* = −11.6± 0.3 kJ mole−1, Δ *S* = −16.2± 0.9 J mole−1 K−1 and Δ *G* = −6.8± 0.3 kJ mole−1 at 298 K. The negative value of enthalpy and free energy reflect the exothermic and spontaneous nature of sorption respectively. Among the anions studied oxalate, citrate, carbonate and borate have reduced the sorption. The cations Y(III), Ce(II) and Ca(II) suppressed sorption. The sawdust column can be used to separate Cr(III) ion from Cs(I), I(I), Tc(VII) and Se(IV).

Keywords: Cr(III) Ions, Kinetics, Radiotracer Technique, Sawdust, Sorption, Sorption Isotherms, Thermodynamics

? Kannan, N. and Rengasamy, G. (2005), Comparison of cadmium ion adsorption on various activated carbons. *Water Air and Soil Pollution*, **163** (1-4), 185-201.

Full Text: [W\Wat Air Soi Pol163, 185.pdf](W/Wat%20Air%20Soi%20Pol163,%20185.pdf)

Abstract: Studies on the removal of cadmium(II) ions from aqueous solutions by adsorption on various activated carbons [commercial activated carbon (CAC) and chemically prepared activated carbons (CPACs) from raw materials such as straw, saw dust and datesnut] have been carried out with an aim to obtain information on treating effluents containing Cd(II) ions. Factors influencing the adsorption of Cd(II) ions from aqueous solution by ACs have been investigated by following a batch adsorption technique at 30±1°C. The percentage removal increased with decrease in initial concentration and particle size of CPACs and an increase in contact time, dose and initial pH of the solution. Adsorption process was inhibited by the added electrolytes. The adsorption data were fitted with the Langmuir, Dubinim-Radushkevich and Freundlich isotherms and first-order kinetic equations viz., first-order, Lagergren and Bhattacharya-Venkobachar equations and intra-particle diffusion model. The kinetics of adsorption is first order with intra-particle diffusion as one of the rate determining steps. Thermodynamic parameters were obtained from equilibrium constants measured at 30, 35 and 40°C (Error = ± 1°C). Results of the studies on adsorption of Cd2+ ions from simulated wastewater were compared with that of CAC and Tulsion CXO-9(H), a commercial ion exchange resin/cationic resin (CR). Straw carbon showed the maximum adsorption capacity towards Cd2+ ions and a high value of rate constant of adsorption. Straw carbon is an alternative low-cost adsorbent to CAC.

Keywords: Adsorption, Cadmium(II) Ions, Chemically Prepared Activated Carbons (Cpacs), Comparison, Intra-Particle Diffusion, Isotherms, Kinetic Equations, Aqueous-Solution, Zinc, Lead, Equilibrium, Sorption, Removal, Copper, Cd, Pb

? Kim, J.H., Shin, W.S., Song, D.I. and Choi, S.J. (2005), Multi-step competitive sorption and desorption of chlorophenols in surfactant modified montmorillonite. *Water Air and Soil Pollution*, **166** (1-4), 367-380.

Full Text: [2005\Wat Air Soi Pol166, 367.pdf](2005/Wat%20Air%20Soi%20Pol166,%20367.pdf)

Abstract: Single- and bi-solute sorption and desorption of 2,4-dichlorophenol (2,4-DCP) and 2,4,5-trichlorophenol (2,4,5-TCP) in montmorillonite modified with hexadecyltrimethylammonium (HDTMA) were investigated using multi-step sorption and desorption procedure. Effect of pH on the multi-step sorption and desorption was investigated. As expected by the magnitude of octanol-water partition coefficient, *K*ow, both sorption and desorption affinity of 2,4,5-TCP was higher than that of 2,4-DCP at pH 4.85 and 9.15. For both chlorophenols, the protonated speciation (at pH 4.85) exhibited a higher affinity in both sorption and desorption than the predominant deprotonated speciation (about 95% and 99% of 2,4-dichlorophenolate and 2,4,5-trichlophenolate anions at pH 9.15, respectively). Desorption of chlorinated phenols was strongly dependent on the current pH regardless of their speciation in the previous sorption stage. Freundlich model was used to analyze the single-solute sorption and desorption data. No appreciable desorption-resistant (or non-desorbing) fraction was observed in organoclays after several multi-step desorptions. This indicates that sorption of phenols in organoclay mainly occurs via partitioning into the core of the pseudo-organic medium, thereby causing desorption nearly reversible. In bisolute competitive systems, sorption (or desorption) affinity of both chlorophenols was reduced compared to that in its single-solute system due to the competition between the solutes. The ideal adsorbed solution theory (IAST) coupled to the single-solute Freundlich model successfully predicted bisolute multi-step competitive sorption and desorption equilibria.

Keywords: Chlorophenols, Competition, Desorption, Hexadecyltrimethylammonium, Ideal Adsorbed Solution Theory, Montmorillonite, Organoclay, Sorption

? Jensen, P.E., Ottosen, L.M. and Pedersen, A.J. (2006), Speciation of Pb in industrially polluted soils. *Water Air and Soil Pollution*, **170** (1-4), 359-382.

Full Text: [2006\Wat Air Soi Pol170, 359.pdf](2006/Wat%20Air%20Soi%20Pol170,%20359.pdf)

Abstract: This study was aimed at elucidating the importance of original Pb-speciation versus soil-characteristics to mobility and distribution of Pb in industrially polluted soils. Ten industrially polluted Danish surface soils were characterized and Pb speciation was evaluated through SEM-EDX studies, examination of pH-dependent desorption, distribution in grain-size fractions and sequential extraction. Our results show that the first factors determining the speciation of Pb in soil are: (1) the stability of the original speciation and (2) the contamination level, while soil characteristics are of secondary importance. In nine of ten soils Pb was concentrated strongly in the soil fines (< 0.063 mm). In all soils, particles with a highly concentrated Pb-content were observed during SEM-EDX. In eight of the soils, the particles contained various Pb-species with aluminum/iron, phosphate, sulfate and various metals (in solder and other alloys) as important associates. In the one soil, where Pb was not concentrated in the soil fines, Pb was precipitated solely as PbCrO4, while pure (metallic) Pb was repeatedly observed in the last soil. Pb was bound strongly to the soils with > 50% extracted in step III (oxidizing) and IV (residual) of sequential extraction for all soils but one. A significant amount of exchangeable Pb existed only in severely contaminated soils, where the bonding capacity of organic matter and oxides was exceeded. Among soil constituents, Pb was observed to adsorb preferentially to feldspars and organic matter while presence of phosphate increased the strength of the Pb-bonding in phosphate-rich soils.

Keywords: Alloys, Capacity, Cd, Central Sweden, Competitive Adsorption, Contaminated Soils, Contamination, Cu, Desorption, Distribution, Examination, Extraction, Fines, Fractions, Grain Size, Heavy-Metals, Importance, IV, Lead Speciation, Matter, Metals, Mobility, Organic, Organic Matter, Organic-Matter, Oxides, Oxidizing, Particles, Pb, Phosphate, Pollution, SEM-EDX, Sequential Extraction, Shooting-Range Soils, Soil, Soils, Sorption, Speciation, Stability, Strength, Sulfate, Surface, Surface Soils, XRD

? Zeroual, Y., Kim, B.S., Kim, C.S., Blaghen, M. and Lee, K.M. (2006), Biosorption of bromophenol blue from aqueous solutions by *Rhizopus stolonifer* biomass. *Water Air and Soil Pollution*, **177** (1-4), 135-146.

Full Text: [2006\Wat Air Soi Pol177, 135.pdf](2006/Wat%20Air%20Soi%20Pol177,%20135.pdf)

Abstract: The removal of bromophenol blue dye (BPB), from aqueous solutions, by biosorption on a non-living biomass of Rhizopus stolonifer was investigated in a batch system. Pretreatment of the biomass with NaOH was found to be the most effective means to enhance the biosorption of BPB. The fungal biomass exhibited the highest dye sorption capacity at pH 2 and the uptake process followed the pseudo-second order reaction model. The equilibrium sorption capacity of the biomass increased as the initial dye concentration increased, and the maximum uptake value was estimated at 1111 mg/g according to Langmuir adsorption isotherm. The adsorbed dye was easily desorbed from a fungal biomass with 0.1 M NaOH solution and the regenerated biomass could be reused for other biosorption essays with similar performances.

Keywords: Biosorption, Bromophenol Blue, Rhizopus Stolonifer, Reactive Dyes, Textile Effluent, Color Removal, Fungal Biosorption, Acid Dyes, Decolorization, Adsorption, Wastewaters, Kinetics, Sorption

? Liu, L., Tindall, J.A., Friedel, M.J. and Zhang, W.X. (2007), Biodegradation of organic chemicals in soil/water microcosms system: Model development. *Water Air and Soil Pollution*, **178** (1-4), 131-143.

Full Text: [2007\Wat Air Soi Pol178, 131.pdf](2007/Wat%20Air%20Soi%20Pol178,%20131.pdf)

Abstract: The chemical interactions of hydrophobic organic contaminants with soils and sediments may result in strong binding and slow subsequent release rates that significantly affect remediation rates and endpoints. In order to illustrate the recalcitrance of chemical to degradation on sites, a sorption mechanism of intraparticle sequestration was postulated to operate on chemical remediation sites. Pseudo-first order sequestration kinetics is used in the study with the hypothesis that sequestration is an irreversibly surface-mediated process. A mathematical model based on mass balance equations was developed to describe the fate of chemical degradation in soil/water microcosm systems. In the model, diffusion was represented by Fick’s second law, local sorption-desorption by a linear isotherm, irreversible sequestration by a pseudo-first order kinetics and biodegradation by Monod kinetics. Solutions were obtained to provide estimates of chemical concentrations. The mathematical model was applied to a benzene biodegradation batch test and simulated model responses correlated well compared to measurements of biodegradation of benzene in the batch soil/water microcosm system. A sensitivity analysis was performed to assess the effects of several parameters on model behavior. Overall chemical removal rate decreased and sequestration increased quickly with an increase in the sorption partition coefficient. When soil particle radius, a, was greater than 1 mm, an increase in radius produced a significant decrease in overall chemical removal rate as well as an increase in sequestration. However, when soil particle radius was less than 0.1 mm, an increase in radius resulted in small changes in the removal rate and sequestration. As pseudo-first order sequestration rate increased, both chemical removal rate and sequestration increased slightly. Model simulation results showed that desorption resistance played an important role in the bioavailability of organic chemicals in porous media. Complete biostabilization of chemicals on remediation sites can be achieved when the concentration of the reversibly sorbed chemical reduces to zero (i.e., undetectable), with a certain amount of irreversibly sequestrated chemical left inside the soil particle solid phase.

Keywords: Biodegradation, Organic Chemicals, Sequestration, Soil/Water Microcosms System, Mathematical Model, Nonequilibrium Sorption, Intraparticle Diffusion, Aquifer Material, Soil, Kinetics, Rates, Degradation, Desorption, Transport, Sediments

? Chevalier, L.R. and Yesuf, J.N. (2007), Spreadsheet optimization for parameter estimation of pressure-saturation equations used for two-phase groundwater flow. *Water Air and Soil Pollution*, **179** (1-4), 57-65.

Full Text: [2007\Wat Air Soi Pol179, 57.pdf](2007/Wat%20Air%20Soi%20Pol179,%2057.pdf)

Abstract: Spreadsheet optimization using a range of nonlinear error functions was utilized for parameter estimation of the two-phase pressure-saturation models developed by van Genuchten, Brutsaert, Russo and Kosugi. The data was obtained from the UNSODA database (US Salinity Laboratory, Riverside, California). Results show that spreadsheet optimization is a practical platform for evaluations based on minimizing nonlinear error functions, consequently allowing for a broader mathematical approach to parameter estimation. An error function representing the sum of the squares of errors provided the best fit for a majority of the soils evaluated, although the fractional error function provided the best fit for silts and loams. Outcomes indicated that the van Genuchten parameters m and n may also be estimated individually as opposed to following the published relationship of m=1-1/n.

Keywords: Pressure-Saturation Relationship, Optimization, Parameter Estimation, Two Phase Flow, Groundwater Flow, Lognormal-Distribution Model, Soil Hydraulic-Properties, Conductivity, Isotherm, Sorption

? Cortés-Martínez, R., Solache-Ríos, M., Martínez-Miranda, V. and Ruth Alfaro-Cuevas V. (2007), Sorption behavior of 4-chlorophenol from aqueous solutions by a surfactant-modified mexican zeolitic rock in batch and fixed bed systems. *Water Air and Soil Pollution*, **183** (1-4), 85-94.

Full Text: [2007\Wat Air Soi Pol183, 85.pdf](2007/Wat%20Air%20Soi%20Pol183,%2085.pdf)

Abstract: The removal of 4-chlorophenol from aqueous solutions by both a Mexican clinoptilolite-heulandite zeolitic rock and the modified zeolitic material with the surfactant hexadecyltrimethylammonium bromide (HDTMABr), using batch and packed-bed (column) configurations, was investigated. The unmodified zeolitic rock did not show any adsorption of 4-chlorophenol. The effects of pH, contact time and concentration of 4-chlorophenol on the adsorption process by the surfactant modified material were examined. The sorption of 4-chlorophenol was not affected by the pH range from 4 to 9.5. 4-chlorophenol retention reached equilibrium in about 18 h and the rate of 4-chorophenol adsorption by the modified material was faster in the first 10 h than later. The experimental data were treated with the models: pseudo-first order, pseudo-second order, fractional power and Elovich models. Although, the last three gave correlation coefficients higher than 0.96, the pseudo-second order model was the best to describe the reaction rate. The experimental data follow a linear isotherm which is characteristic for sorption of organic solutes by the partition mechanism. The Bed Depth-Service Time Model was applied to the sorption results in order to model the column operation. The results showed that the surfactant modified zeolitic rock could be considered as a potential adsorbent for 4-chlorophenol removal from aqueous solutions.

Keywords: 4-Chlorophenol, Activated Carbons, Adsorbent, Adsorption, Adsorption Process, Aqueous Solutions, Batch, Behavior, Chlorophenols, Column, Column Operation, Competitive Sorption, Concentration, Contact Time, Correlation, Desorption, Effects, Effects of pH, Elovich, Equilibrium, Experimental, Experimental Data, Fixed Bed, Fixed-Bed, Hexadecyltrimethylammonium, Isotherm, Isotherms Kinetics, Kinetics, Linear, Linear Isotherm, Mechanism, Model, Models, Modified, Modified Montmorillonite, Operation, Order, Organic, Oxyanions, Packed Bed, Partition, pH, Phenol, Process, Pseudo Second Order, Pseudo-First Order, Pseudo-First-Order, Pseudo-Second Order, Pseudo-Second Order Model, Pseudo-Second-Order, Range, Rate, Reaction, Reaction Rate, Removal, Retention, Solutes, Solutions, Sorption, Surfactant, Zeolite

? Pang, K.M., Ng, S., Chung, W.K. and Wong, P.K. (2007), Removal of pentachlorophenol by adsorption on magnetite-immobilized chitin. *Water Air and Soil Pollution*, **183** (1-4), 355-365.

Full Text: [2007\Wat Air Soi Pol183, 355.pdf](2007/Wat%20Air%20Soi%20Pol183,%20355.pdf)

Abstract The application of magnetite-immobilized chitin in pentachlorophenol (PCP) removal was demonstrated in this study. The physicochemical parameters for immobilization of chitin by magnetite, and for PCP adsorption using magnetite-immobilized chitin were optimized. For chitin immobilization, the optimized conditions were: magnetite to chitin (m:c) ratio at 1:2, initial pH 6, 25°C, 200 rpm and 60 min in batch system. The immobilization efficiency (IE) was 99.4% and immobilization capacity (IC) was 2.0 mg chitin mg−1 magnetite. High initial pH (pH>11) and temperature (>30°C) lowered the IE and IC. For PCP (10 mg l−1) adsorption, the optimized conditions were: 1,500 mg l−1 immobilized chitin, initial pH 6, 25°C, 200 rpm and 60 min in batch system. The removal efficiency (RE) was 57.9% and removal capacity (RC) was 5.4 mg g−1. The adsorption ability of immobilized chitin decreased with pH and temperature increased. However, increasing the amount of immobilized chitin (24,000 mg l−1) can increase the RE up to 92%. Both chitin immobilization and PCP adsorption exhibited Langmuir and Freundlich adsorption isotherms. Results in this study indicated that magnetite-immobilized chitin was a cost-effective and environmental friendly adsorbent to remove environmental pollutants such as PCP.

Keywords Adsorption, Pentachlorophenol, Chitin, Magnetite, Immobilization

? Tsang, D.C.W., Hu, J., Liu, M.Y., Zhang, W.H., Lai, K.C.K. and Lo, I.M.C. (2007), Activated carbon produced from waste wood pallets: Adsorption of three classes of dyes. *Water Air and Soil Pollution*, **184** (1-4), 141-155.

Full Text: [2007\Wat Air Soi Pol184, 141.pdf](2007/Wat%20Air%20Soi%20Pol184,%20141.pdf)

Abstract: Activated carbon was derived from waste wood pallets in Hong Kong via phosphoric acid activation and applied to adsorption of basic dye (methylene blue), acid dyes (acid blue 25 and acid red 151), and reactive dye (reactive red 23). The results showed that respective adjustment in phosphoric acid concentration, impregnation ratio, activation temperature, and activation time could maximize the surface area and pore volume of activated carbon. An increase of impregnation ratio or activation temperature significantly influenced the pore size distribution by expanding the porous structure and creating more macropores than micropores. The characterization of the carbon surface chemistry using Fourier-transform infrared (FTIR) spectroscopy, however, revealed a decrease in the amount of several functional groups with increasing activation temperature. The physical properties (surface area and pore volume) of the wood waste-derived activated carbon (using 36% phosphoric acid with an impregnation ratio of 1.5 at an activation temperature of 550°C for 1.5 h) were comparable to those of commercial activated carbon (Calgon F400). The contrasting pH effects on the adsorption of different classes of dyes signified the importance of both electrostatic interaction and chemical adsorption, which correlated to pH-dependent dissociation of surface functional groups. It is noteworthy that the physical properties of activated carbon were insufficient to account for the observed dye adsorption behavior, whereas the surface chemistry of activated carbon and the nature and chemical structure of dyes were more important. The fast kinetics and high capacity of dye adsorption of wood waste-derived activated carbon suggest that production of activated carbon from different types of wood waste should merit further investigation.

Keywords: Activated Carbon, Adsorption, Dyes, Phosphoric Acid Activation, Wood Waste, Phosphoric-Acid Activation, Pore-Size Distribution, Competitive Adsorption, Agricultural Waste, Marine-Sediments, Aqueous-Solution, Apricot Stones, Sewage-Sludge, Reactive Dye, Reduce PCB

? Rothwell, J.J., Evans, M.G. and Allott, T.E.H. (2008), In-stream processing of sediment-associated metals in peatland fluvial systems. *Water Air and Soil Pollution*, **187** (1-4), 53-64.

Full Text: [2008\Wat Air Soi Pol187, 53.pdf](2008/Wat%20Air%20Soi%20Pol187,%2053.pdf)

Abstract: The interaction between fluvially transported, metal contaminated peat particulates and acidic waters draining peatland catchments has received limited attention. Potential in-stream processing of sediment-associated metals in acidic stream water was investigated in laboratory based mixing experiments, designed to represent conditions of fluvial sediment transport in a highly contaminated and severely eroding peatland catchment in the Peak District (UK). Over the initial 20 min of the first experiment, stream water Cr and Zn concentrations increased by at least an order-of-magnitude and remained elevated for the full duration (24 h) of the experiment. Stream water As, Mo, Pb, Ti and V concentrations increased between 43% (As) and 440% (V) over the first hour of the experiment. After 24 h most of the metals appeared to have reached equilibrium in the water column. Results of the second experiment revealed that when the concentration of metal contaminated peat particulates is increased, there is an associated increase in the stream water As, Cr, Mo, Pb, Ti, V and Zn concentrations. The experimental data suggest that As, Cr, Mo, Pb, Ti, V and Zn are liable to desorption from metal contaminated peat into acidic stream water. The solubilisation of contaminated peat particulates may also contribute to elevated stream water metal concentrations. The laboratory based approach used in this study may indicate that when there is erosion of metal contaminated peat into acidic fluvial systems there is a concomitant increase in dissolved metal levels, especially when suspended sediment concentrations are high. Further laboratory and field based experiments are required to evaluate the relative importance of physical and chemical processes in the interaction between contaminated peat particulates and stream water in peatland fluvial systems.

Keywords: Peat Erosion, Acidic Stream Water, Metals, Mixing, Desorption, Peak District, Sphagnum Moss Peat, Heavy-Metals, Ombrotrophic Peat, Atmospheric Deposition, Southern Pennines, Upland Catchment, Lead Pollution, Bed-Sediment, Organic-Rich, Mid-Wales

? Torres-Pérez, J., Solache-Ríos, M. and Colín-Cruz, A. (2008), Sorption and desorption of dye remazol yellow onto a mexican surfactant-modified clinoptilolite-rich tuff and a carbonaceous material from pyrolysis of sewage sludge. *Water Air and Soil Pollution*, **187** (1-4), 303-313.

Full Text: [2008\Wat Air Soi Pol187, 303.pdf](2008/Wat%20Air%20Soi%20Pol187,%20303.pdf)

Abstract: The sorption behavior of dye remazol yellow using surfactant modified zeolitic rock and a carbonaceous material obtained by pyrolysis of sewage sludge and treated with HCl (1.0%) solution was determined. The kinetic and sorption isotherms experimental results were best adjusted to the pseudo-second order model and to the Langmuir-Freundlich isotherm model which indicate that the sorption process is chemisorption on heterogeneous materials. Remazol yellow could be removed from the saturated modified zeolitic material by different processes, unfortunately, the surfactant was removed together with the dye, the best results were found using Fenton’s reagent. Thermal treatment was the best method found to remove the dye from the carbonaceous material.

Keywords: Activated Carbons, Carbonaceous Material, Regeneration, Remazol Yellow, Removal, Sorption, Water, Zeolites

? Abbas, M., Nadeem, R., Zafar, M.N. and Arshad, M. (2008), Biosorption of chromium(III) and chromium(VI) by untreated and pretreated *Cassia fistula* biomass from aqueous solutions. *Water Air and Soil Pollution*, **191** (1-4), 139-148.

Full Text: [2008\Wat Air Soi Pol191, 139.pdf](2008/Wat%20Air%20Soi%20Pol191,%20139.pdf)

Abstract: The present study explained the effect of pretreatments on the biosorption of Cr(III) and Cr(VI) by Cassia fistula biomass from aqueous solutions. For this purpose Cassia fistula biomass was pretreated physically by heating, autoclaving, boiling and chemically with sodium hydroxide, formaldehyde, gluteraldehyde, acetic acid, hydrogen peroxide, commercial laundry detergent, orthophosphoric, sulphuric acid, nitric acid, and hydrochloric acid. The adsorption capacity of biomass for Cr(III) and Cr(VI) was found to be significantly improved by the treatments of gluteraldehyde (95.41 and 96.21 mg/g) and benzene (85.71 and 90.81 mg/g) respectively. The adsorption capacity was found to depend on pH, initial metal concentration, dose, size, kinetics, and temperature. Maximum adsorption of both the Cr(III) and Cr(VI) was observed at pH 5 and 2. When Freundlich and Langmuir isotherms were tested, the latter had a better fit with the experimental data. The kinetic studies showed that the sorption rates could be described better by a second order expression than by a more commonly applied Lagergren equation.

Keywords: Adsorption, Aqueous Solutions, Biomass, Biosorption, Capacity, Cassia Fistula, Chromium, Detergent, Experimental, Expression, Formaldehyde, Freundlich, Heavy-Metals, Hydrogen, Isotherms, Kinetic, Kinetic Studies, Kinetics, Langmuir, Lead, Metal, pH, Plant Biomass, Pretreatments, Removal, Size, Sorption, Sulphuric Acid, Temperature

? Zubair, A., Bhatti, H.N., Hanif, M.A. and Shafqat, F. (2008), Kinetic and equilibrium modeling for Cr(III) and Cr(VI) removal from aqueous solutions by *Citrus reticulata* waste biomass. *Water Air and Soil Pollution*, **191** (1-4), 305-318.

Full Text: [2008\Wat Air Soi Pol191, 305.pdf](2008/Wat%20Air%20Soi%20Pol191,%20305.pdf)

Abstract: The pulp left after the extraction of juice from Citrus reticulate (kinnow), is a waste material, which was used as a potential sorbent for Cr(III) and Cr(VI) in the present study. The effect of experimental parameters such as pH, biosorbent dosage, biosorbent particle size, initial metal concentrations, temperature, shaking speed and sorption time on the Cr removal is apparent from the obtained results. The Freundlich isotherm and pseudo second order kinetic models fitted well to the data of Cr(III) and Cr(VI) biosorption by Citrus reticulata waste biomass. Effect of several pretreatments such as gases, natural coagulant and many other chemicals on Cr(III) and Cr(VI) sorption capacity of Citrus reticulata waste biomass was first time analyzed in the present study. The metal sorption capacity of Citrus reticulata waste biomass after a specific pretreatment was not only related to the nature of chemical but also strongly dependent on the oxidation state of the metal.

Keywords: Algal Biomass, Aqueous Solutions, Biomass, Biosorbent, Biosorption, Brown Seaweed, Capacity, Chemical-Modification, Citrus Reticulata, Coagulant, Copper, Cr(III), Cr(III), Cr(VI), Cr(VI) Sorption, Equilibrium, Experimental, First, Freundlich, Freundlich Isotherm, Heavy-Metal Biosorption, Hexavalent Chromium, Ions, Isotherm, Kinetic, Kinetic Models, Kinetics, Lead, Metal, Metal Sorption, Modeling, Models, Mucor-Rouxii, Oxidation, Particle Size, pH, Potential, Pretreatment, Pretreatments, Removal, Sargassum sp, Size, Sorbent, Sorption, Sorption Capacity, Temperature

? Yin, C.Y., Aroua, M.K. and Daud, W.M.A.W. (2008), Enhanced adsorption of metal ions onto polyethyleneimine-impregnated palm shell activated carbon: Equilibrium studies. *Water Air and Soil Pollution*, **192** (1-4), 337-348.

Full Text: 2008\Wat Air Soi Pol192, 337.pdf

Abstract: In this study, palm shell activated carbon was impregnated with polyethyleneimine (PEI) and the effect of impregnation on batch adsorption of Ni2+, Cd2+ or Pb2+ as well as the equilibrium behavior of adsorption of metal ions on PEI-impregnated AC were investigated. PEI impregnation evidently increased the single metal adsorption capacities of Ni2+ or Cd2+ except for Pb2+, where its adsorption capacities were reduced by 16.67% and 19.55% for initial solution pH of 3 and 5 respectively. This suggested that PEI-impregnated AC could be used for selective separation of Pb2+ ions from other metal ions. The adsorption data of all the metal ions on both virgin and PEI-impregnated AC for both initial solution pH of 3 and 5 generally fitted the Langmuir and Redlich-Peterson isotherms considerably better than the Freundlich isotherm.

Keywords: Activated Carbon, Adsorption, Aqueous-Solutions, Batch, Capacity, Carbon, Cd2+, CO2 Capture, Copper(II), Equilibrium, Freundlich, Freundlich Isotherm, Impregnation, Isotherm, Isotherms, Langmuir, Membranes, Metal Adsorption, Metal Ions, Ni2+, Nickel(II), Palm Shell, Palm Shell Activated Carbon, Pb2+, pH, Polyethyleneimine, Removal, Separation, Sorption, Surface Sites

? Unuabonah, E.I., Adebowale, K.O. and Ofomaja, A.E. (2009), Two-stage batch adsorber design: A time-dependent Langmuir model for adsorption of Pb2+ and Cd2+ onto modified kaolinite clay. *Water Air and Soil Pollution*, **200** (1-4), 133-145.

Full Text: [2009\Wat Air Soi Pol200, 133.pdf](2009/Wat%20Air%20Soi%20Pol200,%20133.pdf)

Abstract: The kinetics of the adsorption of Pb2+ and Cd2+ by sodium tetraborate (NTB)-modified kaolinite clay adsorbent was studied. A one-stage and two-stage optimization of equilibrium data were carried out using the Langmuir and time-dependent Langmuir models, respectively. Increasing temperature was found to increase the pseudo-second order kinetic rate constant and kinetic data for Pb2+ adsorption were found to fit well with the pseudo-second order kinetic model (PSOM) while that for Cd2+ were found to show very good fit to the modified pseudo-first order kinetic model (MPFOM). Binary solutions of Pb2+ and Cd2+ reduced the adsorption capacity of the modified adsorbent for either metal ion with increased initial sorption rate due to competition of metal ions for available adsorption sites. The use of NTB-modified kaolinite clay adsorbent reduces by approximately 72.2% and 96.3% the amount of kaolinite clay needed to adsorb Pb2+ and Cd2+ from wastewater solutions. From the two-stage batch adsorber design study, the minimum operating time to determine a specified amount of Pb2+ and Cd2+ removal was developed. The two-stage batch adsorption process predicted less than half the minimum contact time to reach equilibrium in the one-stage process for the adsorption of Pb2+ and Cd2+ by NTB-modified kaolinite clay adsorbent and requires 0.05 times the mass of the adsorbent for the single-stage batch adsorption at the same operating conditions.

Keywords: Adsorbent, Adsorption, Aqueous-Solution, Clay, Contact Time, Contact Time, Equilibrium, Kaolinite, Kinetic, Kinetics, Langmuir, Lead, Optimized, Pb2+, Removal, Sorption, Two-Stage, Wastewater

? Hanafiah, M.A.K.M., Zakaria, H. and Ngah, W.S.W. (2009), Preparation, characterization, and adsorption behavior of Cu(II) ions onto alkali-treated weed (*Imperata cylindrica*) leaf powder. *Water Air and Soil Pollution*, **201** (1-4), 43-53.

Full Text: [2009\Wat Air Soi Pol201, 43.pdf](2009/Wat%20Air%20Soi%20Pol201,%2043.pdf)

Abstract: The adsorption of Cu(II) ions by sodium-hydroxide-treated Imperata cylindrica (SoHIC) leaf powder was investigated under batch mode. The influence of solution pH, adsorbent dosage, shaking rate, copper concentration, contact time, and temperature was studied. Copper adsorption was considered fast as the time to reach equilibrium was 40-90 min. Several kinetic models were applied and it was found that pseudo-second-order fitted well the adsorption data. In order to understand the mechanism of adsorption, spectroscopic analyses involving scanning electron microscope (SEM) coupled with energy-dispersive spectroscopy (EDS) and Fourier transform infrared (FTIR) spectrophotometer were carried out. Ion exchange was proven the main mechanism involved as indicated by EDS spectra and as there was a release of light metal ions (K+, Na+, Mg2+, and Ca2+) during copper adsorption. Complexation also occurred as demonstrated by FTIR spectra involving hydroxyl, carboxylate, phosphate, ether, and amino functional groups. The equilibrium data were correlated with Langmuir, Freundlich, and Dubinin-Radushkevich isotherm models. Based on Langmuir model, the maximum adsorption capacity was recorded at the highest temperature of 310 K, which was 11.64 mg g-1.

Keywords: Activated Carbons, Adsorbent, Adsorbents, Adsorption, Aqueous-Solution, By-Products, Copper, Copper, Equilibrium, Heavy-Metal Adsorption, Imperata Cylindrica, Ion Exchange, Isotherm, Kinetic, Kinetics, Langmuir, pH, Removal, SEM, Waste-Water

? Du, A.X., Cao, L.X., Zhang, R.D. and Pan, R. (2009), Effects of a copper-resistant fungus on copper adsorption and chemical forms in soils. *Water Air and Soil Pollution*, **201** (1-4), 99-107.

Full Text: [2009\Wat Air Soi Pol201, 99.pdf](2009/Wat%20Air%20Soi%20Pol201,%2099.pdf)

Abstract: For bioremediation of copper-contaminated soils, it is essential to understand copper adsorption and chemical forms in soils related to microbes. In this study, a Penicillium strain, which can tolerate high copper concentrations up to 150 mmol l-1 Cu2+, was isolated from a copper mining area. The objective was to study effects of this fungus on copper adsorptions in solutions and chemical forms in soils. Results from lab experiments showed the maximum biosorptions occurred at 360 min with 6.15 and 15.08 mg g-1 biomass from the media with Cu2+ of 50 and 500 mg l-1, respectively. The copper was quickly adsorbed by the fungus within the contact time of the first 60 min. To characterize the adsorption process of copper, four types of kinetics models were used to fit the copper adsorption data vs. time. Among the kinetics models, the two-constant equation gave the best results, as indicated by the high coefficients of determination (R-2=0.89) and high significance (p<0.01). The addition of the fungal strain to autoclaved soil facilitated increases in concentrations of acid-soluble copper, copper bound to oxides, and of copper bound to organic matter (p<0.05). However, the inoculation of Penicillium sp. A1 led to a decrease of water-soluble copper in the soil. The results suggested that *Penicillium* sp. A1 has the potential for bioremediation of copper-contaminated soils.

Keywords: Adsorption, Atpase, Biomass, Bioremediation, Biosorption, Chemical, Chemical Forms, Copper, Copper Adsorption, Cu2+, Data, Experiments, First, Forms, Fungus, Growth, Heavy-Metals, Kinetics, Kinetics Models, Media, Mining, Models, Organic, Organic Matter, Oxides, Potential, Removal, *Rhizosphere-Bacteria*, Sediment, Significance, Soil, Soils, Solutions, Tolerance, Water

? Pietrobelli, J.M.T.D., Módenes, A.N., Fagundes-Klen, M.R. and Espinoza-Quiñones, F.R. (2009), Cadmium, copper and zinc biosorption study by non-living *Egeria densa* biomass. *Water Air and Soil Pollution*, **202** (1-4), 385-392.

Full Text: [2009\Wat Air Soi Pol202, 385.pdf](2009/Wat%20Air%20Soi%20Pol202,%20385.pdf)

Abstract: In this work, the potential removal of Cd, Cu, and Zn ions by non-living macrophytes Egeria densa has been studied. The adsorption kinetic and equilibrium experiments of these three metals on *E. densa* were performed in batch systems with controlled temperature and constant shaking. It was observed that all metal adsorption rates have increased when the pH was increasing. A pH threshold of 5 was established for use in adsorption experiments in order to avoid the metal precipitation. For adsorption kinetic tests, the equilibrium times for all metals were around 45 to 60 min. The equilibrium data at pH 5 were better described by the Langmuir isotherm than the Freundlich one, with the adsorption rate and maximum metal content values of 0.43 L g-1 and 1.25 mequiv g-1 for Cd, 4.11 L g-1 and 1.43 mequiv g-1 for Cu, and 0.83 L g-1 and 0.93 mequiv g-1 for Zn. These adsorption parameters for E. densa resemble or are better than those for other biosorbents already studied, suggesting that the macrophytes E. densa as a biosorbent has a good metal removal potential for applications in effluent treatment systems.

Keywords: Adsorption, Adsorption Kinetic, Adsorption Rate, Aqueous-Solutions, Batch, Biomass, Biosorbent, Biosorbents, Biosorption, Cadmium, Cd, Copper, Cu, Cu(II), Data, Egeria Densa, Equilibrium, Experiments, Freundlich, Heavy-Metals, Ions, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Macrophytes, Metal, Metal Adsorption, Metal Removal, Metals, Non-Living, pH, Potential, Precipitation, Rates, Removal, Sorption, Systems, Temperature, Treatment, Waste-Water, Work, Zinc

? Inal, F., Yetgin, S., Aksu, G.T., Simsek, S., Sofuoglu, A. and Sofuoglu, S.C. (2009), Activated carbon adsorption of fuel oxygenates MTBE and ETBE from water. *Water Air and Soil Pollution*, **204** (1-4), 155-163.

Full Text: [2009\Wat Air Soi Pol204, 155.pdf](2009/Wat%20Air%20Soi%20Pol204,%20155.pdf)

Abstract: The aqueous phase adsorption of fuel oxygenates methyl tertiary butyl ether (MTBE) and ethyl tertiary butyl ether (ETBE) onto commercially available granular activated carbon (GAC; Norit GAC 1240) was investigated in a batch system at 27AºC. The oxygenate concentrations were determined by headspace gas chromatography/mass spectrometry analyses. The experimental data were used with four two-parameter isotherm models (Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich) and two kinetic models (pseudo first-order and pseudo second-order) to determine equilibrium and kinetic parameters. Considering the correlation coefficient and root mean square error, Dubinin-Radushkevich isotherm showed better fit with the equilibrium data for MTBE. However, the performances of Langmuir and Dubinin-Radushkevich models were comparable for ETBE. The adsorption capacities were calculated as 5.50 and 6.92 mg/g for MTBE and ETBE, respectively, at an equilibrium solution concentration of 1 mg/L using Dubinin-Radushkevich isotherm. The differences between the model predictions and experimental data were similar for the pseudo first-order and pseudo second-order kinetic models. Gibbs free-energy changes of adsorption were found to be -22.59 and -28.55 kJ/mol for MTBE-GAC and ETBE-GAC systems, respectively, under the experimental conditions studied.

Keywords: Activated Carbon, Adsorption, Adsorption Capacities, Advanced Oxidation, Analyses, Aqueous Phase, Batch, Batch System, Carbon, Changes, Chromatography-Mass-Spectrometry, Concentration, Contaminated Water, Correlation, Correlation Coefficient, Data, Degradation-Products, Direct Aqueous Injection, Drinking-Water, Equilibrium, Error, ETBE, Ether, Experimental, First Order, Freundlich, Fuel Oxygenate, GAC, Gas-Chromatography, Gibbs Free Energy, Granular Activated Carbon, Isotherm, Isotherm Models, Kinetic, Kinetic Models, Kinetic Parameters, Langmuir, Model, Models, MTBE, NOV, Organic Contaminants, Predictions, Pseudo First Order, Pseudo First-Order, Pseudo Second Order, Pseudo Second-Order, Pseudo-First-Order, Pseudo-Second-Order, Removal, Second Order, Second-Order, Solution, Spectrometry, Systems, Tert-Butyl Ether, Water

? Frau, F., Addari, D., Atzei, D., Biddau, R., Cidu, R. and Rossi, A. (2010), Influence of major anions on As(V) adsorption by synthetic 2-line ferrihydrite. kinetic investigation and XPS study of the competitive effect of bicarbonate. *Water Air and Soil Pollution*, **205** (1-4), 25-41.

Full Text: [2010\Wat Air Soi Pol205, 25.pdf](2010/Wat%20Air%20Soi%20Pol205,%2025.pdf)

Abstract: The potential competitive effect of background electrolytes (Na2HPO4 center dot 2H2O, NaHCO3, Na2SO4 and NaCl solutions) on arsenate adsorption onto synthetic 2-line ferrihydrite has been studied by means of kinetic batch experiments conducted at pH values from 4.0 to 10.0 and at anionic concentrations of 0.01 and 0.1 M. The results indicate that the adsorptive capacity of ferrihydrite for arsenate decreases strongly in the presence of phosphate species at pH in the range of 4-10 and in the presence of bicarbonate at pH 8.3 as a consequence of their competitive effect. Analogously to phosphate, a surface interaction of inner-sphere type between ferrihydrite and bicarbonate is suggested. Chloride has negligible effects on arsenate adsorption processes, confirming it as an outer-sphere ion that does not compete with the inner-sphere binding peculiar to arsenate onto ferrihydrite. Sulphate exhibits an intermediate behaviour; at 0.01 M concentration, the competitive effect of sulphate is similar to that of chloride, whereas at 0.1 M concentration sulphate shows a moderate influence on arsenate adsorption. The results of the kinetic studies can be summarised by the following order of competitive capacity: phosphate > carbonate > sulphate > chloride. The process of arsenate adsorption follows pseudo-second order kinetics and the reaction half-time notably increases in the presence of strong competitor anions such as phosphate and carbonate with respect to an ineffective competitor anion such as chloride. Modelling of arsenate adsorption with PHREEQC, according to the Generalized Two-Layer Model, confirms that the pH effect is notably less important than the competitive effect of carbonate species in determining the amount of arsenate adsorbed onto ferrihydrite at pH 8.3 in 0.1 M NaHCO3 solution, whereas the model greatly underestimates the competitive effect of carbonate species at pH 8.3 in 0.01 M NaHCO3 solution. The results of the batch experiments in 0.1 M NaHCO3 solution are substantiated by XPS analyses of ferrihydrite after immersion in the same solution, both with and without dissolved arsenate. XPS confirms the interaction between ferrihydrite surface and arsenate; the binding energy of As3d shifts towards higher binding energies after adsorption with respect to the pure compound Na2HAsO4 center dot 7H2O taken as reference standard. In presence of carbonate species, the As3d binding energy is found at intermediate values. XPS quantitative analysis shows a depletion of arsenate on ferrihydrite surface, providing further evidence of the competition of the two species (i.e. arsenate and bicarbonate) for the ferrihydrite adsorption sites. Important environmental implications concerning arsenic mobility, as well as possible application in various fields (e.g. irrigation agriculture, soil decontamination, water treatment), might derive from these findings.

Keywords: Adsorption, Agriculture, Aluminum-Oxide, Analyses, Analysis, Anion Competition, Anions, Application, Arsenate, Arsenate Adsorption, Arsenate Adsorption, Arsenic, Arsenic Mobility, As(V), ATR-FTIR, Batch, Batch Experiments, Behaviour, Binding, Capacity, Carbonate, Carbonate Adsorption, Chloride, Competition, Competitive, Concentration, Decontamination, Dissolved, Energy, Environmental, Evidence, Experiments, Ferrihydrite, Goethite, Immersion, Interaction, Iron-Oxide, Irrigation, Kinetic, Kinetic Studies, Kinetics, Mobility, Model, Modelling, NaCl, pH, pH Effect, Phosphate, Phosphate Adsorption, Phreeqc, Potential, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second Order, Pseudo-Second Order Kinetics, Pseudo-Second-Order, Quantitative Analysis, Reference, Soil, Solution, Solutions, Species, Standard, Sulfate Adsorption, Surface, Surface Complexation, Surface Interaction, Treatment, Water, Water Interface, Water Treatment, XPS

? Wang, X.S. (2010), Invasive freshwater macrophyte alligator weed: novel adsorbent for removal of malachite green from aqueous solution. *Water Air and Soil Pollution*, **206** (1-4), 215-223.

Full Text: [2010\Wat Air Soi Pol206, 215.pdf](2010/Wat%20Air%20Soi%20Pol206,%20215.pdf)

Abstract: The batch sorption experiments were carried out using a novel adsorbent, freshwater macrophyte alligator weed, for the removal of basic dye malachite green from aqueous solution. Effects of process parameters such as initial solution pH, contact time, adsorbent concentration, particle size, and ion strength were investigated. The adsorbent was characterized by FT-IR. The adsorption of malachite green by alligator weed was solution pH dependent. The adsorption reached equilibrium at 240 min for two particle size fractions. The pseudo-first-order equation, Ritchie second-order equation, and intraparticle diffusion models were tested. The results showed that adsorption of malachite green onto alligator weed followed the Ritchie second-order equation very well and the intraparticle diffusion played important roles in the adsorption process. The Langmuir and Freundlich equations were applied to the data related to the adsorption isotherms and the observed maximum adsorption capacity (*q*max) was 185.54 mg g-1 at 20AºC according to the Langmuir model. The effects of particle size, adsorbent concentration, and ionic strength on the malachite green adsorption were very marked. The alligator weed could serve as low-cost adsorbents for removing malachite green from aqueous solution.

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Isotherms, Alligator Weed, Aqueous Solution, Basic Dye, Batch, Biosorption, Capacity, Carbon, Color Removal, Concentration, Data, Diffusion, Dye, Dye Removal, Equilibrium, Equilibrium, Experiments, Freshwater, Freundlich, FT-IR, FTIR, Intraparticle Diffusion, Ion Strength, Ionic Strength, Isotherms, Kinetics, Kinetics, Langmuir, Langmuir Model, Low Cost, Low Cost Adsorbents, Low-Cost Adsorbents, Malachite Green, Methylene-Blue, Model, Models, Particle Size, Ph, Ph-Dependent, Pseudo First Order, Pseudo-First-Order, Pseudo-First-Order Equation, Racemosa Var. Cylindracea, Removal, Rice Husk, Ritchie Second Order Equation, Second Order, Second-Order, Second-Order Equation, Size, Solution, Sorption, Strength, Waste-Water, Weed

? Ngah, W.S.W., Ariff, N.F.M. and Hanafiah, M.A.K.M. (2010), Preparation, characterization, and environmental application of crosslinked chitosan-coated bentonite for tartrazine adsorption from aqueous solutions. *Water Air and Soil Pollution*, **206** (1-4), 225-236.

Full Text: [2010\Wat Air Soi Pol206, 225.pdf](2010/Wat%20Air%20Soi%20Pol206,%20225.pdf)

Abstract: The preparation, characterization, and environmental application of crosslinked chitosan-coated bentonite (CCB) beads for tartrazine adsorption have been investigated. CCB beads were characterized by using Fourier transform infrared spectrophotometer (FTIR), scanning electron microscope (SEM), and Brunauer-Emmett-Teller (BET) surface area and Barrett-Joyner-Halenda (BJH) pore size distribution analyses were also determined. The values of pH of the aqueous slurry and pH of zero point charge (pHzpc) were almost equal. The adsorption at equilibrium of tartrazine was found to be a function of pH of the solution, stirring rate, contact time, and tartrazine concentration. The optimum conditions for tartrazine adsorption were pH 2.5, stirring rate of 400 rpm and contact time of 80 min. Pseudo-first-order and pseudo-second-order models were used to analyze the kinetics of adsorption with the latter found to agree well with the kinetics data, suggesting that the rate determining step may be chemisorption. The two most common isotherm models, Langmuir and Freundlich, were used to describe the adsorption equilibrium data. On the basis of Langmuir isotherm model, the maximum adsorption capacities were determined to be 250.0, 277.8, and 294.1 mg g-1 at 300, 310, and 320 K, respectively. Desorption studies were carried out at different concentrations of EDTA, H2SO4, and NaOH. All desorbing solutions showed poor recovery of tartrazine.

Keywords: Activated Carbon, Adsorption, Adsorption Capacities, Adsorption Equilibrium, Analyses, Application, Beads, Bentonite, Bet, Characterization, Charge, Chemisorption, Concentration, Copper, Crosslinked Chitosan-Coated Bentonite, Data, De-Oiled-Soya, Desorption, Distribution, EDTA, Environmental, Equilibrium, Freundlich, FTIR, Function, Ions, Isotherm, Isotherm Model, Kinetic, Kinetics, Kinetics of Adsorption, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Malachite Green, Model, Models, NaOH, pH, Preparation, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Reactive Dyes, Recovery, Removal, SEM, Size, Solution, Solutions, Surface, Surface Area, Tartrazine, Water, Zero Point Charge

? Jordão, C.P., Fernandes, R.B.A., Ribeiro, K.D., de Barros, P.M., Fontes, M.P.F. and Souza, F.M.D. (2010), A study on Al(III) and Fe(II) ions sorption by cattle manure vermicompost. *Water Air and Soil Pollution*, **210** (1-4), 51-61.

Full Text: [2010\Wat Air Soi Pol210, 51.pdf](2010/Wat%20Air%20Soi%20Pol210,%2051.pdf)

Abstract: Cattle manure vermicompost has been used for the adsorption of Al(III) and Fe(II) from both synthetic solution and kaolin industry wastewater. The optimum conditions for Al(III) and Fe(II) adsorption at pH 2 (natural pH of the wastewater) were particle size of a parts per thousand currency sign250 A mu m, 1 g/10 mL adsorbent dose, contact time of 4 h, and temperature of 25ºC. Langmuir and Freundlich adsorption isotherms fitted reasonably well in the experimental data, and their constants were evaluated, with R (2) values from 0.90 to 0.98. In synthetic solution, the maximum adsorption capacity of the vermicompost for Al(III) was 8.35 mg g(-1) and for Fe(II) was 16.98 mg g(-1) at 25ºC when the vermicompost dose was 1 g 10 mL(-1), and the initial adjusted pH was 2. The batch adsorption studies of Al(III) and Fe(II) on vermicompost using kaolin wastewater have shown that the maximum adsorption capacities were 1.10 and 4.30 mg g(-1), respectively, at pH 2. The thermodynamic parameter, the Gibbs free energy, was calculated for each system, and the negative values obtained confirm that the adsorption processes were spontaneous.

Keywords: Vermicompost, Aluminum, Iron, Adsorption, Langmuir and Freundich Isotherms, Kaolin Wastewater, Metal-Ions, Mesoporous Silica, Natural Adsorbent, Aqueous-Solution, Heavy-Metals, Adsorption, Removal, Water, Effluents, Cadmium

? Temoçin, Z. and Yiğitoğlu, M. (2010), Studies on selective uptake behavior of Hg(II) and Pb(II) by functionalized poly(ethylene terephthalate) fiber with 4-vinyl pyridine/2-hydroxyethylmethacrylate. *Water Air and Soil Pollution*, **210** (1-4), 463-472.

Full Text: [2010\Wat Air Soi Pol210, 463.pdf](2010/Wat%20Air%20Soi%20Pol210,%20463.pdf)

Abstract: The adsorption behavior of 4-vinyl pyridine and 2-hydroxyethylmethacrylate grafted poly(ethylene terephthalate) fiber toward the Hg(II) and Pb(II) ions in aqueous solutions was studied by a batch equilibration technique. The influence of the treatment time was considered as well as the pH of the solution, the initial metal ions concentration, the graft yield, and the temperature. Such parameters as the adsorption kinetics, the adsorption isotherm, and the desorption time were further studied. Maximum adsorption occurred at pH 3 and pH 6 for Hg(II) and Pb(II), respectively. The adsorption kinetics followed the mechanism of the pseudo-second-order equation for heavy metal ions. The adsorption data is a good fit with Freundlich isotherm. Desorption studies indicated that the maximum percent recovery of Hg(II) and Pb(II) was 93.4% and 76.3%, respectively with 1 M HNO3.

Keywords: Adsorption, Adsorption Behavior, Adsorption Isotherm, Adsorption Kinetics, Aqueous-Solution, Benzoyl Peroxide, Chitosan, Cu(II), Desorption, Freundlich Isotherm, Graft-Copolymerization, Heavy Metal, Hg(II), Ions, Isotherm, Kinetics, Lead, Mercury, Methacrylic-Acid, Pb(II), Pb(II) Ions, Poly(Ethylene Terephthalate) Fiber, Pyridine, Removal

? Fagundes-Klen, M.R., Veit, M.T., Borba, C.E., Bergamasco, R., Vaz, L.G.D. and da Silva, E.A. (2010), Copper biosorption by biomass of marine alga: study of equilibrium and kinetics in batch system and adsorption/desorption cycles in fixed bed column. *Water Air and Soil Pollution*, **213** (1-4), 15-26.

Full Text: [2010\Wat Air Soi Pol213, 15.pdf](2010/Wat%20Air%20Soi%20Pol213,%2015.pdf)

Abstract: Copper biosorption onto chemically modified biomass of marine alga Sargassum filipendula was investigated in a batch reactor and a fixed bed column. Experiments were carried out in the batch reactor to obtain kinetic and equilibrium data and to assess the copper desorption efficiency of different eluent solutions. The pseudo-first-order, pseudo-second-order, and Langmuir kinetic models were used to correlate kinetic data. The experimental data fitted well to the pseudo first order and Langmuir kinetic models. Langmuir and Freundlich models were applied to describe the equilibrium data obtained at a fixed temperature of 30AºC and at pH values of 3.0, 4.0, 5.0, and 6.0. The maximum capacities of copper biosorption onto the algal biomass were 1.43, 1.59, 2.40, and 2.36 mequiv./g at pH 3.0, 4.0, 5.0, and 6.0, respectively. The efficiencies of two eluent solutions (calcium chloride and hydrochloric acid) for copper removal from the biomass were evaluated at different concentrations (0.1, 0.2, 0.5, and 1.0 mol/L). The efficiencies of the calcium chloride solutions varied from 1% to 14%, while efficiencies varying from 95% to 99% were obtained when hydrochloric acid solutions were applied. Three adsorption/desorption cycles were carried out in a fixed bed column using 0.1 mol/L hydrochloric acid as eluent solution. The results showed that an increase in the number of cycles led to a reduction in the adsorption capacity of the alga. The desorbed copper fraction presented no significant variation, remaining around 63% in the three adsorption/desorption cycles.

Keywords: Adsorption, Adsorption Capacity, Adsorption, Desorption, Aqueous-Solutions, Batch, Batch Reactor, Biomass, Biosorption, Cadmium Biosorption, Calcium, Calcium Chloride, Capacity, Chloride, Chloride Solutions, Column, Copper, Copper Biosorption, Copper Removal, Cu(II) Ions, Data, Desorption, Desorption, Efficiency, Equilibrium, Experimental, First, First Order, Fixed BED, Fixed-Bed, Freundlich, Green-Algae, Heavy Metals, Heavy-Metals, Kinetic, Kinetic Models, Kinetics, Langmuir, Models, Modified, NOV, pH, Pseudo First Order, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Reduction, Removal, Sargassum, Sargassum Filipendula, Sargassum sp, Solution, Solutions, Sorption, Temperature, Waste

? Saha, P. (2010), Assessment on the removal of methylene blue dye using tamarind fruit shell as biosorbent. *Water Air and Soil Pollution*, **213** (1-4), 287-299.

Full Text: [2010\Wat Air Soi Pol213, 287.pdf](2010/Wat%20Air%20Soi%20Pol213,%20287.pdf)

Abstract: Tamarind fruit shell was used as a low-cost biosorbent for the removal of methylene blue from aqueous solution. The various factors affecting adsorption, such as agitation, pH, initial dye concentration, contact time, and temperature, were investigated. The dye adsorption capacity was strongly dependent on solution pH as well as temperature. The Langmuir isotherm model showed good fit to the equilibrium adsorption data, and the maximum adsorption capacity obtained was 1.72 mg g-1 at 303 K. The kinetics of adsorption followed the pseudo-second-order model and the rate constant increased with increase in temperature, indicating endothermic nature of adsorption. The Arrhenius equation was used to obtain the activation energy (E (a)) for the adsorption system. The activation energy was estimated to be 19.65 kJ mol(-1). Thermodynamic parameters such as Gibbs free energy (ΔG (0)), enthalpy (ΔH (0)), and entropy (ΔS (0)) were also investigated. Results suggested that adsorption of methylene blue onto tamarind fruit shell was a spontaneous and endothermic process. The present investigation suggests that tamarind fruit shell may be utilized as a low-cost adsorbent for methylene blue removal from aqueous solution.

Keywords: Activation, Activation Energy, Adsorbent, Adsorption, Adsorption Capacity, Agitation, Aqueous Solution, Aqueous-Solutions, Biosorbent, Biosorption, Capacity, Concentration, Data, Dye, Dye Adsorption, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Gibbs Free Energy, Investigation, Isotherm, Isotherm Model, Kinetics, Kinetics, Kinetics of Adsorption, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Low Cost, Low Cost Adsorbent, Low-Cost Adsorbent, Low-Cost Adsorbents, Malachite-Green, Methylene Blue, Model, NOV, Parameters, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Rate Constant, Reduction, Removal, Rice Husk Ash, Solution, Tamarind Fruit Shell, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Thermodynamics

? Sathasivam, K. and Haris, M.R.H.M. (2010), Adsorption kinetics and capacity of fatty acid-modified banana trunk fibers for oil in water. *Water Air and Soil Pollution*, **213** (1-4), 413-423.

Full Text: [2010\Wat Air Soi Pol213, 413.pdf](2010/Wat%20Air%20Soi%20Pol213,%20413.pdf)

Abstract: Oil spill leaves detrimental effects to environment, living organisms, and economy. As such, it is of considerable interest to find an effective, simple, and inexpensive method to treat this calamity. This work reports the use of banana trunk fibers (BTF) modified with oleic acid, stearic acid, castor oil, and palm oil for oil spill recovery. The maximum sorption capacity, effect of oil to water ratio, effect of light oil fractions, and effect of dissolved organic compounds in weathered oil-contaminated seawater were studied. It is found that BTF treated with oleic acid exhibited the best sorption capacity for engine oil, dissolved organic compounds in weathered oil, and light oil fractions. The equilibrium process was described well by the Freundlich isotherm model, and the kinetic studies show good correlation coefficients for a pseudo-second-order kinetic model.

Keywords: Adsorption, Banana Trunk Fibers, Capacity, Correlation, Detrimental Effects, Dissolved, Dye, Economy, Engine, Environment, Equilibrium, Fibers, Freundlich, Freundlich Isotherm, Freundlich Isotherm Model, Isotherm, Isotherm Model, Kinetic, Kinetic Model, Kinetic Studies, Kinetics, Living, Living Organisms, Model, Modified, NOV, Oil Spill, Organic, Organic Compounds, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Recovery, Removal, Sawdust, Seawater, Sorbent, Sorption, Sorption, Sorption Capacity, Spill Cleanup, Water, Work

? Al-Haidary, A.M.A., Zanganah, F.H.H., Al-Azawi, S.R.F., Khalili, F.I. and Al-Dujaili, A.H. (2011), A study on using date palm fibers and leaf base of palm as adsorbents for Pb(II) ions from its aqueous solution. *Water Air and Soil Pollution*, **214** (1-4), 73-82.

Full Text: [2011/Wat Air Soi Pol214, 73.pdf](2011/Wat%20Air%20Soi%20Pol214,%2073.pdf)

Abstract: The adsorption of lead onto date palm fibers (palm fibers) and leaf base of palm (petiole) has been examined in aqueous solution by considering the influence of various parameters such as contact time, solution pH, adsorbent dosage, particle sizes, ionic strength, and temperature. The adsorption of Pb(II) increased with an increase of contact time. The optimal range of pH for Pb(II) adsorption is 3.0-4.5. The linear Langmuir and Freundlich models were applied to describe the equilibrium isotherms, and both models fitted well. The monolayer adsorption capacity of Pb(II) on palm fibers and petiole was found as 18.622 and 20.040 mg/g, respectively, at pH 4.5 and 25A degrees C. Dubinin-Radushkevich (D-R) isotherm model was also applied to equilibrium data. The mean free energy of adsorption (2.397 and 4.082 kJ/mol) onto palm fibers and petiole, respectively, may be carried out via physisorption mechanism. Pseudo-first-order rate equation and pseudo-second-order rate equation were applied to study the adsorption kinetics. In comparison to first-order kinetic model, pseudo-second-order model described well the adsorption kinetics of Pb(II) onto palm fibers and petiole from aqueous solution. From the results of the thermodynamic analysis, Gibbs free energy ΔG, enthalpy change ΔH, and entropy ΔS were determined. The positive value of ΔH suggests that interaction of Pb(II) adsorbed by palm fibers is endothermic. In contrast, the negative value of ΔH indicates that interaction of Pb(II) ions by petiole is exothermic. The negative value of ΔG indicates that the adsorption of Pb(II) ions on both palm fibers and petiole is a spontaneous process.

Keywords: Adsorbent, Adsorbent Dosage, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Adsorption Kinetics, Analysis, Aqueous Solution, Cadmium, Capacity, Comparison, Copper, Data, Endothermic, Energy, Enthalpy, Entropy, Equilibrium, Equilibrium Isotherms, Exothermic, Fibers, First Order, First-Order Kinetic Model, Freundlich, Gibbs Free Energy, Heavy-Metals, Industrial-Waste-Water, Interaction, Ionic Strength, Ions, Isotherm, Isotherm Model, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Lead, Mechanism, Metal-Ions, Model, Models, Monolayer, Palm Fibers, Pb(II), Pb(II) Ions, Petiole, pH, Pseudo Second Order, Pseudo-First-Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Pseudo-Second-Order Rate, Removal, Solution, Sorption, Strength, Temperature, Thermodynamic, Thermodynamics, Value

? Chaillou, K., Gérente, C., Andrès, Y. and Wolbert, D. (2011), Bathroom greywater characterization and potential treatments for reuse. *Water Air and Soil Pollution*, **215** (1-4), 31-42.

Full Text: [2011\Wat Air Soi Pol215, 31.pdf](2011/Wat%20Air%20Soi%20Pol215,%2031.pdf)

Abstract: With the emerging crisis of water, greywaters represent a significant resource of water if considering recycling for uses not requiring a drinking water quality. Samples of greywaters were taken from a few households. Their characterization led to results similar to those in literature. However, they showed a lack of phosphorus in C/N/P ratio. Nevertheless, it was shown that, in our study, median was more appropriate than mean. The potential treatment steps studied during this work were sand bed filtration, adsorption onto granular activated carbon (GAC), and sanitation by chlorine. The sand bed which was supplied with sequential feedings led to a very good removal of total suspended solids (TSS; and consequently of turbidity) as well as to a 30% COD decrease. However, the organic matter withdrawal was more efficient by adsorption onto GAC. The chlorination of greywaters was efficient to decrease the microbial population. Therefore, following the reclaimed water quality which would be required treatment might imply all steps or just one or two. This kind of low-cost device could thus be implemented for reuse such as irrigation, agricultural need, or urban use.

Keywords: Activated Carbon, Activated Carbon, Adsorption, Agricultural, Bioreactor, Carbon, Challenge, Characterization, Chlorine, COD, Crisis, Disinfection, Disinfection, Drinking Water, Drinking Water Quality, Effluent, Filtration, GAC, Granular Activated Carbon, Grey Water, Greywater, Irrigation, Literature, Low Cost, Membrane Filtration, Microbial, Organic, Organic Matter, Phosphorus, Population, Potential, Quality, Recycling, Removal, Reuse, Sand, Sand Filtration, Sanitation, Suspended Solids, Technologies, Total Suspended Solids, Treatment, Turbidity, Urban, Waste-Water, Water, Water Quality, Water Reuse, Water-Quality, Work

? Duan, R.B., Fedler, C.B. and Sheppard, C.D. (2011), Field study of salt balance of a land application system. *Water Air and Soil Pollution*, **215** (1-4), 43-54.

Full Text: [2011\Wat Air Soi Pol215, 43.pdf](2011/Wat%20Air%20Soi%20Pol215,%2043.pdf)

Abstract: Wastewater land application is a cost-effective method to treat and dispose wastewater; however, it may cause soil salinization. Salt mass balance and the potential soil salinization caused by the wastewater land application were investigated in the crop root zone in a wastewater land application system at the City of Littlefield, TX, USA from October 7, 2005 to September 28, 2007 using a lysimeter system. This study showed that, after 2 years of wastewater land application, the ranges of soil salinity were still lower than the threshold (8,500 mu S/cm) for Bermuda grass assuming a 10% yield reduction. The leached salt mass showed large spatial and temporal variation. The average values of electrical conductivity of the saturated paste extract of the soil samples increased from 1,433 mu S/cm in June 2006 to 1,840 mu S/cm in June 2007. The average values of the soil sodium adsorption ratio between June 2006 and June 2007 increased from 11 to 14 resulting in a potential risk of soil dispersion and decreasing the soil infiltration rate. Although the measured leaching fractions in nearly all sampling periods, except one, were higher than the leaching requirement, salt accumulations in the root zone were still found with only two exceptions. Since the time required for reaching equilibrium between cumulative salt mass input and cumulative salt mass output varies from 1 year to a few years, or even longer, the long-term investigation is recommended for the study of salt mass balance in the root zone of this wastewater land application system.

Keywords: Adsorption, Alfalfa, Application, Conductivity, Cost-Effective, Cumulative, Dispersion, Electrical Conductivity, Equilibrium, Field, Infiltration, Investigation, Irrigation, Land Application, Leaching, Leaching Requirement, Long Term, Long-Term, Lysimeter, Mass Balance, Mass-Balance, Municipal Wastewater, On-Site Sewage Facility (OSSF), Potential, Reduction, Requirement, Risk, Root Zone, Salinity, Salinization, Salt, Sampling, Sodium, Sodium Adsorption Ratio, Soil, Sustainable Water Resources, Temporal, Temporal Variation, Usa, Wastewater, Water, Water Recycling, Water Reuse

? Nagpal, U.M.K., Bankar, A.V., Pawar, N.J., Kapadnis, B.P. and Zinjarde, S.S. (2011), Equilibrium and kinetic studies on biosorption of heavy metals by leaf powder of paper mulberry (*Broussonetia papyrifera*). *Water Air and Soil Pollution*, **215** (1-4), 177-188.

Full Text: [2011\Wat Air Soi Pol215, 177.pdf](2011/Wat%20Air%20Soi%20Pol215,%20177.pdf)

Abstract: Paper mulberry (Broussonetia papyrifera) leaf powder was used to remove heavy metal ions from aqueous solutions. The specific uptakes of Cu(II), Pb(II), and Cd(II) by the leaf powder were 43.40±0.2, 43.9±0.5, and 30.65±0.9 mg g-1, respectively, when 500 mg L-1 of the metal solutions were used. The data fitted well to the Langmuir isotherm. The process followed the pseudo-second-order kinetic equation and intraparticle diffusion played an important role in the adsorption process. On the basis of the calculated thermodynamic parameters such as standard enthalpy (ΔHAº), entropy (ΔSAº) and free energy change (ΔGAº), it was inferred that the sorption process was endothermic and spontaneous in nature. The surface properties of the leaf powder (revealed by scanning electron microscopic observations) were suitable for the metal adsorption process. Energy dispersive X-ray fluorescence analysis confirmed the sequestration of the metal ions by the leaf powder. Fourier transform infrared spectroscopy implicated that different functional groups on the leaf powder were involved in the metal adsorption process. The results obtained from this study implicated that the B. papyrifera leaf powder was a good choice as a metal adsorbent. This abundantly available natural and eco-friendly biosorbent could be effectively used to develop a technology in the future.

Keywords: Activated Carbon, Adsorption, Aqueous-Solution, Biosorption, Broussonetia Papyrifera, Copper, ED-XRF, Equilibrium, FTIR, Fungal Biomass, Ions, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Metal Ions, Nickel, Removal, Sorption, Waste

? Fernández-Nava, Y., Ulmanu, M., Anger, I., Marañón, E. and Castrillón, L. (2011), Use of granular bentonite in the removal of mercury(II), cadmium(II) and lead(II) from aqueous solutions. *Water Air and Soil Pollution*, **215** (1-4), 239-249.

Full Text: [2011\Wat Air Soi Pol215, 239.pdf](2011/Wat%20Air%20Soi%20Pol215,%20239.pdf)

Abstract: Granular bentonite has been assessed regarding its capacity to remove Hg(II), Cd(II) and Pb(II) from aqueous solutions. Sorption capacities, kinetics and the dependence of the sorption process on pH were determined. Fractional power, pseudo-first-order, pseudo-second-order and intra-particle diffusion equations were used to model the kinetics of metal adsorption. The pseudo-second-order model showed the best fit to experimental data. Different two-parameter sorption isotherm models (Langmuir, Freundlich, Temkin and Dubinin-Radushkevich) were used to fit the equilibrium data. Freundlich’s isotherm model gave the best fit to experimental data. The selectivity of granular bentonite towards these metals is Pb(II) > Cd(II) > Hg(II). The adsorption capacities of granular bentonite towards the metals expressed in milligramme metal per gramme granular bentonite are 19.45, 13.05 and 1.7 for Pb(II), Cd(II) and Hg(II), respectively (for an initial concentration of 100 mg metal/L).

Keywords: Activated Carbon, Adsorption, Adsorption Kinetics, Cadmium, Cd(II), Equilibrium, Freundlich, Granular Bentonite, Heavy-Metals, Immobilized Bentonite, Ions, Isotherm, Kinetics, Langmuir, Lead, Mercury, Peat, pH, Sorption, Waste-Water, Zinc

? Valderrama, C., Barios, J.I., Farran, A. and Cortina, J.L. (2011), Evaluation of phenol/aniline (Single and Binary) removal from aqueous solutions onto hyper-cross-linked polymeric resin (Macronet MN200) and granular activated carbon in fixed-bed column. *Water Air and Soil Pollution*, **215** (1-4), 285-297.

Full Text: [2011\Wat Air Soi Pol215, 285.pdf](2011/Wat%20Air%20Soi%20Pol215,%20285.pdf)

Abstract: This work was conducted to evaluate the sorption performance of hyper-cross-linked Macronet resin (MN200) compared to the granular activated carbon in order to remove phenol and aniline from aqueous solution in both single and binary solutions. Fixed-bed column experiments were used to obtain the breakthrough curves. The experimental data were fitted to the Thomas, Bed Depth Service Time and Yoon-Nelson models, well-established fixed-bed sorption models. The theoretical sorption capacities obtained by the Thomas model were in good agreement to the breakthrough capacities determined from the sorption data. The sorption capacity decreased in binary sorption for resin MN200, while activated carbon reported similar (aniline) or higher (phenol) sorption performance indicating a synergistic effect between both solutes on the activated carbon surface. A good prediction of the breakthrough curves in binary solution was obtained by using an approach that considers a simple model to describe a breakthrough curve (Thomas) and modified isotherm equilibrium. The resin MN200 fixed-bed columns were easily regenerated by using a methanol solution, reporting more above of 90% of recovery for both solutes, while about 50% was the recovery of activated carbon after single experiments. The regeneration after the binary sorption experiments reported a decrease in the solute recovery, effect that was especially evident for activated carbon.

Keywords: Activated Carbon, Adsorbents, Aniline, Approach, Aqueous Solution, Binary, Biosorption, Breakthrough, Breakthrough Curve, Breakthrough Curves, Capacity, Carbon, Column, Column Experiments, Data, Equilibrium, Evaluation, Experimental, Experiments, Fixed Bed, Fixed-Bed Binary Sorption, Granular Activated Carbon, Hyper-Cross-Linked Polymer MN200, Isotherm, Metal-Ions, Methanol, Mixtures, MN200, Model, Models, Modified, Packed-Bed, Performance, Phenol, Phenol, Aniline, Prediction, Recovery, Regeneration, Removal, Reporting, Resin, Solution, Solutions, Sorption, Sorption Capacity, Sorption Models, Surface, Surface-Chemistry, Synergistic Adsorption, Synergistic Effect, Thomas Model, Waste-Water, Work

? Klepsch, S., Aquino, A.J.A., Haas, U., Tunega, D., Haberhauer, G., Gerzabek, M.H. and Lischka, H. (2011), Sorption of selected aromatic substances-application of kinetic concepts and quantum mechanical modeling. *Water Air and Soil Pollution*, **215** (1-4), 449-464.

Full Text: [2011\Wat Air Soi Pol215, 449.pdf](2011/Wat%20Air%20Soi%20Pol215,%20449.pdf)

Abstract: Prediction of the sorption behavior of environmental pollutants is of utmost importance within the framework of risk assessments. In this work two approaches are presented with the aim to describe sorption of aromatic substances to geosorbents. First, analytical solutions of kinetic models were fitted to experimental data of batch sorption experiments with aniline and 1-naphthylamine onto animal manure-treated soil and the soil mineral montmorillonite. The models, accounting for equilibrium and nonequilibrium sorption coupled to transformation and/or irreversible sorption processes, could well reproduce the concentration course of the sorbates. Results suggest that the amounts transformed/degraded and irreversibly bound were higher for the soil than for the clay mineral. In the second part, quantum chemical calculations were performed on aniline and 1-naphthylamine interacting with acetic acid, acetamide, imidazole, and phenol as models of functional groups present in humic substances. Molecular modeling showed that formation of hydrogen bonds is the dominating binding mechanism in all modeled complexes, which are energetically very similar between aniline and 1-naphthylamine.

Keywords: Amines, Analytical Solutions, Assessments, Batch, Behavior, Binding, Cation, Chemical, Clay, Clay Mineral, Concentration, Course, Covalent Binding, Data, Energy, Environmental, Equilibrium, Exchange, Experimental, Experiments, Framework, Functional Groups, Humic Substances, Hydrogen, Kinetic, Kinetic Models, Kinetic Sorption Processes, Mathematical Modeling, Matter, Mechanism, Modeling, Models, Montmorillonite, Nonequilibrium Sorption, Organic-Compounds, Phenol, Pollutants, Quantum Chemical Modeling, Risk, Risk Assessments, Sediments, Soil, Soils, Solutions, Sorption, Surface, Transformation, Work

? Zuo, R., Teng, Y.G., Wang, J.S., Hu, Q.H. and Guo, M.L. (2011), Experimental validation of retardation of tritium migration in the Chinese loess media. *Water Air and Soil Pollution*, **215** (1-4), 497-506.

Full Text: [2011\Wat Air Soi Pol215, 497.pdf](2011/Wat%20Air%20Soi%20Pol215,%20497.pdf)

Abstract: Retardation of tritium migration in the Chinese loess media was studied through column experiments by comparison of the migration velocity with other three “non-adsorptive” tracers of Br-, Tc-99, and I-131. Results showed that the transport peak of Br- was 1.25 times earlier than that of tritium when the tracers were simultaneously injected into the column, and the migration of Tc-99 was even 1.60 times faster than H-3 when the tracers were simultaneously injected. For iodine, it was only 1.02 times faster than that of tritium, but it should not be ignored. It reflected that the transport of H-3, compared to that of Br-, Tc-99, or I-131 in the loess media, was retarded. In order to validate the adsorption behavior of tritium on loess, batch tests were carried out using Chinese loess soil. The experimental results indicated that the adsorption of tritium was actual existence, and the distribution coefficient of tritium is influenced by initial activity of tritium, pH, water/solid ratio, and the content of humic and fulvic acids.

Keywords: Adsorption, Adsorption Behavior, Apparent Relative Retardation, Batch, Batch Tests, Behavior, Chinese, Chinese Loess, Column, Column Experiment, Column Experiments, Comparison, Diffusion, Distribution, Distribution Coefficient, Experimental, Experimental Validation, Experiments, Groundwater Recharge, I-131, Loess, Media, Migration, Mont-Terri, Ph, Pore-Water, Porous-Media, Retardation, Soil, Sorption, Tracer Experiments, Tracers, Transport, Tritium, Water Saturation

? Dotro, G., Larsen, D. and Palazolo, P. (2011), Preliminary evaluation of biological and physical-chemical chromium removal mechanisms in gravel media used in constructed wetlands. *Water Air and Soil Pollution*, **215** (1-4), 507-515.

Full Text: [2011\Wat Air Soi Pol215, 507.pdf](2011/Wat%20Air%20Soi%20Pol215,%20507.pdf)

Abstract: Constructed wetlands have been shown to achieve high chromium and organic matter removal efficiencies when treating tannery wastewaters. Further, findings suggested chromium was potentially binding to iron oxides and microbial surfaces on the wetland media. The purpose of the present study was to distinguish between physical-chemical and biologically mediated removal mechanisms operating on iron-containing media. A total of 12 small-scale reactors were used for testing three conditions: biotic, abiotic aerobic and abiotic anaerobic. All systems were operated in 3-day batches, with the biotic and abiotic aerobic systems operating for 11 batches and the abiotic anaerobic operating for five batches. The results show that biotic systems achieved significantly higher chromium removal efficiencies (83%) than both abiotic treatments (16%). Biotic reactors quickly lowered dissolved oxygen concentrations, removing an average of 53% of the influent organic matter in the process. Redox conditions were affected by microbial metabolism, favouring iron release from the media surface. Findings suggest that microbiological activity catalyses chromium removal from tannery wastewaters. Chromium removals achieved in sterile reactors illustrate that the media influences metal retention in constructed wetlands; however, microbial interactions with both the media and tannery effluent achieve overall greater chromium removal than achieved solely by physical-chemical mechanisms.

Keywords: Binding, Biological Treatment, Chromium, Chromium Removal, Constructed, Constructed Wetlands, Dissolved, Dissolved Oxygen, Evaluation, Gravel, Iron, Iron, Iron Oxides, Mechanisms, Media, Metabolism, Metal, Metals, Microbial, Organic, Organic Matter, Oxides, Oxygen, Purpose, Reduction, Release, Removal, Retention, Sorption, Surface, Surfaces, Systems, Testing, Wastewaters, Wetland, Wetlands

? Senevirathna, W.U., Zhang, H. and Gu, B.H. (2011), Effect of carboxylic and thiol ligands (oxalate, cysteine) on the kinetics of desorption of Hg(II) from kaolinite. *Water Air and Soil Pollution*, **215** (1-4), 573-584.

Full Text: [2011\Wat Air Soi Pol215, 573.pdf](2011/Wat%20Air%20Soi%20Pol215,%20573.pdf)

Abstract: Sorption and desorption of Hg(II) on clay minerals can impact the biogeochemical cycle and bio-uptake of Hg in the environment. We studied the kinetics of the desorption of Hg(II) from kaolinite as affected by oxalate and cysteine, representing the ligands with carboxylic and thiol groups of different affinities for Hg(II). The effects of pH (3, 5, and 7), ligand concentration (0.25 and 1.0 mM), and temperature (15A degrees C, 25A degrees C, and 35A degrees C) on the Hg(II) desorption were investigated through desorption kinetics. Our study showed that the Hg(II) desorption was pH dependent. In the absence of any organic ligand, > 90% of the previously adsorbed Hg(II) desorbed at pH 3 within 2 h, compared to < 10% at pH 7. Similar results were observed in the presence of oxalate, showing that it hardly affected the Hg(II) desorption. Cysteine inhibited the Hg(II) desorption significantly at all the pH tested, especially in the first 80 min with the desorption less than 20%, but the inhibition of the desorption appeared to be less prominent afterwards. The effect of the ligand concentration on the Hg(II) desorption was small, especially in the presence of oxalate. The effect of temperature on the Hg(II) desorption was nearly insignificant. The effect of the organic acids on the Hg(II) sorption and desorption is explained by the formation of the ternary surface complexes involving the mineral, ligand, and Hg(II). The competition for Hg(II) between the cysteine molecules adsorbed on the particle surfaces and in the solution phase probably can also affect the Hg(II) desorption.

Keywords: Adsorption, Adsorption, Amino-Acids, Aquatic Chemistry, Carboxylic, Clay, Clay Mineral, Clay Minerals, Competition, Concentration, Desorption, Desorption Kinetics, Dicarboxylic-Acids, Dissolved Organic-Matter, Environment, First, Fresh-Water Sediments, Hg(II), Impact, Inhibition, Kaolinite, Kinetics, Ligand, Ligands, Low Molecular Weight (LMW) Organic Acids, Mercury(II), Mineral Surfaces, Minerals, Organic, Particle, pH, pH-Dependent, Phyllosilicates, Reduced Sulfur, Situ Atr-Ftir, Small, Soil, Solution, Sorption, Surface, Surface Complexation, Surface Complexes, Surfaces, Temperature, Ternary Surface Complex

? Mohammod, M., Sen, T.K., Maitra, S. and Dutta, B.K. (2011), Removal of Zn2+ from aqueous solution using castor seed hull. *Water Air and Soil Pollution*, **215** (1-4), 609-620.

Full Text: [2011\Wat Air Soi Pol215, 609.pdf](2011/Wat%20Air%20Soi%20Pol215,%20609.pdf)

Abstract: The effects of various experimental parameters on adsorption of Zn2+ metal ion from its aqueous solution by castor seed hull and also by activated carbon have been investigated using batch adsorption experiments. It has been found that the amount of zinc adsorbed per unit mass of the hull increases with the initial metal ion concentration, contact time, solution pH and with the amount of the adsorbent. Kinetic experiments clearly indicate that adsorption of zinc on both castor hull and activated carbon is a three-step process-a rapid adsorption of the metal ion, a transition phase, and an almost flat plateau. This has also been confirmed by the intraparticle diffusion model. It has also been found that the zinc adsorption process followed pseudo-second order kinetics. The kinetic parameters including rate constants have been determined at different initial metal ion concentration, pH, amount, and type of adsorbent, respectively. The Langmuir and Freundlich adsorption isotherm models have been used to interpret the equilibrium adsorption data. The Langmuir model yields better correlation coefficients. The monolayer adsorption capacities (q (m) ) of castor hull and activated carbon have been compared with those for others reported in the literature. The value of separation factor (R (L) ) derived from the Langmuir model gives an indication of favorable adsorption. Finally, from comparative studies, it has been found that castor hull is a potentially attractive adsorbent as compared to commercial activated carbon for the removal of zinc from aqueus effluents.

Keywords: Activated Carbon, Activated Carbon, Adsorption, Adsorption Isotherm, Adsorption Kinetics, Adsorption Models, Cadmium, Castor Hull, Freundlich, Heavy-Metals, Kinetic, Kinetics, Langmuir, Methylene-Blue, pH, Porous-Media, Waste-Water, Zinc, Zinc Adsorption, Zn(II)

? Zhou, Y.F. and Haynes, R.J. (2011), Removal of Pb(II), Cr(III) and Cr(VI) from aqueous solutions using alum-derived water treatment sludge. *Water Air and Soil Pollution*, **215** (1-4), 631-643.

Full Text: [2011\Wat Air Soi Pol215, 631.pdf](2011/Wat%20Air%20Soi%20Pol215,%20631.pdf)

Abstract: The sorption of Pb(II), Cr(III) and Cr(VI) from aqueous solution using alum-derived water treatment sludge was investigated using the batch adsorption technique. Samples of sludge from two separate water treatment plants were used (one where alum was used alone and one where it was used in combination with activated C). The sorption characteristics of the two samples were generally very similar. Sorption isotherm data for all three ions fitted equally well to both Freundlich and Langmuir equations. Maximum sorption capacity and indices of sorption intensity both followed the order: Cr(III) > Pb(II) > Cr(VI). Kinetic data correlated well with a pseudo-second-order kinetic model suggesting the process involved was chemisorption. Sorption was pH-dependant with percentage sorption of Cr(III) and Pb(II) increasing from < 30% to 100% between pH 3 and 6 whilst that of Cr(VI) declined greatly between pH 5 and 8. HNO3 at a concentration of 0.1 M was effective at removing sorbed Cr(III) and Pb(II) from the sludge surfaces and regeneration was successful for eight sorption/removal cycles. It was concluded that water treatment sludge is a suitable material from which to develop a low-cost adsorbent for removal of Cr and Pb from wastewater streams.

Keywords: Adsorbent, Adsorbent Regeneration, Adsorption, Adsorption Isotherms, Chemistry, Chromium, Cr, Freundlich, Heavy-Metals, Kinetic, Kinetic Model, Kinetics, Langmuir, Maximum Sorption Capacity, Pb, pH, Red Mud, Sorbent, Sorption, Treatment Residuals, Waste-Water, Water Treatment Sludge

? Xiong, W.H. and Peng, J.A. (2011), Laboratory-scale investigation of ferrihydrite-modified diatomite as a phosphorus co-precipitant. *Water Air and Soil Pollution*, **215** (1-4), 645-654.

Full Text: [2011\Wat Air Soi Pol215, 645.pdf](2011/Wat%20Air%20Soi%20Pol215,%20645.pdf)

Abstract: The potential of ferrihydrite-modified diatomite as a phosphorus co-precipitant was investigated at a laboratory scale. Ferrihydrite-modified diatomite was demonstrated to effectively remove phosphorus from lake water as well as strongly bind phosphorus in sediment under anoxic conditions. Phosphorus removal from the lake water proceeded primarily through phosphorus adsorption onto ferrihydrite-modified diatomite and further phosphorus consumption by stimulated diatom growth. A total phosphorus removal efficiency of 85% was achieved when lake water was dosed with 250 mg/L ferrihydrite-modified diatomite; the residual total phosphorus concentration was 17.0 A mu g/L, which falls within the range for oligotrophic phosphorus levels. During a 30-day anoxic incubation period, total phosphorus concentrations in lake water treated with 400, 500, or 600 mg/L of ferrihydrite-modified diatomite slightly decreased and maximum total phosphorus concentrations remained below 15 A mu g/L. Addition of ferrihydrite-modified diatomite resulted in a marked increase in the iron-bound phosphorus fraction, a pronounced decrease in labile phosphorus and organic-bound phosphorus fractions, and stable aluminum-bound phosphorus, calcium-bound phosphorus, and residual phosphorus fractions in the anoxic sediments. Comparable iron-bound phosphorus concentration in the sediment treated by 400 mg/L of ferrihydrite-modified diatomite relative to that of the sediment treated by the combination of 400 mg/L of ferrihydrite-modified diatomite and alum solution at the concentration less than 532 mg/L indicated that ferrihydrite-modified diatomite exhibited a stable phosphorus-binding capacity when dosed at a similar amount. Ferrihydrite-modified diatomite had the potential to be used as an effective phosphorus co-precipitant.

Keywords: Adsorption, Alum, Barriers, Calcite, Capacity, Concentration, Consumption, Diatomite, Efficiency, Eutrophication, Ferrihydrite-Modified Diatomite, Growth, Lake, Marine, Mobile Phosphorus, Phosphate, Phosphorus, Phosphorus Co-Precipitant, Phosphorus Release, Phosphorus Removal, Potential, Removal, Removal Efficiency, Scale, Sediment, Sediments, Solution, Total Phosphorus, Water

? Khambhaty, Y., Mody, K., Basha, S. and Jha, B. (2011), Equilibrium modeling for biosorption of safranin onto chemically modified biomass of marine *Aspergillus wentii*. *Water Air and Soil Pollution*, **215** (1-4), 679-691.

Full Text: [2011\Wat Air Soi Pol215, 679.pdf](2011/Wat%20Air%20Soi%20Pol215,%20679.pdf)

Abstract: Safranin was used as a model reactive dye for biosorption studies onto various forms of chemically modified biomass of Aspergillus wentii. The experimental equilibrium data was analyzed by various single-, two-, three-, four-, and five-parameter isotherms to understand the biosorption process. Biosorption isotherms modeling shows that the interaction of safranin with A. wentii surface is localized monolayer sorption. Results show that in general the accuracy of models to fit experimental data improves with the degree of freedom. The interaction among adsorbed molecules is repulsive having no association between them and sorption 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 regression coefficients (0.9902-0.9941), low standard errors (0.0389-0.0758), and sum of squares error (0.0075-0.0230) values to all experimental data in comparison to other models. The results disclose that the sorption isotherm models fitted the experimental data in the order: Fritz-Schluender (five-parameter) > Langmuir > Khan > Fritz-Schluender (four-parameter) > Temkin. This systematic evaluation of the more important equilibrium isotherm models provided the general basis for making a preliminary selection of an effective model for a given application.

Keywords: Accuracy, Activated Carbon, Application, Aspergillus Wentii, Association, Basic-Dyes, Biomass, Biosorption, Comparison, Data, Dilute Aqueous-Solutions, Dye, Endothermic, Equilibrium, Equilibrium Isotherm, Error, Errors, Evaluation, Experimental, Forms, Freedom, General, Interaction, Isotherm, Isotherm Models, Isotherm Models, Isotherms, Langmuir, Marine Fungi, Mass-Transfer, Methylene-Blue, Model, Modeling, Models, Modified, Monolayer, Organic Solutes, Potential-Theory, Reactive Dye, Regression, Regression-Analysis, Safranin, Sorption, Sorption Isotherm, Standard, Surface, Water-Soluble Dyes

? Dos Santos, V.C.G., De Souza, J.V.T.M., Tarley, C.R.T., Caetano, J. and Dragunski, D.C. (2011), Copper ions adsorption from aqueous medium using the biosorbent sugarcane bagasse in natura and chemically modified. *Water Air and Soil Pollution*, **216** (1-4), 351-359.

Full Text: [2011\Wat Air Soi Pol216, 351.pdf](2011/Wat%20Air%20Soi%20Pol216,%20351.pdf)

Abstract: This study evaluated the copper ion adsorption capacity of sugarcane bagasse in natura and chemically modified with citric acid and sodium hydroxide. Adsorption analyses in batch system were carried out in function of contact time with the adsorbent and adsorbate concentration. Flame atomic absorption spectrometry was used to determine the copper concentrations. Adsorption experimental data were fitted to Langmuir and Freundlich linear models, and the maximum adsorption capacity was estimated for copper ions in function of modifications. The chemical modifications were confirmed at 1,730 cm-1 peak in infrared spectra, referring to the carboxylate groups. The required time for the adsorption to reach equilibrium was 24 h and the kinetics follows the behavior described by the pseudo-second order equation. Besides, a significant improvement of the copper adsorption has been observed after the bagasse treatment, where the maximum adsorption capacity was 31.53 mg g-1 for copper using modified bagasse with nitric acid according to Langmuir isotherm linear model. The high uptake of copper ions from aqueous medium verified by chemically modified sugarcane bagasse makes this material an attractive alternative for effluent treatment and avoids environmental contamination.

Keywords: Activated Carbon, Adsorption, Biosorption, Biosorption, Copper, EDTA Dianhydride Edtad, Equilibrium, Freundlich, Heavy-Metals, Isotherm, Kinetics, Langmuir, Langmuir Isotherm, Mercerized Cellulose, Metals, Methylene-Blue, Modified, Removal, Renewable Sources, Single Metal Solutions, Sugarcane Bagasse, Waste-Water

? Ifelebuegu, A.O. and Ezenwa, C.P. (2011), Removal of endocrine disrupting chemicals in wastewater treatment by Fenton-like oxidation. *Water Air and Soil Pollution*, **217** (1-4), 213-220.

Full Text: [2011\Wat Air Soi Pol217, 213.pdf](2011/Wat%20Air%20Soi%20Pol217,%20213.pdf)

Abstract: The presence of endocrine-disrupting chemicals (EDCs) in wastewater effluent is a major concern to the scientific community. This research effort was aimed at investigating Fenton-like degradation of two EDCs 17 beta-estradiol (E2) and 17 alpha-ethinylestradiol (EE2). The results of the study showed that E2 and EE2 were effectively removed by the Fenton-like oxidation process. Removal efficiencies of 95% and 98% at ferric concentration of 1×10-3 M (58.6 mg l-1) were achieved for E2 and EE2, respectively. The kinetics of Fenton-like degradation of E2 and EE2 were adequately described by the pseudo second order kinetic model. Values of 27.8 and 22.5 kJ mol-1) were obtained for the activation energy for E2 and EE2, respectively, from the Arrhenius-type plot, showing that the process does not just involve radical reactions but also intermediate reaction steps involving radical-molecule or ion-molecule reactions. The presence of high dissolved organics in wastewater significantly reduced the removal efficiencies. The reaction by-products for E2 and EE2 were more stable to the oxidation process and more readily biodegradable. Fenton-like oxidations therefore offers a promising alternative for the removal of these EDCs in wastewater treatment applications at the tertiary treatment stage.

Keywords: 17 Alpha-Ethinylestradiol, 17 Beta-Estradiol, 17-Beta-Estradiol, Activated-Sludge, Adsorption, Bisphenol-A, Combination, Degradation, Effluents, Fenton-Like, Kinetic, Kinetic Model, Kinetics, Organic-Matter, Peroxide, Pharmaceuticals, Removal, Wastewater, Wastewater Treatment

? Abdel-Aziz, H.M. and Siyam, T. (2011), Radiation synthesis of poly(acrylamide-acrylic acid-dimethylaminoethyl methacrylate) resin and its use for binding of some anionic dyes. *Water Air and Soil Pollution*, **218** (1-4), 165-174.

Full Text: [2011\Wat Air Soi Pol218, 165.pdf](2011/Wat%20Air%20Soi%20Pol218,%20165.pdf)

Abstract: Poly(acrylamide-acrylic acid-dimethylaminoethyl methacrylate) P(AAm-AA-DMAEMA) resin was prepared by the template copolymerization. PAAm was used as a template for the copolymerization of DMAEMA and AA in aqueous solution using gamma rays. The adsorption of indigo carmine and eriochrome black-T anionic dyes from aqueous media on P(AAm-AA-DMAEMA) has been investigated. The adsorption behavior of this resin has been studied under different adsorption conditions: dye concentrations (50-500 mg l(-1)), contact times, temperature (30-55AºC), and pH values (2-7). The amount of dye adsorbed increased with increasing resin content, but it had a little change with temperature and decreased slightly with increasing pH. Adsorption data of the samples were modeled by the pseudo-first-order and pseudo-second-order kinetic equations in order to investigate dye adsorption mechanism. It was found that the adsorption kinetics of the resin followed a pseudo-second-order model with rate constant (k (2)) of 2.5 x 10(-3) and 1.8 x 10(-2) g (mg(-1) min(-1)) for indigo carmine and eriochrome black-T, respectively. Equilibrium isotherms were analyzed using the Langmuir and Freundlich isotherms. It was seen that the Freundlich model fits the adsorption data better than the Langmuir model.

Keywords: Acrylic-Acid, Adsorption, Adsorption, Adsorption Kinetics, Aqueous Solution, Aqueous-Solutions, Chitosan, Dye, Dye Adsorption, Dyes, Dyes, Pigments, Effluent, Equilibrium, Freundlich, Hydrogels, Indigo Carmine Dye, Isotherms, Kinetic, Kinetics, Langmuir, Mechanism, pH, Radiation, Removal, Resin, Resins, Template Polymerization, Waste-Water

? Low, L.W., Teng, T.T., Ahmad, A., Morad, N. and Wong, Y.S. (2011), A Novel pretreatment method of Lignocellulosic material as adsorbent and kinetic study of dye waste adsorption. *Water Air and Soil Pollution*, **218** (1-4), 293-306.

Full Text: [2011\Wat Air Soi Pol218, 293.pdf](2011/Wat%20Air%20Soi%20Pol218,%20293.pdf)

Abstract: Sulphuric acid-modified bagasse has been used as low-cost adsorbent for the removal of methylene blue (MB) dye from aqueous solution. In order to remove organic compounds that contribute to chemical oxygen demand (COD), pretreatment with thorough washing of adsorbent using boiling distilled water was performed instead of conventional washing using distilled water at room temperature only. This has resulted in the highest efficiency of color removal of 99.45% and COD reduction of 99.36% for MB dye solution at pH 9. Effects of initial pH, dye concentration, adsorbent dosage, temperature, and contact time have been studied. The adsorption of MB dye was pH dependent. Langmuir and Freundlich isotherm models were tested on the adsorption data. The kinetic experimental data were analyzed using pseudo-first order, pseudo-second order, and the intraparticle diffusion model in order to examine the adsorption mechanisms. The adsorption process followed the Langmuir isotherm as well as the Freundlich isotherm and pseudo-second-order kinetic model. The process was found to be endothermic in nature.

Keywords: Activated Carbon, Adsorption, Aqueous Solution, Aqueous-Solution, Bagasse, Bagasse-Fly-Ash, Basic Dye, Chemical Oxygen Demand, Coconut Husk, Dye, Freundlich, Freundlich Isotherm, Green-Dye, Industry Waste, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Low-Cost Adsorbent, Low-Cost Adsorbents, Methylene Blue, Methylene-Blue, pH, Pretreatment, Removal, Thermodynamics

? Sen, T.K., Afroze, S. and Ang, H.M. (2011), Equilibrium, kinetics and mechanism of removal of methylene blue from aqueous solution by adsorption onto pine cone biomass of *Pinus radiata*. *Water Air and Soil Pollution*, **218** (1-4), 499-515.

Full Text: [2011\Wat Air Soi Pol218, 499.pdf](2011/Wat%20Air%20Soi%20Pol218,%20499.pdf)

Abstract: The kinetics and mechanism of methylene blue adsorption onto raw pine cone biomass (Pinus radiata) was investigated under various physicochemical parameters. The extent of the methylene blue dye adsorption increased with increases in initial dye concentration, contact time and solution pH but decreases with the amount of adsorbent, salt concentration and temperature of the system. Overall the kinetic studies showed that the methylene blue adsorption process followed pseudo-second-order kinetics among various kinetic models tested. The different kinetic parameters including rate constant, half-adsorption time and diffusion coefficient are determined at different physicochemical conditions. Equilibrium data were best represented by Langmuir isotherm among Langmuir and Freundlich adsorption isotherm. The maximum monolayer adsorption capacity of pine cone biomass was 109.89 mg/g at 30AºC. The value of separation factor, R (L), from Langmuir equation and Freundlich constant, n, both give an indication of favourable adsorption. Thermodynamic parameters such as standard Gibbs free energy (a dagger G (0)), standard enthalpy (a dagger H (0)), standard entropy (a dagger S (0)) and the activation energy (A) were calculated. A single-stage batch absorber design for the methylene blue adsorption onto pine cone biomass has been presented based on the Langmuir isotherm model equation.

Keywords: Activated Carbon, Adsorbents, Adsorption, Adsorption Isotherm, Aqueous Solution, Bentonite, Biosorbents, Biosorption, Diffusion, Dye, Dye Adsorption, Dye Removal, Equilibrium, Freundlich, Isotherm, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir, Langmuir Isotherm, Leaf Powder, MB Adsorption, Mechanism, Methylene Blue, pH, Pine Cone, Pinus Radiata, Removal, Sawdust, Separation, Sylvestris, Thermodynamic, Thermodynamic Parameters, Waste-Water

? Teixeira, S.C.G., Ziolli, R.L., Marques, M.R.D. and Perez, D.V. (2011), Study of pyrene adsorption on two Brazilian soils. *Water Air and Soil Pollution*, **219** (1-4), 297-301.

Full Text: [2011\Wat Air Soi Pol219, 297.pdf](2011/Wat%20Air%20Soi%20Pol219,%20297.pdf)

Abstract: This study investigated pyrene adsorption on two contrasting Brazilian soils: a Kandiudult and a Vertisol. It was found that the time taken to reach thermodynamic equilibrium depended on the soil type. The curves for different pyrene-to-soil mass ratios for Vertisol soil showed significant differences. This is probably related to the presence of 2:1 clays that may increase the adsorption of pyrene due to the resulting interlamellar space. The adsorption of pyrene on the Kandiudult showed, in general, good agreement with the Langmuir isotherm. In the case of the Vertisol, there was good agreement with the linear isotherm. The kinetic model that best explains the adsorption in Kandiudult was the pseudo second-order model. For the Vertisol, the Morris Weber model best explains the behavior of pyrene.

Keywords: Adsorption, Clays, Equilibrium, Hydrocarbons, Isotherm, Kinetic, Kinetic Model, Langmuir, Langmuir Isotherm, Soil, Soils, Thermodynamic

? Seifi, L., Torabian, A., Kazemian, H., Bidhendi, G.N., Azimi, A.A., Farhadi, F. and Nazmara, S. (2011), Kinetic study of BTEX removal using granulated surfactant-modified natural zeolites nanoparticles. *Water Air and Soil Pollution*, **219** (1-4), 443-457.

Full Text: [2011\Wat Air Soi Pol219, 443.pdf](2011/Wat%20Air%20Soi%20Pol219,%20443.pdf)

Abstract: Increasing release of organic pollutants to the environment has caused one of the largest world crises for water resources. Volatile organic compounds are toxic monoaromatic pollutants of soil and water. In this research, natural zeolite nanoparticles were produced mechanically by means of a milling technique, modified using two cationic surfactants of hexadecyltrimethylammonium chloride and n-cetyl pyridinium bromide and formed as granules using a novel technique already developed by our group. The granulated adsorbents were used to uptake benzene, toluene, ethylbenzene, and xylenes (BTEX) from contaminated water. Two intra-particle diffusion models (i.e., Weber and Morris and Vermeulen models) and three surface reaction models (i.e., pseudo-first order, pseudo-second order, and Elovich) were applied to evaluate the kinetics of adsorption and the best fitted model was chosen. Results of the adsorption kinetic evaluations were shown that uptake of granulated nanozeolites are higher than natural zeolites (in the order of four). Kinetic results revealed that the adsorption follows a pseudo-second order indicating existence of chemisorption in the studied conditions. It was noticed that the intra-particle diffusion is prevailing in the first stage of adsorption for a relatively short time (i.e., first 25 min).

Keywords: Activated Carbon, Adsorption, Adsorption Kinetics, Benzene, BTEX, Chloride, Diffusion, Dyes, Forming and Granulation, Kinetic, Kinetics, Model, Nanoparticles, Natural Zeolite, Phenol, Removal, Soil, Sorbents, Sorption, Toluene, Uptake, Water, Zeolite

? Mohamed, M. and Ouki, S.K. (2011), Kinetic and removal mechanisms of ethylbenzene from contaminated solutions by chitin and chitosan. *Water Air and Soil Pollution*, **220** (1-4), 131-140.

Full Text: [2011\Wat Air Soi Pol220, 131.pdf](2011/Wat%20Air%20Soi%20Pol220,%20131.pdf)

Abstract: In this study, the efficiency of chitin and chitosan toward the removal of ethylbenzene from aqueous solutions was investigated. Batch adsorption experiments of ethylbenzene-contaminated waters (5-200 mg/L) were carried out to evaluate the removal performance. Ethylbenzene uptake was determined from the changes in concentration, as the residual concentration was measured by gas chromatography with mass spectroscopy. The results indicated that the adsorption of ethylbenzene by chitin and chitosan were in agreement with the Langmuir isotherm, for two parameters model, and Redlich-Peterson isotherm, for three parameters model. A maximum removal percentage of 65% of ethylbenzene can be achieved using chitosan as adsorbent material. The adsorption capacity of ethylbenzene followed the order chitosan > chitin. The pseudo-second order rate model described best the adsorption kinetics of ethylbenzene for the two selected adsorbents. The kinetic studies also revealed that the pore diffusion is not the only rate controlling step in the removal of ethylbenzene. Overall, the study demonstrated that chitosan is a potential adsorbent for the removal of ethylbenzene at concentrations as high as 200 mg/L.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Aqueous-Solution, Batch, Batch Adsorption, BTEX, Chemistry, Chitin, Chitosan, Clays, Diffusion, Ethylbenzene, Hydrocarbons, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Mechanisms, Removal, Sorption, Uptake

? Choi, J.W., Lee, S.Y., Chung, S.G., Hong, S.W., Kim, D.J. and Lee, S.H. (2011), Removal of phosphate from aqueous solution by functionalized mesoporous materials. *Water Air and Soil Pollution*, **222** (1-4), 243-254.

Full Text: [2011\Wat Air Soi Pol222, 243.pdf](2011/Wat%20Air%20Soi%20Pol222,%20243.pdf)

Abstract: In the present study, the applications of mesoporous materials based on silica, namely post-synthesized, one-pot synthesized, and pure MCM-41, were investigated for the removal of phosphate from aqueous solution. The mesostructures were confirmed by X-ray diffraction, Brunauer-Emmett-Teller, Fourier transform spectroscopy, and transmission electron microscopy. The absorptions of phosphate by the mesoporous adsorbents were examined, with different adsorption models used to describe the equilibrium and kinetic data. The maximum adsorption capacities of the mesostructure adsorbents were found to be 45.162, 40.806, and 31.123 mg g-1 for the post-synthesized, one-pot synthesized, and pure MCM-41, respectively. The kinetic data showed that the adsorptions of phosphate onto the post-synthesized and pure MCM-41 followed the pseudo-first-order kinetic model, whereas the one-pot synthesized adsorbent was described by the pseudo-second-order model.

Keywords: Adsorption, Adsorptive Removal, Amine-Functionalized, Chemical Precipitation, Condensation, Engineered Sorbents, MCM-41, Mesostructure, Molecular-Sieves, One-Pot Synthesis, Phosphate, Phosphorus Removal, Post-Synthesis, Removal, Silica, Struvite Formation, Waste-Water

? Saltabaş, Ö., Teker, M., Döver, A. and Atay, E.S. (2012), Removal of Rhodium(III) from aqueous solution by Na- and K-treated clinoptilolites. *Water Air and Soil Pollution*, **223** (1), 411-419.

Full Text: [2012\Wat Air Soi Pol223, 411.pdf](2012/Wat%20Air%20Soi%20Pol223,%20411.pdf)

Abstract: The clinoptilolite which was modified with sodium and potassium chloride was found to have adsorption capacity for rhodium. To evaluate the adsorption capacity and characteristics, the effects of solution pH, dose of clinoptilolite loading, contact time, temperature, and initial rhodium concentration were investigated in a batch mode. Adsorption was decreased with the increasing temperature for both modified clinoptilolites. The Langmuir and Freundlich adsorption models were used for mathematical description of the adsorption equilibrium. Equilibrium data were fitted to the Langmuir model in the concentrations of 2-60 mg l-1 at 293 and 313 K. Based on the Langmuir isotherm plots, the maximum adsorption capacity value was calculated to be 0.415 mg g-1 at 293 K. Various thermodynamic parameters such as a ΔG°, a ΔH°, and a ΔS° were evaluated with results indicating that this system was an exothermic spontaneous reaction and kinetically suited to the pseudo-second-order model.

Keywords: Adsorbents, Adsorption, Adsorption, Chemically-Modified Chitosan, Clinoptilolite, Electroplating Waste-Water, Equilibrium, Freundlich, Heavy-Metal Removal, Ions, Isotherm, Langmuir, pH, Recovery, Removal, Rhodium, Separation, Sorption, Wastewaters

? Netzahuatl-Muñoz, A.R., Guillén-Jiménez, F.D.M., Chávez-Gómez, B., Villegas-Garrido, T.L. and Cristiani-Urbina, E. (2012), Kinetic study of the effect of pH on hexavalent and trivalent chromium removal from aqueous solution by *Cupressus lusitanica* bark. *Water Air and Soil Pollution*, **223** (2), 625-641.

Full Text: [2012\Wat Air Soi Pol223, 625.pdf](2012/Wat%20Air%20Soi%20Pol223,%20625.pdf)

Abstract: Solution pH is among the most important parameters that influence heavy metal biosorption. This work presents a kinetic study of the effects of pH on chromium biosorption onto Cupressus lusitanica Mill bark from aqueous Cr(VI) or Cr(III) solutions and proposes a mechanism of adsorption. At all assayed contact times, the optimum pH for chromium biosorption from the Cr(III) solution was 5.0; in contrast, optimum pH for chromium biosorption from the Cr(VI) solution varied depending on contact time. The kinetic models that satisfactorily described the chromium biosorption processes from the Cr(III) and Cr(VI) solutions were the Elovich and pseudo second-order models, respectively. Diffuse reflectance infrared Fourier transform spectroscopy studies suggest that phenolic compounds present on C. lusitanica Mill bark play an important role in chromium biosorption from the Cr(III) solution. On the other hand, chromium biosorption from the Cr(VI) solution involved carboxyl groups produced on the bark by redox reactions between oxygen-containing groups and Cr(VI), and these were in turn responsible for the biosorption of Cr(III) produced by Cr(VI) reduction.

Keywords: Adsorption, Adsorption Mechanism, Bark, Biosorption, Chromium, Chromium Biosorption, Cr(III), Cr(VI), Cr(VI) Reduction, Cupressus Lusitanica Mill, Drifts, Equilibrium, Fungal Biomass, Heavy Metal, Heavy-Metal Biosorption, Kinetic, Kinetic Models, Mechanism, Modified Sargassum sp, pH, Removal, Seaweed, Tannery Waste-Water, Tannin Gel

? Sekomo, C.B., Rousseau, D.P.L. and Lens, P.N.L. (2012), Use of Gisenyi volcanic rock for adsorptive removal of Cd(II), Cu(II), Pb(II), and Zn(II) from wastewater. *Water Air and Soil Pollution*, **223** (2), 533-547.

Full Text: [2012\Wat Air Soi Pol223, 533.pdf](2012/Wat%20Air%20Soi%20Pol223,%20533.pdf)

Abstract: Volcanic rock is a potential adsorbent for metallic ions from wastewater. This study determined the capacity of Gisenyi volcanic rock found in Northern Rwanda to adsorb Cd, Cu, Pb and Zn using laboratory scale batch experiments under a variety of experimental conditions (initial metal concentration varied from 1 to 50 mg/L, adsorbent dosage 4 g/L, solid/liquid ratio of 1:250, contact time 120 h, particle size 250-900 mu m). The adsorbent had a surface area of 3 m2/g. The adsorption process was optimal at near-neutral pH 6. The maximal adsorption capacity was 6.23, 10.87, 9.52 and 4.46 mg/g for Cd, Cu, Pb and Zn, respectively. The adsorption process proceeded via a fast initial metal uptake during the first 6 h, followed by slow uptake and equilibrium after 24 h. Data fitted well the pseudo second-order kinetic model. Equilibrium experiments showed that the adsorbent has a high affinity for Cu and Pb followed by Cd and Zn. Furthermore, the rock is a stable sorbent that can be reused in multiple sorption-desorption-regeneration cycles. Therefore, the Gisenyi volcanic rock was found to be a promising adsorbent for heavy metal removal from industrial wastewater contaminated with heavy metals.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Isotherms, Aqueous-Solutions, Cadmium, Cd(II), Coated Sand, Concentration, Cu(II), Desorption, Equilibrium, Heavy Metal, Heavy Metals, Heavy-Metal Removal, Kinetic, Low-Cost, Metals, Organic-Matter, Pb(II), pH, Removal, Rwanda, Sorption, Sphagnum Moss Peat, Uptake, Volcanic Rock, Wastewater, Zn(II)

# Title: Water-Engineering & Management

Full Journal Title: Water-Engineering & Management

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ISSN: 0273-2238

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Publisher Address: 380 Northwest Highway, Des Plaines, IL 60016

Subject Categories:

Engineering, Environmental: Impact Factor

Water Resources: Impact Factor

Boehnke, B., Schulze Rettmer, R. and Zuckut, S.W. (1998), Cost-effective reduction of high-strength wastewater by adsorption-based activated sludge technology. *Water-Engineering & Management*, **145** (12), 31-34.

# Title: Water and Environment Journal

Full Journal Title: [Water and Environment Journal](http://www.blackwell-synergy.com/loi/wej?cookieSet=1)

ISO Abbreviated Title: Water Environ. J.

JCR Abbreviated Title: Water Environ J

ISSN: 1747-6585

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Subject Categories:

Environmental Sciences: Impact Factor 0.194, 143/144 (2006); Impact Factor 0.461, 145/160 (2007); Impact Factor 0.493, 170/181 (2009)

Limnology: Impact Factor 0.194, 16/17 (2006); Impact Factor 0.461, 17/19 (2007); Impact Factor 0.493, 16/18 (2009)

Water Resources: Impact Factor 0.194, 56/57 (2006); Impact Factor 0.461, 49/59 (2007); Impact Factor 0.493, 57/66 (2009)

? Amblin, G.J. (2004), Sewage re-use in Mauritius. *Water and Environment Journal*, **18** (3), 171-176.

Full Text: [2004\Wat Env J18, 171.pdf](2004/Wat%20Env%20J18,%20171.pdf)

Abstract: When completed, the sewage-treatment works at St. Martin will serve nearly a third of Mauritius’ 1.1 million population. In addition to protecting the marine environment, it will provide a valuable source of water to supplement irrigation supplies to west-coast sugar-cane plantations.

This paper explains (i) the treatment-process selection which favoured conventional activated sludge over extended aeration, (ii) the need for nutrient removal, (iii) the choice of UV treatment for disinfection, and (iv) the problem of dye discharges from the textile industry. It also describes the complexity of the control system which is designed to (a) supply tertiary effluent to the irrigation canals blended with surface-water supplies to avoid sodium accumulation in the soils, (b) avoid flooding of the canals, and (c) provide an emergency storm-overflow discharge via the same common outfall pipe to the sea.

Keywords: Biological Nutrient Removal, Irrigation, Mauritius, Re-Use, Sugar-Cane, Textile Dyes

# Title: Water Environment Research

Full Journal Title: [Sewage and Industrial Wastes](http://www.jstor.org.ludwig.lub.lu.se/action/showPublication?journalCode=sewaworkj) (1928-1949, Vols. 1-31)

Full Journal Title: [Journal of the Water Pollution Control Federation](http://www.jstor.org.ludwig.lub.lu.se/action/showPublication?journalCode=jwatpollcontfed) (1960-1989, Vols. 32-61)

Full Journal Title: [Research Journal of the Water Pollution Control Federation](http://www.jstor.org.ludwig.lub.lu.se/action/showPublication?journalCode=rjwatpollcontfed) (1989-1991, Vols. 61-63)

Full Journal Title: [Water Environment Research](http://www.jstor.org.ludwig.lub.lu.se/action/showPublication?journalCode=wateenvirese) (1992-2002, Vols. 64-74)

Full Journal Title: [Water Environment Research](http://www.ingentaconnect.com/content/wef/wer/); [Water Environment Research](http://web.ebscohost.com.ludwig.lub.lu.se/ehost/detail?vid=1&hid=106&sid=9525dcb2-6e48-412a-999b-9ee9fd1318a3%40sessionmgr113&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=a9h&jid=2FZ); [Water Environment Research](http://vnweb.hwwilsonweb.com/hww/Journals/getIssues.jhtml?sid=HWW:OMNIS&id=00154)

ISO Abbreviated Title: Water Environ. Res.

JCR Abbreviated Title: Water Environ Res

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Language: English

Publisher: Water Environment Federation

Publisher Address: 601 Wythe St, Alexandria, VA 22314-1994

Subject Categories:

Engineering, Environmental: Impact Factor 0.442, 20/36 (2000); Impact Factor 0.789, 18/35 (2004); Impact Factor 1.118, 17/37 (2007); Impact Factor 0.965, 30/42 (2009)

Environmental Sciences: Impact Factor 1.146, 39/126 (1999); Impact Factor 0.442, 97/127 (2000); Impact Factor 0.789, 89/134 (2004); Impact Factor 1.118, 96/160 (2007); Impact Factor 0.965, 136/181 (2009)

Limnology: Impact Factor 0.442, 8/12 (2000); Impact Factor 0.789, 7/14 (2004); Impact Factor 1.118, 9/19 (2007); Impact Factor 0.965, 13/18 (2009)

Water Resources: Impact Factor 0.442, 31/47 (2000); Impact Factor 0.789, 24/55 (2004); Impact Factor 1.118, 25/59 (2007); Impact Factor 0.965, 45/66 (2009)

James, B.R., Rabenhorst, M.C. and Frigon, G.A. (1992), Phosphorus sorption by peat and sand amended with iron oxides or steel wool. *Water Environment Research*, **64** (5), 699-705.

Full Text: [1992\Wat Env Res64, 699.pdf](1992/Wat%20Env%20Res64,%20699.pdf)

Abstract: Efficient removal of nutrients from municipal sewage treatment plant wastewater is needed to protect surface waters from eu trophication, but artificial peat beds designed for this purpose have proved unsuccessful for phosphorus removal. Laboratory studies were conducted to evaluate the feasibility of adding iron oxides or steel wool to peat and sand to increase phosphate sorption. Langmuir-type batch isotherms and column leaching studies showed that preformed rust and untreated steel wool markedly increased phosphorus sorption by peat and sand, with the steel wool-peat combination removing the most phosphorus under realistic, leaching conditions. Estimated useful lives for the iron amended materials ranged from zero years for unamended sand to several years for steel wool-amended peat, depending on quantities of iron ma terial added. The results suggested that steel wool offers a low-cost, efficient amendment for peat and sand beds designed for phosphorus removal from wastewater. Water Environ. Res., 64, 699 (1992).

Keywords: Isotherms, Rust, Sorption, Tertiary Treatment, Wastewater, Wetlands

? Das, N.C. and Bandyopadhyay, M. (1992), Removal of copper(II) using vermiculite. *Water Environment Research*, **64** (7), 852-857.

Full Text: [1992\Wat Env Res64, 852.pdf](1992/Wat%20Env%20Res64,%20852.pdf)

Abstract: Copper(II) removal efficiency by vermiculite has been investigated through laboratory experiments. The removal phenomenon appears to be consistent with an ion-exchange (exchange adsorption) process. The batch sorption equilibria follows Freundlich adsorption isotherm. The uptake of copper(II) is a function of the pH of the solution and increases with increasing pH. Increasing ionic strength and the presence of soluble complexing agents such as ethylene diamine tetraacetic acid (EDTA) decrease the sorption of copper(II). The presence of other divalent cations like calcium impede the uptake of copper(II). The presence of chloride ion has no significant effect on copper(II) removal. In a fixed bed vermiculite column, the removal efficiency of copper(II) from tap water is less than that from distilled water. Vermiculite can be regenerated with acid and can then be reused.

Keywords: Copper, Ion Exchange, Isotherm, Removal, Vermiculite, Heavy-Metals, Adsorption, Behavior, Soils, Oxide, Zinc

Wilczak, A. and Keinath, T.M. (1993), Kinetics of sorption and desorption of copper(II) and lead(II) on activated carbon. *Water Environment Research*, **65** (3), 238-244.

Full Text: [1993\Wat Env Res65, 238.pdf](1993/Wat%20Env%20Res65,%20238.pdf)

Abstract: The rate of sorption of copper(II) and lead (II) onto activated carbons Nuchar SA and Filtrasorb 400 was observed to occur rapidly at the outset, followed by a slow and prolonged sorption. This indicates that previous sorption studies conducted for short equilibration periods likely underestimated the actual capacity of activated carbon for heavy metals. Although copper and lead ions desorbed from the activated carbon surface rapidly, the rate of desorption of lead was slower, prevailing over several days. Sorption of copper and lead ions on Nuchar SA was found to be fully reversible. Water Environ. Res., 65, 238 (1993).

Keywords: Activated Carbon, Copper, Desorption, Heavy Metals, Kinetics, Lead, Sorption

van Benschoten, J.E., Reed, B.E., Matsumoto, M.R. and Mcgarvey, P.J. (1994), Metal removal by soil washing for an iron oxide coated sandy soil. *Water Environment Research*, **66** (2), 168-174.

Full Text: [1994\Wat Env Res66, 168.pdf](1994/Wat%20Env%20Res66,%20168.pdf)

Abstract: A contaminated, iron oxide coated (15.5% Fe2O3), sandy soil wasstudied to evaluate the effectiveness of conventional soil-washing extractants for metal removal. Metals of interestincluded As, Cu, Pb, Hg and Zn. The extractant solutions were HCl, HNO3, H2SO4, EDTA and NH2OH.HCl. Experiments assesse deffects of extractant strength and contact time. Individualsoil size fractions were studied for the various extractants.Metal-binding mechanisms were evaluated using a sequential extraction procedure. Metals in all size classes were boundstrongly, presumably by an Fe oxide coating observed on thesandy soil. From an analysis of particle size fractions, contaminated soil metal concentration correlated approximatelywith the surface area/volume ratio of soil particles, suggesting that the metals were associated with soil surfaces. During soil washing, a typical rapid metal release in HCl occurred initially, followed by a much slower step. The fraction associated with the slow metal release correlated reasonably well with the residual metal fraction. Althoughsandy soils often are good candidates for soil washing, surfacecoatings may make metal extraction for even sandy soilsdifficult.

? Kindzierski, W.B. and Gabos, S. (1994), Health-effects associated with waste-water treatment, disposal, and reuse. *Water Environment Research*, **66** (4), 651-657.

Full Text: [1994\Wat Env Res66, 651.pdf](1994/Wat%20Env%20Res66,%20651.pdf)

Keywords: Vibrio-Cholerae NON-01, Primary Amebic Meningoencephalitis, Drinking-Water, Hepatitis-A, Microbiological Quality, *Cryptosporidium*-Parvum, Risk Assessment, Sewage Workers, Public-Health, Desert Soil

Neufeld, R.D., Niaki, S. and Badali, C. (1994), Activated biofilm removal of low concentrations of toluene. *Water Environment Research*, **66** (7), 899-904.

Full Text: [1994\Wat Env Res66, 899.pdf](1994/Wat%20Env%20Res66,%20899.pdf)

Abstract: A two-step technique is presented for the biodegradation or transformation of low concentrations of benzene, ethylbenzene, toluene and xylene (BETX) hydrocarbons. Step 1 incorporates the batch growth and attachment of a lush biofilm onto plastic surfaces utilizing a preselected substrate capable of stimulating desired biological activity. Step 2 involves continuous upflow biodegradation of low concentration levels of target organics by the generated biofilm. Step 1-generated biofilms are predicted to deteriorate during protracted time periods, however, extended experimental runs on the order of four months were conducted with continued bioremovals. Target organic removals during Step 2 operations, quantified by a first-order removal constant, are shown to be linked to Step 1 operating methodology. Reprinted by permission of the publisher.

? Marr, J.B. and Facey, R.M. (1995), Agricultural waste. *Water Environment Research*, **67** (4), 503-507.

Full Text: [1995\Wat Env Res67, 503.pdf](1995/Wat%20Env%20Res67,%20503.pdf)

Keywords: Anaerobic-Digestion, Denitrification, Residues

Bahorsky, M.S. and Bryant, D.H. (1995), Textiles. *Water Environment Research*, **67** (4), 544-548.

Full Text: [1995\Wat Env Res67, 544.pdf](1995/Wat%20Env%20Res67,%20544.pdf)

Abstract: A review of the 1994 literature on the treatment of wastes from the textile industry. In general, dye manufacturers are taking a proactive approach in relation to the environmental problem of dyes. The topics covered include biological treatment, physical and chemical treatment and recycling and recovery.

? Nelson, P.O. and Yang, M.Y. (1995), Equilibrium adsorption of chlorophenols on granular activated carbon. *Water Environment Research*, **67** (6), 892-898.

Full Text: [1995\Wat Env Res67, 892.pdf](1995/Wat%20Env%20Res67,%20892.pdf)

Abstract: The adsorption of chlorinated phenols from aqueous so lution on granular activated carbon was studied in batch reactors. Single component equilibrium adsorption data for the eight compounds in two concentration ranges at pH 7.0 and 30°C were fit well by both the Lang muir and the Freundlich equations. The adsorptive capacities at pH 7.0 increase from pentachlorophenol to trichlorophenols and are fairly con stant from trichlorophenols to monochlorophenols. Equilibrium mea surements were also conducted for 2,4,5-trichlorophenol, 2,4-dichloro phenol, and 4-chlorophenol over a wide pH range. A surface complex ation model has been proposed to describe the effect of pH on adsorption equilibria of chlorophenols on activated carbon. Activated carbon surface functional sites are divided into acidic and basic groups with which mo lecular and ionized forms of chlorophenols interact, respectively, and form two neutral complexes. The simulations of the model are in excellent agreement with the experimental data. Water Environ. Res., 67, 892 (1995).

Keywords: Activated Carbon, Adsorption, Isotherms, Chlorophenols, Chlorinated Phenols, Water Interface

Spinti, M., Zhuang, H. and Trujillo, E.M. (1995), Evaluation of immobilized biomass beads for removing heavy metals from wastewaters. *Water Environment Research*, **67** (6), 943-952.

Full Text: [1995\Wat Env Res67, 943.pdf](1995/Wat%20Env%20Res67,%20943.pdf)

Abstract: Immobilized biomass beads, which consist of dried and ground sphagnum peat moss immobilized in a porous polysulfone matrix, effectively remove heavy metals from wastewaters under appropriate conditions. This paper examines the procedure for forming the beads and their performance in packed columns. The beads are produced by atomizing an organic dispersion into water, creating droplets that become solid through phase inversion. Increasing the relative biomass content gave slightly lower surface areas. Metal ion breakthrough curves were obtained for metal ions from two actual acid mine drainage wastewaters. The selectivity of the beads for various cations was Fe > Al > Pb > Cu > Cd, Zn > Ca > Mn > Mg > Na. Capacity increases with initial pH of the column after regeneration. Bead titration tests indicate that the immobilized biomass beads have heterogeneous ionogenic adsorption sites. Experimental results also indicate that most of the magnesium removed from water by the immobilized biomass beads is adsorbed and exchangeable with potassium. Under the conditions used here, the immobilized biomass beads have a lower capacity than two commercially available ion exchange resins.

Keywords: Biosorption, Acid Mine Drainage, Heavy Metals, Ion Exchange, Ion-Exchange, Accumulation Lead, Algal Biomass, Extraction, Sphagnaceae, Cadmium

Wasay, S.A., Haron, Md.J. and Tokunaga, S. (1996), Adsorption of fluoride, phosphate and arsenate ions on lanthanum-impregnated silica gel. *Water Environment Research*, **68** (3), 295-300.

Full Text: [1996\Wat Env Res68, 295.pdf](1996/Wat%20Env%20Res68,%20295.pdf)

Abstract: A lanthanum-impregnated silica gel has been developed for the removal of fluoride, phosphate and arsenate ions by adsorption. The interaction between silica gel and lanthanum ion was maximum at a final pH of 6. The removal of fluoride and arsenate ions by adsorption on the lanthanum-impregnated silica gel was more than 99.9% at neutral pH from initial concentration of 0.55 and 0.2 mmol/L, respectively. The removal of phosphate ion was 95% at an initial concentration of 0.5 mmol/L at neutral pH. Arsenite ion was not adsorbed on the material. The rate of adsorption of the anions followed the first-order reaction and fit in the Lagergren equation. The adsorption of each anion followed the Langmuir isotherm. Other anions such as Cl-Br-, I-, NO3-and SO42-did not interfere with the adsorption. A column study was conducted for the removal of these anions at a fixed flow rate of 0.5 mL/min at pH approximately 7. These anions were removed by more than 99.9% at initial first or second fraction and the column was regenerated at pH 8.5. The method was applied for the removal of these anions from synthetic and high-tech industrial wastewaters. Reprinted by permission of the publisher.

Keywords: Adsorption, Arsenate, Fluoride, Lanthanum Impregnation, Phosphate, Regeneration, Silica Gel, Aqueous-Solution, Waste-Water, Removal, Phosphorus, Carbon

Matsumoto, M.R., Jensen, J.N., Reed, B.E. and Lin, W. (1996), Physicochemical processes. *Water Environment Research*, **68** (4), 431-450.

Full Text: [1996\Wat Env Res68, 431.pdf](1996/Wat%20Env%20Res68,%20431.pdf)

? Lin, W. and Reed, B.E. (1996), Electronics and metal finishing and processing. *Water Environment Research*, **68** (4), 538-542.

Full Text: [1996\Wat Env Res68, 538.pdf](1996/Wat%20Env%20Res68,%20538.pdf)

Reed, B.E., Jamil, M. and Thomas, B. (1996), Effect of pH, empty bed contact time and hydraulic loading rate on lead removal by granular activated carbon columns. *Water Environment Research*, **68** (5), 877-882.

Full Text: [1996\Wat Env Res68, 877.pdf](1996/Wat%20Env%20Res68,%20877.pdf)

Abstract: Batch and column studies were performed to determine the effect of pH, empty bed contact time (EBCT) and hydraulic loading rate (HLR) on lead removal by granular activated carbon (GAC) columns. Lead removal increased with increasing pH and for the majority of the adsorbate: adsorbent ratios investigated, was 100 % at pHs < pHprec. Column pH was extremely important to lead removal in GAC columns. A simple acid-base regeneration procedure was found to be effective in desorbing/resolubilizing the carbon-bound lead and raising the pH for the subsequent treatment run. Regeneration efficiencies were often less than 100%, but column performance was not adversely affected. For 1 mg/L lead, the optimum EBCT was between 6 and 7 minutes, whereas for 10 mg/L lead it was less than 10 minutes. The effect of HLR (4.9 and 9.8 m/hr) on column performance was minimal for 1 mg/L lead, whereas at 10 mg/L lead column removal was slightly better at the higher HLR. Carbon usage rates were higher than those observed for wastewaters containing organic contaminants, especially at 10 mg/L lead. However, given the relatively simple regeneration scheme, the applicability of GAC columns for metal-bearing wastewaters appears to be technically feasible.

? Kuhlmeier, P.D. and Sherwood, S.P. (1996), Treatability of inorganic arsenic and organoarsenicals in groundwater. *Water Environment Research*, **68** (5), 946-951.

Full Text: [1996\Wat Env Res68, 946.pdf](1996/Wat%20Env%20Res68,%20946.pdf)

Abstract: A 2-year three-phase study into methods for treatment of mixed inorganic and organic arsenic species to drinking water levels was conducted at a former pesticide facility in Houston, Tex. The species present include monomethylarsinic acid, dimethylarsinic acid, arsenate, and arsenite. Phase One studies reported here included the evaluation of four adsorbents using bottle roll and column flow through techniques, oxidation through the application of Fenton’s reagent followed by coprecipitation, coprecipitation without oxidation, and ultraviolet (UV)/ozone tests. The four adsorbents tested were activated carbon, activated alumina, ferrous sulfide, and a strongly basic ion exchange resin. All adsorbents removed some arsenic, but none except ferrous sulfide was sufficiently effective to warrant follow-up studies. Two small ferrous sulfide column rests, run under different conditions, removed arsenic but not to the levels and loading capacities needed to make this method practical. Organic compound destruction was tested using Fenton’s reagent (a mixture of hydrogen peroxide and ferrous iron) before coprecipitation. Arsenic was reduced to 170 ppb in the treated liquor. Coprecipitation without oxidative pretreatment produced a liquor containing 260 ppb arsenic. A two-stage Fenton-type coprecipitation procedure produced a supernatant containing 110 ppb total arsenic. Preliminary tests with a second-stage oxidative process, using ozone and UV radiation, showed approximately 80% destruction of an organic-arsenic surrogate (cacodylic acid) in 1 hour.

Keywords: Arsenic, Arsenate, Arsenite, Monomethylarsinic Acid, Dimethylarsinic Acid, Wastewater, Groundwater, Treatment, Adsorption, Ion Exchange, Coprecipitation, Removal, Water

Baker, J.R., Mihelcic, J.R., Luehrs, D.C. and Hickey, J.P. (1997), Evaluation of estimation methods for organic carbon normalized sorption coefficients. *Water Environment Research*, **69** (2), 136-145.

Full Text: [W\Wat Env Res69, 136.pdf](W/Wat%20Env%20Res69,%20136.pdf)

Abstract: A critically evaluated set of 94 soil water partition coefficients normalized to soil organic carbon content (K-oc) is presented for 11 classes of organic chemicals. This data set is used to develop and evaluate K-oc estimation methods using three different descriptors. The three types of descriptors used in predicting K-oc were octanol/water partition coefficient (K-ow), molecular connectivity ((m) chi(t)), and linear solvation energy relationships (LSERs). The best results were obtained estimating K-oc from K-ow, though a slight improvement in the correlation coefficient was obtained by using a two-parameter regression with K-ow and the third order difference term from (m) chi(t). Molecular connectivity correlations seemed to be best suited for use with specific chemical classes. The LSER provided a better fit than (m) chi(t) but not as good as the correlation with K-ow. The correlation to predict K-oc from K-ow was developed for 72 chemicals; log K-oc = 0.903\* log K-ow + 0.094. This correlation accounts for 91% of the variability in the data for chemicals with log K-ow ranging from 1.7 to 7.0. The expression to determine the 95% confidence interval on the estimated K-oc is provided along with an example for two chemicals of different hydrophobicity showing the confidence interval of the retardation factor determined from the estimated K-oc. The data showed that K-oc is not likely to be applicable for chemicals with log K-ow < 1.7. Finally, the K-oc correlation developed using K-ow as a descriptor was compared with three nonclass-specific correlations and two ‘commonly used’ class-specific correlations to determine which method(s) are most suitable.

Keywords: Adsorption, Sorption, Partition Coefficient K-Oc, Groundwater, Molecular Connectivity, Lser, Qsar, Octanol-Water, Solvation Energy Relationships, Polycyclic Aromatic-Hydrocarbons, Water Partition-Coefficients, Soil Sorption, Solvatochromic Parameters, Molecular Connectivity, Pollutant Sorption, Natural Sediments, Adsorption, Prediction

Singh, G. and Prasad, B. (1997), Removal of ammonia from coke-plant wastewater by using synthetic zeolite. *Water Environment Research*, **69** (2), 157-161.

Full Text: [W\Wat Env Res69, 157.pdf](W/Wat%20Env%20Res69,%20157.pdf)

Abstract: Ammonia is discharged at significant concentrations in coke-plant effluents and can adversely impact freshwater-receiving streams. This article reports on the removal of ammonia from such wastewaters by using synthetic zeolites. Factors affecting the ammonium exchange capacity included the contact time, the concentration of ammonia in the solution, the particle size of the zeolites, the loading flow rates, and the number of regenerations of zeolite. The 13X molecular sieve has also been tested for its capacity to remove ammonia from coke-plant secondary wastewater. Results indicate that the ammonium adsorption rate increases with an increase in the contact time of zeolite with ammonia solution. Smaller particle size of the zeolite, increase in ammonium concentration, and lower loading flow rate elevate ammonium exchange capacity for the zeolite. Regeneration of the zeolite with NaCl solution reactivates the zeolite column, and repeated column regeneration is possible without loss of ammonium uptake capacity.

Keywords: Adsorption, Ammonia, Coke Plant, Treatment, Zeolite

Casson, L.W., Ritter, M.O.D., Cossentino, L.M. and Gupta, P. (1997), Survival and recovery of seeded HIV in water and wastewater. *Water Environment Research*, **69** (2), 174-179.

Full Text: [W\Wat Env Res69, 174.pdf](W/Wat%20Env%20Res69,%20174.pdf)

Abstract: Acquired Immunodeficiency Syndrome (AIDS) is one of the major public health concerns in the world today. The Human Immunodeficiency Virus (HIV), the causative agent of AIDS, has been isolated from blood, semen, and other body fluids as well as excretions from infected individuals as both free virions, cell-free virus, and as productively infected cells, cell-associated virus. These body fluids and excretions, when discharged into wastewater collection systems, may contribute to the presence of HIV in wastewater. This raw wastewater, which may contain HIV, passes through wastewater treatment systems and may pose a potential health threat to wastewater treatment plant workers. The objectives of this research were to develop a better understanding of the survival of cell-associated HN in wastewater and to develop reliable methods for the concentration and recovery of HIV from wastewater. Casson et al. (1992) reported survival of cell-free HIV in primary and secondary effluent less than or equal to 12 h followed by a reduction in titer 1-to 2-log in 24-48 hr. The infectivity of cell-associated HIV was observed to be reduced rapidly after exposure to distilled water. However, a subpopulation of cell-associated HIV was observed to remain stable through 48 h and remain infectious for less than or equal to 96 h in distilled water. Preliminary results indicate that cell-associated HIV infectivity in nonchlorinated secondary effluent was less stable than in distilled water. Using a bentonite adsorption-elution procedure, the authors have been able to recover HIV from distilled water and primary and secondary effluent at an efficiency of 30-50% to achieve an 8-to 10-fold concentration depending on the initial HIV concentration. The bentonite-adsorption elution procedure combined with RT-PCR amplification provided a highly sensitive procedure for the detection of HIV in water and wastewater as low as one HIV particle per 25 ml.

Keywords: Human-Immunodeficiency-Virus, Nucleic-Acids, Aids, Detection, Health, HIV, Survivability, Virus, Wastewater, Water

Sabbah, I. and Rebhun, M. (1997), Adsorption-desorption of trichlorophenol in water-soil systems. *Water Environment Research*, **69** (5), 1032-1038.

Full Text: [W\Wat Env Res69, 1032.pdf](W/Wat%20Env%20Res69,%201032.pdf)

Abstract: Adsorption-desorption of trichlorophenol (TCP) on calcium montmorillonite (pure clay), prepared montmorillonite-humic complexes. and natural soils were investigated. Adsorption followed a Freundlich-type isotherm between 5 and 30 mg/L of TCP, and linear adsorption isotherms were obtained for equilibrium concentrations up to 7 mg/L. Linear correlations were obtained between sorption constants (K-p) and organic carbon (f(oc)) and clay-mineral content (f(m)). In the montmorillonite and montmorillonite-humic complex systems, adsorption and desorption isotherms coincided and no hysteresis was observed. Strong hysteresis was observed in adsorption-desorption in natural soils. The different behavior in adsorption-desorption was explained by the different nature of organic matter, its different structure, and interaction with the mineral fraction. Because trichlorophenol is a weak acid, adsorption highly depended on pH and could be predicted by combining the adsorption constant of undissociated TCP and the dissociation constant of phenol-phenolate.

Keywords: Adsorption, Clay, Desorption, Organic Carbon, Remediation, Soil, Trichlorophenol, Organic-Chemicals, Natural Sediments, Aquifer Materials, Porous-Media, Sorption, Equilibrium, Pollutants, Matter

Grady, C.P.L., Magbanua, B.S., Brau, S. and Sanders, R.W. (1997), A simple technique for estimating the contribution of abiotic mechanisms to the removal of synthetic organic chemicals by completely mixed activated sludge. *Water Environment Research*, **69** (7), 1232-1237.

Full Text: [W\Wat Env Res69, 1232.pdf](W/Wat%20Env%20Res69,%201232.pdf)

Abstract: Estimation of the contribution of abiotic removal mechanisms, such as volatilization and sorption, to the overall removal of a synthetic organic chemical (SOC) by the activated-sludge process is often necessary. Recognition that the only effect of the abiotic mechanisms is to reduce the concentration of biomass involved in the biodegradation of the SOC provides the means for estimating; that contribution. Knowledge of the fraction of the influent SOC concentration remaining in the effluent, the hydraulic and solids retention limes, the mixed liquor suspended solids concentration, the volatilization rate coefficient, and the sorption coefficient allows rapid computation of the fractional removal resulting from the abiotic mechanisms.

Keywords: Abiotic Removal, Activated Sludge, Sorption, Synthetic Organic Chemicals, Volatilization, Estimating Emissions, Surface Aeration, 20 VOCs

? Dutta, N.N., Borthakur, S. and Baruah, R. (1998), A novel process for recovery of phenol from alkaline wastewater: Laboratory study and predesign cost estimate. *Water Environment Research*, **70** (1), 4-9.

Full Text: [1998\Wat Env Res70, 4.pdf](1998/Wat%20Env%20Res70,%204.pdf)

Abstract: A novel process for recovery of phenol from alkaline wastewater has been demonstrated at laboratory scale. The process is based on the polymer-supported phase-transfer-catalyzed reaction of alkaline phenols with benzoyl chloride dissolved in toluene. The reaction conducted in a triphase system at room temperature generates phenyl benzoate, which is subsequently recovered as the product. Phosphonium ion immobilized on chloromethyl polystyrene crosslinked with divinylbenzene was used as the catalyst. Laboratory experiments were conducted in a batch slurry reactor and a fixed-bed reactor to assess the suitability of a particular reactor type to practical applications.

An aqueous phase to organic phase volume ratio of 1:2 was found to be suitable. The slurry reactor was found to be more attractive for the reaction. Based on the result of experiments in batch slurry reactors and other processing steps, a conceptual flow scheme was proposed for the process, and a predesign cost estimate was made. As such, the treatment cost of the proposed process is higher than that of the usual solvent extraction process, but the capital cost is comparable. However, the cost of the recovered phenyl benzoate will more than offset the higher treatment cost. This is reflected in a payback period of 1.5 years for the proposed process as compared to 2.5 years for the typical solvent extraction process. For industrial applications, a pilot-plant study needs to be performed for a detailed cost analysis.

Keywords: Phenol Recovery, Batch Slurry Reactions, Fixed-Bed Reactors, Absorption, Air Stripping, Membrane Separation, Costs, Dephenolization Scheme, Substances, Stream

Bulloch, J.L., Hand, D.W. and Crittenden, J.C. (1998), A model for predicting contaminant removal by adsorption within the international space station water processor: 1. Multicomponent equilibrium modeling. *Water Environment Research*, **70** (1), 14-26.

Full Text: [W\Wat Env Res70, 14.pdf](W/Wat%20Env%20Res70,%2014.pdf)

Abstract: A thermodynamic model is developed to predict adsorption equilibrium in the International Space Station water processor’s multifiltration beds. The model predicts multicomponent adsorption equilibrium behavior using single-component isotherm parameters and fictitious components representing the background matrix. The fictitious components are determined by fitting total organic carbon and tracer isotherms with the ideal adsorbed solution theory. Multicomponent isotherms using a wastewater with high surfactant and organic compound concentrations are used to validate the equilibrium description on a coconut-shell-based granular activated carbon (GAG), coal-based GAG, and a polymeric adsorbent.

Keywords: Multi-Solute Adsorption, Thermodynamics, Multifiltration Bed, Multicomponent Adsorption, Isotherm, Equilibrium

Flanagan, W.P. (1998), Biodegradation of dichloromethane in a granular activated carbon fluidized bed reactor. *Water Environment Research*, **70** (1), 60-66.

Full Text: [W\Wat Env Res70, 60.pdf](W/Wat%20Env%20Res70,%2060.pdf)

Abstract: A biological fluidized-bed reactor (FBR) containing biomass attached to granular activated carbon (GAG) was investigated for the treatment of aqueous-phase dichloromethane (DCM). The system was directly inoculated with fresh biomass solids collected from a General Electric Plastics wastewater treatment facility, located in Mount Vernon, Indiana. The biomass consumed DCM as its sole carbon and energy source following an acclimation period of approximately 8 days. Dichloromethane biodegradation rates in excess of 40 kg/m3d were achieved during continuous operation, with no detectable DCM (< 1 mg/L) in the process effluent. Steady-state data were collected to enable process scale-up. This study confirmed that the biological GAC FBR is an environmentally acceptable waste treatment configuration for the destruction of aqueous-phase DCM.

Keywords: Waste, Water, Dichloromethane, Methylene Chloride, Biodegradation, Fluidized-Bed Reactor, Activated-Sludge Inoculation, Granular Activated Carbon Adsorption

Kuo, J.F., Stahl, J.F., Chen, C.L. and Bohlier, P.V. (1998), Dual role of activated carbon process for water reuse. *Water Environment Research*, **70** (2), 161-170.

Full Text: [W\Wat Env Res70, 161.pdf](W/Wat%20Env%20Res70,%20161.pdf)

Abstract: Four granular activated carbon (GAC) filters went into service in 1977 at the County Sanitation Districts of Los Angeles County’s Pomona Water Reclamation Plant to treat 0.44 m3/s (10 mgd) of wastewater for reuse. This article provides long-term operational information for similar water reuse applications. The GAC filters successfully served dual roles as tertiary filters and adsorbers of organics. After 10 regenerations with an average 10% makeup of virgin carbon per regeneration, the iodine number dropped from 1 000 mg/g to a leveled-off value of 600 mg/g; the molasses number increased from 170 to 250; apparent density decreased slightly; and mean particle diameter decreased from 1.65 mm to 1.2 mm. The ash content increased steadily from the initial 6.5% to more than 15% after 15 regenerations. After 20 regenerations, the GAC filters still exerted a total organic carbon removal from more than 80% initially to a level of 20%. The removal of true color by the regenerated carbon decreased from 90% initially to 30%. With the provisions of an afterburner and a wet Venturi scrubber, the air emissions from the carbon regeneration facility were effectively controlled. The energy and labor costs become the dominant operation and maintenance costs as the regeneration frequency increases.

Keywords: Activated Carbon, Water Reuse, Filtration, Adsorption, Tertiary Treatment

Yum, K.J. and Peirce, J.J. (1998), Biodegradation kinetics of chlorophenols in immobilized-cell reactors using a white-rot fungus on wood chips. *Water Environment Research*, **70** (2), 205-213.

Full Text: [W\Wat Env Res70, 205.pdf](W/Wat%20Env%20Res70,%20205.pdf)

Abstract: This research investigated the ability of wood-chip reactors seeded with a white-rot fungus (Phanerochaete chrysosporium) to degrade hazardous substances (4-chlorophenol [4-CP] and 2,4-dichlorophenol [2,4-DCP]). Batch-reactor tests were conducted using 4-CP as a model compound to evaluate the effect of carbon and nitrogen deficiencies on the ability of white-rot fungus immobilized on wood chips to degrade 4-CP. The white-rot fungus degraded 4-CP (71.1 to 83.0%) under all tested conditions including the non-glucose and non-nitrogen conditions. However, there are differences in the degradation percentage of 4-CP using the different growing conditions. The degradation of 4-CP occurs to the greatest extent in the non-glucose/with-nitrogen condition (15.38 ppm/h . g of specific biodegradation rate). Continuous-flow packed-bed reactor tests are conducted using 2,4-DCP as a model compound to evaluate the inhibition effect of 2,4-DCP on the biodegradation enzymes in wood-chip reactor systems, and the inhibition effects seem to be present. The inhibition kinetics of 2,4-DCP are successfully modeled with the mass-balance equation of plug-flow reactors and a substrate-inhibition equation for the reaction rate, yielding an inhibition constant, K-i of 69.8 ppm and a maximum 2,4-DCP concentration, [S](max), of 48.9 ppm at the highest reaction rate. The importance of these results is that the substrate-inhibition model can be used to explain the inhibition effect of 2,4-DCP on the biodegradation enzymes in this wood-chip reactor system. This study points to the potential of continuous-flow reactors using wood chips as a carbon source to degrade toxic chemicals with high-degradation efficiency.

Keywords: Wood-Chip Reactor, White-Rot Fungus, 4-Chlorophenol, 2,4-Dichlorophenol, Continuous-Flow Packed-Bed Reactor, Substrate-Inhibition Model, Basidiomycete Phanerochaete-Chrysosporium, Environmental-Pollutants, Manganese Peroxidases, Lignin Peroxidases, Degradation, 2-Chlorophenol, Parameters, System

Delgado, A., Anselmo, A.M. and Novais, J.M. (1998), Heavy metal biosorption by dried powdered mycelium of Fusarium flocciferum. *Water Environment Research*, **70** (3), 370-375.

Full Text: [W\Wat Env Res70, 370.pdf](W/Wat%20Env%20Res70,%20370.pdf)

Abstract: The biosorption capacity of dead biomass of Fusarium flocciferum for copper (Cu), cadmium (Cd), and nickel (Ni) was studied with the aim of developing the basis for an industrial effluent treatment. It was verified that a Langmuir isotherm describes well the biosorption of cadmium and nickel, whereas copper showed a more irregular behavior. Estimated maximum uptake, Qmax, expressed as mgmetal/100 mgbiosorbent, was 19.2 for cadmium and 5.2 for nickel. Maximum reproducible values for copper biosorption were between 4 and 6 mg/100 mg. Ln this case, it was verified that process efficiency depends on the balance between biosorbent and metal initial concentrations. Studies with different contact times showed that the process was completed within a few minutes. No difference in biosorbent metal affinity was found for cell incubation periods ranging from 24 hours to 4 days, but the biosorbent obtained from older cultures showed a decrease in metal removal capacity. This biosorbent is prepared from a fast-growing fungus with low nutritional and physical requirements. It can be used to remove metals from very dilute solutions at neutral pH values, as in the final steps of heavy metal removal from industrial wastewaters.

Keywords: *Saccharomyces-Cerevisiae*, Binding, Adsorption, Cu(II), Biosorption, Fusarium Flocciferum, Fungus, Heavy Metals, Copper, Cadmium, Nickel, Adsorption

Wang, J.M., Huang, C.P., Allen, H.E., Takiyama, L.R., Poesponegoro, I., Poesponegoro, H. and Pirestani, D. (1998), Acid characteristics of dissolved organic matter in wastewater. *Water Environment Research*, **70** (5), 1041-1048.

Full Text: [W\Wat Env Res70, 1041.pdf](W/Wat%20Env%20Res70,%201041.pdf)

Abstract: The presence of dissolved organic matter (DOM) in a wastewater treatment system can significantly affect the uptake of heavy metals by sludge particulates. The characteristics of DOM, its concentration, and the solution pH are important parameters governing the heavy metals uptake reaction. The characteristics of DOM of various wastewater and sludge (primary, secondary, and tertiary) samples collected from four municipal wastewater treatment plants were investigated. Results showed that the dissolution of DOM from sludge is significantly affected by pH and suspended solids concentration. Results also showed that DOM contains two discrete acid groups that are available for metals complexation. The site concentration and acidity constants were determined by an alkalimetric titration method. For all DOM samples studied, the acidity constants, pK(aA) and pK(aB), were 5.3 and 9.5, respectively. Based on the acidity constants and the Fourier transform infrared spectra, it is believed that the acid sites consist of carboxylic and amino functional groups. The density of the first acid site was approximately 10-5 mol/mg chemical oxygen demand for all samples studied. However, the density of the second acid site varied significantly among the DOM samples investigated.

Keywords: Wastewater, Sludge, Dissolved Organic Matter, Acid Sites, Acidity Constants, Functional Groups, Heavy Metals, Heavy-Metals, Activated-Sludge

? Lee, M.W. and Park, J.M. (1998), Biological nitrogen removal from coke plant wastewater with external carbon addition. *Water Environment Research*, **70** (5), 1090-1095.

Full Text: [1998\Wat Env Res70, 1090.pdf](1998/Wat%20Env%20Res70,%201090.pdf)

Abstract: Coke plant wastewater containing high concentrations of ammonia and toxic compounds such as phenol and cyanide was treated using a biological nitrogen removal (BNR) system comprising carbon removal, nitrification, and dentrification stages. The objective of this study was to investigate the feasibility of complete ammonia removal from the coke plant wastewater using a sequential BNR process with external carbon addition. Sodium acetate was introduced as an external carbon source to the denitrification stage after oxidation of phenol and other carbonaceous compounds in the carbon-removal stage. The efficiency of denitrification was strongly affected by the loading rate of the external carbon source, and its optimal rate was determined based on the ratio of chemical oxygen demand to nitrate- and nitrite-nitrogen (COD:NOx-N) of the denitrification stage. The overall removal efficiency of major soluble pollutants in the wastewater was greater than 95% in the BNR system. When a step input of phenol was introduced to check the stability of the overall system, the nitrification was markedly inhibited because of the incomplete degradation of phenol in the carbon-removal stage. However, after this brief inhibition, the nitrification stage recovered to its normal efficiency within 18 days.

Keywords: Biological Nitrogen Removal System, Carbon Addition, Coke Plant Wastewater, Cyanide, Degradation, Denitrification, External Carbon Addition, Nitrate, Nitrification, System Stability, Wastewater, Water

Daigger, G.T. and Sadick, T.E. (1998), Evaluation of methods to detect and control nitrification inhibition with specific application to incinerator flue-gas scrubber water. *Water Environment Research*, **70** (7), 1248-1257.

Full Text: [W\Wat Env Res70, 1248.pdf](W/Wat%20Env%20Res70,%201248.pdf)

Abstract: Two procedures for determining the maximum specific growth rate of nitrifying bacteria in the presence of inhibitors were evaluated. One procedure uses a population of nitrifying bacteria and a short-term (6-hour) batch assay to determine the impact of the test wastewater on the maximum specific growth rate of the nitrifiers. The difference in the specific nitrification rate for the subject population between a control and the test wastewater quantifies the effect of the constituents in the test wastewater on the nitrifier maximum specific growth rate. The second procedure uses batch fill-and-draw bioreactors operated under steady-state conditions to determine the minimum mean cell residence time for growth of the nitrifiers. The need to assess nitrification inhibition at two large municipal wastewater treatment plants provided the opportunity to evaluate these two procedures. Incineration of biosolids is practiced at both of these plants, and it was shown that in-plant recycle of the multiple-hearth flue-gas scrubber water can be inhibitory to nitrification. Results from extensive testing indicated that hydrocyanic acid (HCN), present in the scrubber water, is the probable inhibitor. Consistent results were obtained at both plants. They indicated that HCN concentrations on the order of 0.1 to 0.2 mg/L resulted in a reduction in the nitrifier maximum specific growth rate of approximately 50[percent]. Treatment methods were evaluated at each plant and implemented. At one plant, aerobic biological treatment of the incinerator sidestream is being practiced. At the other facility, cyanide is thermally destroyed in afterburners before contact with the wet scrubbing system.Reprinted by permission of the publisher.

Guibal, E., Milot, C. and Roussy, J. (1999), Molybdate sorption by cross-linked chitosan beads: Dynamic studies. *Water Environment Research*, **71** (1), 10-17.

Full Text: [W\Wat Env Res71, 10.pdf](W/Wat%20Env%20Res71,%2010.pdf)

Abstract: Chitosan, a biopolymer extracted from crustacean shells, exhibits high sorption capacities for metal ion recovery. Sorption efficiency and removal rates are controlled by several diffusion mechanisms. Chitosan gel beads have been prepared and have shown enhanced sorption performance in batch systems. This study shows that, in continuous systems. sorption capacities can reach 700 mg/g, a level close to that obtained in batch studies. The effects of metal concentration, how velocity, and column size are investigated and demonstrate that, because of diffusion mechanisms, the optimum concentration range is approximately 50 to 100 mg/L. In column systems, the Blot number, though greater than 1, is lower than the Blot number obtained in batch systems, indicating that external mass transfer influences mass transfer at the low superficial velocity investigated in this work (0.5 to 2 m/h).

Keywords: Metal-Ions, *Rhizopus-arrhizus*, Aqueous-Solutions, Calcium Alginate, Uranyl Ions, Equilibrium, Biosorption, Adsorption, Diffusion, Cadmium, Molybdate, Chitosan, Gel Beads, Diffusion, Adsorption, Dynamic Removal, Flow Velocity, Column Depth, Concentration Effect

Min, J.H. and Hering, J.G. (1999), Removal of selenite and chromate using iron(III)-doped alginate gels. *Water Environment Research*, **71** (2), 169-175.

Full Text: [W\Wat Env Res71, 169.pdf](W/Wat%20Env%20Res71,%20169.pdf)

Abstract: Oxyanionic contaminants, specifically selenium and chromium(VI), were removed from solution by sorption onto gel beads formed by pretreating the biopolymer alginic acid with calcium and iron(III). The calcium-iron gel beads were found to be effective at removing selenium(IV) from solution. Chromium(VI) removal was less effective and the rate of sorption was slower than that of selenium(IV). Al an initial selenium(IV) concentration of 400 µg/L (5.1 µM), UP to approximately 94% removal of selenium from solution was achieved by a 120-hour equilibration with 20 calcium-iron beads (10 mg/L or 180 µM total iron). Optimal selenium(IV) removal and stability of the calcium-iron beads were achieved at pH 4. Selenium(IV) sorption and kinetics data were comparable with those observed previously for arsenic(V). Selenium(IV) sorption data, as a function of dissolved concentration and iron content, were modeled. As calcium-iron beads became saturated, the extent of sorption of selenium(IV) or arsenic(V) was decreased by the presence of competing contaminant oxyanions or nonhazardous inorganic anions such as phosphate.

Keywords: Oxyanion, Selenite, Chromate, Biopolymer, Alginate, Gel Bead, Iron(III)-Doped, Removal, Wastewater, Waste-Water, Hexavalent Chromium, Adsorption, Oxide, Acid, Generation, Reduction, Hydroxide, Sorption, Recovery

Tokunaga, S., Yokoyama, S. and Wasay, S.A. (1999), Removal of arsenic(III) and arsenic(V) ions from aqueous solutions with lanthanum(III) salt and comparison with aluminum(III), calcium(II), and iron(III) salts. *Water Environment Research*, **71** (3), 299-306.

Full Text: [W\Wat Env Res71, 299.pdf](W/Wat%20Env%20Res71,%20299.pdf)

Abstract: Interactions of arsenic(III) and arsenic(V) ions with a lanthanum salt were studied with the aim of developing a new precipitation method for removal of arsenic from aqueous solutions. Performance was compared to those of aluminum? polyaluminum chloride (PAC), calcium, and iron(III) salts. Arsenic(III) was removed by iron(LII) and lanthanum in a narrow pH range with less than 60% removal. Arsenic(V) was removed more efficiently by aluminum, PAC, iron(III), and lanthanum. Lanthanum was most effective, meeting Japanese effluent and drinking water standards by adding three times as much lanthanum as arsenic(V). The stoichiometry and X-ray diffraction measurement showed that the precipitation reactions are

La3+ + H2AsO4- --> LaASO4 + 2H(+) (pH 5) (1)

and

La3+ + HAsO4- --> LaAsO4 + H+ (pH 9) (2)

The solubility product of lanthanum arsenate, LaAsO4, was calculated to be 1.07±0.03 x 10(-21).

Keywords: Arsenic(V), Arsenic(III), Lanthanum, Iron(III), Aluminum, Calcium, Precipitation, Removal, Solubility Product, Kinetics, Drinking-Water, Precipitation, Arsenate

Sperry, J.M. and Peirce, J.J. (1999), Ion exchange and surface charge on montmorillonite clay. *Water Environment Research*, **71** (3), 316-322.

Full Text: [W\Wat Env Res71, 316.pdf](W/Wat%20Env%20Res71,%20316.pdf)

Abstract: An ion-exchange model originally developed for pure oxides prepared in the laboratory is extended to study of ion exchange and surface charge on a naturally occurring montmorillonite clay. The range of surface charges (-2.0×10-6 to 0 mol/m2) measured for montmorillonite with various electrolyte solutions and clay pretreatments is within the range of those measured for a wide variety of oxides prepared in the laboratory (-6.0×10-6 to 1.0×10-7 mol/m2), including MnO2-IC1, MnO2-IC12, MnO2-IC22, titanium dioxide, ferric oxide, and aluminum oxide. In addition, fitted parameter values for lateral interaction constants and equilibrium constants for the acid sites that characterize ion exchange on montmorillonite are on the same order of magnitude as those obtained for pure oxides. Surface charge of montmorillonite in sodium nitrate solution is measured to be approximately 15 to 25% greater than that measured between a pH of 4 and 9 in calcium chloride solution. This difference is attributed to the greater charge on the calcium (2(+)) ion; thus, its stronger electrostatic attraction to the acid hydroxyl site. An order of magnitude change in solids concentration (C-P) can lead to a difference in measured net surface charge density of the same oxide sample of several orders of magnitude. This difference increases at higher pH, indicating the importance of reporting the corresponding C-P at which experiments are conducted.

Keywords: Ion Exchange, Surface Charge, Hydrous Metal Oxides, Montmorillonite Clay, Particle Concentration, Acid-Base, Sorption, Adsorption, Systems, Sediments, Chemicals, Partition, Solids, Model

Reed, B.E., Matsumoto, M.R., Viadero, R., Segar, R.L., Vaughan, R. and Masciola, D. (1999), Physicochemical processes. *Water Environment Research*, **71** (5), 584-618.

Full Text: [W\Wat Env Res71, 584.pdf](W/Wat%20Env%20Res71,%20584.pdf)

Abstract: A review of physicochemical processes in water treatment systems is presented. The topics addressed are air stripping, filtration, precipitation, coagulation/flocculation, sedimentation/flotation, sorption of organics, sorption of inorganics, oxidation, reduction, and membrane processes.

Keywords: Waste-Water Treatment, Cross-Flow Microfiltration, Natural Organic-Matter, Micellar-Enhanced Ultrafiltration, Hollow-Fiber Modules, Heavy-Metal Ions, Advanced Oxidation Processes, Membrane Separation Process, Powdered Activated Carbon, Dilute Aqueous-Solutions

Poggi-Varaldo, H.M. (1999), Agricultural wastes. *Water Environment Research*, **71** (5), 737-785.

Full Text: [W\Wat Env Res71, 737.pdf](W/Wat%20Env%20Res71,%20737.pdf)

Abstract: A review of the treatment of agricultural wastes is presented. The topics addressed are waste characterization and analysis, agricultural pollution and environmental impact, waste recycling and reuse, and agricultural waste treatment.

Keywords: Municipal Solid-Waste, Spent Pig Litter, Nitrous-Oxide Emissions, Soil Organic-Matter, *Cyanobacterium Cylindrospermum Sp*, Chromatography Mass-Spectrometry, Factors Affecting Degradation, Sustainable Food-Production, Linked-Immunosorbent-Assay, Ecological Risk Assessment

Pascucci, P.R. and Kowalak, A.D. (1999), Metal distributions in complexes with *Chlorella vulgaris* in seawater and wastewater. *Water Environment Research*, **71** (6), 1165-1170.

Full Text: [W\Wat Env Res71, 1165.pdf](W/Wat%20Env%20Res71,%201165.pdf)

Abstract: Divalent cadmium (Cd), copper (Cu), iron (Fe), nickel (Ni), lead (Pb), and zinc (Zn) simultaneous complexes with an algal biomass *Chlorella vulgaris* were studied for bioremediation purposes in various aqueous media: distilled-deionized water (DDIW), seawater, nuclear-reactor pool water, and process wastewater. Reactions were monitored using various dry masses of algae (2 to 12 mg) at constant temperature (20 to 22°C) and constant metal concentrations for reaction times ranging from 0 to 150 minutes. Complexes occurred within 30 minutes and reached a steady state after 80 to 120 minutes. Distribution constants (K-d’) were calculated for the complexes and relative orders of K-d’ were reported. The K-d’ are used to evaluate relative efficiency of metal remediation from waters. Lead, Cu, and Ni complexes had the greatest K-d’ values and those metals were most efficiently removed from these waters. Zinc and Fe formed the most labile complexes. The order of K-d’ values for complexes in DDIW was Pb > Cu > Cd > Zn, then Cu > Cd > Zn in seawater, Cd > Cu > Zn in reactor pool water, and Ni > Cd > Cu > Zn > Fe in wastewater. *C. Vulgaris* biomass may potentially be used as an alternative to traditional water treatment methods for simultaneous extraction of metals from seawater, process wastewater, or drinking water.

Keywords: Simultaneous Multielement, Stichococcus-Bacillaris, Atomic-Absorption, Algal Biomass, Adsorption, Binding, Cadmium, Simultaneous Extraction, Metals, Distribution, Constants, Complexation, Algae, Remediation

Han, I., Schlautman, M.A. and Batchelor, B. (2000), Removal of hexavalent chromium from groundwater by granular activated carbon. *Water Environment Research*, **72** (1), 29-39.

Full Text: [W\Wat Env Res72, 29.pdf](W/Wat%20Env%20Res72,%2029.pdf)

Abstract: Removal of hexavalent chromium, Cr(VI), from an artificial groundwater by two commercially available granular activated carbons (GACs) was investigated in batch and continuous-flow column studies. Experimental parameters examined included solution pH, presence of dissolved oxygen (DO), and GAC pretreatment with reducing agents. As solution pH increased from 4 to 7.5, the amount of Cr(VI) removed by both GACs decreased significantly. Removal of DO from experimental systems enhanced GAC performance, but pretreatment of the GACs with reductants (ferrous iron or dithionite) did not improve Cr(VI) removal. Equilibration with 0.01 M dibasic potassium phosphate [to extract adsorbed Cr(VI)] followed by a wash with 0.02 N sulfuric acid [to remove precipitated-sorbed Cr(III)] proved to be a viable method to regenerate carbons whose Cr(VI) removal capacities were exhausted. Performance of regenerated carbons exceeded that of virgin carbons, primarily because of the favorable adsorption of Cr(VI) at low pH values and the reduction of Cr(VI) to Cr(III) on acidic GAC surfaces. The presence of Cr(III) in acid wash solutions provides direct evidence that Cr(VI) is reduced to Cr(III) in GAC systems under relatively acidic conditions. Granular activated carbon performance during five complete cycles was consistently high, which suggests that such a system will be able to function over many operation cycles without deleterious effects.

Keywords: Adsorption, Activated Carbon, Chromium, pH Effects, Pre-Treatment, Dissolved Oxygen, Extraction, Acid Washing, Reduction, Regeneration, Organic Macromolecules, Chromate Adsorption, Solution Chemistry, Dissolved-Oxygen, Reduction, Sorption, Soils, Extraction, Oxidation, Cr(VI)

Quintal, I.D.B., Correa, H.E.S., Cortés, C.G., Pérez, P.A. and García, J.A. (2000), Determination of cadmium and lead species in the water column of the Jose Antonio Alzate Reservoir, Mexico. *Water Environment Research*, **72** (2), 132-140.

Full Text: [W\Wat Env Res72, 132.pdf](W/Wat%20Env%20Res72,%20132.pdf)

Abstract: Contamination by dissolved cadmium and lead was studied at two different depths at four sites of the Jose Antonio Alzate Reservoir in central Mexico. Total dissolved levels were found to be between 0.3 and 0.6 µg/L for cadmium and between 2.1 and 4.8 µg/L for lead. Chemical dissolved speciation showed primarily inorganic lead species, whereas cadmium species were detected in both inorganic and organic fractions. Most of the lead and cadmium species were removable by cationic exchange. No specific distribution trend was noted for the metalspecies in the reservoir, although a difference between the surface and bottom samples resulted from physical and chemical factors. Sedimentation and adsorption seemed to help with the natural scavenging process of reservoir water metals.

Keywords: Trace-Metal, Physicochemical Speciation, Chelex-100, Cd, Water Reservoir, Contamination, Heavy Metals, Dissolved Chemical Speciation

Vidal, A. and Díaz, A.I. (2001), High-performance, low-cost solar collectors for disinfection of contaminated water. *Water Environment Research*, **72** (3), 271-276.

Full Text: [W\Wat Env Res72, 271.pdf](W/Wat%20Env%20Res72,%20271.pdf)

Abstract: Although the germicidal action of sunlight has long been recognized, its potential for practical applications has to be researched more thoroughly. This paper summarizes the progress made toward a commercially practical collector for solar disinfection applications. Nontracking compound parabolic collectors (CPCs), developed originally for capturing solar photons for thermal energy applications, were examined as potential solar photoreactors. A field demonstration of solar disinfection treatment using commercially manufactured solar reactors was conducted. Field tests showed successful destruction of *Escherichia* coti and *Enterococcus* faecalis and have provided data for full-scale design of water treatment systems. From above observations, a throughput value of 50 L/m2.h for the low-cost CPC reactor tested was estimated. For a 190 m2/d (0.05 MGD) facility. the estimated total costs for disinfection using UV-A is U.S. $0.19/m3 ($0.70/1000 gal). The use of near-UV sunlight to disinfect water supplies seems promising in rural communities of developing countries where treated water is unavailable.

Keywords: Disinfection, Fecal Contamination, Drinking Water Treatment, Solar Energy, Compound Parabolic Solar Collectors, Ultraviolet Disinfection, Indicator Bacteria, Inactivation, Radiation, Sunlight, Seawater, Area

Davis, A.P., Shokouhian, M., Sharma, H. and Minami, C. (2001), Laboratory study of biological retention for urban stormwater management. *Water Environment Research*, **73** (1), 5-14.

Full Text: [W\Wat Env Res73, 5.pdf](W/Wat%20Env%20Res73,%205.pdf)

Abstract: Urban stormwater runoff contains a broad range of pollutants that are transported to natural water systems. A practice known as biological retention (bioretention) has been suggested to manage stormwater runoff from small, developed areas. Bioretention facilities consist of porous soil, a topping layer of hardwood mulch, and a variety of different plant species.

A detailed study of the characteristics and performance of bioretention systems for the removal of several heavy metals (copper, lead, and zinc) and nutrients (phosphorus, total Kjeldahl nitrogen [TKN], ammonium, and nitrate) from a synthetic urban stormwater runoff was completed using batch and column adsorption studies along with pilot-scale laboratory systems. The roles of the soil, mulch, and plants in the removal of heavy metals and nutrients were evaluated to estimate the treatment capacity of laboratory bioretention systems. Reductions in concentrations of all metals were excellent (>90%) with specific metal removals of 15 to 145 mg/m2 per event. Moderate reductions of TKN, ammonium, and phosphorus levels were found (60 to 80%). Little nitrate was removed, and nitrate production was noted in several cases, The importance of the mulch layer in metal removal was identified. Overall results support the use of bioretention as a stormwater best management practice and indicate the need for further research and development.

Keywords: Biological Retention, Urban Stormwater Runoff, Treatment, Heavy Metals, Soil, Mulch, Plants, Pollutant Removal, Highway Runoff, Metals, Adsorption, Soils, Water, Ponds, Peat

Brown, P., Gill, S. and Allen, S.J. (2001), Determination of optimal peat type to potentially capture copper and cadmium from solution. *Water Environment Research*, **73** (3), 351-362.

Full Text: [W\Wat Env Res73, 351.pdf](W/Wat%20Env%20Res73,%20351.pdf)

Abstract: The focus of this study was to determine the optimum type of pear for application as a medium to capture dissolved metals from aqueous solution. Seventeen media were examined, including eleven Irish peat samples from various locations and stages in processing, a Northern Ireland lignite, peat and lignite chars, a commercial-grade bone char, and two commercial-grade granular activated carbons. Considerable variation in sorption capacity was found with a ratio of 20: 1 between the best-performing (bone char) and the poorest-performing (peat char) samples. Among the 14 varieties of peat, the best-performing sample outperformed the commonly investigated sphagnum moss by a ratio of 4: 1. A correlation has been established between cation exchange capacity. the presence of adsorbed calcium, and the uptake capacity of different peats. This correlation will he a valuable tool in choosing peat type for filter media for metals removal applications.

Keywords: Adsorption, Metals, Adsorbents, Peat, Lignite, Exchange, Moss, Removal, Metals, Acid

Rosenfeld, P.E. and Henry, C.L. (2001), Activated carbon and wood ash sorption of wastewater, compost, and biosolids odorants. *Water Environment Research*, **73** (4), 388-393.

Full Text: [W\Wat Env Res73, 388.pdf](W/Wat%20Env%20Res73,%20388.pdf)

Abstract: Odor emissions from wastewater treatment facilities and composting operations and land application of biosolids are priority concerns for wastewater engineers, compost operators, and biosolids managers. High carbon wood ash is a material produced by the pulp and paper industry and cogeneration energy producing facilities; although this material has been found to have characteristics similar to activated carbon, it is currently treated as waste and deposited in landfills. To control odors associated with wastewater and biosolids, activated carbon and wood ash were exposed to odorants that often are associated with biosolids and wastewater, including dimethyl disulfide, dimethyl sulfide, carbon disulfide, ammonia, trimethyl amine, acetone, and methyl ethyl ketone. The sorption materials included activated carbon containing 87% carbon and wood ash residuals containing 32, 27, 6, and 0.24% carbon, with surface areas of 520, 85, 74, 25, and 2.1 m2/g, respectively. This laboratory sorption experiment was undertaken to examine sorption efficiency and kinetics of chemical odorants by activated carbon and wood ash residuals. Results demonstrate that wood ash with higher carbon concentrations and higher surface areas sorbed odorants better than low-carbon ash. Furthermore, the 32 and 27% carbon wood ash possessed characteristics similar to activated carbon and were able to sorb odorous gases effectively.

Keywords: Biosolids, Wastewater, Wood Ash, Carbon, Odor, Sorption, Sulfur, Nitrogen, Dimethyl Disulfide, Ammonia, Acetone

? Lee, M.W., Park, Y.J., Park, J.M. and Chun, H.D. (2001), Control of external carbon addition in biological nitrogen removal process for the treatment of coke-plant wastewater. *Water Environment Research*, **73** (4), 415-425.

Full Text: [2001\Wat Env Res73, 415.pdf](2001/Wat%20Env%20Res73,%20415.pdf)

Abstract: An online monitoring and controlling system was developed for controlling external carbon addition in the biological nitrogen removal (BNR) process of a coke-plant wastewater treatment plant Two control regimes, on-off control and feed-forward control, were applied and their performances were compared under normal and abnormal nitrate (NO3--N) input conditions. The water quality of the final effluent was stably controlled under normal nitrate input conditions by using the on-off control algorithm that is connected to the effluent nitrate concentration. However, unexpected nitrite accumulation was observed under abnormal nitrate input conditions (i.e., sudden increase of nitrate concentration), resulting from chemical oxygen demand (COD) limitations during denitrification. On the contrary, the feedforward control algorithm more reliably controlled external carbon addition even under abnormal nitrate input conditions. The input COD/NO3-N was controlled between 3.55 and 3.62 during the operational period when the feed-forward algorithm was applied. Through trial and error, the optimum value of COD/NO3-N for denitrification was determined to be 3.59 in separate experiments.

Keywords: Chemical Oxygen Demand, Nitrate Ratio, Coke Plant Wastewater, Coke-Plant Wastewater, Denitrification, Dynamic Model, External Carbon Addition, Feed-Forward Control, Nutrient Removal, On-Off Control, Wastewater, Wastewater Treatment, Water

Koparal, A.S., Yavuz, Y. and Öğütveren, Ü.B. (2002), Electroadsorption of acilan blau dye from textile effluents by using activated carbon-perlite mixtures. *Water Environment Research*, **74** (6), 521-525.

Full Text: [W\Wat Env Res74, 521.pdf](W/Wat%20Env%20Res74,%20521.pdf)

Abstract: The feasibility of the removal of dye stuffs from textile effluents by electroadsorption has been investigated. An activated carbon-perlite mixture with a ratio of 8: 1 for bipolarity has been used as the adsorbent. Conventional adsorption experiments have also been conducted for comparison. A bipolar trickle reactor has been used in the electroadsorption experiments. The model wastewater has been prepared by using acilan blau dye. Initial dye concentration, bed height between the electrodes, applied potential, flowrate, and the supporting electrolyte concentration have been examined as the parameters affecting the removal efficiency. A local textile plant effluent has been treated in the optimum values of these parameters obtained from the experimental studies. Adsorption kinetics and the amount of adsorbent required to reach the maximum removal efficiency have also been investigated and mass-transfer coefficients have been calculated for adsorption and electroadsorption. The results showed that a removal efficiency of up to 100% can be achieved with energy consumption values of 1.58 kWh/m3 of wastewater treated. However. energy consumption decreases to 0.09 kWh/m3 if an exit dye concentration of 4.65 mg/L is accepted. It can be concluded from this work that this method combines all of the advantages of the activated-carbon adsorption and electrolytic methods for the removal of dyes from wastewater.

Keywords: Electroadsorption, Adsorption, Dye Stuffs Removal, Textile Effluents, Electrosorption

Kacha, S., Derriche, Z. and Elmaleh, S. (2003), Equilibrium and kinetics of color removal from dye solutions with bentonite and polyaluminum hydroxide. *Water Environment Research*, **75** (1), 15-20.

Full Text: [W\Wat Env Res75, 15.pdf](W/Wat%20Env%20Res75,%2015.pdf)

Abstract: Wastewater from the textile industry contains soluble dyes that are toxic and particularly difficult to remove. A promising low-cost treatment, however, is use of polyaluminum hydroxide associated with bentonite. At suitable conditions, this process is able to efficiently remove color from solutions containing mixtures of soluble acid azo dyes and produce easily settleable sludge. The removal mechanism, which is believed to involve adsorption or precipitation and weak pH variations, is not well understood. With the overall reaction being second order, two elementary first-order reactions could be assumed. The equilibrium removal is a decreasing. function of the temperature. However, this effect is weak and decreases when the dye concentration increases. At usual values of concentration in textile wastewater, this effect can be neglected. The resulting solid compound is particularly resistant to mechanical stress. Moreover, color was significantly released at pH greater than 8. Sodium ions have no influence on the compound stability, which reinforces the assumption of the involvement of an adsorption process.

Keywords: Color Removal, Flocculation, Adsorption, Textile Industry Effluents, Equilibrium, Kinetics, Effluents, Aluminum, Clay

Ofer, R., Yerachmiel, A. and Shmuel, Y. (2003), Marine macroalgae as bisorbents for cadmium and nickel in water. *Water Environment Research*, **75** (3), 246-253.

Full Text: [W\Wat Env Res75, 246.pdf](W/Wat%20Env%20Res75,%20246.pdf)

Abstract: Experimental studies showed that brown marine algae, Sargassum vulgaris and Padina pavonia, can be used to develop an efficient biosorbent for heavy metal removal from aqueous solutions. Sargassum vulgaris exhibited high uptake capacities for cadmium (0.9 to 1.1 mmol Cd/gr) and nickel (0.85 to 1 mmol Ni/gr) that are higher than those of other types of biomass and powdered activated carbon, while P. pavonia showed a broader range of nickel and cadmium uptake capacities (0.7 to 1 mmol Ni/gr and 0.8 to 1.1 mmol Cd/gr). The metal adsorption and desorption processes were rapid, with 70% of the sorption and desorption completed within 10 minutes. The equilibrium data for both algae fit well to Langmuir and Freundlich isotherm models. More than 90% desorption of adsorbed metals from the algae was achieved by hydrochloric acid and ethylenediaminetetraacetic acid (1:1 molar ratio). After eight to nine adsorption and desorption cycles, S. vulgaris showed a 15 to 35% decrease in metal uptake capacities; P. pavonia showed a higher decrease of 50 to 60%.

Keywords: Biosorption, Brown Marine Macroalgae, Heavy Metal Removal, Aqueous Solutions, Padina Pavonia, Sargassum Vulgaris, Heavy-Metal Biosorption, Azolla-Filiculoides, Pretreated Biomass, Sargassum Biomass, Rhizopus-Arrhizus, Aqueous-Solutions, Ion-Exchange, Removal, Algae, Lead

? Ahmad, R., Begum, S., Hoek, E.M.V., Karanfil, T., Genceli, E.A., Yadav, A., Trivedi, P. and Zhang, C.L. (2004), Physico-chemical processes. *Water Environment Research*, **76** (6), 823-1002.

Full Text: [2004\Wat Env Res76, 823.pdf](2004/Wat%20Env%20Res76,%20823.pdf)

Keywords: Waste-Water Treatment, Zero-Valent Iron, Activated Carbon Adsorption, Wet Air Oxidation, Agricultural Drainage Water, Hydroxyl Radical Generation, Particle-Size Distribution, Hydrophobic Cotton Fibers, Reverse-Osmosis Membranes, Ozone-Enhanced Oxidation

? Khan, E., Huang, C.P. and Reed, B.E. (2004), Hazardous waste treatment technologies. *Water Environment Research*, **76** (6), 1872-1966.

Full Text: [2004\Wat Env Res76, 1872.pdf](2004/Wat%20Env%20Res76,%201872.pdf)

Keywords: Polycyclic Aromatic-Hydrocarbons, Heavy-Metal Removal, Volatile Organic-Compounds, Sulfate-Reducing Bacteria, Agricultural Drainage Water, Hydrophobic Cotton Fibers, Sequencing Batch Reactor, Rotating Drum Biofilters, Sludge Blanket Reactors, Nonaqueous Phase Liquid

? Jelínek, L., Parschová, H., Matějka, Z., Paidar, M. and Bouzek, K. (2004), A combination of ion exchange and electrochemical reduction for nitrate removal from drinking water. Part I: Nitrate removal using a selective anion exchanger in the bicarbonate form with reuse of the regenerant solution. *Water Environment Research*, **76** (7), 2686-2690.

Full Text: [2004\Wat Env Res76, 2686.pdf](2004/Wat%20Env%20Res76,%202686.pdf)

Abstract: The process of selective nitrate removal from drinking water by means of ion exchange was studied. A commercial strong base anion exchanger with triethylammonium (-N+Et3) functional groups was used in the bicarbonate (HCO3-) and carbonate (CO32-) form. The aim of this study was to optimize ion-exchanger regeneration in view of the subsequent electrochemical reduction of nitrates in the spent regenerant solution. The effects of ion-exchanger form, concentration of regenerant solution, and presence of nitrates, chlorides, and sulphates in the regenerant solution were studied. The strong base anion exchanger in HCO3- form that was investigated was able to treat 270 bed volumes of model water solution containing 124 mg dm-3 nitrates. To achieve adequate regeneration of the saturated anion exchanger, it is necessary to use approximately 30 bed volumes of fresh 1-M sodium bicarbonate (NaHCO3) regenerant solution. The presence of residual 50-mg dm-3 nitrates in the regenerant solution, treated by electrolysis, resulted in an increase in the close of regenerant solution to 35 bed volumes and a decrease in the subsequent sorption run of approximately 13%. The volume of applied regenerant solution was high but the consumption of NaHCO3 for regeneration was low.

Keywords: Drinking Water, Integrated Process, Ion Exchange, Nitrate Removal

? Paidar, M., Bouzek, K., Jelínek, L. and Matějka, Z. (2004), A combination of ion exchange and electrochemical reduction for nitrate removal from drinking water. Part II: Electrochemical treatment of a spent regenerant solution. *Water Environment Research*, **76** (7), 2691-2698.

Full Text: [2004\Wat Env Res76, 2691.pdf](2004/Wat%20Env%20Res76,%202691.pdf)

Abstract: The process of electrochemical treatment of a solution after strong basic anion exchanger regeneration was Studied. The goal of the study was to reduce the nitrate content in the solution to allow its use in a closed loop. Diaphragmless, flow-through cells in a recirculation mode with and without a fluidizing bed of inert particles in the interelectrode space equipped with copper (Cu) cathodes and activated titanium anodes were used. The temperature was maintained at 20degreesC. To assess the influence of recirculation of the regenerant solution on the quality of the treated water, the effect of the addition of copper ions to the solution, postelectrolysis cathode treatment, and enhanced mass transfer on the electrolysis results with respect to current efficiency and residual nitrate and nitrite concentration were investigated using an artificial solution. On the basis of the experimental results, a laboratory-scale unit for selective nitrate removal was designed and constructed that integrated ion exchange and electrochemical cell to one assembly. The process of recirculation of regenerant solution was tested using groundwater.

Keywords: Drinking Water, Electrochemical Nitrate Reduction, Electrodes, Electroreduction, Integrated Process, Ion Exchange, Nitrate Removal, Sodium-Hydroxide Solutions, Waste Solutions

? Caliskaner, O. and Tchobanoglous, G. (2005), Modeling depth filtration of activated sludge effluent using a compressible medium filter. *Water Environment Research*, **77** (7), 3080-3091.

Full Text: [2005\Wat Env Res77, 3080.pdf](2005/Wat%20Env%20Res77,%203080.pdf)

Abstract: A new filter, using a compressible-filter medium, has been evaluated for the filtration of secondary effluent. The ability to adjust the properties of the filter medium by altering the degree of the medium compression is a significant departure from conventional depth-filtration technology. Unlike conventional filters, it is possible to optimize the performance of the compressible-medium filter (CMF) by adjusting the medium properties (i.e., collector size, porosity, and depth) to respond to the variations in influent quality.

Because existing filter models cannot be used to predict the performance of the CMF, a new predictive model has been developed to describe the filtration performance of the CMF and the effect of medium-compression ratio. The model accounts for the fact that the properties of the filter medium change with time and depth. The model, developed for heterodisperse suspensions and variable influent total suspended solids concentrations, can be used to predict all possible phases of filtration (i.e., ripening, constant removal, and breakthrough). A hyperbolic-type, second-order, nonlinear, partial-differential equation was derived to model the CMF. The equation was solved using the finite-difference numerical method. The accuracy of the numerical method was tested by a sensitivity analysis and a convergence test. The model is first-order accurate with respect to medium depth and time. Field data were obtained for the filtration of settled secondary effluent using a CMF with a capacity of 1200 m3/d. Model predictions were compared with observed performance from filter runs conducted at medium-compression ratios between 15 and 40% and filtration rates from 410 to 820 L/m2-min. The difference between the observed and the predicted values was found to be within 0 to 15%.

Keywords: Modeling, Depth Filtration, Synthetic Compressible-Medium Filter, Fuzzy Filter, Deep-Bed Filtration, Entire Cycle, Head Loss, Suspensions, Performance, Deposition, Simulation

? Li, Y.S., Liu, C.C. and Chiou, C.S. (2006), Kinetic studies of adsorption of lead(II) from aqueous solution by wine-processing waste sludge. *Water Environment Research*, **78** (3), 263-268.

Full Text: [2006\Wat Env Res78, 263.pdf](2006/Wat%20Env%20Res78,%20263.pdf)

Abstract: A waste sludge produced from a wine-processing wastewater treatment process was used as an adsorbent to removal of heavy metal-lead(II) from aqueous solution. Results of kinetic experiments demonstrated that the adsorption was effective and rapid. Four different kinds of adsorption kinetic models (i.e., pseudo-first-order, pseudo-second-order, and two intraparticular mass diffusion models) were used to investigate the adsorption mechanisms. A normalized standard deviation was used to find the best adsorption kinetic model for the removal of lead(II) by the sludge. The comparison shows that the kinetic adsorption data can be well-described by the pseudo-second-order adsorption model and that sorption might be a rate-limiting control. The adsorption-rate constant and adsorption capacity of pseudo-second-order adsorption equation were calculated. The parameters (initial lead(II) concentration, sludge-particle size, and sludge dosages), which affect the adsorption capacity of sludge, were discussed by using the pseudo-second-order adsorption equation.

Keywords: Adsorption, Wine-Processing Sludge, Lead, Kinetics

? Goswami, S., Bhat, S.C. and Ghosh, U.C. (2006), Crystalline hydrous ferric oxide: An adsorbent for chromium(VI)-contaminated industrial wastewater treatment. *Water Environment Research*, **78** (9), 986-993.

Full Text: [2006\Wat Env Res78, 986.pdf](2006/Wat%20Env%20Res78,%20986.pdf)

Abstract: Synthetic crystalline hydrous ferric oxide (CHFO) (particle size 0.14 to 0.29 mm) has been used systematically for adsorptive chromium(VI) removal from contaminated water. Batch experiments were performed as a function of pH, contact time, solute concentration, and regeneration of adsorbents. Column experiments were performed for breakthrough points in the presence and absence of other ions and treatment of industrial effluent. The optimum pH range was 2.0 to 4.0. The adsorption kinetic data could be described well by both second-order and pseudo-first-order models. The isotherm adsorption data at 30±2°C obeyed the Langmuir model best. The monolayer adsorption capacity was 35.7 mg/g. Chromium(VI)-rich CHFO could be regenerated up to 89±1% with 2.0 M sodium hydroxide. Regenerated column reuse showed a decrease (10 to 12%) in breakthrough capacity. Finally, the CHFO- (dried at 300°C) packed column was used for the recovery (98.5±1.0%) of chromium(VI) from contaminated industrial waste effluent of Hindustan Motor Limited (Hooghly, West Bengal, India).

Keywords: Adsorption, Chromium(VI), Crystalline Hydrous Ferric Oxide, Kinetics, Isotherm, Removal, Recovery, Industrial Wastewater, Removal, Chromium(VI)

? Edwards, F.G. (2006), Electronics and metal finishing and processing. *Water Environment Research*, **78** (10), 1642-1653.

Full Text: [2006\Wat Env Res78, 1642.pdf](2006/Wat%20Env%20Res78,%201642.pdf)

Keywords: Electroplating Waste-Water, Lentinus-Sajor-Caju, Aqueous-Solutions, Heavy-Metals, Electrochemical Reactor, Hexavalent Chromium, Hydrogen-Peroxide, Sorptive Removal, Copper Cyanide, Ions

? Khan, E., Huang, C.P. and Reed, B.E. (2006), Hazardous waste treatment technologies. *Water Environment Research*, **78** (10), 1809-1855.

Full Text: [2006\Wat Env Res78, 1809.pdf](2006/Wat%20Env%20Res78,%201809.pdf)

Keywords: Polycyclic Aromatic-Hydrocarbons, Sequencing Batch Reactor, Modified Fentons Reagent, 2-Phase Partitioning Bioreactor, Volatile Organic-Compounds, Dechloromonas Strain RCB, Iron-Reducing Conditions, Activated-Sludge Process, Sewage-Treatment Plant, Water Treatment Plants

? Mukherjee, S., Kumar, S., Misra, A.K. and Acharya, P.C. (2006), Removal of aqueous nickel(II) using laterite as a low-cost adsorbent. *Water Environment Research*, **78** (11), 2268-2275.

Full Text: [2006\Wat Env Res78, 2268.pdf](2006/Wat%20Env%20Res78,%202268.pdf)

Abstract: The present paper describes the laboratory study of laterite as a low-cost adsorbent for removal of aqueous nickel (H). At pH 7 and a temperature of 30°C, a sorbent dose of 15 mg/L resulted in approximately 90% removal of nickel (II) from its initial concentration of 10 mg/L. A maximum removal of 98% of the adsorbate was observed with an adsorbent particle size of 210 p with the above conditions. Batch kinetics results were described by fitting in a Langmuir isotherm. Helffrich’s half-time equation (Helffrich, 1962) has been applied to evaluate the adsorption process. It appears that film diffusion would be the rate-limiting step. The effect of pH on the sorption process was carried out to a value of 8.0. The removal rate of nickel was found to be the function of pH of the reaction mixture. The rate, of nickel uptake by laterite with the decrease in pH value has been explained on the basis of aqueous-complex formation and the subsequent acid-base dissociation at the solid-solution interface.

Keywords: Adsorbent, Adsorption, Cadmium, Desorption, Diffusion, Goethite, Iron, Isotherm, Kinetics, Kinetics, Langmuir, Laterite, Nickel, Nickel(II), pH Effect, Soil, Sorption, Sorption, Temperature, Zinc

? Wesley, M.J., Pikus, W., Ikehata, K., Fu, H.J., El-Din, A.G., Bressler, D.C. and El-Din, M.G. (2007), Agricultural wastes. *Water Environment Research*, **79** (10), 1568-1612.

Full Text: [2007\Wat Env Res79, 1568.pdf](2007/Wat%20Env%20Res79,%201568.pdf)

Keywords: Agricultural Wastes, Liquid Swine Manure, Low-Cost Adsorbents, Olive Mill Wastes, Sequencing Batch Reactor, Simulated Land Application, Soil Microbial Communities, Solid-Phase Microextraction, Thermophilic Anaerobic-Digestion, Tomato Plant Residues, Volatile Organic-Compounds

? Peng, S.C., Ma, M.H., Jin, S. and Chen, T.H. (2009), Kinetics of p-Nitrophenol adsorption by layered double oxides during its hydration. *Water Environment Research*, **81** (1), 91-96.

Full Text: [2009\Wat Env Res81, 91.pdf](2009/Wat%20Env%20Res81,%2091.pdf)

Abstract: Kinetics of p-nitrophenol (PNP) adsorption onto layered double oxides (LDO) during its hydration into layered double hydroxides (LDH) was studied. Results indicate that the adsorption of PNP onto LDO is a spontaneous endothermic process. The adsorption isotherms correlate well with the Freundlich type model. Results suggest that the adsorption of PNP onto LDO is an entropy-increasing process, and it appears to be in agreement with pseudo-second-order kinetics. Intra-particle diffusion was found to take part in the adsorption processes, and it might be the primary rate-limiting step for the sorbing capacity of LDO to PNP. Results from X-ray diffraction and Fourier transform infrared indicate that PNP molecules are probably taken into the interlayer of the structure during the hydration of LDO into the LDH. Activated carbon was used as a benchmark material in evaluating the sorbing capacity of LDO to PNP. The sorbing capacity of LDO to PNP (32 mg PNP, g LDO) was well below activated carbon (659 mg PNP, g carbon); however, the sorbing process of LDO to PNP is also a unique synthetic process for LDH, which has been used in removing specific anionic species, such as bioagents and pharmaceutical intermediates from waters. Water Environ. Res., 81, 91 (2009).

Keywords: Activated Carbon, Adsorption, Adsorption Isotherms, Biodegradation, Breakthrough Curves, Capacity, Carbon, Degradation, Diffusion, Double Hydroxide, Endothermic, Freundlich, Hydration, Hydrotalcite-Like Compounds, Infrared, Intra Particle Diffusion, Intra-Particle Diffusion, Intraparticle Diffusion, Isotherms, Kinetics, Layered Double Hydroxide, Layered Double Hydroxides, Layered Double Oxide, Model, Oxides, P-Nitrophenol, Phenols, Primary, Process, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second-Order, Pseudo-Second-Order Kinetics, Rate Limiting Step, Rate-Limiting Step, Removal, Sorbent, Species, Spontaneous, Structure, Water, Waters, X-Ray, X-Ray Diffraction

? Bellebia, S., Kacha, S., Bouberka, Z., Bouyakoub, A.Z. and Derriche, Z. (2009), Color removal from acid and reactive dye solutions by electrocoagulation and electrocoagulation/adsorption processes. *Water Environment Research*, **81** (4), 382-393.

Full Text: [2009\Wat Env Res81, 382.pdf](2009/Wat%20Env%20Res81,%20382.pdf)

Abstract: In this study, electrocoagulation of Marine Blue Erionyl MR (acid dye) and electrocoagulation followed by adsorption of Brilliant Blue Levafix E-BRA (reactive dye) from aqueous solutions were investigated, using aluminum electrodes and granular activated carbon (GAC). In the electrocoagulation and adsorption of dyestuff solutions, the effects of current density, loading charge, pH, conductivity, stirring velocity, contact time, and GAC concentration were examined. The optimum conditions for the electrocoagulation process were identified as loading charges 7.46 and 1.49 F/m3, for a maximum abatement of 200 mg/L reactive and acid dye, respectively. The residual reactive dye concentration was completely removed with 700 mg/L GAC. The results of this investigation provide important data for the development of a combined process to remove significant concentrations of recalcitrant dyes from water, using moderate activated carbon energy and aluminum consumption, and thereby lowering the cost of treatment. Water Environ. Res., 81, 382 (2009).

Keywords: Acid, Adsorption, Adsorption, Aluminum Electrodes, Aluminum Electrodes, Decolorization, Effluent, Electrocoagulation, Electroflotation, Equilibrium, Granular Activated Carbon, Kinetics, Reactive Dye Solutions, Technologies, Textile Wastewaters, Waste-Water

? Tang, C.F., Zhang, R.Q., Wen, S.Z., Li, K.L., Zheng, X.L. and Zhu, M.Q. (2009), Adsorption of hexavalent chromium from aqueous solution on raw and modified activated carbon. *Water Environment Research*, **81** (7), 728-734.

Full Text: [2009\Wat Env Res81, 72.pdf](2009/Wat%20Env%20Res81,%2072.pdf)

Abstract: Hexavalent chromium [Cr(VI)] is toxic and readily adsorbed by some adsorbents; therefore, its removal from wastewater is extremely important. Batch adsorption of Cr(VI) from aqueous solution using raw and acid-modified activated carbon was investigated in this study. The Cr(VI) sorption was found to be dependent on pH, contact time, initial concentration of solution, adsorbent dose, and temperature. The maximum efficiencies of Cr(VI) removal were 97.67 and 99.87% for activated carbon (AC(0)) and modified activated carbon (AC(1)), respectively. The maximum adsorption capacity was found to be 4.75 and 5.95 mg/g for AC(0) and AC(1), respectively. Thermodynamic parameters indicate that the adsorption process was endothermic and spontaneous in nature. Freundlich adsorption isotherm model was fitted well the equilibrium data for both adsorbents. The Cr(VI) uptake by AC(0) and AC(1) followed pseudo first-order and second-order kinetics, but was best described by the pseudo second-order rate model. The results also showed that both film diffusion and intraparticle diffusion were concurrently operating, but that intraparticle diffusion controlled the adsorption mechanism. Water Environ. Res., 81, 728 (2009).

Keywords: Acid, Activated Carbon, Adsorbent, Adsorbent Dose, Adsorbents, Adsorption, Adsorption Capability, Adsorption Capacity, Adsorption Isotherm, Adsorption Isotherm Model, Adsorption Mechanism, Agricultural Waste, Algae, Aqueous Solution, Batch Adsorption, Biosorption, Capacity, Carbon, Chromium, Concentration, Cr(VI), Cr(VI) Removal, Cr(VI) Sorption, Data, Diffusion, Endothermic, Equilibrium, Film Diffusion, First Order, Freundlich, Freundlich Adsorption Isotherm, Hexavalent Chromium, Intraparticle Diffusion, Ions, Isotherm, Isotherm Model, Kinetics, Mechanism, Model, Modified, Modified Activated Carbon, Part I, pH, Pseudo First Order, Pseudo First-Order, Pseudo Second Order, Pseudo Second-Order, Pseudo-First-Order, Pseudo-Second-Order, Reduction, Removal, Second Order, Second Order Kinetics, Second-Order, Second-Order Kinetics, Solution, Sorption, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Toxic, Uptake, Waste-Water, Wastewater, Water

? Chai, L.Y., Chen, Y.N. and Yang, Z.H. (2009), Kinetics and thermodynamics of arsenate and arsenite biosorption by pretreated spent grains. *Water Environment Research*, **81** (9), 843-848.

Full Text: [2009\Wat Env Res81, 843.pdf](2009/Wat%20Env%20Res81,%20843.pdf)

Abstract: Using chemically modified spent grains as a new biosorbent to treat arsenate and arsenite ions was studied. The influences of pH, contact time, initial concentration and temperature were studied in batch experiments. The equilibrium process was described well by Langmuir isotherm model with maximum biosorption capacities of 13.39 and 4.86 mg/g of arsenate and arsenite on spent grains, respectively. The initial removal was rapid, and equilibrium was established in less than 180 min. Good correlation coefficients were obtained for the pseudo-second-order kinetic model. In the binary metal solutions, the finite sites on the surface of spent grains showed a greater preference for As(V) ions. The enthalpy of biosorption was exothermic and the increase in As(III) removal was larger than that of As(V) over the same rise in temperature. In this study, spent grains proved to be suitable for removal of As(V) and As(III) from the effluent of metallurgical industry. Water Environ. Res., 81, 843 (2009).

Keywords: Adsorption, Aqueous-Solutions, Area, Arsenate, Arsenate Ions, Arsenite, Arsenite Ions, As(III), As(V), Batch, Batch Experiments, Biosorbent, Biosorption, Concentration, Correlation, Enthalpy, Equilibrium, Exothermic, Experiments, Groundwater, Human Health, Ions, Isotherm, Isotherm Model, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Lead, Metal, Model, Modified, pH, Preference, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Solutions, Sorption, Spent Grains, Surface, Temperature, Thermodynamics, Water

? Chiavola, A. (2009), Textiles. *Water Environment Research*, **81** (10), 1696-1730.

Full Text: [2009\Wat Env Res81, 1696.pdf](2009/Wat%20Env%20Res81,%201696.pdf)

Abstract: A review of the literature published in 2008 on topics relating to wastewater treatment issues and technologies in the textile industries is presented. After a brief overview of the BATTLE project, the review is divided into the following sections: physico-chemical, biological and combined processes.

Keywords: Activated Carbon, Aqueous-Solution, Azo-Dye Decolorization, Bacterial, Basic Dye, Color, Decolorization, Degradation, Dyes, Industries, Literature, Malachite Green Adsorption, Methylene-Blue Dye, Overview, Response-Surface Methodology, Review, Starch-Based Material, Textiles, Topics, Treatment, Waste-Water Treatment, Wastewater, Wastewater Treatment, Zero-Valent Iron

? Bouguerra, W., Marzouk, I. and Hamrouni, B. (2009), Equilibrium and kinetic studies of adsorption of boron on activated alumina. *Water Environment Research*, **81** (12), 2455-2459.

Full Text: [2009\Wat Env Res81, 2455.pdf](2009/Wat%20Env%20Res81,%202455.pdf)

Abstract: Boron is widely distributed in the environment, mainly in the form of boric acid or borate salts, and its contamination of waters is a concern around the world. This study focuses on boron removal by means of adsorption onto activated alumina. Optimum adsorption was achieved in the pH range 8.0 to 8.5. Approximately 60% (by mass) boron removal was achieved using an adsorbent dose of 5 g at an initial boron concentration of 50 mg/L. Adsorption isotherms at 10, 20, and 30ºC were investigated. The results fitted with the Langmuir and Freundlich equations showed a monolayer adsorption onto a surface, with a finite number of identical sites. To study the rate-limiting step, the adsorption kinetic data of boron were analyzed using first-order (Lagergren) and second-order kinetic models. The experimental results obtained showed that the adsorption process followed a second-order kinetic model. Water Environ. Res., 81, 2455 (2009).

Keywords: Activated Alumina, Adsorbent, Adsorbent Dose, Adsorption, Adsorption Isotherms, Adsorption Kinetic, Adsorption Kinetics, Alumina, Boron, Boron Removal, Carbon, Coir Pith, Concentration, Contamination, Data, Distributed, Environment, Equilibrium, Experimental, First Order, Freundlich, Ion-Exchange, Isotherms, Kinetic, Kinetic Model, Kinetic Models, Langmuir, Model, Models, Monolayer, pH, Phosphate, Rate Limiting Step, Rate-Limiting Step, Removal, Reverse-Osmosis, Salts, Second Order, Second-Order, Surface, Water, Waters, World

? Kumar, R.A., Velayudhan, K.T., Ramachandran, V., Bhai, R.S., Unnikrishnan, G. and Vasu, K. (2010), Adsorption and removal kinetics of phosphonate from water using natural adsorbents. *Water Environment Research*, **82** (1), 62-68.

Full Text: [2010\Wat Env Res82, 62.pdf](2010/Wat%20Env%20Res82,%2062.pdf)

Abstract: The removal of phosphonate from water was studied using some natural adsorbents. Potassium phosphonate is a fungicide used for the control of Phytophthora capsici, which is prevalent in black pepper (Piper nigrum L.). Batch adsorption kinetic experiments were conducted on the adsorption of phosphonate onto the adsorbents. The concentration of phosphonate was measured on a high-performance liquid chromatograph fitted with a conductivity detector. The percentage removal of phosphonate by powdered laterite stone (PLS) from water was 40.4%, within a residence time of 15 minutes. The mechanisms of the rate of adsorption were analyzed and compared using the pseudo-second-order, Elovich, and intraparticle diffusion models. The experimental data was found to correlate well with the pseudo-second-order kinetic model, indicating adsorption as a chemisorption process. A possible reaction in the phosphonate-PLS system also has been proposed. The PLS can be used as a low-cost natural adsorbent for phosphonate removal from water. Water Environ. Res., 82, 62 (2010).

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Kinetic, Adsorption Kinetics, Batch Adsorption, Chemisorption, Concentration, Conductivity, Control, Data, Diffusion, Divalent Metal-Ions, Elovich, Equilibrium, Experimental, Experiments, Fluoride, Fungicide, Intraparticle Diffusion, Kinetic, Kinetic Model, Kinetics, Laterite, Liquid, Low Cost, Mechanisms, Model, Models, Natural, Natural Adsorbent, Natural Adsorbents, Peat, PLS, Potassium, Potassium Phosphonate, Powdered Laterite Stone, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Pseudosecond-Order, Removal, Residence Time, Sediments, Soil, Sorption, Systems, Water

? Yue, Q.Y., Wang, W.Y., Gao, B.Y., Xu, X., Zhang, J. and Li, Q. (2010), Phosphate removal from aqueous solution by adsorption on modified giant reed. *Water Environment Research*, **82** (4), 374-381.

Full Text: [2010\Wat Env Res82, 374.pdf](2010/Wat%20Env%20Res82,%20374.pdf)

Abstract: The use of modified giant reed (MGR) as an adsorbent to remove phosphate from an aqueous solution was investigated. The dosage of MGR, pH of the phosphate solution, thermodynamics, and the effects of several factors on kinetics (concentration of phosphate solution, solution temperature, and shaking speed) were studied in batch experiments. The results showed that MGR was particularly effective to remove phosphate and that the effective pH range for the phosphate removal was between 4 and 9. The adsorption process could reach equilibrium in 25 minutes. Three kinetic models have been evaluated to fit the experimental data. It was shown that the pseudo-second-order model best described the adsorption kinetics of phosphate on MGR. The low activation energy of the adsorption suggested a physisorption process for phosphate adsorption. The equilibrium isotherm showed that the adsorption system was consistent with the Langmuir equation. The negative values of standard free energy (ΔG) and enthalpy (ΔH) indicated that the adsorption of phosphate onto MGR was a spontaneous and exothermic process. Water Environ. Res., 82, 374 (2010).

Keywords: Acid, Activated Carbon, Activation, Activation Energy, Adsorbent, Adsorption, Adsorption Kinetics, Aqueous Solution, Arundo-Donax, Batch, Batch Experiments, Biosorption, Concentration, Data, Dye Adsorption, Energy, Enthalpy, Equilibrium, Equilibrium Isotherm, Exothermic, Experimental, Experiments, Isotherm, Isotherms, Kinetic, Kinetic Models, Kinetics, Kinetics, Langmuir, Langmuir Equation, Model, Models, Modified, Modified Giant Reed, pH, Phosphate, Phosphate Adsorption, Phosphate Removal, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Range, Reed, Removal, Solution, Standard, Temperature, Thermodynamics, Thermodynamics, Waste, Water

? Zhang, Y.Z., Shi, W.J., Zhou, H.L., Fu, X. and Chen, X. (2010), Kinetic and thermodynamic studies on the adsorption of anionic surfactant on quaternary ammonium cationic cellulose. *Water Environment Research*, **82** (6), 567-573.

Full Text: [2010\Wat Env Res82, 567.pdf](2010/Wat%20Env%20Res82,%20567.pdf)

Abstract: Removal of anionic surfactants from aqueous solutions by adsorption onto quaternary ammonium cationic cellulose (QACC) was investigated. The effects of solution acidity, initial concentration, adsorption time, and temperature on the adsorption of sodium dodecylbenzene sulfonate (SDBS), sodium lauryl sulfate (SLS), and sodium dodecyl sulfonate (SDS) were studied. The kinetic experimental data fit well with the pseudo-second-order model; the rate constant of the adsorption increased with temperature. The values of apparent activation energy for the adsorption were calculated as ranging from 10.2 to 17.4 kJ/mol. The adsorption isotherm can be described by the Langmuir isotherm. The values of thermodynamic parameters (ΔH0, ΔS0, and ΔG0) for the adsorption indicated that this process was spontaneous and endothermic. At 318 K, the saturated adsorption capacities of QACC for SDBS, SLS, and SDS were 1.75, 1.53, and 1.39 mmol/g, respectively. The adsorption process was mainly chemisorption and partially physisorption. The results show that QACC is effective for the removal of anionic surfactants. Water Environ. Res., 82, 567 (2010).

Keywords: Acidity, Activation, Activation Energy, Adsorption, Adsorption Capacities, Adsorption Isotherm, Ammonium, Anionic Surfactant, Aqueous Solutions, Aqueous-Solution, Carbon, Cellulose, Chemisorption, Concentration, Data, Endothermic, Energy, Experimental, Fibers, Isotherm, Isotherms, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Lead(II), Model, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Quaternary Ammonium Cationic Cellulose, Rate Constant, Removal, SDS, Sodium, Sodium Dodecylbenzene Sulfonate, Solution, Solutions, Sorption, Sulfate, Surfactant, Surfactants, Temperature, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Water, Wood

? Hu, X.Y., Zhao, M.M. and Huang, H.H. (2010), Modification of pineapple peel fiber as metal ion adsorbent through reaction with succinic anhydride in pyridine and dimethyl sulfoxide solvents. *Water Environment Research*, **82** (8), 733-741.

Full Text: [2010\Wat Env Res82, 733.pdf](2010/Wat%20Env%20Res82,%20733.pdf)

Abstract: Reactions between saponified pineapple peel fiber (SPPF) and succinic anhydride were performed in refluxed pyridine and dimethyl sulfoxide to obtain modified pineapple peel fiber in pyridine (MPPF-PY) and modified pineapple peel fiber in dimethyl sulfoxide at room temperature (MPPF-DMRT) and at 70 degrees C (MPPF-DM70) as novel metal ionic adsorbents. The modified pineapple peel fibers were characterized by Fourier transform infrared (FTIR) and X-ray diffraction (XRD). The MPPF-PY, MPPF-DMRT, and MPPF-DM70 showed higher Cu2+, Cd2+, and Pb2+ adsorption capacity than raw pineapple peel fiber (RPPF) and SPPF. Dimethyl sulfoxide favored introduction of a carboxylic function group into pineapple peel fiber compared with pyridine. The elevated reaction temperature of dimethyl sulfoxide could increase the adsorption capacity of the modified pineapple fiber. Optimum pH values for Cu2+, Cd2+, and Pb2+ removal by MPPF-DM70 were pH 5.5, 7.5, and 5.5, respectively. The Cu2+, Cd2+, and Pb2+ adsorptions by MPPF-DM70 followed the pseudo second-order kinetics model and Langmuir model. Water Environ. Res., 82, 733 (2010).

Keywords: Adsorbent, Adsorbents, Adsorption, Adsorption Capacity, Agricultural Waste, Aqueous-Solutions, Biosorption Mechanism, Capacity, Carboxylic, Cd2+, Chemical-Modification, Cu2+, Dimethyl Sulfoxide, Fibers, FTIR, Function, Heavy-Metals, Jute Fibers, Kinetics, Kinetics Model, Langmuir, Langmuir Model, Metal, Metal Ionic Adsorbent, Model, Modification, Modified, Pb2+, Pb2+ Adsorption, pH, Pineapple Peel Fiber, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo Second-Order, Pseudo-Second-Order, Pyridine, Removal, Rice Husk, Room Temperature, Second Order, Second Order Kinetics, Second-Order, Second-Order Kinetics, Succinic Anhydride-Modification, Temperature, Waste-Water, Water, X-Ray, X-Ray Diffraction, XRD

? Li, Q.Z., Chai, L.Y., Yang, Z.H., Wang, Q.W. and Wang, Y.Y. (2010), A Comparative study of Ag(I) adsorption on raw and modified spent grain: Kinetic and thermodynamic aspects. *Water Environment Research*, **82** (11), 2290-2296.

Full Text: [2010\Wat Env Res82, 2290.pdf](2010/Wat%20Env%20Res82,%202290.pdf)

Abstract: The capability of modified spent grain (MSG) to adsorb silver (I) [Ag(I)] from aqueous solution was investigated and compared with raw spent grain (RSG) regarding their adsorption isotherms, kinetics, and thermodynamics. The monolayer adsorption capacity was 30.28 mg/g for RSG and 158.23 mg/g for MSG according to the Langmuir isotherm. The Ag(I) adsorption on MSG was approximately 4 times higher than that on RSG. The pseudo-second-order kinetic model provided the best description of Ag(I) adsorption on the two adsorbents. The calculated activation energy (E-a) implies that the adsorption of Ag(I) on RSG is a physical adsorption and on MSG is of a chemical nature. Thermodynamic results suggest that the adsorption of Ag(I) is an exothermic process for RSG and an endothermic process for MSG, whereas both adsorption processes are spontaneous in nature. Water Environ. Res., 82, 2290 (2010).

Keywords: Activation, Activation Energy, Adsorbents, Adsorption, Adsorption Capacity, Adsorption Isotherms, Aqueous Solution, Aqueous-Solution, Biomass, Biosorbent, Biosorption, Capacity, Chemical, Endothermic, Energy, Equilibrium, Exothermic, Growth, Heavy-Metal Ions, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Model, Modified, Monolayer, NOV, Physical, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Silver, Silver Ions, Silver(I), Solution, Spent Grain, Spent-Grain, Thermodynamic, Thermodynamics, Waste-Water, Water

? Chen, Y.N., Ding, L.C. and Fan, J.B. (2011), Ammonia-nitrogen sorptional properties of banana peels. *Water Environment Research*, **83** (4), 368-372.

Full Text: [2011\Wat Env Res83, 368.pdf](2011/Wat%20Env%20Res83,%20368.pdf)

Abstract: Using modified banana peel as a biosorbent to treat water containing ammonia-nitrogen (NH4+-N) was studied. Related parameters in the sorptional process, such as chemical modification, pH, and contact time were investigaed. The experimental results showed that banana peel modified by 30% sodium hydroxide (NaOH) and mesothermal microwaves (NMBPs) can greatly improve the sorption removal for NH4+-N. The kinetics study revealed that the sorption behavior better fit the pseudo-second-order equation than the Lagergren first-order equation. Fourier transform infrared absorption spectrum analysis of banana peels and NMBPs before and after NH4+-N sorption revealed that the activity of hydroxyl groups at the surface of the banana peels was strengthened after modification, and nitrogenous groups appeared after biosorpting the NH4+-N. In the end, metallurgical wastewater containing a low concentration of NH4+-N was treated by NMBPs. The initial NH4+-N concentration of 138 mg/L was reduced to 13 mg/L in 25 minutes by 4 g/L NMBPs at pH 10. Water Environ. Res., 83, 368 (2011).

Keywords: Ammonia-Nitrogen, Banana Peel, Biosorbent, Kinetics, Landfill Leachate, Mechanism, pH, Removal, Sorption, Wastewater, Water

? Jia, D.M., Zhou, C. and Li, C.H. (2011), Adsorption of glyphosate on resin supported by hydrated iron oxide: Equilibrium and kinetic studies. *Water Environment Research*, **83** (9), 784-790.

Full Text: [2011\Wat Env Res83, 784.pdf](2011/Wat%20Env%20Res83,%20784.pdf)

Abstract: Hydrated iron oxide supported on resin (D301) was prepared as a new sorbent for the removal of glyphosate from wastewater. Batch adsorption studies were performed on glyphosate aqueous solutions with different initial glyphosate concentrations and temperatures. Experimental data were analyzed using the Langmuir and Freundlich isotherms, and the adsorption data were best fit to the Langmuir isotherm model. The thermodynamic parameters ΔG, ΔH, and ΔS also were calculated for the adsorption processes. Adsorption rate constants were determined using the pseudo-first-order and pseudo-second-order rate equations and Kannan-Sundaram intraparticle diffusion models. Adsorption of glyphosate clearly followed the pseudo-second-order model and was controlled by both film diffusion and intraparticle diffusion. Water Environ. Res., 83, 784 (2011).

Keywords: Adsorption, Aqueous-Solution, Arsenic Removal, Complexation, Degradation, Dye Adsorption, Equilibrium, Freundlich, Glyphosate, Iron Oxides, Isotherm, Kinetic, Kinetics, Langmuir, Malachite Green, Phosphate, Sorption, Spectroscopy, Thermodynamics, Waste-Water

? Sen, T.K., Bin Azman, A.F., Maitra, S. and Dutta, B.K. (2011), Removal of mercury(II) from aqueous solutions using the leaves of the Rambai Tree (*Baccaurea motleyana*). *Water Environment Research*, **83** (9), 834-842.

Full Text: [2011\Wat Env Res83, 834.pdf](2011/Wat%20Env%20Res83,%20834.pdf)

Abstract: This study was undertaken to evaluate the biosorption potential of a natural, low-cost biosorbent, Rambai leaves (Baccaurea motleyana), to remove trace amounts of Hg(II) from aqueous solutions. It was found that the amount of Hg(II) biosorption by Rambai leaves increased with initial metal ion concentration, contact time, and solution pH but decreased as the amount of biosorbent increased. The maximum biosorption capacity was 121.95 mg/g for an initial concentration range of 5 to 120 ppb. Overall, kinetic studies showed that the Hg(II) biosorption process followed pseudo-second-order kinetics based on pseudo-first-order and intraparticle diffusion models. Isotherm data revealed that the biosorption process followed both Freundlich and Langmuir isotherms. The value of separation factor, R(L), from the Langmuir equation and rate of biosorption, n, from the Freundlich model also indicated favorable adsorption. Water Environ. Res., 83, 834 (2011).

Keywords: Adsorption, Baccaurea Motleyana, Biosorbent, Biosorption, Biosorption, Cadmium, Equilibrium, Freundlich, Fungal Biomass, Heavy-Metals, Isotherm, Kinetic, Kinetics, Kinetics, Langmuir, Mercury, Methylene-Blue, pH, Removal, Sorption, Waste

? Biksey, T.M., Schultz, A.C., Bernhardt, A.M., Marion, B., Peterson, C. and Smith, P. (2011), Ecological and human health risk assessment. *Water Environment Research*, **83** (10), 1876-1905.

Full Text: [2011\Wat Env Res83, 1876.pdf](2011/Wat%20Env%20Res83,%201876.pdf)

Abstract: This literature review covers the risk assessment process and addresses both ecological and human receptors. 1 The review covers the risk assessment literature including methodology, analysis, interpretation, management, uncertainty, policy, and regulatory guidance. The review is divided into ecological and human health sections. The focus of the review is on the risk assessment process as it is applied to ecological systems and human health, site investigation and remediation, and natural resources. The objective is to provide an overview of the scope of the literature published in 2010.

Keywords: Ecological, Human Health, Risk Assessment, Management, Policy, Regulatory, Guidance, Standards, Persistent Organic Pollutants, Toxicity Identification Evaluation, Tittabawassee River Floodplain, Prince-William-Sound, Drinking-Water, Human Exposure, Polychlorinated-Biphenyls, Reduction Strategies, Assessment Criteria, United-States

? Ou, H.X., Wang, Q., Xue, Y.L., Pan, J.M., Du, D.L. and Yan, Y.S. (2011), Biosorption of Pb(II) by biomass of KC-2: kinetic, equilibrium and characteristic studies. *Water Environment Research*, **83** (12), 2148-2153.

Full Text: 2011\Wat Env Res83, 2148.pdf

Abstract: Performance and characteristics of biosorption of Pb(II) had been studied in a batch system using the fungal strain biomass, KC-2. The biosorption performance was investigated by analysing the effects of such factors as the initial pH, initial Pb(II) concentration, and contact time at 303 K. The maximum Pb(II) adsorption was obtained at pH 5.0. The experimental data were described by the pseudo first-order, pseudo second-order and intraparticle diffusion kinetic models, and were closely followed the pseudo second-order kinetic model. The equilibrium experimental data were well fitted to Langmuir model and the maximum biosorption capacity was 84.03 mg g-1. The adsorption mechanism was examined by FTIR, SEM and EDAX analysis. Results indicated that carboxylic, hydroxyl and amine groups were involved in the biosorption and ion exchange mechanism existed. Water Environ. Res., 83, 2148 (2011).

Keywords: Adsorption, Adsorption Isotherms, Aqueous-Solutions, Biosorbents, Biosorption, Concentration, Copper, Equilibrium, FTIR, Heavy-Metals, Ion Exchange, Ion-Exchange, Ions, Kinetic, Kinetic Models, Langmuir, Lead, Mechanism, Pb(II), Pb(II) Biosorption, pH, Removal

# Title: Water Pollution Control

(Water Poll. Cont. Water pollut. control)

Full Journal Title: Water Pollution Control

ISO Abbreviated Title:

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ISSN:

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Journal Country/Territory:

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Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Lowe, W. (1970), The origin characteristics of toxic wastes, with particular reference to the metal industries. *Water Pollution Control*, **69**, 270-280.

Chalmers, R.K. (1970), Pretreatment of toxic wastes. *Water Pollution Control*, **69**, 281-291.

Chiu, H.S.S. and Lee, R.M.L. (1987), Treatment of electroplating wastes. *Water Pollution Control*, **86**, 12-19.

# Title: Water Pollution VIII: Modelling, Monitoring and Management

Full Journal Title: Water Pollution VIII: Modelling, Monitoring and Management

ISO Abbreviated Title:

JCR Abbreviated Title:

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Bologna, ITALY, SEP, 2006

Wessex Inst Technol; Univ Coimbra; WIT Transact Ecol & Environm

Book Series: Wit Transactions on Ecology and the Environment

Editor(s): Brebbia, C.A., AntunesDoCarmo, J.S.

? O’Connell, D.W., Birkinshaw, C. and O’Dwyer, T.F. (2006), Design of a novel cellulose-based adsorbent for use in heavy metal recovery from aqueous waste streams. *Water Pollution VIII: Modelling, Monitoring and Management*, **95**, 489-498.

Conference Information: 8th International Conference on Modelling, Monitoring and Management of Water Pollution  
Bologna, ITALY, SEP, 2006  
Wessex Inst Technol; Univ Coimbra; WIT Transact Ecol & Environm

Abstract: Currently, significant metal-laden waste streams are produced from a number of industries with obvious consequences for the environment. A variety of techniques are being used to treat these wastewaters. One such technique is adsorption and recent focus in this area has been around the preparation of selective adsorbents based on naturally occurring support materials. In our work, a regenerated cellulose wood pulp was grafted with the vinyl monomer glycidyl methacrylate (GMA) and was further functionalised with imidazole to produce a novel adsorbent material, cellulose-g-GMA-imidazole. A series of adsorption studies were carried out on the cellulose-g-GMA-imidazole to assess its capacity in the separate removal of lead and nickel ions (Pb(II), Ni(II)) from aqueous solution. Cellulose-g-GMA-imidazole sorbent showed an uptake of approximately 72 mg g(-1) of Pb(II) and 45 mg g(-1) of Ni(II) from aqueous solution. The adsorption process in both cases followed the Langmuir model of adsorption and Pb(II) uptake occurred within 30 minutes while Ni(II) uptake was considerably slower at 400 minutes for maximum uptake. In both cases pseudo second order kinetics best describes the overall process for each metal uptake. The cellulose-g-GMA-imidazole material shows significant promise as a sorbent for the removal of both Ni(II) and Pb(II) and other heavy metal ions from aqueous and waste streams.

Keywords: Aqueous Waste Streams, Heavy Metals, Cellulose, Adsorption, Activated Carbon, Adsorption, Removal, Ions, Lead(II), Equilibrium, Behavior, Cu(II), Shells, Ni(II)

# Title: Water Quality Professional

(1998), Protecting public health from drinking-water sources affected by MTBE. *Water Quality Professional*, **2** (1), 7.

# Title: Water Quality Research Journal of Canada

Full Journal Title: [Water Quality Research Journal of Canada](http://www.nwri.ca/other-activities/wqrjc-e.html)

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? Al-Asheh, S. and Duvnjak, Z. (1999), Sorption of heavy metals from synthetic metalsolutions and industrial wastewater using plant materials. *Water Quality Research Journal of Canada*, **34** (3), 481-503.

Full Text: 1999\Wat Qua Res J Can34, 481.pdf

Abstract: In a batch process, canola meal, pine bark and moss decreased the copper concentration in an industrial wastewater from a copper refining/smelting plant from 36.5 to 2.5, 4.1 and 5.2 ppm, respectively, when the concentration of each sorbent was 15 mg/mL. pH-controlled tests showed greater Cu2+ removal compared to those without pH control The copper concentration was decreased to below its permissible upper limit for drinking water when the wastewater was treated with 9.2 mg/mL of bark at pH 5.2 followed by sorption with 2.3 mg/mL of activated carbon This study also showed that the same total amount of sorbent used either in a single-or multistage sorption process resulted in the same level of copper removal. The removal of copper from the wastewater was also studied using columns packed with bark. After three sorption/desorption cycles, the copper concentration was decreased to 4 ppm. This study also examined the mechanisms of metal biosorption by moss using analytical solutions. Scanning electron microscopy and energy-dispersive X-ray microanalyses revealed that metal ions were sorbed mainly at the cell wall of the moss and only a small amount of ions diffused into the cytoplasm. Both the energy dispersive X-ray analysis and the atomic absorption spectrophotometry measurements showed that ion exchange was an important mechanism in this sorption process.

Keywords: Activated Carbon, Adsorption, Bark, Biosorption, Canola Meal, Copper, EDX, Heavy Metals, Ion Exchange, Mechanism, Metal, Metal Ions, Metals, Moss, pH, Pine Bark, Removal, *Rhizopus-arrhizus* Biomass, SEM, Sorbent, Sorption

Viraraghavan, T. and Ramakrishna, K.R. (1999), Fly ash for colour removal from synthetic dye solutions. *Water Quality Research Journal of Canada*, **34** (3), 505-517.

Full Text: 1999\Wat Qua Res J Can34, 505.pdf

Abstract: Fly ash was investigated for its ability to adsorb dyes from aqueous solutions. Batch pH, kinetic and isotherm studies were performed on a laboratory scale with synthetic dye solutions made up of four different commercial grade dyes. Fly ash samples with differing compositions and particle sizes were employed to understand the effect of fly ash composition and particle size on their dye removal capacity. The first-order rate equation by Lagergren was tested on the kinetic data, and isotherm data was analyzed for possible agreement with the Langmuir and Freundlich adsorption isotherm equations. The removal capacity of fly ash for the different dyes was compared with that of granular activated carbon under identical conditions. Results showed that fly ash exhibited reasonably good dye removals for Basic Blue 9, Acid Blue 29 and Acid Red 91 while the removals by fly ash exceeded that of granular activated carbon for Disperse Red 1. Lime content in fly ash seemed to influence dye adsorption to a significant degree-better adsorption was observed at lower particle sizes because of the increased external surface area available for adsorption. Acid Blue 29 adsorption by fly ash provided the best fit for the Lagergren first-order plot. Because high pH and heavy metals (leached from fly ash) in the treated wastewater may exceed the limits set in municipal sewer-use bylaws, engineering and economic feasibility assessment should include these aspects when considering fly ash for colour removal.

Keywords: Fly Ash, Colour Removal, Isotherm Kinetics, Dye Solutions

Fu, Y.Z. and Viraraghavan, T. (2000), Removal of a dye from an aqueous solution by the fungus *Aspergillus niger*. *Water Quality Research Journal of Canada*, **35** (1), 95-111.

Full Text: [2000\Wat Qua Res J Can35, 95.pdf](2000/Wat%20Qua%20Res%20J%20Can35,%2095.pdf)

Abstract: Biosorption is becoming a promising alternative to replace or supplement the present dye removal processes from dye wastewater. In this study, removal of a dye, Basic Blue 9, from an aqueous solution by biosorption on the dead fungal biomass *Aspergillus niger* was studied. The effective pretreatment method for increasing the biosorption capacity of *A. niger* was investigated. Autoclaving was found to effectively enhance the biosorption capacity of *A. niger* to 18.54 mg/g compared with 1.17 mg/g of living cells for Basic Blue 9. Batch pH, kinetic and isotherm studies were conducted to evaluate the biosorption capacity of the pretreated (dead) biomass. The initial pH of the dye solution strongly affected the biosorption capacity and rate. The effective initial pH was between 4 and 6. The equilibrium time varied with the initial pH of the dye solution and was set at 30 h because no significant dye removals occurred after that time of contact The Lagergren and Ho et al. models can be used to describe the kinetics of Basic Blue 9 biosorption on A, niger successfully for different initial pH values, except for pH 4. At initial pH 4, biosorption of Basic Blue 9 fitted the Langmuir equation well; at initial pH 10, the Langmuir and Freundlich isotherm models both fitted biosorption well. The results of this study indicated that fungal biomass of *A. niger* can be used for removing Basic Blue 9 from an aqueous solution.

Keywords: Waste-Water, Color Removal, Decolorization, Biosorption, Effluents, Biomass, Wastewaters, Adsorption, Adsorbent, Biosorption, *Aspergillus niger*, Basic Blue 9

? Singh, K.S. and Viraraghavan, T. (2000), Performance of UASB reactors at 6 to 32°C in municipal wastewater treatment. *Water Quality Research Journal of Canada*, **35** (1), 113-124.

Full Text: [1999\Wat Qua Res J Can35, 113.pdf](1999/Wat%20Qua%20Res%20J%20Can35,%20113.pdf)

Abstract: The feasibility of using a high-rate upflow anaerobic sludge blanket (UASB) system for the treatment of low-strength municipal wastewater at 6 to 32°C was investigated for temperate climate applications. UASB reactors could be started up successfully in about 60 days at 20°C. Under stable conditions, the removal of GOD, BOD and SS ranged from 38 to 90%, 47 to 91% and 50 to 92%, respectively, for a temperature range of 6 to 32°C. Sulfate reduction ranged from 10 to 90%, showing a decreasing trend with a decrease in temperature at each HRT. The average biogas production and methane content ranged from 167 to 199 mt CH4/g-CODremoved and 65 to 86%, respectively. The recovery of methane in the gas phase was very low compared with soluble COD removals, especially during operation at lower temperatures (6 to 15°C). Digital image analysis and scanning electron microscopy results indicated the aggregation of biomass in the form of flocs and small granules. The mean size of aggregated sludge particles increased from 0.2 to 3.0 mm, with a sludge volume index of 18±2 mL/g during the operation.

Keywords: UASB Reactor, Municipal Wastewater, Low Temperature, Anaerobic Treatment, Anaerobic Treatment, Water Treatment, Sewage, Temperatures

? Thirunavkukkarasu, O.S., Viraraghavan, T. and Subramanian, K.S. (2001), Removal of arsenic in drinking water by iron oxide-coated sand and ferrihydrite: Batch studies. *Water Quality Research Journal of Canada*, **36** (1), 55-70.

Full Text: [2001\Wat Qua Res J Can36, 55.pdf](2001/Wat%20Qua%20Res%20J%20Can36,%2055.pdf)

Abstract: Arsenic, a common toxic element is mainly transported in the environment by water. Arsenic in drinking water is of major concern to many of the water utilities in the world. Numerous studies have examined the removal of arsenic from drinking water through treatment processes such as coagulation-precipitation, reverse osmosis and ion exchange. The focus of research has now shifted to solve the problems using suitable adsorbents to achieve low level As in drinking water for communities with high raw water arsenic concentration The determination of arsenic species is also essential for a better understanding and prediction of the toxic and carcinogenic nature of the species present in natural water systems. It is generally known that As(III) is more toxic than As(V) and inorganic arsenicals are more toxic than organic derivatives. The objective of this study was to study the arsenic adsorption behaviour on iron oxide-coated sand (IOCS) and ferrihydrite (FH). Batch studies were conducted using these adsorbents with natural water containing 325 µg/L arsenic, and the removal of approximately 90% was obtained. The adsorption capacity of the IOCS and FH used in this study for arsenic was estimated as 18.3 and 285 µg/g respectively. The experimental data fitted well with the well-known isotherms, namely, Freundlich, Langmuir and BET, indicating a favourable adsorption by these adsorbents. Speciation studies were also conducted with natural water containing arsenic. Particulate and soluble arsenic in water were determined, and As(III) in the sample was determined by passing the sample containing arsenic through anion exchange resin (Dowex 1X8-100; acetate form) packed in the column. Speciation studies with natural water showed that the particulate and soluble arsenic contributed 11.4 and 88.6% of the total arsenic present in the natural water, respectively. In the case of soluble arsenic, As(III) and As(V) were 47.3 and 52.7%, respectively.

Keywords: Arsenic, Drinking Water, Treatment, Adsorption, Isotherm, Speciation, British-Columbia, Natural-Waters, West-Bengal, Adsorption, Hydroxide, Coagulation, Groundwater, People, North, India

? Fiset, J.E., Tyagi, R.D. and Blais, J.F. (2002), Cocoa shells as adsorbent for metal recovery from acid effluent. *Water Quality Research Journal of Canada*, **37** (2), 379-388.

Full Text: [2002\Wat Qua Res J Can37, 379.pdf](2002/Wat%20Qua%20Res%20J%20Can37,%20379.pdf)

Abstract: Cocoa shells are commonly used in the horticulture field. This inexpensive substrate was studied for metal removal from acidic effluents. Batch adsorption tests in shake flasks revealed that cocoa shells were particularly efficient for lead removal. More than 90% of lead could be removed from a mono-metallic solution containing 51.8 mg Pb/L (250 μM Pb) using 20 g/L of cocoa shells. Langmuir isotherm indicated that cocoa shells have a maximum lead uptake of 7.56 mg/g (36.5 μmol/g) at pH = 2.0. Adsorption tests were also successfully completed with three types of heavily contaminated acid effluents: a multi-element synthetic solution and effluents produced during sewage sludge and soil decontamination. These tests have shown that the presence of other metals and organic matter only slightly decreases the lead removal by cocoa shells. After adsorption, metals could be eluted using a diluted acid solution (0.5 N) and the cocoa shells could be reused for many adsorption/desorption cycles.

Keywords: Cocoa Shells, Metals, Adsorption, Lead, Metal Removal, Acid Effluent, Amorphous Iron Oxyhydroxide, Heavy-Metals, Aqueous-Solutions, Adsorption, Ions, Water, Cu, Pb, Zn, Cd

? Watson, S.B. and Lawrence, J. (2003), Drinking water quality and sustainability. *Water Quality Research Journal of Canada*, **38** (1), 3-13.

Full Text: [2003\Wat Qua Res J Can38, 3.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%203.pdf)

Keywords: Banff-National-Park, Groundwater, Canada, Chemicals, Future

? Darbi, A., Viraraghavan, T., Jin, Y.C., Braul, L. and Corkal, D. (2003), Sulfate removal from water. *Water Quality Research Journal of Canada*, **38** (1), 169-182.

Full Text: [2003\Wat Qua Res J Can38, 169.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%20169.pdf)

Abstract: Sulfate occurs naturally in groundwater. Concerns regarding the health effects from sulfate in drinking water have been raised because of reports that diarrhea may be associated with water that contains high levels of sulfate. In the livestock Production industry, there is a concern that high levels of sulfate in water can adversely affect productivity. Different methods can be used to remove sulfate from water. Proven technologies are ion-exchange, nanofiltration, reverse osmosis, and electrodialysis. A few earlier studies have shown that the use of bentonite/kaolinite for sulfate removal has produced encouraging results. Experimental work was undertaken to examine in detail the feasibility of such processes. Laboratory studies using bentonite showed poor or no removal in the case of high sulfate water. Ion exchange and nanofiltration were found to be very effective in removing sulfate. Ion exchange is likely to be more reliable than nanofiltration because of the sensitivity of the nanofiltration process to total dissolved solids and biofouling.

Keywords: Sulfate Removal, Drinking Water, Bentonite, Ion Exchange, Nanofiltration, Drinking-Water

? Darbi, A. and Viraraghavan, T. (2003), A kinetic model for autotrophic denitrification using sulphur: Limestone reactors. *Water Quality Research Journal of Canada*, **38** (1), 183-192.

Full Text: [2003\Wat Qua Res J Can38, 183.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%20183.pdf)

Abstract: The kinetics of autotrophic denitrification of groundwater by Thiobacillus denitrificans in a sulfur: limestone upflow reactor was examined in order to predict effluent concentrations. Experiments were performed using-water containing 60 and 90 mg NO3-N/L and sulfur and limestone with average particle size of 3.5 mm. Results clearly showed that nitrate was completely removed from 60 and 90 mg NO3-N/L influent concentrations. The results showed that the autotrophic denitrification rates in sulfur: limestone reactors can be described by half-order kinetics. The half-order reaction rate constants for the entire media were estimated at 1.34 and 1.54 mg(1/2)/L-1/2 h for influent concentrations of 60 and 90 mg NO3-N/L, respectively.

Keywords: Autotrophic Denitrification, Nitrate Removal, Thiobacillus Denitrificans, Sulfur, Limestone, Drinking Water, Kinetics, Nitrate Removal

? Manna, B.R., Dey, S., Debnath, S. and Ghosh, U.C. (2003), Removal of arsenic from groundwater using crystalline hydrous ferric oxide (CHFO). *Water Quality Research Journal of Canada*, **38** (1), 193-210.

Full Text: [2003\Wat Qua Res J Can38, 193.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%20193.pdf)

Abstract: Synthesis of crystalline hydrous ferric oxide (CHFO), a modified iron-based adsorbent, and its arsenic sorption behaviour have been reported. Here, the effects of pH with variation of arsenic concentrations, contact time, pre-drying of CHFO, competition of some other anions and regeneration of arsenic-saturated CHFO are conducted by batch method. The sorption of As(V) is highly dependent on the concentration and pH of the experimental system, while that for As(III) is pH insensitive. As(III) is found to require less contact time to attain equilibrium than that of arsenic(V). Pre-drying of CHFO in the temperature range of 200 to 300degreesC is found to be effective in removing both MUM and As(V). Adsorption kinetics follow the first-order Lagergren model. The equilibrium data conform to the Langmuir isotherm. Evaluated Langmuir constants and equilibrium parameter (R-L) indicate that CHFO is a better As(III) adsorbent under experimental conditions. Sulphate, phosphate and bicarbonate compete poorly with As(III) sorption. A field test using CHFO-packed fixed-bed column is reported. Effluent water bed volumes of 14,000, 11,000 and 9000 BV (arsenic less than or equal to 0.01 mg L-1) were obtained in the first, second and third cycle of operation from a groundwater sample (arsenic content: 320400 mug L-1). Regeneration of the exhausted column was achieved with up to 80 to 85% efficiency using 3 BV of 5 M NaOH solution recycled through the column five times. Arsenic was recovered as As2S3 from the regenerates, to avoid recycling of arsenic into the environment.

Keywords: Adsorption, Aluminum, Arsenic, As(V), Column, Crystalline Ferric Oxide, Environment, Ferrihydrite, Fixed Bed, Fixed Bed Column, Fixed-Bed Column, Goethite, Groundwater, Hydroxide, Kinetics, Model, Oxidation, Recovery, Regeneration, Removal, Sorption, Water

? Tahiri, S., Messaoudi, A., Albizane, A., Azzi, M., Bouhria, M., Younssi, S.A., Bennazha, J. and Mabrour, J. (2003), Removal of dyes from aqueous solutions by adsorption on chrome-tanned solid wastes generated in the leather industry. *Water Quality Research Journal of Canada*, **38** (2), 393-411.

Full Text: Wat Qua Res J Can38, 393

Abstract: In this work, the ability of chrome shavings and of crust leather buffing dusts to remove dyes from aqueous solutions has been studied. Buffing dusts proved to be a much better adsorbent than chrome shavings for cationic dyes. The adsorption of anionic dyes is very important on two studied wastes. The pH has an obvious influence on the adsorption of dyes. Adsorption of cationic dyes is less favourable under acidic conditions (pH < 3.5) and at high pH values (pH > 10.5). The adsorption of anionic dyes on both adsorbents is more favourable under acidic conditions (pH < 3). The adsorption on chrome shavings is improved by the use of finer particles. The kinetic adsorption was also studied. Adsorption isotherms, at the optimum operating conditions, were determined. Adsorption follows the Langmuir model. The isotherm parameters have been calculated. The column technique could be applied to treat significant volumes of solutions.

Keywords: Activated-Sludge, Adsorbent, Adsorption, Anionic Dyes, Buffing Dusts, Cake, Carbon, Cationic Dyes, Chrome Shavings, Dyes, Langmuir, Particles, Pigment, Pilot-Scale, Recovery, Shavings, Water

? Mathialagan, T., Viraraghavan, T. and Cullimore, D.R. (2003), Adsorption of cadmium from aqueous solutions by edible mushrooms (Agaricus bisporus and Lentinus edodes). *Water Quality Research Journal of Canada*, **38** (3), 499-514.

Full Text: [2003\Wat Qua Res J Can38, 499.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%20499.pdf)

Abstract: Fungal organisms can remove heavy metals from aqueous solutions. Macro fungi such as Agaricus bisporus and Lentinus edodes (shiitake), commonly called mushrooms, are edible and are grown commercially. Laboratory batch studies were conducted at room temperature (21±1degreesC) to determine the potential of these fungal biomasses for adsorption of cadmium from aqueous solutions containing 1 mg/L cadmium. Results from batch studies showed that biomasses prepared from A. bisponts and L. edodes had good potential for removing cadmium from aqueous solutions. The maximum adsorption capacity of A. bisporus and L. edodes for uptake of cadmium from aqueous solutions was 2.08 and 0.716 mg/g, respectively. The equilibrium time for adsorption was found to be 6 and 1 h for A. bisporus and L. edodes, respectively. 68% cadmium removal was achieved with A. bisporus and 45% with L. edodes. The optimum initial pH was found to be 6.0 and 5.0 for A. bisporus and L. edodes, respectively. Isotherm studies suggested that cadmium adsorption by both the mushrooms followed the Freundlich isotherm. Desorption of cadmium from mushrooms by dilute HCL was minimal (19%), but rapid

Keywords: Activated Carbon, Adsorption, Agaricus Bisporus, Binding, Biosorption, Cadmium, Copper, Fly-Ash, Fruiting Bodies, Lentinus Edodes, Metals, Mushrooms, Peat, Removal, Water

? Sanghi, R. and Bhattacharya, B. (2003), Adsorption-coagulation for the decolorisation of textile dye solutions. *Water Quality Research Journal of Canada*, **38** (3), 553-562.

Full Text: [2003\Wat Qua Res J Can38, 553.pdf](2003/Wat%20Qua%20Res%20J%20Can38,%20553.pdf)

Abstract: Studies were undertaken for the removal of colour from different types of synthetic dye solutions by using powdered activated carbon (PAC) and bentonite clay (BC) as adsorbents. The different types of dyes (direct, mordant and basic) studied were Direct Orange, Eriochrome Black T and Malachite Green. The synthetic dye solutions behaved differently with the two adsorbents. The effect of adsorption by PAC and the further addition of a very small dose of a coagulant polyaluminium chloride (PAIC) on the settling and/or reuse of adsorbents used was studied. PAC and BC, though effective adsorbents, remained suspended in the solution for a long time. PAIC not only enhanced dye removal, but also formed a sludge that settled very quickly and which could also be reused effectively for dye removal.

Keywords: Powdered Activated Carbon, Polyaluminium Chloride, Dye, Adsorption, Coagulation, Activated Carbon, Contact-Time, Removal, Color

? Davis, T.A., Ali, F.E., Giannitti, E., Volesky, B. and Mucci, A. (2004), Cadmium biosorption by *S. fluitans*: Treatment, resilience and uptake relative to other *Sargassum* spp. and brown algae. *Water Quality Research Journal of Canada*, **39** (3), 183-189.

Full Text: [2004\Wat Qua Res J Can39, 183.pdf](2004/Wat%20Qua%20Res%20J%20Can39,%20183.pdf)

Abstract: Species of the brown algae Sargassum have been targeted for use in the implementation of strategies to remediate toxic heavy metal contamination in effluents and drinking waters. This work focusses on some of the intrinsic physico-chemical properties of the algal material and aspects of the sorption mechanism, in particular: their maximal metal uptake, the influence of particle size and their resilience to leaching during equilibrium batch experiments. In addition to S. fluitans, the database on cadmium uptake capacities by Sargassum is extended to include S. thunbergii and S. oligocystum, and these are compared to those of two common brown algae. Results of our experiments demonstrate that cadmium sorption is independent of the range of particle sizes investigated (<2 and 3-6 mm), thereby indicating that sorption is not a function of the specific surface area of the biomass exposed to the solution. Dissolved organic carbon (DOC) analyses reveal that leaching to the cadmium solutions during the metal sorption reaction is independent of the biomass preparations used to obtain the two size fractions but decreases with increasing final cadmium concentration.

Keywords: Alginate, Biosorption, Cadmium, *Sargassum Fluitans*, *Sargassum Thunbergii*, *Sargassum Oligocystum*, Leaching, Heavy-Metal Biosorption, Great-Barrier-Reef, Exchange Properties, Ionic-Strength, Alginate, Biomass, Seaweed, Column, Protons, H-1-NMR

Zeng, L. (2004), Arsenic adsorption from aqueous solutions on an Fe(III)-Si binary oxide adsorbent. *Water Quality Research Journal of Canada*, **39** (3), 269-277.

Full Text: [W\Wat Qua Res J Can39, 269.pdf](W/Wat%20Qua%20Res%20J%20Can39,%20269.pdf)

This study investigated arsenate and arsenite adsorption on an iron(III) oxide/silica adsorbent that had a Fe/Si molar ratio of 3. Batch experiments were conducted with regard to adsorption kinetics, isotherms, pH effects and interference of phosphate and sulfate on arsenic adsorption. The adsorption of arsenite was faster than that of arsenate. The adsorption kinetics could be well described by the power function equation for both arsenate and arsenite. The arsenate and arsenite adsorption isotherm data were satisfactorily fitted by the Redlich-Peterson, Freundlich-Langmuir and Langmuir models. The equilibrium adsorption capacity for As(III) was larger than that for As(V). This capacity for both As(III) and As(V) increased with temperature, from 11.3 to 14.9 (mg As/g) for As(V) and from 21.1 to 21.5 (mg As/g) for As(III) when the temperature was increased from 20 to 35ºC. The arsenate adsorption was significantly reduced at pH above 7.5, while the arsenite adsorption was almost independent of pH in the range of 3 to 9. The calculated thermodynamic parameters including ∆Gº, ∆Hº and ∆Sº reflected the spontaneous nature of As(V) and As(III) adsorption on this binary oxide adsorbent. The opposite values of ∆Hº indicated that the adsorption of As(V) was exothermic, whereas that of As(III) was endothermic. It was found that the interference of phosphate at pH 7.4 was more significant for arsenate adsorption than for arsenite adsorption. In contrast, sulfate had insignificant interference on arsenic adsorption at the tested sulfate concentration up to 460 mg/L and pH 7.4.

Keywords: Arsenic Adsorption, Equilibrium, Kinetics, Isotherm, Hydrous Ferric Oxide, Silica

? Manna, B. and Ghosh, U.C. (2005), Pilot-scale performance of iron and arsenic removal from contaminated groundwater. *Water Quality Research Journal of Canada*, **40** (1), 82-90.

Abstract: Pilot-scale performance in reducing excess iron and arsenic from contaminated groundwater has been systematically reported. Here, a double column unit, the first packed with &beta;-MnO2 and the second with crystalline FeOOH (goethite variety), with filters attached to the outlet of hand-pump tube-wells has been used in the field. Results showed that the filters generate 10,000 to 15,000 BV and 19,000 to 35,000 BV water with iron &LE; 0.3 mg, L and arsenic &LE; 10 &mu; g, L from groundwater having influent iron and arsenic levels of 3.75 to 7.25 mg, L and 70 to 220 &mu; g, L, respectively. The downflow rate of effluent water was 237.6 to 305.5 L, m2-Min. The performance results were achieved with a single charging of the iron and arsenic removal media. Toxicity characteristic leaching procedure (TCLP) tests of the waste (arsenic content: 2.4 g, kg) showed that it is not hazardous to the environment and does not pose any risk to users. Cost evaluation showed $US0.50 to 0.70 per 1000 gallons of treated water and, hence, the technology is cost-effective for countries such as India and Bangladesh.

Keywords: Adsorption, Arsenic, Bangladesh, Fixed Bed Adsorbent, Groundwater, Iron, Kinetics, Low-Cost, Mechanisms, Natural-Waters, Oxidation, Oxide-Coated Sand, Pilot-Scale, Removal, West-Bengal

? Al-Asheh, S., Banat, F. and Masad, A. (2005), Use of activated oil shale for the removal of 2,4-dichlorophenol from aqueous solutions. *Water Quality Research Journal of Canada*, **40** (2), 211-221.

Full Text: [2005\Wat Qua Res J Can40, 211.pdf](2005/Wat%20Qua%20Res%20J%20Can40,%20211.pdf)

Abstract: Sorption of the phenolic compound 2,4-dichlorophenol (2,4-DCP) by pyrolyzed and different forms of treated residue of Jordanian oil shale was examined. Pyrolyzed oil shale was prepared using a fluidized bed reactor at 520°C in the presence of nitrogen. Physical activation was carried out by treating the resultant pyrolyzed oil shale with CO2 at 830°C, while chemical activation of oil shale was carried out using KOH and ZnCl2 as impregnating agents. Uptake of 2,4-DCP onto the different types of sorbents increased in the order ZnCl2-OS > Pyr-OS > CO2-OS, with minimal uptake when KOH-OS was used. The process was found to be exothermic in nature. An increase in the initial pH of the solution negatively influenced the sorption of 2,4-DCP. The isotherm experimental data fitted reasonably to the Langmuir, Freundlich and Redlich-Paterson models. According to kinetics studies, the rate of 2,4-DCP sorption onto ZnCl2-OS was faster than that by Pyr-OS. Three kinetics models, namely the Morris-Weber model, Lagergren model, and pseudo-second-order model (PSOM), were applied to represent the experimental results for both pyrolyzed and ZnCl2-oil shale sorbents.

Keywords: Oil Shale, Physical Activation, Chemical Activation, 2,4-Dichlorophenol, Phenolic-Compounds, Adsorption-Isotherms, Chlorinated Phenols, Substituted Phenols, Fly-Ash, Carbon, Kinetics, Sorption, Chlorophenols, Residue

? Singh, T.S. and Pant, K.K. (2006), Kinetics and mass transfer studies on the adsorption of arsenic onto activated alumina and iron oxide impregnated activated alumina. *Water Quality Research Journal of Canada*, **41** (2), 147-156.

Full Text: Wat Qua Res J Can41, 147

Abstract: The present investigation deals with the uptake of As(III) and As(V) ions from aqueous solution by activated alumina and a new laboratory-prepared sorbent-iron oxide impregnated activated alumina. Iron oxide impregnation onto activated alumina significantly increased the percent arsenic removal and adsorption capacity for As(III) and As(V) ions. The maximum As(III) and As(V) removals were 96.8% and 98.4%, respectively, by iron oxide impregnated activated alumina (IOIAA). Maximum As(III) and As(V) removal of 94.2% and 96.1% was observed over activated alumina. Kinetic studies were performed at different initial sorbate concentrations to determine the mechanism of mass transfer of sorbate onto this sorbent. The maximum removal of As(III) and As(V) by activated alumina and iron oxide impregnated alumina takes place within 6 h and attains equilibrium within 12 h. First-order Lagergren kinetics explained the adsorption of arsenic over activated alumina whereas a pseudo-second order rate equation explained the behaviour of As(III) adsorption over iron oxide impregnated activated alumina. Diffusional. effects in solid pellets were also investigated to understand the mechanism of adsorption. These results indicate that the mechanism of arsenic adsorption is complex on both sorbents as both pore diffusion and surface diffusion contribute to the arsenic removal. During the initial period, surface diffusion was predominant but as the adsorption progresses, pore diffusion dominated the rate of adsorption.

Keywords: Arsenic, Diffusion, Adsorption, Kinetics, Iron Oxide, Drinking-Water, Aqueous-Solution, West-Bengal, Affected People, Ground-Water, Coated Sand, 6 Districts, Fly-Ash, Removal, As(III)

? Ghosh, U.C., Bandyopadhyay, D., Manna, B. and Mandal, M. (2006), Hydrous iron(III)-tin(IV) binary mixed oxide: Arsenic adsorption behaviour from aqueous solution. *Water Quality Research Journal of Canada*, **41** (2), 198-209.

Full Text: Wat Qua Res J Can41, 198

Abstract: Groundwater in the Bengal delta plain is primarily in an anoxic environment and As(III)/As(total) ratios reported are in the range of 0.60 to 0.90. Most of the studied adsorbents showed greater adsorption affinity for less toxic As(V) than for more toxic As(III). The synthesis and physicochemical characterizations of iron(III)-tin(IV) binary mixed oxide composite with systematic arsenic adsorption behaviour are reported here. The parameters studied are the effect of pH, adsorption capacity with varying arsenic loads, contact time for kinetics and isotherm modelling by batch method. In the pH range of 3.0 to 9.0, the adsorption of As(III) is found to be nearly the same while that of As(V) decreases with increasing pH for the studied arsenic concentrations (5.0 to 20.0 mg L-1). The adsorption data were analyzed using various kinetic and isotherm model equations. The rate of adsorption of As(III) was faster than that of As(V) at equilibrium pH similar to 7.0 and temperature 30±2°C. The adsorption kinetic data for arsenic fitted best with the Ho’s pseudo-second order [R2 similar to 0.99-1.00 for As(III) and similar to 0.97-0.98 for As(V)] and parabolic diffusion (R2 similar to 0.98-0.99) equations. The present kinetic data fitted the power function and simple Elovich kinetic equations well (R2 = similar to 0.97-1.00), except the data obtained for As(III) from the 20.0 mg 1:1 solution. The analyses of adsorption data for As(III) and As(V), respectively, at equilibrium PH 6.8±0.1 and 7.3±0.1 with three different two-parameter isotherm model equations show the fitting order: Langmuir > Freundlich > Temkin. The monolayer adsorption capacity (theta(0), mg g-1) values evaluated from the Langmuir isotherm for As(III) and As(V) are 43.86 and 27.55, respectively.

Keywords: Arsenic, Adsorption, Hydrous Iron(III)-Tin(IV) Mixed Oxide, Isotherm, Kinetics, pH, Granular Ferric Hydroxide, Drinking-Water, Natural-Waters, Coated Sand, Removal, Ferrihydrite, Groundwater, Aluminum

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? Mount, D.I. and Brungs, W.A. (1967), A simplified dosing apparatus for fish toxicology studies. *Water Research*, **1** (1), 21-22.

Full Text: [1960-80\Wat Res1, 21.pdf](1960-80/Wat%20Res1,%2021.pdf)

Abstract: A simplified diluter for maintaining a series of constant concentrations of a material in flowing water is described. It depends on water flows, metering cells, and venturi tubes to proportion volumes of water and toxicant to give desired concentrations. Construction requires less than 2 days, and only readily available materials are needed. An injector for mixing pesticides in water is also described.

Nozaki, M. and Hatotani, H. (1967), Treatment of tetraethyl lead manufacturing wastes. *Water Research*, **1** (2), 167-177.

Full Text: [W\Wat Res1, 167.pdf](W/Wat%20Res1,%20167.pdf)

Abstract: A study was carried out in an effort to find an effective means of treating tetraethyl lead manufacturing process waste waters. The conventional method of coagulation was effective for the removal of inorganic lead compounds in the tetraethyl lead process streams whereas the organic lead compounds present in the waste waters were not amenable to coagulation. Of the various waste waters arising from the tetraethyl lead manufacturing process, those waste waters which are rich in organic lead compounds were passed through a macroreticular sulfonate type strongly acidic cation exchange resin and the exhausted resin was eluted by caustic soda to give eluate containing high concentrations of organic lead compounds. The ion exchange resin was used repeatedly in this way. The organic lead thus concentrated was converted to inorganic lead by the addition of chlorine gas. When the eluate thus enriched in inorganic lead is added to the process streams carrying chiefly inorganic lead and coagulation is carried out, an almost complete elimination of lead in the tetraethyl lead process discharges will be obtained.

Brouzes, P. (1968), Control of the respiratory metabolism of activated sludge and the automatic working of purification plants based on this measurement. *Water Research*, **2** (1), 58-61.

Full Text: [W\Wat Res2, 58.pdf](W/Wat%20Res2,%2058.pdf)

Häusler, J. (1968), The importance and application of the natural succession of microbial processes during the anaerobic decomposition of organic compounds in waste waters. *Water Research*, **2** (1), 61-63.

Full Text: [W\Wat Res2, 61.pdf](W/Wat%20Res2,%2061.pdf)

? Brown, V.M. (1968), The calculation of the acute toxicity of mixtures of poisons to rainbow trout. *Water Research*, **2** (10), 723-733.

Full Text: [1960-80\Wat Res2, 723.pdf](1960-80/Wat%20Res2,%20723.pdf)

Abstract: The estimation of the acute toxicity to trout of mixtures of the common industrial pollutants ammonia, phenol, zinc, copper, cadmium, lead, nickel, and hydrogen cyanide is described. This is done from a knowledge of the concentrations of these poisons and of the temperature, pH value, total hardness, bicarbonate alkalinity, total dissolved solids concentration, and dissolved-oxygen concentration of the dilution water. The toxicity of the mixture is taken to be the sum of the proportions of the acutely toxic concentration of each poison.

The assumptions made in the use of this method are discussed along with its limitations, and the fact that in critical areas of study, such estimates can never be substitutes for the actual determination of the toxicity of a water by the use of fish is stressed.

? Lloyd, R. and Orr, L.D. (1969), The diuretic response by rainbow trout to sub-lethal concentrations of ammonia. *Water Research*, **3** (5), 335-344.

Full Text: [1960-80\Wat Res3, 335.pdf](1960-80/Wat%20Res3,%20335.pdf)

Abstract: The rate of urine excretion by rainbow trout increases with a rise in the concentration of ambient un-ionized ammonia. It is suggested that this diuresis is caused by an increase in the permeability of the fish to water. Quantitative measurements of urine excretion rates indicate that concentrations of un-ionized ammonia below 12 per cent of the lethal threshold concentration may be without toxic effect. Increases in temperature produce no well defined trend in urine excretion rates with a given concentration of un-ionized ammonia, but normal excretion rates have a Q10 of 2·4. Some evidence is presented for acclimation of rainbow trout to sub-lethal levels of ammonia. It is suggested that any environmental factor which affects the water balance of fish may also influence their susceptibility to ammonia poisoning.

Ganczarczyk, J. (1970), Variation in the activated sludge volume index. *Water Research*, **4** (1), 69-77.

Full Text: [W\Wat Res4, 69.pdf](W/Wat%20Res4,%2069.pdf)

Abstract: From the operational experience of the full-scale activated sludge treatment of the effluent from the unbleached Kraft pulp production in the Ostrołęka Mill, it was observed that substantial decreases in sludge volume index take place due to the extended storage of the activated sludge in the secondary clarifiers. Moreover, was found that in the studied range of wastewater pH and alkalinity the sludge loadings are the main factor determining the sludge volume index in the aeration tanks. Both decreases and increases of the sludge loading causes increases of the sludge volume index. The optimal sludge load values for the minimal sludge volume index are between 0·3–0·5 g BOD/g of sludge per day.

During the mixed liquor piston-type flow in the aeration tanks, at low average sludge loadings, there were also observed increases of the sludge index value and then partial decreases. At higher average sludge loadings the sludge index values after initial minimal decreases showed a tendency to increase.

? Harwood, J.E. and Kühn, A.L. (1970), A colorimetric method for ammonia in natural waters. *Water Research*, **4** (12), 805-811.

Full Text: [1960-80\Wat Res4, 805.pdf](1960-80/Wat%20Res4,%20805.pdf)

Abstract: An improved phenol-hypochlorite method for determining ammonia in water using nitroprusside as catalyst has been investigated. Unlike other recently published methods, the method is simple (and sufficiently sensitive for low-level analyses) and does not require accurate time intervals between reagents, not expensive equipment. The method is well suited for routine use.

Beer’s Law was obeyed over the whole ammonia range investigated. Reproducibility was 1·3 per cent with 10 μg N, and 5·7 per cent with 1 μg N.

Nilsson, R. (1971), Removal of metals by chemical treatment of municipal waste water. *Water Research*, **5** (2), 51-60.

Full Text: [W\Wat Res5, 51.pdf](W/Wat%20Res5,%2051.pdf)

Abstract: The reduction of the metal content of waste water by chemical treatment with aluminium sulfate or calcium hydroxide has been studied. p] Pb(II), Cu(II), Cr(III), Hg(II), Cd(II) and As(V) are reduced to low levels by both precipitants. Zn(II), Ni(II) and Co(II) are precipitated only at pH-values ≤ 9.5. The precipitation of Cu(II) and Pb(II) is greatly inhibited by the presence of nitrilotriacetate at pH ≤ 9.

? Weddle, C.L. and Jenkins, D. (1971), The viability and activity of activated sludge. *Water Research*, **5** (8), 621-640.

Full Text: [1960-80\Wat Res5, 621.pdf](1960-80/Wat%20Res5,%20621.pdf)

? Skidmore, J.F. and Tovell, P.W.A. (1972), Toxic effects of zinc sulphate on the gills of rainbow trout. *Water Research*, **6** (3), 217-228.

Full Text: [1960-80\Wat Res6, 217.pdf](1960-80/Wat%20Res6,%20217.pdf)

Abstract: The initial changes that occur in the gill tissue of rainbow trout exposed to 40 ppm Zn2+ are typical of an acute inflammatory reaction. The epithelium covering the secondary lamellae lifts away in a continuous sheet from the pillar cell system, thus increasing the diffusion distance from water to blood. Blood flow patterns through the lamellae change, granulocytes appear in large numbers within the lamellar blood spaces and beneath the raised epithelium. Finally the lamellar blood circulation stagnates, terminating in respiratory collapse and death of the animal. The dynamics of blood flow during the progressive stages of gill damage are discussed.

Ferguson, J.F. and Garvis, J.A. (1972), A review of the arsenic cycle in natural waters. *Water Research*, **6** (11), 1259-1274.

Full Text: [W\Wat Res6, 125.pdf](W/Wat%20Res6,%20125.pdf)

Abstract: A review of the occurrence and cycling of arsenic in fresh waters is presented. The fate of arsenic in natural waters has received little attention in past years, in spite of the fact that arsenic is toxic and probably carcinogenic through exposure by drinking water.

The chemistry of arsenic in aqueous systems is reviewed. Thermodynamic information is summarized in an Eh pH diagram for a system including sulfur. Mechanisms for removal of arsenic from the solution phase to the sediments are discussed. The possible microbially-mediated reactions of arsenic, including oxidation of arsenite, methylation of arsenic species, and reduction of arsenate, are discussed with reference to the locale of the reaction in the water column or in the sediments and to the toxicological significance of the reaction products and the rates of reaction.

A cycle of reactions for arsenic in a stratified lake is proposed and evidence is summarized relating to the occurrence and importance of particular reactions.

The potential pollutional hazard of arsenic is from ingestion of drinking water with high concentrations of arsenic, rather than consuming arsenic containing aquatic organisms. Although arsenic is greatly concentrated in aquatic organisms, it is evidently not progressively concentrated along a food chain. In addition, arsenic when consumed as an organically-bound species in flesh evidently has low toxicity.

The global cycle of arsenic is discussed. While volcanic activity is the original source of much of the arsenic in sedimentary rocks, in recent times weathering of arsenic has been approximately in balance with deposition of arsenic in sediments. Human activities, including the use of arsenic, the burning of fossil fuels, increased erosion of land and the mining and processing of sulfide minerals, have increased the amount of arsenic entering the oceans by at least a factor of 3. This increase will have no effect on the concentration in the oceans for many hundreds of years.

However, these cultural contributions are the source of high localized concentrations in many fresh waters. Careful surveillance and increased knowledge of the fate or arsenic in the aquatic environment are needed to insure that there will be no public health hazard.

Tóth, L. (1972), Reeds control eutrophication of Blaton lake. *Water Research*, **6** (12), 1533-1539.

Full Text: [W\Wat Res6, 1533.pdf](W/Wat%20Res6,%201533.pdf)

? Chudoba, J., Grau, P. and Ottová, V. (1973), Control of activated-sludge filamentous bulking. II. Selection of microorganisms by means of a selector. *Water Research*, **7** (10), 1389-1398.

Full Text: [1960-80\Wat Res7, 1389.pdf](1960-80/Wat%20Res7,%201389.pdf)

Abstract: The kinetic theory of species selection in mixed cultures is presented and verified under laboratory conditions. The theory is based on the Monod equation presuming different growth constants μ and k, for different species and, consequently, their different specific growth rates relationships to substrate concentration. Suppression of filamentous microorganisms in mixed cultures can be achieved by a selector. The selector forms the initial part of a biological reactor and is characterized by a low value of the dispersion number, desirably below 0·2, and by an adequate substrate concentration gradient. A definite relationship does exist between the SVI and the dispersion number or the CODmax in the reactor. If the selector is used, the dispersion number for the selector only should be considered for the SVI prediction. It was repeatedly demonstrated that changing the factors indicated by the selection kinetic theory brings mixed culture to filamentous bulking and back. The time necessary to suppress the filamentous bulking depends on the initial culture composition and the substrate concentration gradient in the selector. In general, propagation of filaments proceeds faster than their suppression. It is emphasized that the kinetic theory of selection does not cover the whole phenomenon of population dynamics in mixed cultures.

Gardiner, J. (1974), The chemistry of cadmium in natural water. II. The adsorption of cadmium on river muds and naturally occurring solids. *Water Research*, **8** (3), 157-164.

Full Text: [W\Wat Res8, 157.pdf](W/Wat%20Res8,%20157.pdf)

Abstract: The adsorption of cadmium on mud solids and particles of clay, silica, humic material and other naturally occurring solids has been studied. Radiochemical methods were employed so that cadmium concentrations in the μg l-1 range could be used. The variation of the extent of adsorption with many of the large number of factors involved was investigated, concentration factors (distribution coefficients) were determined, and in the course of the work, loss of cadmium by adsorption on container surfaces and filters was investigated.

Rates of adsorption and desorption were shown to be rapid. Concentration factors for river muds varied between 5000 and 50,000 and depended mainly on the type of solid, its state of subdivision, the concentration of metal ion present, the time of contact and the concentration of complexing ligands. Humic material appeared to be the main component of river mud responsible for adsorption. Adsorption and desorption processes are likely to be major factors in controlling the concentration of cadmium in natural waters and will tend to counteract changes in the concentration of the metal ion in solution.

? Eikelboom, D.H. (1975), Filamentous organisms observed in activated sludge. *Water Research*, **9** (4), 365-388.

Full Text: [1960-80\Wat Res9, 365.pdf](1960-80/Wat%20Res9,%20365.pdf)

Abstract: Approximately 1100 activated sludge samples, mostly derived from purification plants with bulking sludge, have been investigated for the presence of filamentous organisms. Twenty-six types were distinguished which are preliminary classified into seven groups.

The sheath-forming Gram-negative and Gram-positive bacteria are classified into Groups I and II, respectively. The organisms morphologically resembling some types of Cyanophyceae are included in Group III. The bacteria of Group IV are characterized by their tiny, curled filaments. The short, straight, multicellular bacteria are classified into Group V, whilst the organisms of Group VI are motile by a gliding activity. Finally, a number of additional types are collected in Group VII.

Grau, P., Dohányos, M. and Chudoba, J. (1974), Kinetics of multicomponent substrate removal by activated sludge. *Water Research*, **9** (7), 637-642.

Full Text: [W\Wat Res9, 637.pdf](W/Wat%20Res9,%20637.pdf)

Abstract: A kinetic model for multicomponent substrate removal by activated sludge has been presented. The model is based on the linear removal concept which is a special case of the broader Monod equation. Both the simultaneous and sequential removals have been considered in the kinetic model. It maintains the ‘order of reaction’ analogical to chemical reaction kinetics, which in this case simulates random and gradual diminuation of individual components with time, and is not limited to the integers only. The model has been verified experimentally and it has been found that the variation coefficients of the substrate removal kinetics constants were 3–5 times lower than those of the chemical reaction kinetics constants, calculated from the same data.

Gujer, W. and Jenkins, D. (1975), The contact stabilization activated sludge process: Oxygen utilization, sludge production and efficiency. *Water Research*, **9** (5-6), 553-560.

Full Text: [W\Wat Res9, 553.pdf](W/Wat%20Res9,%20553.pdf)

Abstract: A kinetic model of the contact stabilization process has been developed and experimentally verified with the aid of bench-scale activated sludge units treating domestic sewage. The model provides information on the relationship between the design parameters (process loading, temperature, residence time distribution) and process performance (sludge, production, oxygen uptake, COD-removal, organic nitrogen conversion, nitrification and effluent suspended solids). An oxygen equivalence mass balance equation, which is applicable to all activated sludge process modifications is proposed and may be used in the design and operation of these processes.

Bell, B.A. and Molof, A.H. (1975), A new model of granular activated carbon adsorption kinetics. *Water Research*, **9** (10), 857-860.

Full Text: [W\Wat Res9, 857.pdf](W/Wat%20Res9,%20857.pdf)

? Hoigné, J. and Bader, H. (1976), The role of hydroxyl radical reactions in ozonation processes in aqueous solutions. *Water Research*, **10** (5), 377-386.

Full Text: [1960-80\Wat Res10, 377.pdf](1960-80/Wat%20Res10,%20377.pdf)

Abstract: Hydroxyl radicals are formed upon the hydroxide-ion catalyzed decomposition of ozone in water as is shown by the relative rates with which organic substrates compete with each other for consuming the oxidative intermediates. The yield of the decarboxylation of 14C-labelled benzoic acid indicates that up to 0.55 ± 0.08 mol of hydroxyl radicals may be produced from 1 mol ozone at pH 10.5. Published data on hydroxyl radical-reactions can now be applied to describe oxidations initiated by ozonation. Parameters influencing the prior ozone decomposition and protective effects of radical scavengers, such as carbonates, have to be accounted for when optimizing the processes. The solutes present in water influence appreciably the rate of the chain reaction leading to the decomposition of ozone.

Poots, V.J.P., McKay, G. and Healy, J.J. (1976), The removal of acid dye from effluent using natural adsorbents: I. Peat. *Water Research*, **10** (12), 1061-1066.

Full Text: [W\Wat Res10, 1061.pdf](W/Wat%20Res10,%201061.pdf)

Abstract: The adsorption of Telon Blue (Acid Blue 25) on peat has been investigated. Adsorption parameters for the Langmuir and Freundlich isotherms were determined and the effects of contact time, initial dye concentration and peat particle size were studied. A series of fixed bed experiments were performed and the results compared with existing design models for adsorption columns.

Poots, V.J.P., McKay, G. and Healy, J.J. (1976), The removal of acid dye from effluent, using natural adsorbents II. Wood. *Water Research*, **10** (12), 1067-1070.

Full Text: [W\Wat Res10, 1067.pdf](W/Wat%20Res10,%201067.pdf)

Abstract: The ability of wood to adsorb Telon Blue (Acid Blue 25) has been investigated. The effects of contact time, particle size and adsorption capacity have been studied. In addition a series of fixed bed experiments were performed to study the flow system in an attempt to simulate industrial conditions on a small scale.

Notes: highly cited

Coupal, B. and Lalancette, J.M. (1976), The treatment of wastewaters with peat moss. *Water Research*, **10** (12), 1071-1076.

Full Text: [W\Wat Res10, 1071.pdf](W/Wat%20Res10,%201071.pdf)

Abstract: Waste waters containing heavy metals such as Hg, Cd, Zn, Cu, Fe, Ni, Cr6+, Cr3+, Ag, Pb, Sb or cyanide, phosphates and organic matters such as oil, detergents and dyes can be treated efficiently after a crude settling by contacting with peat moss. Chromium, as Cr6+, can be eliminated in our step from a starting solution of low turbidity to give effluent containing less than 10 ppb of Cr6+ and less than 40 ppb of Cr3+. The characteristics and performances of a contacting machine of 20,000 gal/day capacity for the treatment of industrial waste waters are reported.

Hung, C.P. and Wu, M.H. (1977), The removal of chromium(VI) from dilute aqueous solution by activated carbon. *Water Research*, **11** (8), 673-679.

Full Text: [W\Wat Res11, 673.pdf](W/Wat%20Res11,%20673.pdf)

Abstract: The removal of chromium(VI) by activated carbon, filtrasorb 400, is brought by two major interfacial reactions: adsorption and reduction. Chemical factors such as pH and total Cr(VI) that affect the magnitude of Cr(VI) adsorption were investigated. The adsorption of Cr(VI) exhibits a peak value at pH 5–6. The particle size of carbon and the presence of cyanide species do not change the magnitude of chromium removal. The reduced Cr(VI), e.g. Cr(III) is less adsorbable than Cr(VI).

The free energy of specific chemical interaction, Δ*G*chem was computed by the Gouy-Chapman-Stern-Grahame model. The average values of Δ*G*chem are -5.57 *RT* and -5.81*RT*, respectively, for Cr(VI) and CN. These values are significant enough to influence the overall magnitude of Cr(VI) and CN adsorption. Results also indicate that HCrO-4 and Cr2O2-7 are the major Cr(VI) species involved in surface association.

? Florence, T.M. (1977), Trace metal species in fresh waters. *Water Research*, **11** (8), 681-687.

Full Text: [1960-80\Wat Res11, 681.pdf](1960-80/Wat%20Res11,%20681.pdf)

Abstract: A recently proposed trace metal speciation scheme was applied to the determination of the chemical forms of copper, lead, cadmium and zinc in four natural fresh waters and a tap water. Studies were also made on the reliability of the technique, and of the effect of various methods of storage on the speciation results. The measurements showed that (a) copper in the river and reservoir samples was associated mainly with organic matter, probably organic colloids; (b) lead was divided between stable inorganic and organic forms, but one particular inorganic lead species predominated; (c) cadmium existed almost entirely as labile ionic forms; (d) zinc was divided between labile ionic species and a stable inorganic form; very little zinc was associated with organic colloids, and (e) the trace metals were not combined with inorganic colloids. Samples stored in polyethylene containers for over three weeks at 25°C or 4°C showed little change in either total metal concentration or metal speciation. Freezing, however, caused some irreversible changes.

Martin, R.J. and Al-Bahrani, K.S. (1977), Adsorption studies using gas-liquid chromatography. II. Competitive adsorption. *Water Research*, **11** (11), 991-999.

Full Text: [W\Wat Res11, 991.pdf](W/Wat%20Res11,%20991.pdf)

Abstract: Gas-liquid chromatography with a flame ionization detector system using the direct injection of aqueous solutions was used to monitor the adsorption of selected organic compounds dissolved in water onto activated carbon. The effects of competitive adsorption in batch (agitated flask) and column (flow through packed bed) systems were investigated. The effects became more pronounced with increase in the number of solutes in solution. This emphasises the importance of the competitive adsorption effect on the performance of an activated carbon unit in water or wastewater treatment.

? Verdouw, H., Van Echteld, C.J.A. and Dekkers, E.M.J. (1978), Ammonia determination based on indophenol formation with sodium salicylate. *Water Research*, **12** (6), 399-402.

Full Text: [1960-80\Wat Res12, 399.pdf](1960-80/Wat%20Res12,%20399.pdf)

Abstract: An ammonia determination based on formation of a substituted indophenol with sodium salicylate as phenolic reagent has been developed and compared with other methods. Sensitivity and reproducibility are comparable with results obtained in a method where phenol was used, while a number of the disadvantages inherent to the use of phenol are avoided. The salicylate method is specific for NH3－N and interferences are generally absent in samples from natural fresh waters. The method can be easily applied for seawater analysis.

Gould, M.S. and Genetelli, E.J. (1978), Heavy metal complexation behavior in anaerobically digested sludges. *Water Research*, **12** (8), 505-512.

Full Text: [W\Wat Res12, 505.pdf](W/Wat%20Res12,%20505.pdf)

Abstract: Heavy metal interactions with anaerobically digested sludges have been examined by equilibrating sludge solids with solutions containing acetate salts of zinc, nickel copper, and cadmium over the range of pH from 5.0 to 8.0. The partitioning of the metals with the solids suggested chemisorptive behavior. Currently available adsorption isotherms could be used to describe this behavior if modified to incorporate effects due to hydrogen ion concentration. The Freundlich isotherm was superior to the Langmuir and Temkin isotherms.

A comparison of Langmuir inhibition variations and Freundlich results suggests that weakly acidic ligands are involved in heavy metal complexation and that there exists a competition between the metal and hydrogen ions for these sites. Lowering the pH resulted in lower degrees of complexation.

Stability constants were calculated from Langmuir isotherm results and are in the range of values calculated by others for heavy metal complexation with soil organic matter.

? Painter, H.A. and King, E.F. (1978), Effect of phosphate and temperature on growth of activated-sludge and on biodegradation of surfactants. *Water Research*, **12** (11), 909-915.

Full Text: [1960-80\Wat Res12, 909.pdf](1960-80/Wat%20Res12,%20909.pdf)

Abstract: Occasional inconsistent and low removals of readily biodegradable surfactants and poor growths of sludge have been traced to sub-optimal concentrations of phosphate in the synthetic sewage used in the EEC method of assessment. The variable concentration of phosphate in this sewage was probably the result of variable amounts present in the organic components, peptone and meat extract. Reduced removal of alkylphenol ethoxylate surfactants at low temperature has been shown not to be related to a phosphate deficiency.

Jørgensen, S.E., Libor, O., Barkacs, K. and Kuna, L. (1979), Equilibrium and capacity data of clinoptilolite. *Water Research*, **13** (2), 159-165.

Full Text: [W\Wat Res13, 159.pdf](W/Wat%20Res13,%20159.pdf)

Abstract: The equilibrium and capacity data of natural clinoptilolite and clinoptilolite treated with sodium hydroxide were investigated. It was shown that the usual description of the selectivity as function of the equilibrium concentration can be replaced by equation (1), which is independent of the equilibrium concentration. Once constants *K*, *n* and *Q*o (see the equation) have been determined the equilibrium data can be calculated from equation (1) and the mass balance equation (2).

The practical capacity has been found by pilot plant experiment, and it was demonstrated that if it is expressed as `layer not used’ (*Y*), it is only dependent upon the flow rate. Once the relation between *y* and the flow rate is established, it is easy to design a column. This procedure is considerably less cumbersome than the usually applied calculation on the basis of diffusion coefficient.

? Nayar, S.C. and Sylvester, N.D. (1979), Control of phenol in biological reactors by addition of powdered activated carbon. *Water Research*, **13** (2), 201-205.

Full Text: [1960-80\Wat Res13, 201.pdf](1960-80/Wat%20Res13,%20201.pdf)

Abstract: A biological reactor containing a pure culture of E. coli was subjected to a variety of feed upsets involving phenol with powdered activated carbon applied as a control mechanism. The amount and rate of addition of the carbon was varied to evaluate the effectiveness of this strategy for maintaining the effluent quality. It was found that the carbon addition greatly reduced the magnitude of concentration transients and permitted operation with an input phenol concentration above 1000 mg 1−1.

Notes: highly cited (> 1000)

Karickhoff, S.W. Brown, D.S. and Scott, T.A. (1979), Sorption of hydrophobic pollutants on natural sediments. *Water Research*, **13** (3), 241-248.

Full Text: [W\Wat Res13, 241.pdf](W/Wat%20Res13,%20241.pdf)

Abstract: The sorption of hydrophobic compounds (aromatic hydrocarbons and chlorinated hydrocarbons) spanning a concentration range in water solubility from 500 parts per trillion (ppt) to 1800 parts per million (ppm) on local (North Georgia) pond and river sediments was investigated. The sorption isotherms were linear over a broad range of aqueous phase pollutant concentrations. The linear partition coefficients (*K*p) were relatively independent of sediment concentrations and ionic strength in the suspensions. The *K*p Imagewere directly related to organic carbon content for given particle size isolates in the different sediments. On an organic carbon basis (*K*oc = Kp/fraction) organic carbon), the sand fraction (> 50 μ*m* particle size) was a considerably less effective sorbent (50–90% reduction in *K*oc) than the fines fraction (> 50 μ*m* particles). Differences in sorption within the silt and clay fractions were largely related to differences in organic carbon content. Reasonable estimates of *K*ocImage can be made from octanol/water distribution coefficients, which are widely catalogued or easily measured in the laboratory.

Keywords: Sediments, Sorption, US

El-Dib, M.A. and Badawy, M.I. (1979), Adsorption of soluble aromatic hydrocarbons on granular activated carbon. *Water Research*, **13** (3), 255-258.

Full Text: [W\Wat Res13, 255.pdf](W/Wat%20Res13,%20255.pdf)

Abstract: Adsorption of benzene, toluene, *o*-oxylene and ethylbenzene on granular activated carbon proceeds in accordance with the Freundlich model. Adsorption parameters, *k* and 1/*n*, reflect the effects of chemical structure, solubility and competitive interactions on the adsorption process. Results obtained add to the validity of the carbon column technique in the removal of soluble aromatic hydrocarbons that affect water quality.

Notes: highly cited

? Owen, W.F., Stuckey, D.C., Healy, J.B., Young, L.Y. and McCarty, P.L. (1979), Bioassay for monitoring biochemical methane potential and anaerobic toxicity. *Water Research*, **13** (6), 485-492.

Full Text: [1960-80\Wat Res13, 485.pdf](1960-80/Wat%20Res13,%20485.pdf)

Abstract: Techniques are presented for measuring the biodegradability (Biochemical Methane Potential—BMP) and toxicity (Anaerobic Toxicity Assay—ATA) of material subjected to anaerobic treatment. These relatively simple bioassays can be conducted in most research laboratories without the need for sophisticated equipment. BMP is a measure of substrate biodegradability determined by monitoring cumulative methane production from a sample which is anaerobically incubated in a chemically defined medium. The ATA measures the adverse effect of a compound on the rate of the total gas production from an easily-utilized, methanogenic substrate. These techniques are demonstrated by an analysis of the BMP and ATA of processed samples of peat.

Brown, M.J. and Lester, J.N. (1979), Metal removal in activated sludge: The role of bacterial extracellular polymers. *Water Research*, **13** (9), 817-837.

Full Text: [W\Wat Res13, 817.pdf](W/Wat%20Res13,%20817.pdf)

Abstract: A combination of flocculation and settling is the mechanism by which metal removal is achieved in activated sludge. Bacterial extracellular polymers appear to play an important role in flocculation; metal cations may also be involved in this process. Extracellular polymers in activated sludge are mainly of a polysaccharide nature, although protein and nucleic acid from autolysis are constituents of the polymer matrix. Precipitated metals may be removed either by independent settling or by physical trapping in the sludge floc matrix. Metals present in the ionic form may be removed from solution by adsorption to sites on bacterial extracellular polymers. Metal ions may also be accumulated in the cytoplasm of a bacterial cell, or adsorbed on to the cell wall.

If activated sludge plants are overloaded with metals, toxic effects on bacteria and other microorganisms may severely inhibit the treatment process, resulting in poor quality effluents. Acclimated bacterial cultures can tolerate much higher metal concentrations than non-acclimated cultures; these are advantageous in the treatment of metal-laden wastes.

McKay, G., Otterburn, M.S. and Sweeney, A.G. (1980), The removal of colour from effluent using various adsorbents. III Silica: Rate processes. *Water Research*, **14** (1), 15-20.

Full Text: [W\Wat Res14, 15.pdf](W/Wat%20Res14,%2015.pdf)

Abstract: The rate of adsorption of Astrazone Blue, a basic dye, on Sorbsil Silica has been studied. The parameters studied include particle size, initial dye concentration, agitation and dye solution temperature. The rate controlling step is mainly intraparticle diffusion, although a small boundary layer resistance is experienced. The activation energy for the adsorption of Astrazone Blue on silica is 13.2±0.6 kJ kg-1. The diffusion coefficients vary from 9×10-9 cm2 s-1 at 20°C to 10×10-8 cm2 s-1 at 82°C.

McKay, G., Otterburn, M.S. and Sweeney, A.G. (1980), The removal of colour from effluent using various adsorbents. IV. Silica: Equilibrium and column studies. *Water Research*, **14** (1), 21-27.

Full Text: [W\Wat Res14, 21.pdf](W/Wat%20Res14,%2021.pdf)

Abstract: The adsorption of Astrazone Blue (Basic Blue 69) on silica has been investigated. Adsorption parameters for the Langmuir and Freundlich isotherms were determined. A series of static and fluidised bed experiments were undertaken and the results compared with existing design models for adsorption columns.

? Klieve, J.R. and Semmens, M.J. (1980), Evaluation of pretreated natural zeolites for ammonium removal. *Water Research*, **14** (2), 161-168.

Full Text: [1960-80\Wat Res14, 161.pdf](1960-80/Wat%20Res14,%20161.pdf)

Abstract: Clinoptilolite has been widely studied for ammonium removal in the past 2 yr. However, many investigators have reported variations in the measured capacities of samples of clinoptilolite. These studies and the factors believed to influence measured zeolite capacity are reviewed. In addition no studies to evaluate other natural zeolites for ammonium removal have been reported.

In this study samples of clinoptilolite, erionite, mordenite and phillipsite provided by the Anaconda Company were evaluated for ammonium removal from wastewaters. In addition, samples of clinoptilolite were pretreated in various ways to determine whether an improvement in ammonium removal performance could be realized. Total exchange capacities, capacities for ammonium removal from a synthetic waste, packed bed densities and crushing strengths were measured.

Phillipsite was found to have almost twice the weight capacity for ammonium removal from synthetic waste compared to that of clinoptilolite. The volumetric capacity was 26% better than that of clinoptilolite. However, the phillipsite sample was extremely friable and it could not be used for water treatment unless it was strengthened with a binder.

Pretreatment of clinoptilolite with NaOH, HNO3 and steam did little to improve the zeolite’s performance. However, heat pretreatment (600°C for 1 h) improved the zeolite’s selectivity for ammonium significantly. Ammonium removal capacities were increased by approximately 17% for heat treated zeolite samples although the total exchange capacity of the zeolite was reduced somewhat.

? O’Connor, D.J. and Connolly, J.P. (1980), The effect of concentration of adsorbing solids on the partition coefficient. *Water Research*, **14** (10), 1517-1523.

Full Text: [1960-80\Wat Res14, 1517.pdf](1960-80/Wat%20Res14,%201517.pdf)

Abstract: The results of a number of laboratory studies are presented to demonstrate an inverse relationship between concentration of adsorbing solids and partition coefficient. Various functional forms which define the relation are developed and correlated with the data. A power-law dependence of partition coefficient on concentration of solids is shown. The significance of this relationship in assessing the fate of hydrophobic pollutants in natural water systems is discussed.

Notes: IIsotherm

? van Vliet, B.M., Weber, Jr., W.J. and Hozumi, H. (1980), Modeling and prediction of specific compound adsorption by activated carbon and synthetic adsorbents. *Water Research*, **14** (12), 1719-1728.

Full Text: [1960-80\Wat Res14, 1719.pdf](1960-80/Wat%20Res14,%201719.pdf)

Abstract: The performance characteristics of two activated carbons and eight synthetic adsorbents are compared. The comparison addresses both the equilibrium capacities and mass transport properties of the adsorbents. A new empirical adsorption isotherm is employed for description of adsorption equilibrium data. A predictive mathematical model is used for forecasting adsorption bed performance from independent batch reactor system data.

Knocke, W.R. and Hemphill, L.H. (1981), Mercury(II) sorption by waste rubber. *Water Research*, **15** (2), 275-282.

Full Text: [1981\Wat Res15, 275.pdf](1981/Wat%20Res15,%20275.pdf)

Abstract: Studies were connected to assess the capability of waste tire rubber for removing inorganic mercury from solution. Samples of vulcanized tire rubber were ground to a suitable sorbent size and utilized in batch sorption studies. Research parameters included aqueous mercury concentration, rubber sorbent particle size, solution temperature, and hydrogen ion concentration. Alternate sulfur-free rubber materials were also evaluated in an attempt to identify the sorption mechanism. The studies showed tire rubber to be an efficient sorbent material for mercury removal from waste solutions. Of the parameters investigated, pH was determined to be most crucial, with an optimum pH range of 5.5 to 6.0 for good mercury removal. The diffusion of mercury through pores in the rubber sorbent was shown to be the rate limiting step regarding mercury uptake. Finally, sulfur-free rubber materials were shown to be equally efficient for inorganic mercury removal.

McKay, G., Otterburn, M.S. and Sweeney, A.G. (1981), Surface mass transfer processes during colour removal from effluent using silica. *Water Research*, **15** (3), 327-331.

Full Text: [W\Wat Res15, 327.pdf](W/Wat%20Res15,%20327.pdf)

Abstract: The effects of several variables on the initial rate of Astrazone Blue (Basic) dye removal have been investigated. The surface mass transfer coefficients have been determined and correlated as the dimensionless mass transfer term *Sh/Sc*0.33, as a function of agitation, initial dye concentration, silica particle size and temperature.

? Bader, H. and Hoigné, J. (1981), Determination of ozone in water by the indigo method. *Water Research*, **15** (4), 449-456.

Full Text: [1981\Wat Res15, 449.pdf](1981/Wat%20Res15,%20449.pdf)

Abstract: The concentration of aqueous ozone can best be determined by the decolorization of indigo trisulfonate (600 nm, pH below 4) whenever the ozone cannot be measured directly by its u.v. absorption. The method is stoichiometric and extremely fast. The change of absorbance vs ozone added is −2.0±0.1×104 M−1 cm−1 and is independent of the concentration of aqueous ozone in the range 0.005–30 mg 1−1. The precision of the analysis is 2% or 3 μg 1−1 for low concentrations if a spectrophotometer or a good filter instrument is used. Visual methods can be used to measure 0.01 mgl−1 ozone. Secondary oxidants produced by ozone in natural water, including hydrogen peroxide or chlorite, do not interfere; chlorine can be masked. The reagent solution is stable for 3 months. The method is recommended for kinetic measurements, for studies of ozonation processes and for visual field methods.

? Larson, R.J., Clinckemaillie, G.G. and Vanbelle, L. (1981), Effect of temperature and dissolved-oxygen on biodegradation of nitrilotriacetate. *Water Research*, **15** (5), 615-620.

Full Text: [1981\Wat Res15, 615.pdf](1981/Wat%20Res15,%20615.pdf)

Abstract: The effect of temperature and dissolved oxygen on the rate of biodegradation of nitrilotriacetate (NTA) was examined in water samples collected from the Rur River. Biodegradation of NTA was first order with respect to NTA concentration over a concentration range of 50–1000 μg l−1. First order rate constants showed a typical temperature dependency (temperature coefficient, *Q*10 = 2) and biodegradation of NTA was observed over a temperature range of 2–24°C. The effect of temperature on the rate of NTA biodegradation was described by the Arrhenius equation, with calculated activation energies in the range reported for ordinary enzyme reactions. Biodegradation of NTA was also observed at low dissolved oxygen concentrations (0.3 mg l−1), although at reduced rates compared to high oxygen concentrations (13 mg l−1). Biodegradation of NTA was oxygen-dependent, suggesting an obligate oxygen requirement for the initial steps in NTA metabolism by natural microbial communities in surface waters. In general, our results indicate that NTA biodegradation will occur in natural waters under conditions of low temperature and low dissolved oxygen and also at low NTA concentrations.

Elliott, H.A. and Huang, C.P. (1981), Adsorption characteristics of some Cu(II) complexes on alumino silicates. *Water Research*, **15** (7), 849-855.

Full Text: [W\Wat Res15, 849.pdf](W/Wat%20Res15,%20849.pdf)

Abstract: The adsorption of Cu(II) by aluminosilicates with varying Si/Al ratios was investigated. The presence of complex-forming organic ligands [nitrilotriacetate (NTA) and glycine (Gly)] alters metal electrovalency and, in so doing, modifies Cu(II) adsorption characteristics which can influence its fate, biological activity and transport in aquatic systems. Electrostatic attraction by a positively-charged aluminosilicate surface is an important mechanism whereby anion CuNTA− complexes were adsorbed. Two distinct mechanisms are involved in the adsorption of cationic complexes: (1) an exchange reaction at permanent structural sites and (2) interfacial accumulation in response to the pH-dependent surface charge. The contribution of each mechanism to the total amount of CuGly+ adsorbed is related to the Si/A1 ratio. At the critical Si/A1 ratio (Si/A1iso), the aluminosilicates have zero net pH-dependent surface charge. In the absence of specific adsorption, aluminosilicates for which Si/A1 ≥ Si/A1iso can only function as cation exchangers. For Si/A1 < Si/A1iso simultaneous adsorption of anions and cations is possible.

Laxen, D.P.H. and Harrison, R.M. (1981), The physicochemical speciation of Cd, Pb, Cu, Fe and Mn in the final effluent of a sewage treatment works and its impact on speciation in the receiving river. *Water Research*, **15** (9), 1053-1065.

Full Text: [W\Wat Res15, 1053.pdf](W/Wat%20Res15,%201053.pdf)

Abstract: A scheme for the speciation of metals in freshwaters has been applied to the analysis of the final effluent from a sewage treatment plant and to the receiving river upstream and downstream of the effluent outfall. The treatment plant was selected because of the high influent and effluent concentrations of Cd. The metal speciation patterns in the effluent are interpreted primarily in terms of organic interactions, which appear to be exerting a solubilizing effect on Cd and Cu, but not on the Pb and Fe which are principally associated with the particulate size fraction (> 12 μm). The influx of metals with the sewage effluent alters the speciation pattern in the river. A large part of the Cd is added to the smallest size fraction (< 0.015 μm). However, the major part of each metal, with the exception of Mn, is associated with the colloidal and particulate size fractions, thus minimising the immediate toxic significance to aquatic life.

Braam, F. and Klapwijk, A. (1981), Effect of copper on nitrification in activated sludge. *Water Research*, **15** (9), 1093-1098.

Full Text: [W\Wat Res15, 1093.pdf](W/Wat%20Res15,%201093.pdf)

Abstract: The concentration of free copper in activated sludge with copper added is strongly influenced by pH. For example, at pH 6.5 with 9.13×10-5 mol Cu l-1, the free copper concentration is 4.0×10-7 mol l-1 (pCu = 6.4) and at pH 8.4 this concentration is 10-8 mol l-1 (pCu = 8.0). In both cases the activated sludge concentration is 0.7 g MLSS l-1. The free copper concentration is also affected by the concentration of mixed liquor suspended solids (MLSS).

In batch experiments with constant pH, the effect of copper on the nitrification rate was not regulated by total copper concentration but by copper/sludge ratio or by free copper concentrations. Experiments at different pH showed a linear correlation between nitrification capacity and free copper concentration, suggesting that the pH effect on nitrification below 8.3 is in fact a copper effect.

Activated sludge with copper did not become acclimatized to the copper in a period of three days. Addition of nitrilotriacetic acid (NTA) within one day did cancel the copper inhibition.

The results were compared with the effect of copper on acetate removal by heterotrophic micro-organisms. The nitrifiers proved to be no more susceptible to copper than heterotrophic micro-organisms.

Frenet, M. (1981), The distribution of mercury, cadmium and lead between water and suspended matter in the loire estuary as a function of the hydrological regime. *Water Research*, **15** (12), 1343-1350.

Full Text: [W\Wat Res15, 1343.pdf](W/Wat%20Res15,%201343.pdf)

Abstract: We examined Hg, Pb, Cd in filtered water and suspended sediments from the Loire Estuary. The metal concentration in both varies widely and is a function of hydrodynamic and hydraulic parameters. We classified them according to geographical repartition, salinity, tidal state etc. A laboratory study, monitored under the same conditions of salinity, showed the affinity of suspended material for Hg, Pb and Cd. The results of the two studies, *in vivo* and *in vitro* emphasize the importance of salinity in the metal repartition between water and sediments.

Christensen, E.R. and Delwiche, J.P. (1982), Removal of heavy metals from electroplating rinsewaters by precipitation, flocculation, and ultrafiltration. *Water Research*, **16** (5), 729-737.

Full Text: [W\Wat Res16, 729.pdf](W/Wat%20Res16,%20729.pdf)

Abstract: Chromium, nickel, copper and zinc can be effectively removed from electroplating rinsewaters by hydroxide precipitation, flocculation and ultrafiltration. Prior to precipitation, chromium is reduced from the hexavalent to the trivalent form by ferrous sulfate and cyanide in copper and zinc rinsewaters are oxidized by sodium hypochlorite. Minimum metal concentrations in the permeate from separate batches of chromium, nickel, copper and zinc rinsewaters were found to be, respectively, 0.17 mg 1-1 Cr (T), 0.26 mg 1-1 Ni, 0.30 mg 1-1 Cu and 1.84 mg 1-1 Zn. These solubilities are in good agreement with the theoretical solubility curves, except for copper where the formation of stable copper cyanide complexes appears to increase the solubilities at least two orders of magnitude relative to those predicted on the basis of the equilibrium constants for copper hydroxides and oxides. A simple mass balance model, assuming concentrate recycle and constant metal concentration in the permeate, is adequate for the prediction of feed and permeate concentrations as a function of the volume filtered up to a relative volume of about 0.3. Above this value, the feed concentrations are lower than predicted, apparently because of entrapment of metal precipitate in the strainer. Water recoveries are strongly dependent on the specific metal removed and are found to be 24% for Ni with a 0.20 μm membrane, 10% for Cr with a 0.80 μm membrane, 6.5% for Cu and 3.7% for Zn, both with a 0.45 μm membrane.

Aoki, T. and Munemori, M. (1982), Recovery of chromium(VI) from wastewaters with iron(III) hydroxide. I: Adsorption mechanism of chromium(VI) on iron(III) hydroxide. *Water Research*, **16** (6), 793-796.

Full Text: [W\Wat Res16, 793.pdf](W/Wat%20Res16,%20793.pdf)

Chromium(VI) [Cr(VI)] is adsorbed as HCrO4- on iron(III) hydroxide at pH below 8.5. The Cr(VI) adsorption is suppressed by the presence of other anions such as SO42- and SCN-, and enhanced by the presence of metal ions such as Cd(II) and Pb(II). The suppression is due to the competitive adsorption of other anions, depending upon the stability of their iron complexes. The enhancement is probably due to the increase in adsorption sites as a result of coprecipitation of metal ion with iron(III) hydroxide.

Winfield, B.A. (1982), Cellulose acetate membranes for the reverse osmosis treatment of sewage effluents. *Water Research*, **16** (6), 797-799.

Full Text: [W\Wat Res16, 797.pdf](W/Wat%20Res16,%20797.pdf)

Abstract: A study has been made of the performance of cellulose acetate reverse osmosis membranes used in the treatment of secondary sewage effluents over a period of three years. The trials have shown that the deterioration in salt rejection performance is less than hydrolysis theory predicts. In addition there is a reduction in the water permeability of the membrane when theory suggests that it should increase. There is no evidence to indicate that microbiological attack of the membrane occurs to a significant extent. Several explanations are given in support of the observed phenomena.

Pandey, M.P. and Chaudhuri, M. (1982), Removal of inorganic mercury from water by bituminous coal. *Water Research*, **16** (7), 1113-1118.

Full Text: [W\Wat Res16, 1113.pdf](W/Wat%20Res16,%201113.pdf)

Abstract: Sorption of inorganic mercury in water onto bituminous coal and activated carbon was investigated in the laboratory. Some coal samples were observed to be comparable to activated carbon in mercury sorption. Chemical pretreatment of coal, e.g. nitric acid oxidation, sulfonation, and sulfurisation further improved the sorption capacity. Column studies indicated the feasibility of using coal for removing mercury from water supplies or industrial wastewater.

Couillard, D. (1982), Toxicity, assessment of snowmelt water runoff in an urban area. *Water Research*, **16** (7), 1197-1205.

Full Text: [W\Wat Res16, 1197.pdf](W/Wat%20Res16,%201197.pdf)

Abstract: There is a current paucity of information on the characteristics of water originating from melting snow in urbanized areas. In fact no data exist on the potential chronic toxicity of waters originating from melting snow combined with sewage waters of industrial and domestic activities. Bioassays were conducted on the green alga *Selenastrum capricornutum* to evaluate the composite effect of all pollutants occurring in waters originated from melting snow in urbanized areas and also to determine the long-term bioavailability of selected toxicants in these waters.

The publication resumes a sampling study of two outfalls (Curotte-Papineau and Meilleur-Atlantique) from collector systems on the island of Montréal, Québec, Canada (see Fig. 1). Both sewer systems are of the combined surface runoff-wastewater type, are self contained and drain watersheds of 11.7 and 22.2 km2 area respectively (see Table 1). The sampling program carried out in spring (March–May) 1978, was oriented towards the analysis of flow-quality relationships during two dry and three snowmelt periods. The flow from the intrusion of snowmelt into the sewage networks were due not only to high air temperature and solar radiation conditions but also to a heavy rainfall (9.67 mm; maximum intensity of 4.6 mm h-1. The principal water quality parameters studied were BOD5, COD, Cl-, Nin, Pi, Pb, Cr, Zn, Cn- and SS (see Table 2).

In addition a bioassay based on the fertility potential [the *Selenastrum capricornutum* Printz algal assay bottle test; U.S.E.P.A. (1978)] on filtered samples (1.2 μm GF/C) of waste water was used to detect any toxological qualities of the outfalls during both dry and snowmelt periods. An analysis of the relationship between chemical quality and the toxological properties of the samples from both sewage networks showed that water collected during a period of snowmelt without rain had a greater potential chronic toxicity and greater mean ratios of BEDTA/B than combined water collected during a dry climatic period (see Table 3). This toxicity is due mainly to inorganic compounds. However, the increase in water discharge rate during periods of snowmelt accompanied by rain results in an apparent dilution of the aquatic toxicants. The potential chronic toxicity of water during the latter periods is consequently reduced compared with combined waters during dry periods.

Knowledge of relationships between water flow and the chronic toxicity characteristics of waste water from urban snowmelt is necessary in the planning of any future combined water treatment system.

Notes: highly cited

? Pierce, M.L. and Moore, C.B. (1982), Adsorption of arsenite and arsenate on amorphous iron hydroxide. *Water Research*, **16** (7), 1247-1253.

Full Text: [1982\Wat Res16, 1247.pdf](1982/Wat%20Res16,%201247.pdf)

Abstract: Adsorption isotherms in solutions with ionic strengths of 0.01 at 25°C were measured over the arsenite and arsenate concentration range 10−7−10−3 M and the pH range 4–10. At low concentrations, these isotherms obeyed equations of the Langmuir type. At higher concentrations the adsorption isotherms were linear, indicating the existence of more than one type of surface site on the amorphous iron hydroxide adsorbent. Removal of arsenite and arsenate by amorphous iron hydroxide throughout the concentration range were determined as a function of pH. By careful selection of the relative concentration of arsenic and amorphous iron hydroxide and pH, removals on the order of 92% can be achieved.

Keywords: Adsorption, Arsenate, Arsenite, Iron

Cullen, G.V. and Siviour, N.G. (1982), Removing metals from waste solutions with low rank coals and related materials. *Water Research*, **16** (8), 1357-1366.

Full Text: [W\Wat Res16, 1357.pdf](W/Wat%20Res16,%201357.pdf)

Abstract: Ion exchange media were produced by contacting brown coal, peat or wood sawdust with a solution of calcium hydroxide, preferably as an aqueous slurry of lime. The resultant calcium loading on the media, which ranged up to 8% for sawdust, 12% for peat and to 19% for brown coal, was exchanged for many metals in solution.

Preliminary work showed the method to be amenable to extraction of copper, nickel, chromium, cadmium, lead, zinc, mercury, cobalt, silver, iron, manganese, vanadium, germanium, gallium, aluminium, antimony and uranium. For most of the metals more than 99% was removed from I g 1-1 solutions.

In more detailed work, confined to calcium loaded brown coal and solutions having metal concentrations more typical of industrial operations, minimum residual metal concentrations of 0.0005 mg l-1 mercury; 0.02 mg 1-1 copper; 0.02 mg 1-1 zinc; <0.05 mg l-1 cadmium; 0.1 mg 1-1 lead and 0.2 mg l-1 manganese were obtained. These results compare favourably with those reported for other relevant processes and there might be operational advantages in the method.

The method can be applied either by agitating the calcium loaded media in the solution and then filtering, or by passing the solution through packed beds of the media. Where appropriate, dilute solutions can be up-graded for re-use by stripping the metals from the media which can also be re-used. Alternatively, the loaded media can be combusted and the metals recovered from the residues.

The method might be applicable to mine drainage and to effluents from metallurgical processing and electroplating, but more work is required to assess costs.

It is suggested that the method is environmentally preferable to other common effluent treatment procedures because it enables collection and recycling of heavy metal pollutants.

Laxen, D.P.H. and Harrison, R.M. (1983), Physico-chemical speciation of selected metals in the treated effluent of a lead-acid battery manufacturer and in the receiving river. *Water Research*, **17** (1), 71-80.

Full Text: [W\Wat Res17, 71.pdf](W/Wat%20Res17,%2071.pdf)

Abstract: A scheme for the speciation of metals in freshwaters has been applied to the metals Pb, Cd, Cu, Fe and Mn in the treated effluent of a lead-acid battery manufacturer and the receiving river upstream and downstream of the effluent outfall. The speciation is inferred from measurements of the size-associations of the metals, the lability with respect to anodic stripping voltammetry and Chelex resin and by u.v. irradiation to destroy organic complexing agents. The results are related to chemical and physical interactions within the waters and are discussed in terms of the impact of the effluent discharge upon the receiving river.

Notes: highly cited

? Hoigné, J. and Bader, H. (1983), Rate constants of reactions of ozone with organic and inorganic compounds in water. I. Non-dissociating organic compounds. *Water Research*, **17** (2), 173-183.

Full Text: [1983\Wat Res17, 173.pdf](1983/Wat%20Res17,%20173.pdf)

Abstract: Rate constants of reactions of ozone with non-ionized solutes, such as aliphatic alcohols, olefins, chlorosubstituted ethylenes, substituted benzenes and carbohydrates, have been determined from the absolute rates with which ozone reacts in the presence of various concentrations of these compounds in water. They have been tested by comparison with the relative rates by which pairs of these solutes are transformed by ozone. Different experimental methods have been developed to determine such rate constants in the range from 10−2 to 105 M−1 s−1. Interferences between the direct reactions of ozone and reactions due to its preliminary decomposition to secondary oxidants could be eliminated. The kinetics of all the reactions studied are first order with respect to ozone and solute concentration. The rate constants of many types of organic compounds in water are of the same order of magnitude as in organic solvents. Substituted benzenes, however, react in water about 100 times faster. They obey a linear free energy relationship with p = −3.1 when based on δp+ values. Comparisons of rate constants with chemical structures of the reacting groups show that all reactions of ozone are highly selective and electrophilic. The kinetic data allow explanation of the chemical effects of ozone observed in water treatment practice.

Notes: highly cited

? Hoigné, J. and Bader, H. (1983), Rate constants of reactions of ozone with organic and inorganic-compounds in water. II. Dissociating organic-compounds. *Water Research*, **17** (2), 185-194.

Full Text: [1983\Wat Res17, 185.pdf](1983/Wat%20Res17,%20185.pdf)

Abstract: Comprehensive lists of rate constants of reactions of ozone with acidic and basic organic chemicals dissolved in water, such as amines, amino acids, carboxylic acids and phenols are reported. The second-order rate constants increase with pH as does the degree of deprotonation of the dissolved substances, e.g. from 1 to 100 M- ~ s- ~ for formic acid, from 0.2 to 2 M- ~ s- t for glyoxalic acid and from [03 to l09 M - t s- t for phenolic compounds. All results support the conclusions presented in Part I for the electrophilic reactions of ozone with non-dissociating compounds. They are important for the understanding of the pH dependence of the rate and selectivity of ozonation reactions and for explaining the chemical effects of ozone on impurities in drinking water and waste waters.

Keywords: Water

Cooney, D.O., Nagerl, A. and Hines, A.L. (1983), Solvent regeneration of activated carbon. *Water Research*, **17** (4), 403-410.

Full Text: [W\Wat Res17, 403.pdf](W/Wat%20Res17,%20403.pdf)

Abstract: Nineteen solvents were evaluated in batch tests involving the desorption of a representative organic adsorbate (phenol) from activated carbon. Three of the better solvents which also possess complete miscibility with water (acetone, dimethylformamide, methanol) were tested further in fixed-bed runs. The effects of solvent temperature and solvent flow rate on phenol desorption were evaluated. In addition, the recovery of phenol adsorption capacity by an activated carbon bed operated cyclically using a sequence of phenol adsorption, desorption with methanol, and rinsing with water was determined. It was found that solvent temperature and flow rate are not critical variables. Solvent volume and type were the most important factors in phenol desorption. A modest volume of methanol restored 88% of the fixed-bed adsorption capacity for phenol after 1 regeneration, and the capacity essentially leveled off after 5 regenerations at a value of 81% of the capacity of fresh carbon. Methanol regeneration is effective, easy to perform and offers convenient solvent recovery. Thus, it is an attractive alternative to thermal regeneration methods.

Salim, R. (1983), Adsorption of lead on the suspended particles of river water. *Water Research*, **17** (4), 423-429.

Full Text: [W\Wat Res17, 423.pdf](W/Wat%20Res17,%20423.pdf)

Abstract: The effects of the chemical composition and particle size, of suspended particles in river water, on the adsorption of lead onto these particles have been studied. Lead has been determined using the conventional method of anodic stripping voltammetry. Particle sizes have been determined using the Coulter Counter. The organic matter content of the suspended particles has been found responsible for most of the lead adsorbed onto these particles. An attempt has been made to quantify the relationship between the particle size of suspended particles and the amount of lead adsorbed onto these particles. The shape of the calibration graphs of lead from solutions in river water has been explained with reference to the adsorption of lead on suspended particles.

Becker, E.W. (1983), Limitations of heavy metal removal from waste water by means of algae. *Water Research*, **17** (4), 459-466.

Full Text: [W\Wat Res17, 459.pdf](W/Wat%20Res17,%20459.pdf)

Abstract: It has been suggested by several authors that heavy metals might be removed from aqueous systems by phytoplanktonic algae, whose high capacity for accumulating dissolved metals has previously been described. This paper shows––by comparing results obtained on accumulation factors and growth rates in different models––that metal removal by means of algae is not feasible in practice. It was found that under optimum conditions in a static system the reduction of a given initial metal concentration by 50% requires approx. 14 days, while in a dynamic model a retention time of approx. 19 days is needed to achieve the same reduction. Finally, measurements of nitrogenase activity inhibition caused by various concentrations of mercury and cadmium demonstrate that nitrogen-fixing blue-green algae can be used for biological sewage treatment only at very low heavy metal concentrations in the medium.

Box, J.D. (1983), Investigation of the folin-ciocalteau phenol reagent for the determination of polyphenolic substances in natural-waters. *Water Research*, **17** (5), 511-525.

Full Text: [W\Wat Res17, 511.pdf](W/Wat%20Res17,%20511.pdf)

Abstract: The methodology associated with the Folin-Ciocalteau phenol reagent was investigated and the performance characteristics of a method using sodium carbonate as the supporting medium were determined. Calibration curves using phenol, tannic acid, or L-tyrosine were linear up to at least 1000 μg l-1. The limit of detection was 6 μg phenol l-1 and the relative standard deviation at 100 μg phenol l-1 was 5.2% and at 1000 μg phenol l-1 was 4.1%. The absorbances obtained with equal amounts of a range of potential standards showed variations when compared with that of phenol: phenol (100%), L-tyrosine (62%), oak gall tannin (58%), tannic acid (48%), chestnut tannin (26%), oak tannin (24%), fulvic acid (5%). The method was applicable to a wide range of monohydric and polyhydric phenolic substances and interferences from inorganic and non-phenolic organic compounds were examined. Interference would be expected above 30 μg S2- l-1, 300 μg Mn(II) l-1, or 400 μg SO32- l-1. Concentrations of iron >2 mg l-1 as Fe(II) or Fe(III) formed the insoluble iron(III) hydroxide which increased the absorbance, but centrifugation could be used to remove this source of interference. Other potential sources of intereference (e.g. reducing agents and certain metabolic products) would be expected to have a negligible effect in unpolluted waters. Methods using diazotised sulphanilic acid or 4-aminoantipyrine (4-AAP) were found to be inferior when applied to natural water samples.

Perineau, F., Molinier, J. and Gaset, A. (1983), Adsorption of ionic dyes on wool carbonizing waste. *Water Research*, **17** (5), 559-567.

Full Text: [W\Wat Res17, 559.pdf](W/Wat%20Res17,%20559.pdf)

Abstract: Wool carbonizing waste is not used although large amounts are available in the countries where wool is processed. Wool carbonizing waste is made up of two components: the plant particles can be considered as sulfo lignins; the short-size wool fibres have undergone chemical modifications. Owing to its physical structure and to the polar as well as apolar properties of its macromolecules, this waste is liable to adsorb ionic organic solutes. The adsorption of ionic dyes on wool carbonizing waste was therefore investigated so as to evaluate its possible use for the decolourization of dyeing effluents. The effect of the solution-substrate reaction time on the adsorption at various temperatures was studied first. Temperature had a marked effect on the adsorption of the acid dye (AB 80) (Fig. 1) whereas the basic dye (BR 22) (Fig. 2) was characterized by its faster diffusion within the wool carbonizing waste particles. These differences can be ascribed to the higher steric hindrance of the AB 80 molecules and to their possible aggregation. The L-type adsorption isotherms corroborated the temperature effect already mentioned as well as the high affinity of the wool carbonizing waste with acid (Fig. 3) and basic (Fig. 4) dyes. The shape of the adsorption isotherms suggests that the adsorption proceeds through ionic bonding; as the dye molecules are oriented flatwise on the surface of the waste, the dye-substrate hydrophobic interactions can be maximum. The amounts adsorbed were 0.744 mmol g-1 (i.e. 52.5%) for AB 80 at pH 2 and 0.193 mmol g-1 (i.e. 5.5%) for BR 22 at pH 4. Higher amounts of basic dyes might however be expected to be adsorbed since the adsorption maximum is reached at pH 9 in the case of BR 22 (Fig. 5), as a result of the increasingly electronegative charge of the substrate. The Langmuir and Freundlich equations (Table 1) were used to have a mathematical model for the operation of a waste water processing unit. As shown by the L-type adsorption isotherms, the wool carbonizing waste used is suitable for the processing of low concentration effluents, such as dyeing waste waters: the decolourization of synthetic solutions was therefore considred. The column processing of an AB 80 solution showed the effect of the reaction time on the efficiency of the material used (Table 2). Investigation of the processing of a BR 22 solution in a stirred reactor led to the determination of the optimum carbonizing waste concentration (Fig. 6). as well as of the optimum effluent-substrate reaction time and the number of reactors to be used (Fig. 7). Eventually, the adsorptive power of the wool carbonizing waste used was compared with that of various materials (Table 3): the uptake capacity of wool carbonizing waste is lower than or equal to that of other substrates in the case of basic dyes but it is 6–10-fold higher in the case of acid dyes.

de Mora, S.J. and Harrison, R.M. (1983), The use of physical separation techniques in trace metalspeciation studies. *Water Research*, **17** (7), 723-733.

Full Text: [W\Wat Res17, 723.pdf](W/Wat%20Res17,%20723.pdf)

Abstract: Size fractionation techniques used in speciation studies of trace metals in natural waters have been reviewed. Centrifugation, filtration, ultrafiltration (UF), dialysis and gel filtration chromatography (GFC) have been considered with respect to trace metal contamination, adsorption effects and size selectivity. Size differentiation during centrifugation is impeded due to density effects on particle settling rates. Filtration is the most commonly used method to fractionate trace metal species, but often only ‘issolved’ and ‘particulate’ fractions are identified. Filters may be decontaminated with dilute nitric acid and adsorption effects may be minimised by preconditioning with a dilute calcium nitrate solution. Several studies concerning the size selectivity of filters indicate that at present only Nuclepore polycarbonate filters are suitable for size spectrum investigations. Those difficulties outlined above are also experienced with UF methods but generally have not been so well resolved. particularly with respect to adsorption. Adsorption during UF causes an overestimation of the molecular size of metal complexes. Dialysis techniques have been utilized with some success in order to isolate trace metal species in true solution but have seen only limited applications in comprehensive speciation schemes. GFC offers considerable potential in physicochemical speciation studies. The major advantage lies with the ability to determine metal concentrations over a continuous size spectrum rather than at discrete size ranges. In contrast to other methods, adsorption during GFC will cause the molecular weight of organometallic complexes to be underestimated. Several examples of the environmental application of each technique have been considered, thereby illustrating the value of examining the size distribution of metal species in natural waters.

Huang, C.P. and Blankenship, D.W. (1984), The removal of mercury(II) from dilute aqueous solution by activated carbon. *Water Research*, **18** (1), 37-46.

Full Text: [W\Wat Res18, 37.pdf](W/Wat%20Res18,%2037.pdf)

Abstract: The results of preliminary screening tests comparing the total Hg(II) removal capacity of 11 different brands of commercial activated carbon indicated that a very high percent (99–100%) total Hg removal was attained by all types of activated carbon especially at pH 4–5; the percent total Hg(II) removal decreased with pH’s 4–5 except activated carbons Nuchar SA and SN which maintained a relatively high percent (>90%) total Hg(II) removal capacity at all pH values. Experiments were then conducted to reveal the mechanisms of Hg(II) removal by Nuchar SA (a powdered carbon). The results show that total Hg(II) removal was brought by two mechanisms: the adsorption and reduction. In order to investigate the kinetics of these two reactions, volatilization by bubbling N2 gas at high flow rate was used to remove the Hg(g) product of the reduction reaction. It was noted that both the adsorption and the reduction/volatilization reactions were highly pH-dependent; at pH approx. <3–4 or > approx. 9–10 the extent of reduction/volatilization reaction superceded the adsorption reaction; whereas in the mid-pH region adsorption reaction dominated the total Hg(II) removal. The rate of adsorption reaction is very fast, reaching equilibrium in a few minutes; the rate of reduction/volatilization follows a linear *t*0.5 expression. The reduction reaction is more significant with Filtrasorb 400 (H-type carbon) than Nuchar SA (L-type carbon). In the presence of strong chelating agent, ethylenediaminetetraacetate (EDTA), the total Hg(II) removal decreases due partly to the formation of less adsorbably mercuric(II)-EDTA complexes.

Martin, R.J. and Ng, W.J. (1984), Chemical regeneration of exhausted activated carbon-I. *Water Research*, **18** (1), 59-73.

Full Text: [W\Wat Res18, 59.pdf](W/Wat%20Res18,%2059.pdf)

Abstract: This paper represents the first of a series of reports on the chemical regeneration of exhausted activated carbon following experimental research studies carried out at the University of Birmingham, U.K.

A wide range of regenerants, inorganic and organic, was evaluated in the treatment of carbon samples exhausted with mono-substituted benzene compounds. Organic chemical regenerants with solubilising powers were found to be generally much more effective than inorganic chemical regenerants with oxidising powers. Results showed that the efficacy of organic solubilising regenerants decreased as their molecular weights and sizes increased; it is likely that the smaller the regenerant, the further it could penetrate into the micropores of the carbon and displace the adsorbate. The relationship between the molecular weight of the adsorbate and that of the organic regenerant was observed to be of significant importance; the regenerant chosen should be smaller than the smallest adsorbate to be removed.

Keywords: Activated Carbon, Adsorption, Desorption, Regeneration, Chemicals, Molecular Size, Molecular Structure, Chemical Properties

Gould, M.S. and Genetelli, E.J. (1984), Effects of competition on heavy metal binding by anaerobically digested sludges. *Water Research*, **18** (1), 123-126.

Full Text: [W\Wat Res18, 123.pdf](W/Wat%20Res18,%20123.pdf)

? Beltrame, P., Beltrame, P.L. and Carniti, P. (1984), Influence of feed concentration on the kinetics of biodegradation of phenol in a continuous stirred reactor. *Water Research*, **18** (4), 403-407.

Full Text: [1984\Wat Res18, 403.pdf](1984/Wat%20Res18,%20403.pdf)

Abstract: The rate of phenol degradation by activated sludge was studied in a completely mixed continuous-flow reactor with sludge recycle, operated at steady-state conditions at 20°C. Monod kinetics was followed when the influent concentration (*C*s°) was kept constant. When using different *C*s° levels, the phenol removal rate was found to have an inverse dependence on *C*s°. It is suggested that this kinetic anomaly is due to inhibition of the biooxidation by some secondary reaction product(s). A kinetic model based on this concept is able to interpret experimental facts.

Keywords: Phenol Biodegradation, Activated Sludge, Continuous Reactor, Removal Rate, Influent Concentration, Inhibition, Kinetic Model

Netzer, A. and Hughes, D.E. (1984), Adsorption of copper, lead and cobalt by activated carbon. *Water Research*, **18** (8), 927-933.

Full Text: [W\Wat Res18, 927.pdf](W/Wat%20Res18,%20927.pdf)

Abstract: The phenomena of lead, copper and cobalt adsorption by activated carbon from aqueous solution was studied in detail. Laboratory studies were conducted to evaluate and optimize the various process variables (i.e. carbon type, solution pH, equilibrium time and carbon dose). A quantitative determination of the adsorptive capacity of activated carbon to remove these metals was also determined.

Significant differences were found in the ability of different types of activated carbons to adsorb lead, copper and cobalt from aqueous solution. Solution pH was found to be the most important parameter affecting the adsorption. It was found that there was practically no adsorption of lead, copper and cobalt by activated carbon below a well defined solution pH value for each metal. This critical solution pH value was found to be lower than the pH value associated with the formation of hydrolysis products. Of the ten commercially available activated carbons evaluated in these experiments, Barney Cheney NL 1266 was found to adsorb the largest percentage of lead, copper and cobalt. The adsorption of any single metal (lead, copper and cobalt) was hindered by the presence of the other metals; the metals apparently competed for adsorption sites.

Keywords: Copper, Lead, Cobalt, Aqueous Solution, Removal, Activated Adsorption

Rowley, A.G., Husband, F.M. and Cunningham, A.B. (1984), Mechanism of metal adsorption from aqueous solutions by waste tyre rubber. *Water Research*, **18** (8), 981-984.

Full Text: [W\Wat Res18, 981.pdf](W/Wat%20Res18,%20981.pdf)

Abstract: The mechanisms of adsorption of cadmium(II), mercury(II) and lead(II) on to shredded rubber from old automobile types have been studied and it is shown that at least two distinct processes can be involved depending upon the metal being adsorbed. Mercury and cadmium uptake are accompanied by displacement of zinc and therefore probably involve an ion exchange type mechanism. Lead adsorption, in contrast, involves no zinc displacement and is not competitive with cadium or mercury uptake, suggesting that a completely separate mechanism and site of binding are used by lead(II).

Keywords: Tyres, Waste, Rubber, Metal Adsorption, Mercury, Cadmium, Lead, Mechanism, Effluents

Jardim, W.F. and Pearson, H.W. (1984), A study of the copper-complexing compounds released by some species of cyanobacteria. *Water Research*, **18** (8), 985-989.

Full Text: [W\Wat Res18, 985.pdf](W/Wat%20Res18,%20985.pdf)

Abstract: The production of copper-complexing extracellular material by cyanobacteria was studied by using ion specific electrodes. The species studied were *Plectonema boryanum* and *Anabaena cylindrica*. The values of the conditional stability constants for the copper complexes (*K*’), for the two species at pH 6.60 (±0.05) were, respectively 2.8 (±0.8)×106 and 5.9 (±2.0)×107. A strain of *P. boryanum* that was made tolerant to a concentration of 1×10-6M copper produced greater amounts of copper-complexing products than the normal strain although the *K*’ value for the copper complexes was the same. When stressed with copper, *P. boryanum* and *A. cylindrica* produced more complexing material than under the usual growth conditions.

Keywords: Cyanobacteria, Extracellular Products, Copper, Stressing, Conditional Stability Constants, Toxicity, Copper Tolerance

Notes: highly cited

Blanchard, G., Maunaye, M. and Martin, G. (1984), Removal of heavy metals from waters by means of natural zeolites. *Water Research*, **18** (12), 1501-1507.

Full Text: [W\Wat Res18, 1501.pdf](W/Wat%20Res18,%201501.pdf)

Abstract: The natural zeolite clinoptilolite can be used as an ion exchanger for the removal of ammonium ions from drinking waters. These waters may also contain small amounts of heavy metals. The retention possibilities of these cations by the zeolite are presented.

The study of the selectivity of the Na-exchanged clinoptilolite in presence of ammonium ions has been achieved by plotting the exchange isotherms relative to the various cations. This leads to the following order of decreasing efficiency of the zeolite.

Tan, T.C., Chia, C.K. and Teo, C.K. (1985), Uptake of metal ions by chemically treated human hair. *Water Research*, **19** (2), 157-162.

Full Text: [W\Wat Res19, 157.pdf](W/Wat%20Res19,%20157.pdf)

Abstract: The uptake capacity of chemically treated human hair waste for the various metal ions can be arranged in the following decreasing order: Hg2+ (Hg+), Ag+, Pb2+, Cd2+, Cu2+ (Cu+), Cr6+, Ni2+, Cr3+. The uptake capacity is significantly affected by the presence of other metal ions. Anionic effect was found to be more pronounced for a mixed ions system than for a single ion system.

Keywords: Keratinous Waste, Human Hair, Metal Ion Adsorption

McKay, G., Bino, M.J. and Altamemi, A.R. (1985), The adsorption of various pollutants from aqueous solutions on to activated carbon. *Water Research*, **19** (4), 491-495.

Full Text: [W\Wat Res19, 491.pdf](W/Wat%20Res19,%20491.pdf)

Abstract: The ability of activated carbon. Filtrasorb 400, to adsorb various pollutants from aqueous solutions has been studied. The pollutants investigated are phenol, *p*-chlorophenol, sodium dodecyl sulphate, mercuric ions and chromic(III) ions. The saturation adsorption capacity of the activated carbon for the pollutants is 213, 434, 361, 35 and 138 mg g-1 for phenol, *p*-chlorophenol, sodium dodecylsulphate, chromium(III) and mercuric(II) respectively. Equilibrium isotherm analyses were undertaken using Langmuir and Freundlich equations.

Keywords: Adsorption, Activated Carbon, Water Pollution, Equilibrium Isotherms, Phenol, *p*-Chlorophenol, Sodium Dodecyl Sulphate, Mercuric Ions, Chromium(III) Ions

Narkis, N. and Ben-David, B. (1985), Adsorption of non-ionic surfactants on activated carbon and mineral clay. *Water Research*, **19** (7), 815-824.

Full Text: [W\Wat Res19, 815.pdf](W/Wat%20Res19,%20815.pdf)

Abstract: A series of non-ionic surfactants of nonyl-phenol ethoxylates, with *n* = 4−23;0 ethylene oxide groups and dinonyl-phenol ethoxylate were studied in dilute aqueous solution. Their removal efficiencies and mechanisms by adsorption on powdered and granular activated carbon and on Na-montmorillonite clay were investigated. The powdered activated carbon proved to be the most efficient with 94–100% non-ionic surfactants removal by addition of 40–80 mg activated carbon. Various models of adsorption isotherms such as Langmuir, BET and S-type were used to determine *Q*4, the limiting adsorption capacity. The relationships between *Q*o and parameters affecting the adsorption of non-ionic surfactants such as *n*, HLB and CMC were determined. The cross-sectional area σ0 occupied by surfactant molecules on the adsorbent was calculated. Adsorption has been proven to be a potential advanced physicochemical treatment method for the effective removal of non-ionic surfactants present in effluents intended for reuse.

Keywords: Non-Ionic Surfactants, Nonyl-Phenol Ethoxylate, Adsorption, Activated Carbon, Na-Montmorillonite, Limiting Adsorption Capacity

Notes: highly cited

Panday, K.K., Prasad, G. and Singh, V.N. (1985), Copper(II) removal from aqueous solution by fly ash. *Water Research*, **19** (7), 869-873.

Full Text: [W\Wat Res19, 869.pdf](W/Wat%20Res19,%20869.pdf)

Abstract: The removal of Cu(II) by adsorption on fly ash has been found to be concentration, pH and temperature dependent. The kinetics of adsorption indicates the process to be diffusion controlled. The Langmuir constants have been calculated at different temperatures, and the adsorption has been found to be endothermic (Δ*H* = 15.652 kcal mol-1). The maximum removal is observed at pH 8.0, and variation in adsorption with pH has been explained on the basis of surface ionisation and complexation.

Keywords: Fly Ash, Cu(II), Adsorption Dynamics, Mass Transfer Coefficient, Pore Diffusion, Langmuir Isotherm, Surface Ionization, Complexation

? Hoigné, J., Bader, H., Haag, W.R. and Staehelin, J. (1985), Rate constants of reactions of ozone with organic and inorganic compounds in water. III. Inorganic compounds and radicals. *Water Research*, **19** (8), 993-1004.

Full Text: [1985\Wat Res19, 993.pdf](1985/Wat%20Res19,%20993.pdf)

Abstract: Second-order rate constants for reactions of ozone with 40 inorganic aqueous solutes are reported. Included are compounds of sulfur (e.g. H2S, H2SO3, HOCH2SO3H), chlorine (e.g. Cl−, HOCl, NH2Cl, HClO2, ClO2), bromine (e.g. Br−, HOBr), nitrogen (e.g. NH3, NH2OH, N2O, HNO2) and oxygen (e.g. H2O2), as well as free radicals (e.g. O2−, OH•). Most of these compounds exhibit an increase in rate constant with increasing pH corresponding to their degree of dissociation. Rate constants are based on ozone consumption rates measured by conventional batch-type or continuous-flow methods (10−3-10+6 M−1 s−1 range) and determinations of stoichiometric factors. Also listed are data determined by pulse-irradiation techniques using kinetic spectroscopy (1010 M−1 s−1 range). Additional literature data are reviewed for completeness. Results are discussed with respect to water treatment and environmental processes.

Keywords: Free Radicals (Ozonation), Inorganic Anions (Ozonation), Nitrite (Ozonation), Oxidation (Ozone), Ozone, Rate Constants (Ozone), Reaction Kinetics (Ozone), Sulfite (Ozonation), Water Treatment

Forster, C.F. (1985), Factors involved in the settlement of activated-sludge. I. Nutrients and surface polymers. *Water Research*, **19** (10), 1259-1264.

Full Text: [W\Wat Res19, 1259.pdf](W/Wat%20Res19,%201259.pdf)

Abstract: Using data obtained from a number of full-scale plants, the settlement characteristics of activated sludge were examined in relation to the variations in the main nutrients (carbon, nitrogen, phosphorus) present in the sewage being fed to the aeration tank. The results tended to confirm previous work by showing that there were certain combinations of nutrients that were more likely to produce poor settlement. The molecular weights of the surface polymers extracted from activated sludge by heat were determined by a gel-filtration unit with an exclusion limit of 100,000. The distributions found by this technique were similar to those reported previously; a fraction at ≥100,000, a major fraction at < 100,000 and one or more minor fractions. The actual weight of the major fraction was found to increase as the settlement of the sludge deteriorated. It is suggested that this could be due to steric effects allowing greater amounts of interstitial water to be bound in the sludge. Molecular weight distributions were also obtained with a gel system whose exclusion limit was four million. These showed the presence of several high molecular weight (> 100,000) species with the highest exceeding 2×106.

Keywords: Nutrients, Activated Sludge Settlement, Extracellular Polymers, Molecular Weights

Forster, C.F. (1976), Factors involved in the settlement of activated sludge II. The binding of polyvalent metals. *Water Research*, **19** (10), 1265-1271.

Full Text: [W\Wat Res10, 1265.pdf](W/Wat%20Res10,%201265.pdf)

Abstract: Extra cellular polymers (ECP) were extracted from a series of activated sludges which were obtained from a number of full-time plants. The sludges had settlement properties characterized by SSVI values (measured at 3.5 g 1-1) ranging from 63 to 260. The metal binding properties of these polymers were examined by two methods; gel filtration and equilibrium analysis. This enabled three parameters to be quantified for each of the ECPs; the conditional stability constants for the metal/polymer sites, the number of binding sites per molecule of polymer and the complexation capacities of the ECPs. In addition, the equilibrium analysis method enabled an assessment to be made as to the number of types of binding site existing for any metal/polymer series. The gel filtration results show that the affinity series (based on stability constants) varied randomly as the SSVI varied and that the number of binding sites did not show any particular pattern in relation to settlement. The equilibrium analysis results show that whilst copper, zinc and chromium exhibit a similar behaviour at all SSVI values, the way in which nickel behaves depends on the settlement properties of the sludge.

Keywords: Activated Sludge, Metal-Binding, Equilibrium Analysis, Conditional Stability Constants, Extra Cellular Polymer

Alibhai, K.R.K., Mehrotra, I. and Forster, C.F. (1985), Heavy metal binding to digested sludge. *Water Research*, **19** (12), 1483-1488.

Full Text: [W\Wat Res19, 1483.pdf](W/Wat%20Res19,%201483.pdf)

Abstract: The interactions of heavy metals with anaerobically digested sludges and with digested sludge which had been washed with EDTA have been examined by equilibrating the sludge solids with solutions containing zinc acetate, lead acetate, ferrous sulphate and chromic chloride. This equilibration has been studied at 20 and 35°C. Langmuir and Freundlich isotherms were used to describe the metal binding behaviour of the solids. The linear part of the isotherm was obtained by regression analysis and conditional adsorption constants were calculated from the slope of these lines. These calculations suggested that, under the conditions used in this work, the mechanism of attachment was predominantly one involving metal/surface ligand interactions. Attachment series, based on the various constants, are reported and lead the authors to question the suitability of such series for describing the binding of metals relative to one another.

Keywords: Digested Sludge, Heavy Metals, Adsorption, Isotherms, Sorption Constants, Binding Series

Gosset, T., Trancart, J.L. and Thévenot, D.R. (1986), Batch metal removal by peat: Kinetics and thermodynamics. *Water Research*, **20** (1), 21-26.

Full Text: [W\Wat Res20, 21.pdf](W/Wat%20Res20,%2021.pdf)

Abstract: Peat moss, a natural inexpensive material, is able to play an important rôle in treatment processes of metal-bearing industrial effluents since it adsorbs, complexes or exchanges various metal cations. This paper presents kinetics and thermodynamics of batch metal removal reactions by 50 g l-1 (dry wt) eutrophic or oligotrophic peat particles using Cu2+, Cd2+, Zn2+ and Ni2+ concentrations ranging from 0.01 to 100 mM.

Metal cation removal reactions are moderately rapid in 10 mM metal unbuffered solutions: the forward kinetic constant ranges between 0.005 and 0.17 M-1s-1, and equilibrium is reached within about 1 h. Under these conditions of pH (2.2–4.2) and concentrations, apparent binding equilibrium constants were found to range between 2 and 3150 M-1 depending upon the peat origin and the metal cation.

In 0–6.5 pH-buffered metal cation solutions, the four cations binding reactions behaved differently demonstrating that metal binding equilibrium constant decrease in the order Ni2+ > Cu2+ > Cd2+ = Zn2+. When pH is higher than 6.7, more than 90% of a 10 mM metal cation solution is removed by 50 g 1-1 peat particles and metal binding capacities equal 200 mmol kg-1 dry wt, whatever the metal nature and the peat origin. Except for nickel cation which is very strongly bound to peat, all metal cations are completely released when pH is fixed below 1.5.

Keywords: Peat, Heavy Metals, Ion Exchange, Complexation, Kinetics, Thermodynamics

McKay, G., Bino, M.J. and Altememi, A. (1986), External mass transfer during the adsorption of various pollutants onto activated carbon. *Water Research*, **20** (4), 435-442.

Full Text: [W\Wat Res20, 435.pdf](W/Wat%20Res20,%20435.pdf)

Abstract: A wide range of experimental studies are reported for the adsorption of phenol and *p*-chlorophenol onto activated carbon––Type Filtrasorb 400––in an agitated batch adsorber. A model has been used to determine the external mass transfer coefficient for the systems and the effect of several experimental variables have been investigated: these include agitation, initial pollutant concentration, carbon mass, carbon particle size and solution temperature. The mass transfer coefficient has been correlated in terms of the dimensionless *Sh/Sc*0.33 against each variable. The Sherwood number, *Sh* = *k*f*R*/*D*mol, relates the external mass transfer coefficient *k*f to particle radius, *R*, and molecular diffusivity, *D*mol. The Schmidt number, *Sc*, is the ratio of kinematic viscosity, *v*, to molecular diffusivity. A few results are also reported for the adsorption of sodium dodecyl sulphate and mercuric ions onto activated carbon.

Keywords: Adsorption, Activated Carbon, Phenol, *p*-Chlorophenol, Mercury, Sodium Dodecyl Sulphate, Mass Transfer

? Matthews, R.W. (1986), Photo-oxidation of organic material in aqueous suspensions of titanium dioxide. *Water Research*, **20** (5), 569-578.

Full Text: [1986\Wat Res20, 569.pdf](1986/Wat%20Res20,%20569.pdf)

Abstract: Twenty-one organic compounds, known to be possible contaminants of water, have been treated with u.v.-illuminated titanium dioxide powder in aqueous suspension. In each case the organic material was converted to carbon dioxide. The rate of carbon dioxide formation did not vary greatly from one compound to another; even nitrobenzene was converted at 40% of the maximum rate observed with 2,4 dichlorophenol. Chlorobenzene, benzoic acid and 4-chlorophenol were selected for more detailed studies of the effect of solute concentration, pH and products other than CO2. Results were compared using illumination by a 100 W medium pressure mercury lamp, an 0.25 m2 parabolic trough solar collector and by solar illumination of a flat bed. The CO2 production rate from 300 ml of 10−3 M 4-chlorophenol in contact with 0.15 g TiO2 solar illuminated with the 0.25 m2 collector was 20 μM min−1 which corresponds to the oxidizing radicals generated in water by a 60Co gamma ray dose rate of not less than 8.3 krad min−1. The possible use of solar-illuminated TiO2 for the disinfection of water is suggested.

**Keywords:** Ultraviolet, Solar, Photo-Oxidation, Organic Impurities, Water, Titanium Dioxide, Suspensions

Tsezos, M. and Seto, W. (1986), The adsorption of chloroethanes by microbial biomass. *Water Research*, **20** (7), 851-858.

Full Text: [W\Wat Res20, 851.pdf](W/Wat%20Res20,%20851.pdf)

Abstract: The adsorption isotherms of halogenated aliphatic hydrocarbons by various selected types of inactive microbial biomass were determined. The isotherms were shown to be independent of the initial organic solution concentration and could be described by a modified Freundlich adsorption equation. Biosorptive uptake capacities varied among the biomass species. The water solubility and the octanol/water partition coefficient of the tested organics affected the biomass uptake capacity. In general, the least water soluble component showed the greatest tendency to be accumulated by the microbial biomass. The results also suggest that structural differences among the various microbial biomass types and possibly the fragmentation of the microbial cells, also affect the biomass uptake capacity for both single and mixed-solute systems.

Keywords: Adsorption, Biosorption, Toxic Organics, Biomass, Microorganisms, Chloroethanes

Brattebø, H. and Ødegaard, H. (1986), Phosphorus removal by granular activated alumina. *Water Research*, **20** (8), 977-986.

Full Text: [W\Wat Res20, 977.pdf](W/Wat%20Res20,%20977.pdf)

Abstract: Phosphorus removal from wastewater may be carried out by fixed-bed adsorption using activated alumina. In order to prevent unacceptable head-losses coarse-grained alumina must be used. Such systems have been referred to by several authors in literature. The mass transport characteristics of the system has so far, however, not been given a thorough investigation. This study uses the homogeneous surface diffusion model (HSDM) to describe the process as influenced by the system parameters.

A sensitivity analysis is presented to optimize the process design for given conditions. The pH, the alumina particle size and the column length are found to be very important parameters determining the column performance. The process is very well suited for designing a beds-in-series system.

Keywords: Wastewater, Phosphorus, Removal, Adsorption, Activated Alumina, Modelling

Martin, T.R. and Holdich, D.M. (1986), The acute lethal toxicity of heavy-metals to peracarid crustaceans (with particular reference to fresh-water asellids and gammarids). *Water Research*, **20** (9), 1137-1147.

Full Text: [W\Wat Res20, 1137.pdf](W/Wat%20Res20,%201137.pdf)

Abstract: In static tests on the acute toxicity of metal salts to two fresh-water peracarids, *Asellus aquaticus* (L.) (Isopoda) and *Crangonyx pseudogracilis* Bousfield (Amphipoda), 48 and 96 h LC50 values were determined for Al(III), Cd(II), Cr(III), Cu(II), Fe(III), Hg(II), Mn(II), Ni(II), Pb(II) and Zn(II). Additional metals tested upon *Crangonyx* alone were Ag(I), Co(II), Cr(VI), Fe(II), Mn(VII), Mo(VI), Sn(II) and V(V). Of the metal salts tested on both species, *Asellus* was more sensitive to Al(III) and Mn(II) than *Crangonyx*, similarly sensitive to Cd(II), Fe(III) and Zn(II), and less sensitive to the remainder. Toxicity of metal salts which are unstable with respect to reduction or oxidation was found to be higher than that of the corresponding stable salts of the same metal.

Previously published data on the acute toxicity of heavy metal salts to fresh-water, estuarine and marine amphipods and isopods are tabulated and discussed. Brief comparisons are also made between the relative tolerances of peracarids, *Daphnia* and fresh-water fish. *Crangonyx pseudogracilis* is recommended as worthy of further research, due to its widespread distribution and ease of culture.

Keywords: Heavy Metals, Acute Toxicity, LC50, Crustaceans, Peracarids, *Asellus*, *Crangonyx*

Grau, P., Sutton, P.M., Henze, M., Elmaleh, S., Grady, C.P., Gujer, W. and Koller, J. (1987), Notation for use in the description of wastewater treatment processes. *Water Research*, **21** (2), 135-139.

Full Text: [W\Wat Res21, 135.pdf](W/Wat%20Res21,%20135.pdf)

McKay, G., Ramprasad, G. and Pratapa Mowli, P. (1987), Desorption and regeneration of dye colors from low-cost materials. *Water Research*, **21** (3), 375-377.

Full Text: [W\Wat Res21, 375.pdf](W/Wat%20Res21,%20375.pdf)

Abstract: Experimental methods and results are reported in this paper on the desorption and regeneration of eight dye colours individually from six low-cost sorbent materials. Desorption and regeneration values give an idea about the type of interaction between the sorbate and the sorbent, and the possibility of regeneration of the sorbent. Bentonite clay, amongst the six low-cost materials studied in the present investigation, could sorb all the dyes used in investigation with the exception of the acid dyes. No regeneration of clay is possible in the sorption of dyes, since strong chemical bonding occurs between it and the sorbed dyes. Rice husk, bark, cotton waste and hair could sorb only the red and blue basic dyes and a combination of ion-exchange and chemical bonding occurs in the sorption process.

Keywords: Dyes, Sorption/Desorption, Sorbents

? Henze, M., Grady, Jr., C.P.L., Gujer, W., Marais, G.V.R. and Matsuo, T. (1987), A general model for single-sludge wastewater treatment systems. *Water Research*, **21** (5), 505-515.

Full Text: [1987\Wat Res21, 505.pdf](1987/Wat%20Res21,%20505.pdf)

Abstract: In 1983 IAWPRC formed a task group to facilitate the application of practical models to the design and operation of biological wastewater treatment systems. This paper is a summary of the report prepared by the task group. It presents the model development for single-sludge systems performing carbon oxidation, nitrification and denitrification. The model includes eight fundamental processes: aerobic growth of heterotrophic biomass, anoxic growth of heterotrophic biomass, aerobic growth of autotrophic biomass, decay of heterotrophic biomass, decay of autotrophic biomass, ammonification of soluble organic nitrogen, hydrolysis of entrapped particulate organic matter, and hydrolysis of entrapped organic nitrogen. Methods are suggested for characterization of wastewaters and estimation of parameter values in ways consistent with the model. Finally, techniques are presented by which the model may be implemented for both education and engineering practice.

? Elrehaili, A.M. and Weber, Jr., W.J. (1987), Correlation of humic substance trihalomethane formation potential and adsorption behavior to molecular-weight distribution in raw and chemically treated waters. *Water Research*, **21** (5), 573-582.

Full Text: [1987\Wat Res21, 573.pdf](1987/Wat%20Res21,%20573.pdf)

Abstract: The molecular weight distributions (MWDs) of several commercially prepared humic and fulvic acids and organic matter present in natural waters were analyzed by gel chromatography. The responses of these substances to treatment by alum coagulation, lime softening, and activated carbon adsorption were also analyzed, as were their trihalomethane formation potentials before and after each treatment. The treatability characteristics and trihalomethane formation properties of the different organic substances were then related to their respective MWDs. Differences in the MWDs were found to effect differences in the behavior of lumped parameter measures of organic matter (such as TOC) with respect to the several treatment operations. The treatments in turn were observed to alter the MWDs of the organic substances as well as their phenomenological behavior in subsequent process operations.

Keywords: Humic Substances, Molecular Weight Distributions, Water Treatment, Adsorption, Coagulation, Softening, Trihalomethane Formation Potential

? Sen, A.K. and De, A.K. (1987), Adsorption of mercury(II) by coal fly ash. *Water Research*, **21** (8), 885-888.

Full Text: [1987\Wat Res21, 885.pdf](1987/Wat%20Res21,%20885.pdf)

Abstract: Coal fly ash, an industrial solid waste, was found to have a good adsorption capacity for mercury(II). Adsorption of mercury(II) on coal fly ash conforms to Freundlich’s adsorption model. Several parameters such as time of equilibration, effect of pH, effect of initial concentration of solute, effect of fly ash dose etc. were studied. The maximum adsorption was observed after shaking for 3 h. Solution pH was the most important parameter affecting the adsorption. The optimum pH range was 3.5–4.5. There was total adsorption of mercury below 10 mg l−1. The performance of coal fly ash as an adsorbent was found to be significant when compared with activated powdered charcoal.

Keywords: Coal Fly Ash, Adsorption, Mercury, Flameless Atomic Absorption

Corapcioglu, M.O. and Huang, C.P. (1987), The adsorption of heavy metals onto hydrous activated carbon. *Water Research*, **21** (9), 1031-1044.

Full Text: [W\Wat Res21, 1031.pdf](W/Wat%20Res21,%201031.pdf)

Abstract: The absorption characteristics of some heavy metals, namely Cu(II), Pb(II), Ni(II) and Zn(II) onto the hydrous activated carbon surface are studied. Carbon type, pH and surface loading are the most important factors affecting the extent of metal removal. The adsorption reaction can be best described by a surface complex formation model. The free metal ions, M2+, and their hydroxo species, M(OH)y2-y all participate in the absorption reaction. Specific chemical bonding, probably hydrogen bonding provided the sole energy needed for adsorption reaction.

Keywords: Adsorption, Surface Complexes, Activated Carbon, Heavy Metals, Surface Loading

Tan, T.C. and Teo, W.K. (1987), Combined effect of carbon dosage and initial adsorbate concentration on the adsorption isotherm of heavy metals on activated carbon. *Water Research*, **21** (10), 1183-1188.

Full Text: [W\Wat Res21, 1183.pdf](W/Wat%20Res21,%201183.pdf)

Abstract: The adsorption of dissolved chromium and lead ions by powdered activated carbons significantly depends on the pH, initial adsorbate concentration and carbon dosage. Freundlich and Langmuir equations were unable to describe adequately the observed isotherms under the combined influence of both the carbon dosage and initial adsorbate concentration. These equations were modified and the resulting equations were found to correlate well with the experimental equilibrium data. The modified Langmuir equation gave an overall mean ratio of calculated to experimental adsorptive capacity of 1.001 compared with 1.046 given by the modified Freundlich equation for a total of 135 sets of equilibrium data obtained at different carbon dosages and initial adsorbate concentrations.

Keywords: Metal Ion Adsorption, Carbon, Adsorption Isotherms

Srivastava, S.K., Pant, N. and Pal, N. (1987), Studies on the efficiency of a local fertilizer waste as a low cost adsorbent. *Water Research*, **21** (11), 1389-1394.

Full Text: [W\Wat Res21, 1389.pdf](W/Wat%20Res21,%201389.pdf)

Abstract: Waste slurry, generated in local fertilizer plants, is converted into activated carbon in air, steam and nitrogen atmospheres. Products so obtained have been characterized and utilized for the removal of phenols, especially 2,4-dinitrophenol. Investigations include the effect of pH, kinetics of adsorption and the effect of salts on the uptake of DNP. Carbon prepared in air exhibits good sorption capacity for DNP and the adsorption data follows both Langmuir and Freundlich models. Some experiments have also been performed with a view to recover phenols and have *in situ* regeneration of spent carbon column. It is observed that 5% NaOH removes almost 96% of phenol loaded on the carbon column and a treatment with 1 M HNO3 reactivates the adsorbent particles which can be used for 6–10 cycles at a stretch.

Keywords: Activated Carbon Systems, Carbon, Adsorbent, Activated Carbon Columns

McKay, G., El-Geundi, M. and Nassar, M.M. (1987), Equilibrium studies during the removal of dyestuffs from aqueous solutions using bagasse pith. *Water Research*, **21** (12), 1513-1520.

Full Text: [W\Wat Res21, 1513.pdf](W/Wat%20Res21,%201513.pdf)

Abstract: The adsorption of four dyestuffs, namely, Basic Blue 69 (BB69), Basic Red 22 (BR22), Acid Red 114 (AR114) and Acid Blue 25 (AB25), onto bagasse pith has been studied. Bagasse pith is a cheap, abundant waste product from the sugar industry in Egypt and was found to have the following monolayer equilibrium saturation capacities: 158, 77, 23 and 22 mg dye g-1 pith.

The effects of pith particle size range and dye solution temperature were studied. The equilibrium data were analysed using Langmuir, Freundlich and Jossens isotherms.

Keywords: Equilibrium Isotherms, Bagasse Pith, Dyestuffs, Adsorption Capacity

McKay, G. and Bino, M.J. (1988), Adsorption of pollutants from waste water onto activated carbon based on external mass transfer and pore diffusion. *Water Research*, **22** (3), 279-286.

Full Text: [W\Wat Res22, 279.pdf](W/Wat%20Res22,%20279.pdf)

Abstract: The adsorption of four pollutants in aqueous solutions onto activated carbon has been studied. The following solutes have been investigated, phenol, *p*-chlorophenol, sodium dodecyl sulphate and mercuric ions. The kinetics were studied using an agitated batch adsorber and a model was proposed, based on external mass transfer and pore diffusion. The model presented has a rapid analytical solution and is based on the assumption of a pseudo-irreversible (rectangular) isotherm.

Keywords: Adsorption, Carbon, Mass Transport, Phenol, Mercuric Ions, Sodium Dodecyl Sulphate, *P*-Chlorophenol

Toller, G. and Flaim, G.M. (1988), A filtering unit for the removal of pesticide residues from aqueous solutions. *Water Research*, **22** (5), 657-661.

Full Text: [W\Wat Res22, 657.pdf](W/Wat%20Res22,%20657.pdf)

Abstract: Pesticide loss during filling and washing spray tanks can be considerable especially where cooperative pesticide distribution centres exist (up to 200 1000-litre tanks daily). A filtering unit using readily available organic media (peat, moss and manure) was designed to filter out a variety of commonly-used pesticides in apple orchards. Each filtering unit received residues from 20 pesticide applications consisting of a typical pesticide treatment schedule for apples. Initial concentration of the pesticides in the wastewater was between 26 and 1820 mg 1-1. Average removal efficiencies were > 99% for dodine. copper oxychloride, azinphos methyl, triadimefon, bitertanol, dithianon, fenarimol, chlorpyrifos ethyl, cyhexatin, benzomate, dinocap and benomyl. Removal efficiency for vamidothion averaged 61%; removal for sulphur was 73%. Bioassays with *Daphnia magna* and *Gloeosporium* sp. were performed to evaluate effluent toxicity.

Keywords: Wastewater Treatment, Adsorption, Pesticides, Insecticides, Fungicides, Filtering Unit, Metabolites, Bioassays

? Xue, H.B., Stumm, W. and Sigg, L. (1988), The binding of heavy metals to algal surfaces. *Water Research*, **22** (7), 917-926.

Full Text: [1988\Wat Res22, 917.pdf](1988/Wat%20Res22,%20917.pdf)

Abstract: Biological particles can profoundly influence the distribution of heavy metals in natural waters because the functional groups on the cell surfaces are able to bind metal ions. The interaction of Cu(III) and Cd(II) was evaluated from titration of algal suspensions (Chlamydomonas rheinhardii) (i) at a constant pH with increments of metal ions and (ii) in the presence of the metal ions with increments of acid. A voltammetric methodology was developed to measure (without prior separation of the solid phase) the metal ions in solution in the presence of algae and to assess the binding of metals to the surfaces of algae. The surfaces of algal cells have a high affinity for Cu(II) and Cd(II), even in the presence of 10−3 M Ca2+; their functional group ligands can compete with soluble complex formers typically present in natural waters. The adsorption of metals is readily interpreted in terms of surface complex formation equilibria or—mathematically equivalent—Langmuir type adsorption equilibria. The ‘average’ conditional equilibrium constant extracted from the experimental data permits a generalization valid for a certain range of metal surface loading and can be used in multi-metal multi-ligand speciation calculations. Under-standably, the data cannot be fitted over a large range of free metal ion concentrations or metal loading of the surface because the tendency to form surface complexes decreases with increasing metal loading, because there are a variety of surface ligands, and the metal ions bind first to the surface groups with highest affinity and subsequently to groups with lower affinity. A much better fit of the data is obtained if models are used with more than one adjustable constant such as the constant capacitance or the Fowler Guggenheim Frumkin model or a two-site Langmuir isotherm. The kinetics of adsorption and uptake of Cu(II) to Chlamydomonas is characterized by the establishment of a relatively fast pseudo-adsorption equilibrium with the surface that is followed by slow diffusion-controlled uptake into the inside of the cell.

**Keywords:** Heavy Metals, Adsorption Algae, pH Dependence, Metal Adsorption, Aquatic Chemistry, Biological Particles

Wong, M.K., Gan, L.M. and Koh, L.L. (1988), Temperature effects on the leaching of lead from unplasticized polyvinyl-chloride pipes. *Water Research*, **22** (11), 1399-1403.

Full Text: [W\Wat Res22, 1399.pdf](W/Wat%20Res22,%201399.pdf)

Abstract: The leaching of lead from unplasticized poly(vinyl chloride) pipes under different temperatures and by different extractants was studied. The extractants used were tap water, sodium hydrogen carbonate and disodium hydrogen phosphate solutions. The results show that for tap water and sodium hydrogen carbonate extractants, increasing the temperature generally increases the leaching rate of lead. The reverse was observed for the phosphate extractant. The study also shows that the extrusion temperature of the pipes affects the leaching rate of lead by water. Less lead is leached from pipes extruded at higher temperature.

Keywords: Unplasticized Poly(Vinyl Chloride) Pipes, Lead, Water, Leaching, Extraction, Extrusion, Temperature Effect

McKay, G., El-Geundi, M. and Nassar, M.M. (1988), External mass transport processes during the adsorption of dyes onto bagasse pith. *Water Research*, **22** (12), 1527-1533.

Full Text: [W\Wat Res22, 1527.pdf](W/Wat%20Res22,%201527.pdf)

Abstract: The kinetics of the adsorption of four dyestuffs onto bagasse pith has been studied. Two basic dyes, Basic Blue 69 and Basic Red 22, and two acid dyes, Acid Blue 25 and Acid Red 114, were used in an agitated batch adsorber. The effect of agitation, initial dye concentration, pith mass, pith particle size and dye solution temperature were investigated. A model is proposed to determine the external mass transfer coefficients, *k*f, for the systems and these are correlated with the system variable by the following equation: *k*f = A(variable)B.

Keywords: Dyestuffs, Adsorption, Mass Transfer, Bagasse Pith

Wolborska, A. (1989), Adsorption on activated carbon of *p*-nitrophenol from aqueous solution. *Water Research*, **23** (1), 85-91.

Full Text: [W\Wat Res23, 85.pdf](W/Wat%20Res23,%2085.pdf)

Abstract: A method of the fixed-bed adsorption on activated carbon has been used in the removal of *p*-nitrophenol from water. The range of low concentrations of a break-through curve has been analyzed. On the basis of a three-stage model of the process the equations describing the initial stage of the adsorption dynamics and concentration distribution in the bed at low concentrations of the break-through curve have been derived. The equations were used to determine the effective kinetic coefficient and to evaluate the effect of axial diffusion on the process kinetics. A method for determination of the time for protective action of the adsorbent layer has been proposed.

Keywords: Adsorption, Water Purification, Activated Carbon, Break-Through Curve, Fixed-Bed Adsorption, Concentration Distribution, Adsorption From Solution, Mass Transfer Coefficient

Tsezos, M. and Bell, J.P. (1989), Comparison of the biosorption and desorption of hazardous organic pollutants by live and dead biomass. *Water Research*, **23** (5), 561-568.

Full Text: [W\Wat Res23, 561.pdf](W/Wat%20Res23,%20561.pdf)

Abstract: The adsorption and desorption of lindane, diazinon, pentachlorophenol and 2-chlorobiphenyl by living and dead cells of the fungus *R. arrhizus* and activated sludge was studied. A generalization concerning the relative magnitude of biosorptive uptake between live and dead biomass cannot be made using the experimental data. Uptakes by live and dead cells are similarly correlated to the octanol/water partition coefficient of the organic pollutants. The desorption of the organic pollutants is not always complete. A part of the observed biosorptive uptake can be attributed to the cell walls of the microbial biomass.

Keywords: Biosorption, Adsorption, Organic, Pollutants, Activated Sludge, Desorption, Fate

Couillard, D., Gariépy, S. and Tran, F. (1989), Slaughterhouse effluent treatment by thermophilic aerobic process. *Water Research*, **23** (5), 573-579.

Full Text: [W\Wat Res23, 573.pdf](W/Wat%20Res23,%20573.pdf)

Abstract: A pig slaughterhouse effluent was submitted to laboratory runs in order to assess the potentiality of the thermophilic aerobic process for the treatment of meat processing industry’s effluents. A mixed aerobic bacterial culture was successfully maintained at 52 and 58°C in a semi-continuously fed bioreactor, without recycling the cells. Operation was conducted at 6, 12, 18, 24 and 30 h of solids retention time. Over 93% of the CODs (Chemical Oxygen Demand) were removed during the treatment at 52°C for all the retention times investigated, as compared to 86% of removal at 58°C, with an exception for the case of 6 h retention time. Reduction of phosphorus in the form of orthophosphate ranged between 72–90% with the best efficiency noted at 52°C and 6 h retention time. Extremely high specific utilization rates (*q*m) were observed and revealed that the process is about 10 times faster than the mesophilic process for slaughterhouse effluent treatment. Biokinetics parameters μm (maximal specific growth rate) and *k*d (endogenous respiration coefficient) were evaluated by fitting to appropriate mathematical models. They were found superior to those reported in the literature for mesophilic process, with the exception of the *Y* (actual yield) coefficient which is of the same magnitude. High *k*d values had a marked effect on the apparent yield of sludges which showed low values as compared to those found in mesophilic systems.

Keywords: Thermophilic, Aerobic, Bacteria, Activated Sludge, Slaughterhouse, Mixed Culture, Orthophosphate, Kinetics, Ammonia, Microbial

Srivastava, S.K., Tyagi, R. and Pant, N. (1989), Adsorption of heavy metal ions on carbonaceous material developed from the waste slurry generated in local for tiliser plants. *Water Research*, **23** (9), 1161-1165.

Full Text: [W\Wat Res23, 1161.pdf](W/Wat%20Res23,%201161.pdf)

Abstract: The waste slurry generated in fertilizer plants in India has been converted into a cheap carbonaceous adsorbent material. This product exhibits a good adsorption potential for chromium, mercury and lead, significant uptake of copper and molybdenum but is a poor scavenger for cadmium, nickel, cobalt and zinc. Isotherms have been used to obtain the thermodynamic parameters of the process. Some column studies have also been performed with a view to recovering the metal ions and have an *in situ* chemical regeneration of the adsorbent material.

Keywords: Metal Ion Adsorption, Activated Carbon, Recycling Fertilizer Waste

? Sotelo, J.L., Beltrán, F.J., Benitez, F.J. and Beltrán-Heredia, J. (1989), Henry’s law constant for the ozone-water system. *Water Research*, **23** (10), 1239-1246.

Full Text: [1989\Wat Res23, 1239.pdf](1989/Wat%20Res23,%201239.pdf)

Abstract: Ozone absorption in water in the presence of several salts has been studied in an agitated tank. The influence of the operating variables: ionic strength, temperature, pH, gas flow rate, ozone partial pressure and agitation speed, on the dissolved ozone concentration has been investigated. From an ozone balance in the reactor, the liquid phase volumetric mass transfer coefficient and the equilibrium ozone concentration were calculated.

Finally, equations for the Henry’s law constant as a function of temperature, pH and ionic strength for every salt have been deduced. These equations reproduce the experimental results with deviations less than ±15%. The equations allow us to know the ozone solubility for a given operating condition.

Keywords: Ozone, Ozone Solubility, Absorption, Ionic Strength, Water Ozonation

Notes: highly cited

Gupta, G.S., Prasad, G. and Singh, V.N. (1990), Removal of chrome dye from aqueous solutions by mixed adsorbents: Fly ash and coal. *Water Research*, **24** (1), 45-50.

Full Text: [W\Wat Res24, 45.pdf](W/Wat%20Res24,%2045.pdf)

Abstract: The removal of Omega Chrome Red ME (a popular chrome dye) from its aqueous solutions by adsorption on a homogeneous mixture of fly ash and coal in different proportions has been carried out. It has been noted that low adsorbate concentration, small particle size of adsorbent, low temperature and acidic medium favour the removal of the dye. A 100% removal of the said dye was achieved at 10 mg1-1, 30°C, 2.0 pH and 53 μm particle size, using a 1: 1 ratio of fly ash and coal. The kinetics and mass transfer studies were made using the models suggested by Lagergren and McKay *et al.* respectively. The equilibrium data fit well in the Langmuir model of adsorption, showing the formation of monolayer coverage of dye molecules at the outer surface of the adsorbent. Effect of temperature was explained on the basis of solubility and chemical potential of the adsorbate. An attempt has been made to explain the results thus obtained on the basis of various physiochemical properties of the solid-solution interface involved in the process of removal.

Keywords: Chrome Dye, Fly Ash, Coal, Adsorption Kinetics, Pore Diffusion, Mass Transfer and Langmuir’s Model

Huang, C.P., Huang, C.P. and Morehart, A.L. (1990), The removal of Cu(II) from dilute aqueous solutions by *Saccharomyces cerevisiae*. *Water Research*, **24** (4), 433-439.

Full Text: [W\Wat Res24, 433.pdf](W/Wat%20Res24,%20433.pdf)

Abstract: Biosorption of Cu(II) by virgin or treated unicellular yeast, *Saccharomyces cerevisiae*, was studied. Cu(II) adsorption is strongly affected by pH. A given amount of protein is released from live cells upon interactions with metal ions. This decreases the amount of Cu(II) uptake and is most pronounced at high pH values. Adsorption takes place on multisites and can be analyzed by Scatchard plots. Cu(II) uptake by live yeast was biphasic and consisted of an initial, rapid surface binding of Cu(II) followed by a second, slower intracellular uptake of Cu(II). Cu(II) uptake by dead yeast and Cd(II), Pb(II) uptake by live yeast takes place only via surface binding. In a total of 30 μmol/g Cu(II) uptake by live yeast, 7 μmol/g can be attributed to the intracellular uptake.

A sand column with immobilized *S. cerevisiae* can completely remove metals before the breakpoint. After the breakpoint, a significant amount of Cu(II) removal over a long period was observed. This is thought to be the result of intracellular uptake. Strong acid can be used to strip the Cu(II)-laden column for reuse.

The result shows that a Cu(II)-laden column can be stripped of adsorbed Cu(II) with one volume of acid (5×10-3 M HClO4) per 20 volumes of Cu(II) containing solution.

Keywords: Biosorption, *Saccharomyces Cerevisiae*, Yeast, Heavy Metals, Copper(II)

Kim, B.R., Anderson, S.G. and Zemla, J.F. (1990), Effect of biological treatments on COD adsorption. *Water Research*, **24** (4), 457-461.

Full Text: [W\Wat Res24, 457.pdf](W/Wat%20Res24,%20457.pdf)

Abstract: A simulated wastewater, which contains eight metal cutting fluids, was treated using three biological schemes: anaerobic, anaerobic followed by aerobic and aerobic. Sludge ages for the biological schemes were sufficiently long to produce the effluents in which the residual organics were practically nonbiodegradable. Adsorption isotherms, obtained using the wastewater and the three biologically treated effluents, revealed that the absorption capacity of activated carbon increased substantially after the wastewater was biologically treated. This increase appeared to be due to selective, biological removal of poorly adsorbable organics, displaying a synergistic relationship between adsorption and biodegradation.

The organic compositions in the anaerobic/aerobic effluent and in the aerobic effluent might be similar because the adsorption isotherms for the effluents were virtually identical.

Keywords: Adsorption, Chemical Oxygen Demand, Metal Cutting Fluids, Activated Carbon, Anaerobic Treatment, Aerobic Treatment, Isotherms

Martin, R.J. and Shackleton, R.C. (1990), Comparison of two partially activated carbon fabrics for the removal of chlorine and other impurities from water. *Water Research*, **24** (4), 477-484.

Full Text: [W\Wat Res24, 477.pdf](W/Wat%20Res24,%20477.pdf)

Abstract: Experimental studies were undertaken at the University of Birmingham to investigate and compare the use of two partially activated carbon fabrics for the removal of chlorine and other impurities from potable water in domestic point-of-use water filters. Since the implementation of the EEC drinking water quality directive in July 1985, there has been a marketing surge in domestic water filters, generally aimed at improving taste (the taste of chlorine is frequently cited). The fabrics were observed to be very effective at removing chlorine from water; their dechlorinating powers were significantly superior to that of the granular activated carbon used for comparison. The fabrics were observed to be much less effective at removing phenol, methylene blue and colour.

Keywords: Activated Carbon, Fabric Filters, Domestic Water Filters, Point-of-Use Water Filters, Dechlorination, Taste Removal, Drinking Water Quality

? Matthews, R.W. (1990), Purification of water with near-U.V. illuminated suspensions of titanium dioxide. *Water Research*, **24** (5), 653-660.

Full Text: [1990\Wat Res24, 653.pdf](1990/Wat%20Res24,%20653.pdf)

Abstract: Benzoic acid, salicyclic acid, phenol, 2-chlorophenol, 3-chlorophenol, 4-chlorophenol, nitrobenzene, methanol, ethanol, acetic acid and formic acid in aerated, aqueous suspensions of TiO2 were illuminated with near u.v. light. Each solute was present over a range of concentration; generally 1–50 mg 1−1. The rate of oxidation to carbon dioxide was measured at each concentration. The dependence of the rate on concentration obeyed simple Langmuir-Hinshelwood (L-H) kinetics for each solute. Empirical constants have been determined enabling the prediction of mineralization rates at any solute concentration in 0.1% (w/w) TiO2 suspensions. The integrated L-H rate expression gives reasonable agreement with observed time-dependent CO2 formation curves. A comparison was made between CO2 formation rate using 4-chlorophenol illuminated with artificial and natural u.v. light. The results indicate that 90% mineralization of all the solutes except formic acid initially present as 50 mg solute 1−1 suspension occurs within 2–3 h with 1 m2 of sunlight. Formic acid was mineralized at approximately twice the rate of the other solutes.

**Keywords:** organic contaminants, photocatalytic oxidation to CO2, U.V. illuminated TiO2

Deshicar, A.M., Bokade, S.S. and Dara, S.S. (1990), Modified *hardwickia binata* bark for adsorption of mercury(II) from water. *Water Rese**arch*, **24** (8), 1011-1016.

Full Text: [W\Wat Res24, 1011.pdf](W/Wat%20Res24,%201011.pdf)

Abstract: *Hardwickia binata* bark was found to have a good sorption capacity for mercury(II). Colour leaching can be prevented and the physical characteristics of the bark can be improved by treatment with formaldehyde in acidic medium. Studies indicated that the sorption of Hg(II) increases as the pH increases and a contact time of 2 h was found to be optimum. The effect of concentration shows that modified bark can remove most of the Hg(II) from water if its concentration is below 20 mg/l and sorption of mercury conformed to the Freundlich adsorption isotherm. The presence of light metal ions interferes with the sorption of mercury. Mg(II) at a concentration of 200 mg/l interferes with sorption to a maximum extent. Among the different anions, it was observed that sorption of mercury was maximum for acetate and nitrate (97%). The break-through sorption capacity determined by conducting a column experiment was observed to be 21 mg/g.

Keywords: Mercury Removal, Wastewater Treatment, Bark; Sorption

Chen, X.H., Gosset, T. and Thévenot, D.R. (1990), Batch copper ion binding and exchange properties of peat. *Water Research*, **24** (12), 1463-1471.

Full Text: [W\Wat Res24, 1463.pdf](W/Wat%20Res24,%201463.pdf)

Abstract: Cupric ion fixation by raw peat is likely involved in both cation exchange with H+, Ca2+, Mg2+ and adsorption-complexation, i.e. fixation of the same equivalent of copper ions and anions (NO3-) without any ion release. The importance of both reactions depends largely on initial copper concentration, peat type and pH. Isotherms of copper (initial concentration ranging between 1 and 20 mM) fixation on two types of peat (eutrophic and oligotrophic peat at 30 g d.w./l at pH ranging between 2 and 4) showed that the higher the initial cupric concentration, the more important is this complexation reaction; over this initial cupric concentration range, ion exchange sites were relatively saturated and reached 308 and 101 mmol/kg d.w. for eutrophic and oligotrophic peat whereas no saturation was found for complexation sites, their capacity attaining up to 74 and 119 mmol/kg d.w., respectively.

The apparent equilibrium constant for ion exchange with acid-treated peat (initial pH 4.0, 30 g d.w./l) for various metal binding on both peat sites ranged between 1.1 and 10.8 in 15 mM metallic solutions. The apparent affinity in batch conditions for 5 elements may be compared according to the apparent global equilibrium constants, ranging between 1.1×10-6 and 20.2×10-6: Pb > Cu > Ca > Mg, Zn for eutrophic peat and Pb > Ca > Cu > Mg, Zn for oligotrophic peat.

Keywords: Peat, Metal Cation, Ion Exchange, Adsorption, Complexation Equilibrium, Electroneutrality, Soil Organic-Matter, Kinetics, Acid

? Joglekar, H.S., Samant, S.D. and Joshi, J.B. (1991), Kinetics of wet air oxidation of phenol and substituted phenols. *Water Research*, **25** (2), 135-145.

Full Text: [1991\Wat Res25, 135.pdf](1991/Wat%20Res25,%20135.pdf)

Abstract: Wet air oxidation (WAO) of aqueous solutions of phenol and substituted phenols namely, omicron-, m- and p-chlorophenols, omicron-, m-cresols, omicron- and p-methoxyphenols, omicron-ethylphenol and 2,6-dimethylphenol, were carried out. The process was studied in a 1 litre stainless steel autoclave at temperatures in the range of 150-180-degrees-C. The oxygen partial pressure was varied from 0.3 to 1.5 MPa and the initial phenol concentration was 200 mg/l.

The oxidation of phenols in water involves a free-radical mechanism and proceeds in two steps. The oxidation reaction was found to be first order in oxygen and also first order with respect to phenolic substrates in both steps. The values of activation energy were found to be in the range of 12.4×103-201×103 kJ/kmol. The conditions have been found under which the overall oxidation reaction becomes reaction controlled or mass transfer controlled. The values of mass transfer coefficient have been obtained. The data based on bench scale shows wet air oxidation of phenols can achieve destruction efficiencies exceeding 99.9%. The reduction of COD during oxidation of all phenols was also measured. Greater than 90% COD reduction was achieved. Some aspects of the process design of the oxidation reactor have been discussed.

Keywords: Wet Air Oxidation, Phenols, Cod Reduction, Kinetics, Effluent Treatment, Mass Transfer Coefficient At High Temperature and Pressure, Catalytic-Oxidation, Copper Oxide, Phase, Reactors

Christoffersen, J., Christoffersen, M.R., Larsen, R. and Moller, I.J. (1991), Regereration by surface-coating of bone char used for defluoridation of water. *Water Research*, **25** (2), 227-229.

Full Text: [W\Wat Res25, 227.pdf](W/Wat%20Res25,%20227.pdf)

Abstract: A bone char column used to defluoridate water can be very simply and repeatedly regenerated without significant loss of binding capacity for fluoride or of efficiency. The regenerating solution contains calcium chloride and sodium dihydrogen phosphate with pH adjusted to about 3. The regenerating solution can also be produced by dissolving the present waste part of the bone char product, which is too finely powderized for use in the column, in dilute hydrochloric acid. During regeneration, most of the pre-adsorbed fluoride is retained by the bone char and the precipitating phase is apatitic. The ‘regeneration’ is thus a surface-coating process.

Keywords: Defluoridation, Water, Bone Char, Regeneration, Fluoride, Surface-Coating

El-Geundi, M.S. (1991), Clour removal from textile effluents by adsorption techniques. *Water Research*, **25** (3), 271-273.

Full Text: [1991\Wat Res25, 271.pdf](1991/Wat%20Res25,%20271.pdf)

Abstract: The adsorption of two basic dyestuffs (Atrazon Blue and Maxilon Red) and two acid dyestuffs (Telon Blue and Erionyl Red) onto maize cob was studied. High adsorptive capacities were observed for the adsorption of basic dyestuffs, namely, 160 and 94.5 mg dye per g maize cob for Astrazon Blue and Maxilon Red, respectively. Lower capacities were obtained with the acid dyestuffs, namely, 47.7 and 41.4 mg dye per g maize cob for Erionyl Red and Telon Blue, respectively. A series of contact-time experiments was undertaken in an agitated batch adsorber to assess the effect of the system variables, namely, agitation speed, maize cob particle size and maize cob mass. The experimental results for these contact-time experiments were discussed.

Keywords: Dyestuffs, Maize Cob, Adsorption Capacity, Adsorption Rate

Notes: IIsotherm

Weber, Jr., W.J., McGinley, P.M. and Katz, L.E. (1991), Sorption phenomena in subsurface systems: Concepts, models and effects on contaminant fate and transport. *Water Research*, **25** (5), 499-528.

Full Text: [W\Wat Res25, 499.pdf](W/Wat%20Res25,%20499.pdf)

Abstract: The behavior, transport and ultimate fate of contaminants in subsurface environments may be affected significantly by their participation in sorption reactions and related phenomena. The degree to which the resulting effects can be quantified and predicted upon the extent to which certain fundamental aspects of sorption are understood, and upon the accuracy with which these phenomena can be characterized and modeled in complex subsurface systems. Current levels of understanding of the reactions and processes comprising sorption phenomena are discussed in this paper, as are the forms and utilities of different models used to describe them. Emphasis is placed on concept development, on the translation of these concepts into functional models for characterizing sorption rates and equilibria, and on the application of these concepts and models for explaining contaminant behavior in subsurface systems. Examples are provided to illustrate the impacts of sorption phenomena on contaminant transport.

Keywords: Sorption, Partitioning, Soils, Groundwater, Subsurface Systems, Rate and Equilibrium Models, Mass Transfer, Contaminant Transport, Dispersed Organic Polymers, Natural Solids, Porous-Media, Groundwater, Water, Soil, Adsorption, Surface, Interface

Richard, F.C. and Bourg, A.C.M. (1991), Aqueous geochemistry of chromium: A review. *Water Research*, **25** (7), 807-816.

Full Text: [W\Wat Res25, 807.pdf](W/Wat%20Res25,%20807.pdf)

Abstract: The aqueous geochemistry of chromium is reviewed, especially with reference to the recent work of Rai et al. (Report EPRI EA-4544, 1986, Report EPRI EA-5741, 1988). The chromium content of natural waters is generally low whereas rocks exhibit a wide range of Cr concentrations. In natural environments, the most stable oxidation states of chromium are Cr(III) and Cr(VI). The following minerals can control the dissolved chromium content of natural waters: Cr(OH)3(s) and (Fe, Cr)(OH)3 (ss) for Cr(III). Major Cr(III) disolved species are CrOH2+ and Cr(OH)3(0), as well as several organic and a few inorganic complexes, whereas HCrO4-and CrO4-2 are the main forms of Cr(VI) in natural waters. The chromium distribution is also controlled by redox processes. Oxidation of Cr(III) to Cr(VI), poor with dissolved oxygen, is very effective in the presence of solid MnO2. Fe(II)-and organic matter-rich environments favour the reduction of Cr(VI) to Cr(III). Interaction with solid phases can also regulate the chromium content of water. Cr(III) exhibits a typical cationic sorption behaviour. Its adsorption increases with pH, but decreases when competing cations are present. Chromium(VI), on the other hand, exhibits a typical anionic sorption behaviour. Its adsorption decreases with increasing pH and when competing dissolved anions are present.

The migration of chromium is determined by the competition between complexation, dissolution/precipitation, redox processes and adsorption/desorption mechanisms. Cr(III) will migrate under acidic conditions and/or if present as dissolved organic matter complexes. Hexavalent chromium generally migrates rapidly but its mobility is inhibited when the Fe(II) and organic matter concentrations are high and when sorption processes are favoured (low pH).

Keywords: Chromium, Geochemistry, Natural Waters, Review, Minerals, Oxidoreduction, Adsorption, Migration, Water-Soluble Chromium(V), Sea-Water, Chronium Speciation, Hexavalent Chromium, Chemical Speciation, Organic Materials, Soils, Adsorption, Behavior, Iron

Yaacoubi, A., Mazet, M. and Dusart, O. (1991), Competitive effect in bi-solute adsorption onto activated carbon: DSS, alcohols and phenols as solutes. *Water Research*, **25** (8), 929-937.

Full Text: [W\Wat Res25, 929.pdf](W/Wat%20Res25,%20929.pdf)

Abstract: Many organic toxic compounds in water supplies are resistant to conventional treatment. For low concentrations of organic contaminants, activated carbon is a good adsorbent and its use for water supplies has been widely studied. Bath experiments are generally used for the prediction of performance such as adsorptive capacity of granular activated carbon filters. To simulate the adsorption process, studies have been carried out with alcohols (Abe et al., 1979, 1980; Gaid et al., 1983; Belfort, 1979), in a mixture with another organic solute, LaFrance et al. (1983), Dusart et al. (1990), Martin and Albahrani (1977, 1979) have investigated equilibrium expressions and different constants for multisolute adsorption on activated carbon.

The purpose of this work is to study the adsorption kinetic evolution for sodium dodecylsulphate in the presence of n-alcohols (methanol to pentanol) and n-dodecanol and to examine the steric hindrance influence for the adsorption equilibrium parameters and the external mass transfer coefficient Kf [equation (1)].

Also, aromatic molecules such as phenol and 2-naphthol have been chosen to be compared to alcohols in their co-adsorption with the DSS in order to have a better knowledge of the surface heterogeneity of the activated carbon. Then, the maximal adsorption capacity GAMMA infinity is determined from the Langmuir isotherm equation. A 3 h contact time is required for the obtention of the equilibrium DSS adsorption; this stabilization in the rapid phase of the adsorption is more rapidly achieved in the presence of a co-adsorbate. The effect of the alcohols studied in the millimolar range: methanol, ethanol, propanol, butanol, pentanol at equilibrium time is shown in Fig. 1-the dimensionless adsorbed concentration C/C0 is unchanged for methanol and ethanol but diminished in the other cases.

The low solubility of pentanol in water seems to be a limiting factor for this study; so that the dodecanol is solubilized in methanol before being added to water solutions of DSS. The micromolar range of dodecanol is sufficient to strongly diminish DSS adsorption on activated carbon (Fig. 2). K(f) evolution is of the same order. The large steric hindrance and hydrophobic effects of the chain of dodecanol and its equally good adsorbability (Schwuger and Smolka, 1977) give competitive phenomena in the co-adsorption of the DSS. A compact molecule such as phenol or 2-naphthol is compared to these results (Figs 3 and 4). The sequence of the added co-adsorbates in the adsorption can modify the kinetic external mass transfer coefficient and also the pseudo equilibrium parameters are important to obtain the CAG filter performance.

The influence of Ca2+ ions, which are very important for DSS fixation onto the negative charged surface of the CAP (Mazet et al., 1988), is also studied. The results of the adsorption of DSS in the presence of phenol, naphthol (N2) are noted on Fig. 3. No phenol effect on DSS appeared. The N2 presence somewhat diminishes the adsorption of DSS (Fig. 5) and desorbs the DSS when it is added after 3 h adsorption contact time (Fig. 6) but, Kf valiues are not modified (Fig. 7). Ca2+ ions give, and maintain good promotion of the adsorption of DSS only if simultaneously present with the DSS (Figs 5 and 6). The complex DSS-Ca2+ seems to be necessary to have supplementary sites on the carbon surface.

For N2 adsorption in the presence of DSS (Figs 8, 9 and 10), an inhibition effect can be observed; Kf is also diminished and if the DSS-Ca2+ mixture is first adsorbed, a stronger inhibition of the adsorption is noted (Kf is reduced in the same order). In this case an inhibition effect is obtained which is reflected in the evolution of the maximum capacity results (Fig. 11).

Keywords: Adsorption, Activated Carbon, Surfactants, Alcohols, Phenols, Water Treatment, Gas-Liquid-Chromatography, Organic-Compounds, Aqueous-Solution

Cohen, A.D., Rollins, M.S., Zunic, W.M. and Durig, J.R. (1991), Effects of chemical and physical differences in peats on their ability to extract hydrocarbons from water. *Water Research*, **25** (9), 1047-1060.

Full Text: [W\Wat Res25, 1047.pdf](W/Wat%20Res25,%201047.pdf)

Abstract: This paper reports on the first phase of a project designed to determine the potential of peats in extracting hydrocarbons from groundwater. Peat samples with markedly different compositions were slurried under controlled conditions in either saturated solutions or emulsions of benzene, toluene, or m-xylene. All peats were characterized in order to determine the possible correlation between various parameters and extraction capacities. All peats were found to be capable of extracting substantial amounts of either free-phase or dissolved hydrocarbons from water. Free-phase extraction ranged from 30 to 50% of the starting wet volume of the peats. Solution extraction produced reductions in concentrations of between 53 and 97%, depending on the peat type. In solution, toluene was found to be more slowly adsorbed than either benzene or m-xylene. In general, the best hydrocarbon adsorption from solution can be achieved by using peats that are low in fiber and birefringent organics and high in ash and guaiacyl lignin pyrolysis products.

Keywords: Peat, Hydrocarbons, Oil, Underground Storage Tanks, Chromatography-Mass-Spectrometry, Pyrolysis

? Takács, I., Patry, G.G. and Nolasco, D. (1991), A dynamic model of the clarification-thickening process. *Water Research*, **25** (10), 1263-1271.

Full Text: [1991\Wat Res25, 1263.pdf](1991/Wat%20Res25,%201263.pdf)

Abstract: A dynamic model of the clarification-thickening process is presented. Based on the solids flux concept and on a mass balance around each layer of a one-dimensional settler, this model can simulate the solids profile throughout the settling column, including the underflow and effluent suspended solids concentrations under steady-state and dynamic conditions. The model makes use of a special settling velocity equation designed to simulate the settling velocity of dilute and more concentrated suspensions. The model can be applied to both primary and secondary settlers to simulate dynamic and steady-state conditions. Examples based on full-scale and pilot-scale experimental data taken from the literature serve to illustrate the application of the model to secondary settlers. Results of the analysis confirm that the model can serve to predict the effluent and underflow suspended solids concentrations under a variety of conditions.

**Keywords:** Clarifications, Dynamic Modeling, Hindered Settling, Steady-State Analysis, Solids Flux Analysis, Thickening

Rhodes, M.W. and Kator, H.I. (1991), Use of *Salmonella-typhimurium* WG49 to enumerate male-specific coliphages in an estuary and watershed subject to nonpoint pollution. *Water Research*, **25** (11), 1315-1323.

Full Text: [W\Wat Res25, 1315.pdf](W/Wat%20Res25,%201315.pdf)

Abstract: The occurrence of male-specific RNA (FRNA) coliphages, proposed as indicators of enteric viruses, was determined in an estuary subject to nonpoint pollution that included fecal inputs from livestock. A host originally developed for detecting FRNA phages in sewage was applied to water and sediment samples. Phages were enumerated using the host Salmonella typhimurium WG49 containing an *Escherichia coli* plasmid coding for sex pili, and the female parent strain WG45. FRNA phages and fecal coliforms were enumerated in samples collected seasonally from an estuary and associated feeder streams and densities related to selected environmental parameters. Mean phage densities enumerated on WG49 ranged from < 1 to 50 100 ml-1 water and < 13 to 7200 100 g-1 dry sediment. Examination of 300 phages from estuarine and freshwater samples showed that greater-than-or-equal-to 99% were RNase-resistant, greater-than-or-equal-to 94% were lytic to the female parent salmonella strain (WG45), less-than-or-equal-to 9% were lytic to male E. coli C3000, and none were lytic to female E. coli C. RNase resistant phages lytic to both salmonella strains were noncontractile flexible tailed phages and those lytic to male salmonella or E. coli hosts were filamentous phages. Electron micrographs of the only RNase-sensitive phage recovered that plaqued only male hosts showed cubic phage particles adsorbed to sex pili. Parallel enumerations of environmental samples on WG45 and WG49 yielded equal or greater phage densities on the former host. Purified phages from these samples were lytic to certain salmonella serovars recovered from the environment but did not cross react with fecal coliform or heterotrophic bacteria isolated from the environment. Although the WG49 host was inappropriate to estuarine and freshwater samples examined because of interference by somatic phages, WG45 and WG49 should be examined as hosts for enumerating salmonella phages. Similarly, the public health significance of somatic phages detected by these hosts should be determined. FRNA phages, with a single exception (1/187 samples), were not detected in a condemned shellfish growing area subject to nonpoint pollution. This observation questions the application of FRNA phages as indicators of fecal contamination in waters impacted by diffuse fecal inputs.

Huang, C., Huang, C.P. and Morehart, A.L. (1991), Proton competition in Cu(II) adsorption by fungal mycelia. *Water Research*, **25** (11), 1365-1375.

Full Text: [W\Wat Res25, 1365.pdf](W/Wat%20Res25,%201365.pdf)

Abstract: Fungal mycelia have been shown to be effective adsorbents for the removal of heavy metals from dilute solutions. Copper ions and protons become adsorbed to the fungal surface through reaction with specific surface sites including amino-, phosphate, carboxyl-or hydroxo-groups. In this study, an alkalimetric/metal titration technique was used to evaluate the competitive adsorption between protons and Cu(II) ions onto acid-washed mycelia of *Aspergillus oryzae* and *Rhizopus* *oryzae*. A general macroscopic mechanism has been established to describe the specific adsorption of both protons and Cu(II) ions. Using a simple graphic or a non-linear least squares technique, the adsorption parameters; i.e. adsorption constant and maximum adsorption capacity, were evaluated. The results predicted by the two-site model with a double reciprocal plot or the Scatchard plot were compared by non-linear regression. In the presence of multiple classes of sites, better fit of the experimental data was obtained by treating the fungal surface as one which possesses two major functional groups, namely: (1) high affinity of monodentate binding, (2) low affinity of bidentate binding. Because hydrogen ions compete significantly with Cu(II) ions for adsorption sites, the competitive Langmuir isotherm so derived was characterized by three parameters: two-site Cu(II) affinity, two-site Cu(II) adsorption density and apparent proton affinity. This enabled differentiation of the Cu(II) adsorption from protons. Two intrinsic equilibrium constants for Cu(II) surface complexation were estimated. With this information, it was possible to predict the adsorption of Cu(II) over a wide range of metal loading conditions at various pH values.

Keywords: Biosorption, Adsorption, Langmuir Adsorption Isotherm, Copper, Fungus, *Aspergillus-Oryzae*, *Rhizopus*-*Oryzae*, Dilute Aqueous-Solutions, Metal-Ions, Surfaces, Removal, Binding, Model

Mathavan, G.N. and Viaraghavan, T. (1992), Coalescence/Filtration of an oil-in-water emulsion in a peat bed. *Water Research*, **26** (1), 91-98.

Full Text: [W\Wat Res26, 91.pdf](W/Wat%20Res26,%2091.pdf)

Abstract: Breakdown mechanisms and flow characteristics involved in a peat bed treating oil-in-water emulsions have not yet been understood fully. This paper examines the applicability of the well-known Carman-Kozeny filtration equation to a 1000 mm peat bed treating a standard mineral oil-in-water emulsion at six different flow rates. The specific permeability coefficient, the Carman-Kozeny constant and the shape factor of peat were found to be 5.3×10-11 m2, 3.4 and 2.2, respectively.

Assuming the impaction-interception mechanism to predominate, the overall coalescence efficiency of the peat bed was evaluated. The effects of flow rates and depths of peat bed on coalescence efficiency were analyzed. Contrary to the general trends observed by other investigators, coalescence efficiency decreased with an increase in bed depth (from 14% at 200 mm depths to 3% at 1000 mm depth) indicating possible simultaneous occurrence of filtration and coalescence in the peat bed.

Keywords: Coalescence, Filtration, Oil-In-Water Emulsion, Peat, Oily Wastes, Emulsions

Fu, G. and Allen, H.E. (1992), Cadmium adsorption by oxic sediment. *Water Research*, **26** (2), 225-233.

Full Text: [W\Wat Res26, 225.pdf](W/Wat%20Res26,%20225.pdf)

Abstract: To understand the strong pH dependency of cadmium adsorption by oxic sediment, we investigated the surface charge of sediment particles by potentiometric titration with acid and base. Metal adsorbed by sediment can occur by complexation of metal ions with weakly acidic functional groups or by ion exchange of metal ions. A multi-site binding model, which incorporates the effect of pH, has been applied to describe the adsorption of cadmium onto sediment. The model has been used to satisfactorily predict the extent of adsorption over the pH range of 4.5-7.0.

Keywords: Adsorption, Cadmium, Sediment, pH, Multisite Model, Trace-Metals, Complexation, Speciation, Matter, Water, Model

Hewitt, C.N. and Rashed, M. (1992), Removal rates of selected pollutanta in the runoff waters from a major rural highway. *Water Research*, **26** (3), 311-319.

Full Text: [W\Wat Res26, 311.pdf](W/Wat%20Res26,%20311.pdf)

Abstract: The concentrations of cadmium, copper, lead, the organic compounds of lead and eight polycyclic aromatic hydrocarbons have been measured in surface drainage waters from a major rural highway in north-west England during a number of runoff events. The particulate phase (> 0.45-mu-m) contained > 90% of the inorganic Pb, approximately 70% of the Cu and approximately 56% of the Cd and the particulate-phase metal concentration profiles largely followed those of the suspended sediments. A ‘first-flush’ effect was seen for the dissolved metals. A highly significant correlation was found between the length of the antecedent dry period and the amount of lead and dissolved copper removed during a runoff event but this was not found for the other pollutants. A simple regression model allows the reliable first-order approximation of lead concentrations and removal rates in the runoff waters to be made from the discharge rate and the length of the antecedent dry period. Budget calculations show that approximately 8% of the Pb, 5% of the organic lead and 3% of the PAHs emitted by vehicles are removed in the highway drainage waters.

Keywords: Pollution, Motor Vehicles, Runoff Waters, Drainage Waters, Highway, Lead, Cadmium, Copper, Polycyclic Aromatic Hydrocarbons, Chemical-Composition, Drainage Waters, Metals, Speciation, Lead

Nyholm, N., Jacobsen, B.N., Pedersen, B.M., Poulsen, O., Damborg, A. and Schultz, B. (1992), Removal of organic micropollutants at PPB levels in laboratory activated sludge reactors under various operating conditions: biodegradation. *Water Research*, **26** (3), 339-353.

Full Text: [W\Wat Res26, 339.pdf](W/Wat%20Res26,%20339.pdf)

Abstract: The biodegradation behaviour of 5 model chemical contaminants, 2,4-dichlorophenoxy acetic acid (2,4-D); 2,4,6-trichlorophenol (TCP); pentachlorophenol (PCP); 4-nitrophenol (4-NP) and lindane, spiked into synthetic peptone sewage to μg/l levels (5–1000 μg/l) have been studied in laboratory activated sludge reactors under a range of operating conditions (sludge ages of 1–32 days and sludge loadings of 0.09–0.9 mg BOD5/mg MLSS/d). The reactors were continuously stirred tanks operated under a computer controlled fill and draw cycle of 4 h. Experiments were started with sludge collected from a municipal treatment plant.

In most experiments, a gradual adaptation took place resulting in increases in biodegradation rates by an order of magnitude or more compared to initial biodegradation rates and rates obtained in comparative batch experiments, respectively. Times required for adaptation varied among chemicals and experiments and ranged from 2–5 days for 4-NP to 1–2 months for 2,4-D and lindane. No concentration thresholds for adaptation were observed, and the biodegradation generally followed first-order kinetics. Removals by biodegradation in successfully adapted systems were generally within a range of about 40 to about 95% except for 4-NP, which was degraded to concentration levels below the analytical detection limit. For estimation of the part of the total removal which was due to biodegradation the amounts of PCP, TCP and lindane wasted with the sludge were calculated from sorption isotherms. Volatilization was negligible. The operational parameters influenced the biodegradation differently for the different chemicals. PCP was degraded best at high sludge ages and was not degraded significantly at sludge ages below approx. 8 days. This suggests catabolic degradation by slow growing specific degraders. TCP was consistently degraded at high sludge ages (low sludge loadings) and at random at lower sludge ages, but rate constants were highest at intermediate sludge loadings. A similar pattern was seen for 2,4-D. Lindane was degraded poorly at high sludge ages and to a much greater extent at intermediate and at high sludge loadings. These findings suggest co-oxidation as the dominant degradation mechanism for lindane and as a significant mechanism for TCP and 2,4-D.

Keywords: Biodegradation, Trace Contaminants, Chemical Contaminants, Organic Micropollutants, Xenobiotic Compounds, Activated Sludge, Sewage Treatment Plants, Adaptation

Waara, K.O. (1992), Effects of copper, cadmium, lead and zinc on nitrate reduction in a synthetic water medium and lake water from northern Sweden. *Water Research*, **26** (3), 355-364.

Full Text: [W\Wat Res26, 355.pdf](W/Wat%20Res26,%20355.pdf)

Abstract: This paper presents laboratory experiments on the effects of heavy metal on nitrate reduction, using natural lake water or a synthetic water medium without complexing agents. A bacteria inoculum consisting of a mixed facultatively heterotrophic bacterial culture, nitrate and glucose were added to tubes, which were filled to capacity, sealed and incubated in the dark at 20-degrees-C. Nitrate reduction was followed in terms of the decrease in added nitrate against time.

For the synthetic water medium, the effects of Cd, Zn and Pb at concentrations of 10-500 µg l-1 were tested and for Cu at concentrations between 10 and 100 µg l-1. Nitrate reduction in natural lake water with and without additions of an external bacterial culture was measured. The effect of an addition of 50 µg l-1 of metal above the natural level was also investigated. In synthetic water, a 50% decrease in nitrate reduction activity was found at about 25 µg Cu l-1, 85 µg Cd l-1, 95 µg Pb l-1 or 200-400 µg Zn l-1. The order of toxicity was Cu > Cd > = Pb > Zn.

In the lake water, nitrate reduction activity decreased with increasing metal levels. From the experiments involving the addition of metal to lake water the order of toxicity was found to be Cu > Cd > = Pb > Zn.

Keywords: Nitrate Reduction, Copper, Cadmium, Lead, Zinc, Toxicity, Lake Water, Synthetic Water, Microorganisms

Deans, J.R. and Dixon, B.G. (1992), Uptake of Pb2+ and Cu2+ by novel biopolymers. *Water Research*, **26** (4), 469-472.

Full Text: [W\Wat Res26, 469.pdf](W/Wat%20Res26,%20469.pdf)

Abstract: A series of different functionalized biopolymers were prepared and their comparative efficiencies for removing lead(II) and copper(II) ions from water at part per million concentrations determined. The biopolymers evaluated included cellulose, alginic acid, chitin, chitosan and carrageenan. Besides the base bipolymers, the carboxymethyl and hydroxamic acid derivatives of these materials were prepared and tested as well. Terephthalic acid and its hydroxamic acid derivative and a state of the art ion exchange resin, Chelex 20TM (Bio-Rad), were also tested as controls. It was found that, generally, the hydroxamic acid derivatives were the most efficient at removing both metals at a number of different starting ion concentrations although no one material was found to be the best under all experimental circumstances.

Keywords: Lead, Copper, Heavy Metals, Biopolymer, Pollution, Cellulose, Alginate, Chitin, Chitosan

Luo, B., Patterson, J.W. and Anderson, P.R. (1992), Kinetics of cadmium hydroxide precipitation. *Water Research*, **26** (6), 745-751.

Full Text: [W\Wat Res26, 745.pdf](W/Wat%20Res26,%20745.pdf)

Abstract: The kinetics of cadmium hydroxide precipitation in the presence and in the absence of citrate was investigated. Precipitation experiments were conducted in a continuous stirred tank reactor. Experiments were performed with initial cadmium concentrations ranging from 2.0 to 4.0×10-4 M; a range commonly occurring in electroplating rinsewater.

A population balance model was used to compute the nucleation and particle growth rates and relate these to the supersaturation ratio. Particle growth rates found in the presence of citrate were much lower than that in the absence of citrate. The examination of growth inhibition suggested that the mechanism was surface reaction controlled.

Keywords: Cadmium Hydroxide, Precipitation, Kinetics, Nucleation, Particle Growth, Growth Rate, Population Balance, Growth Inhibition, Citrate

Bhargava, D.S. and Killedar, D.J. (1992), Fluoride adsorption on fishbone charcoal though a moving media adsorber. *Water Research*, **26** (6), 781-788.

Full Text: [W\Wat Res26, 781.pdf](W/Wat%20Res26,%20781.pdf)

Abstract: Results of studies conducted to investigate the effect of some of the variables viz. sorbent mass input rate, sorbate flow-rate, initial sorbate concentration on the removal of fluoride by adsorption on fishbone charcoal in a moving media adsorption system, are presented. The ratio of attained equilibrium sorbate concentration to the initial sorbate concentration and the fluoride removal capacity of sorbent were found to vary inversely with the sorbent mass input rate whereas they varied directly with the sorbate flow rate and initial sorbate concentration. Empirical relationships have been developed to predict the ratio of attained equilibrium sorbate concentration to the initial sorbate concentration and the fluoride removal capacity of sorbent with respect to the variables investigated for the observed test conditions. The conventional isotherms (Langmuir and Freudlich isotherms) showed no good correlations for the data of the presented study. Correlation equations for the moving media adsorption system have been evolved. The ratio of attained equilibrium sorbate concentration to the initial sorbate concentration was found to be a function of sorbent-sorbate mass input rates ratio. Also, a model between these parameters manifesting a fairly high coefficient of correlation is presented.

Keywords: Adsorption, Fishbone Charcoal, Fluoride Removal, Moving Media Absorber, Isotherm Relationships, Reactor

? Kuo, W.G. (1992), Decolorizing dye wastewater with Fenton’s reagent. *Water Research*, **26** (7), 881-886.

Full Text: [1992\Wat Res26, 881.pdf](1992/Wat%20Res26,%20881.pdf)

Abstract: Five types of simulated dye wastewater, separately prepared with disperse, reactive, direct, acid and basic dyes, were decolorized with a hydrogen peroxide-ferrous ion system, known as Fenton’s reagent. The results are that the best pH value for decolorization is below 3.5, the average percent removal of chemical oxygen demand (COD) is about 90%, the transparency of wastewater is above 25 cm and the average percent decolorization is above 97%. All the results of treating the dye wastewater of actual dyeing and finishing mills are similar to those in the laboratory. Temperature mainly influences the speed of decolorization, i.e. the lower the temperature, the longer the time for decolorization.

Keywords: Dye Wastewater, Fenton’s Reagent, Decolorization, Transparency, COD, Absorbency

Gagnon, C., Arnac, M. and Brindle, J.R. (1992), Sorption interactions between trace metals (Cd and Ni) and phenolic substances on suspended clay minerals. *Water Research*, **26** (8), 1067-1072.

Full Text: [W\Wat Res26, 1067.pdf](W/Wat%20Res26,%201067.pdf)

Abstract: The phenomena of pollutant fixation on suspended clay minerals (chlorite, illite and kaolinite) were studied in an estuarine system. Isotherms and the dependence of adsorption on time for Cd, Ni and phenolic compounds (eugenol and vanillic acid) were studied. Clay minerals (as suspended matter) were exposed to trace metals and phenolic compound solutions. It was found that chlorite was a better adsorbent with 71% of Cd and 79% of Ni adsorbed at concentrations of suspended particulate matter of 400 mg l-1. At pH 8, the quantity of adsorbed phenolic compounds was lower than that of trace metals (up to 23% as compared to up to 79%). After examinations of adsorption capacities, investigation of the interactive effects of these pollutants on the sorption phenomena was studied. Cadmium would compete with nickel for the same adsorption sites. Vanillic acid was less sorbed than eugenol, but phenolic compounds generally enhanced the sorption of metallic cations on studied clay minerals. The presence of metallic cations increased the sorption of phenolic compounds. Investigated phenolic compounds represent the structure of humic substances in the environment, which are considered a predominant form of soluble (or colloidal) organic matter in natural waters.

Keywords: Sorption, Clay Minerals, Metals, Phenolic Compounds, Nickel, Cadmium, Eugenol, Vanillic Acid, Interaction, Atomic-Absorption Spectrometry, St-Lawrence Estuary, Adsorption, Matter, Cadmium, Copper, Oxide, Water

Notes: highly cited

Guibal, E., Roulph, C. and Le Cloirec, P. (1992), Uranium biosorption by a filamentous fungus mucor-miehei pH effect on mechanisms and performances of Uptake. *Water Research*, **26** (8), 1139-1145.

Full Text: [W\Wat Res26, 1139.pdf](W/Wat%20Res26,%201139.pdf)

Abstract: This study focuses on uranium sorption mechanisms by Mucor miehei, a fungal biomass, used in agro-industries (enzyme synthesis). The pH plays an important part in these phenomena, mainly by its influence on metal or cell wall chemistry. Hydroxylation of uranyl, dependent on the pH and total metal concentration, influences kinetics, via the nature of the limiting phases: diffusion of metal through layers bordering or constituting the biomass, or intramembranar precipitation of uranyl initially adsorbed, and sorption mechanisms. With a moderate pH, sorption of uranylhydroxides modifies extracellular sorbent structures, consequently inducing a multilayer sorption opposed to monolayer adsorption obtained with acid pH. Uptake capacity is characterized by high values obtained even with low metal concentration in solution. Biosorbent could be a technical answer to pollution treatment and valorization of low charge waste streams and leaching solutions obtained in recovery of infra-marginal ores.

Keywords: Adsorption, Complexation, Diffusion, Fungus, Hydrolysis, Isotherms, Kinetics, Leaching, Metal, Microorganisms, pH, Removal, *Rhizopus-arrhizus*, Sorption, Uranium, Waste, Water

? Kennedy, K.J., Lu, J.H. and Mohn, W.W. (1992), Biosorption of chlorophenols to anaerobic granular sludge. *Water Research*, **26** (8), 1085-1092.

Full Text: [1992\Wat Res26, 1085.pdf](1992/Wat%20Res26,%201085.pdf)

Abstract: The sorption of chlorophenols by anaerobic sludge granules was studied in order to more completely understand the fate of chlorophenols and their degradation products in upflow anaerobic sludge blanket reactors. Sorption isotherms were determined for pentachlorophenol and most isomers of tri-, di- and monochlorophenols, and the data were fitted to the Freundlich equation. Sorption by the sludge granules was considerable. Most, but not all, chlorophenols had linear sorption isotherms, which were defined by simple distribution coefficients. Those distribution coefficients were only weakly correlated to octanol-water partition coefficients, and there were no obvious relationships between sorption and numbers or positions of chlorine substituents. Sorption of two chlorophenols was highly reversible, but it was not for a third chlorophenol tested. Pentachlorophenol was more strongly sorbed than the lesser-chlorinated phenols, and pentachlorophenol sorption by sludge granules was weaker than its previously reported sorption by other biological materials. The Freundlich model, with empirically determined constants from this study, described the partitioning behaviour of chlorophenols in anaerobic sludge blanket reactors reasonably well.

Keywords: chlorophenols, biosorption, anaerobic, biomass

Moutin, T., Gal, J.Y., El Halouani, H., Picot, B. and Bontoux, J. (1992), Decrease of phosphate concentration in a high rate pond by precipitation of calcium phosphate: Theoretical and experimental results. *Water Research*, **26** (11), 1445-1450.

Full Text: [W\Wat Res26, 1445.pdf](W/Wat%20Res26,%201445.pdf)

Abstract: The mechanism involved in the decrease of phosphate in a high rate pond (HRP) is investigated. The calcium concentration in the water (1.25-3.75 mM) and the high pH obtained in the reactors (8-10), result in the precipitation of calcium phosphate minerals. Although calcium hydroxyapatite [Ca5(PO4)3OH, pK(s) = 571 is the thermodynamical stable state, the phosphate concentration is determined by the solubility of the amorphous tricalcium phosphate [Ca3(PO4)2, PK(s) = 25.2]. This is confirmed by the calculation of the theoretical predicted solubility as well as various experiments. The relationship between pH and phosphate concentration may be used to optimize the efficiency of this type of reactor to produce a minimum concentration of phosphate in the effluent.

Keywords: Phosphorus Removal, Waste-Water Treatment, High Rate Pond, Calcium, Phosphate, Chemical Precipitation, Hydroxyapatite, pH

Lo, C.K. and Fung, Y.S. (1992), Heavy metal pollution profiles of dated sediment cores from Hebe Haven, Hong Kong. *Water Research*, **26** (12), 1605-1619.

Full Text: [W\Wat Res26, 1605.pdf](W/Wat%20Res26,%201605.pdf)

Abstract: Eight sediment cores from Hebe Haven were collected and studied for metals including Cd, Cr, Cu, Fe, Ni, Pb, Zn and Ca. Pb-210 and Cs-137 activities were determined to date the time of deposition of the sediment. Hebe Haven is a yacht area and is close to the urbanized coast with several dyeing factories. Except Cd, the greatest enrichment was found at locations closest to the Ho Chung Stream which carried domestic and industrial wastewater to Hebe Haven. Concentrations as high as 0.930, 120, 131, 42.3 and 50.9 mg/kg were found for Cd, Cr, Zn, Cu and Pb, respectively. The corresponding enrichment factors are 13(Cd), 7.0(Cr), 2.9(Zn), 5.2(Cu) and 2.4(Pb). The extent of pollution diminishes from the riverine source. Cr is a typical example because its enrichment was mostly attributed to the nearby dyeing operation. The distribution of Cd appears more complicated. A maximum concentration of 3.60 mg/kg was found at a location far from Ho Chung Stream and with no nearby municipal or industrial activity. No significant Fe and Ni enrichment was found in the area. Ca in all cores decreases towards the sediment-water interface. It is probable that the abundance of shellfish has decreased as a result of excessive exploitation as seafood and pollution. Pb-210 activity and heavy metal concentrations of surficial layers have been ‘diluted’ by excessive deposition of Fe-deficient particles. This likely indicates the rapid deposition of coarser and sandy particles during the construction of a nearby large housing estate. Some Pb-210 activity profiles have periodic low values in deeper layers, which should correspond to events of rapid deposition of erosion during heavy typhoons and rainstorms. Overall, the sedimentation rates calculated were in the range of 0.351-0.561 cm/yr. In one site (Core S4) close to the riverine source and with the best available dating data, the recent anthropogenic fluxes of heavy metals in µg cm-2 yr-1 are estimated as: 0.081(Cd), 22(Cr), 20(Zn), 6.4(Cu) and 7.4(Pb).

Keywords: Heavy Metals, Calcium, Pb-210 Dating, Concentration Profiles, Sediment Core, Dyeing Plants, Pollution, River, California, Records

Rav-Achha, Ch. and Rebhun, M. (1992), Binding of organic solutes to dissolved humic substaces and its effects on adsorption and transport in the aquatic environment. *Water Research*, **26** (12), 1645-1654.

Full Text: [W\Wat Res26, 1645.pdf](W/Wat%20Res26,%201645.pdf)

Abstract: Humic substances constitute a major fraction of dissolved organic matter in natural water and effluents. Their effect on the adsorption of organic contaminants to aquifer material was elucidated, and a model was proposed for the adsorption of organic solutes to aquifer solids in the presence of dissolved humic substances. The model is based on the assumption that organic solute binds to dissolved humic substances in a reversible manner to form a solute humate complex. Following binding, both free and bound fractions of the organic solute are independently adsorbed onto the solid phase. In order to evaluate the validity of the model, the following parameters were determined: (1) the adsorption coefficient of the organic solute to clay; (2) the binding constant of the solute humate complex; and (3) the adsorption of humic acid (HA) to clay, assuming that the solute humate complex is adsorbed similarly to humic acid itself. Using these parameters in the model enabled the effect of dissolved humic substances on adsorption to be evaluated. Experimental results obtained for the adsorption of fluoranthene (a model compound of the PAH group) to clay in the presence of dissolved HA were compared with calculated values derived from the model described above. The sensitivity of the model to various parameters was evaluated and a prediction was made with respect to the effect of dissolved humic substances on the adsorption of a variety of organic solutes. It appears that dissolved humic substances solubilize organic solutes which have higher adsorption coefficients to clay than humic substances, but increase the adsorption of solutes having lower adsorption coefficients relative to humic substances.

Keywords: Sorption, Organic Solutes, Interaction Model, Solubilization, Binding To Humic Substances, Polycyclic Aromatic-Hydrocarbons, Biodegradation, Groundwater, Pollutants, Sorption, Systems, Matter, Water

Delgado, M., Bigeriego, M. and Guardiola, E. (1993), Uptake of Zn, Cr and Cd by water hyacinths. *Water Research*, **27** (2), 269-272.

Full Text: [W\Wat Res27, 269.pdf](W/Wat%20Res27,%20269.pdf)

Abstract: Studies were conducted in a greenhouse to determine the phytotoxic effect and uptake capacity of Zn, Cr and Cd by the water hyacinth Eichhornia crassipes. Results show that among the three elements tested, Cd was the most phytotoxic, showing up some necrosis in the plant when the concentration was greater than 2.5 ppm. In the case of Cr and Zn, the phytotoxicity produced the appearance of chlorosis in the aerial part of the plant. For the tested rates of Cr (maximum 9 ppm) no reduction of productivity was found, whereas in the case of Zn the concentration of 9 ppm in solution caused a 30% reduction in the weight. As for the heavy metal absorption, it was proved that after 24 days of growth, the heavy metals were totally depleted from the nutritive solution suggesting complete absorption of these metals by the plants.

Keywords: Absorption, Heavy Metals, Chlorosis, Concentration, Growth, Phytotoxic, Necrosis, Water Hyacinth, Pollution, Treatment, Cadmium, Plants, Soils, Corn

Bhargava, D.S. and Sheldarkar, S.B. (1993), Use of TNSAC in phosphate adsorption studies and relationships. Literature, experimental methodology, justification and effects of process variables. *Water Research*, **27** (2), 303-312.

Full Text: [W\Wat Res27, 303.pdf](W/Wat%20Res27,%20303.pdf)

Abstract: There is a need for developing low cost, easily and abundantly available, yet efficient, adsorbents for the removal of phosphates during the tertiary treatment of wastewaters. The tamarind nut shell activated carbon (TNSAC) prepared on a laboratory scale has been used to evaluate its performance for phosphate adsorption. This paper describes the laboratory production of this adsorbent material in its various forms, and discusses the effects of the TNSAC process variables (the unrinsed and rinsed forms of the TNSAC and the impregnation ratio) on its performance in adsorbing phosphate. The material has been shown to be a good alternative adsorbent. As much as 95% phosphate removal by the unrinsed TNSAC is possible in about 30 min under the test conditions. The phosphate adsorbing capacity is about two times higher for the unrinsed TNSAC in comparison to the rinsed TNSAC. The adsorption rates, however, transit to extremely low rates towards the end when equilibrium conditions could be attained in about 2 h contact time. The phosphate removal mechanics are adsorption and precipitation/ion exchange when unrinsed TNSAC is used, and adsorption alone for the rinsed TNSAC. The maximum phosphate removal is found to take place at an impregnation ratio of 10 for both forms of the TNSAC.

Keywords: Tamarind Nut Shell, Activated Carbon, Phosphate Adsorption, Process Variables, Moving-Media Reactor, Exhausted Activated Carbon, Chemical Regeneration, Water, Diffusion, Sorbent

Bhargava, D.S. and Sheldarkar, S.B. (1993), Use of TNSAC in phosphate adsorption studies and relationships. Effects of adsorption operating variables and related relationships. *Water Research*, **27** (2), 313-324.

Full Text: [W\Wat Res27, 313.pdf](W/Wat%20Res27,%20313.pdf)

Abstract: The phosphate removal potential of a low cost and abundantly available material, tamarind nut shell activated carbon (TNSAC) was investigated. A previous paper of ours has described the laboratory scale production of this material and the effects of the process variables (unrinsed and rinsed forms of the TNSAC and the impregnation ratio) on its performance in adsorbing phosphates. This paper discusses the effects of operating variables (adsorbent particles size, initial adsorbate concentration, adsorbent dose and contact time duration) on the phosphate adsorption by the TNSAC. Phosphate removal is seen to increase with increasing adsorbent doses, decreasing adsorbent particle size and increasing ratios of initial phosphate concentration to adsorbent dose. The unrinsed TNSAC provides higher phosphate removal in comparison to the rinsed TNSAC. The maximum difference in the effectiveness of the unrinsed and rinsed TNSAC is seen to occur at an adsorbent dose of 2 g l-1 under the test conditions. The lowest equilibrium phosphate concentration is attained at an impregnation ratio of 1.0. Models for predicting phosphate removal have been evolved. These models also incorporate operational variables such as the adsorbent particle size, initial adsorbate concentration, adsorbent dose, contact time etc., and manifest high values of the correlation coefficients.

Keywords: Tamarind Nut Shell, Activated Carbon, Phosphate Adsorption, Operation Variables

Bhargava, D.S. and Sheldarkar, S.B. (1993), Use of TNSAC in phosphate adsorption studies and relationships. Isotherm relationships and utility in the field. *Water Research*, **27** (2), 325-335.

Full Text: [W\Wat Res27, 325.pdf](W/Wat%20Res27,%20325.pdf)

Abstract: The studies related to the phosphate removal potential of a laboratory scale produced adsorbent, the tamarind nut shell activated carbon (TNSAC), have been partly reported in two papers by us which described the production of the various TNSAC forms, and the effects of the process variables (unrinsed and rinsed TNSAC forms and the impregnation ratio) and of the operational variables (adsorbent particle size, initial adsorbate concentration, adsorbent dose and contact time duration) on the performance evaluation of the TNSAC in adsorbing phosphates. The performance predictive models were also presented. This paper discusses the adsorption isotherm relationships and models. The applicability of the system to real field situations, and the reuse possibility and removal of the phosphate loaded adsorbent particles, have also been brought out in this paper. The isotherm plots show higher phosphate adsorptive capacity for greater equilibrium concentration values. The highest adsorptive capacity results at an impregnation ratio of 1.0 for both forms of the TNSAC and at all adsorbent doses. The adsorptive capacity is higher for the unrinsed TNSAC in comparison to the rinsed TNSAC, corresponding to the same equilibrium concentration. The rinsed TNSAC yields an isotherm model similar to the Freudlich isotherm. The unrinsed TNSAC does not yield any conventional isotherm forms, yet they have been modelled. Generalized models for predicting the adsorptive capacity have been evolved, and such models also incorporate the impregnation ratio, and the term for the adsorbent particle size. The models have indicated high correlation coefficients. When present in wastewaters, the adsorption of phosphates on the TNSAC is seen to reduce due to the preferential adsorption of other pollutants present in the wastewaters. The spent and phosphate loaded TNSAC particles are seen to be removable. Physical adsorption is seen to be the predominantly likely mechanism of phosphate adsorption on the TNSAC, which suggests the reuse possibility of the TNSAC.

Keywords: Tamarind Nut Shell Activated Carbon, Phosphate Adsorption, Modeling, Isotherm Relationships, Moving-Media Reactor

Ojha, C.S.P. and Graham, N.J.D. (1993), Theoretical estimates of bulk specific deposit in deep bed filters. *Water Research*, **27** (3), 377-387.

Full Text: [W\Wat Res27, 377.pdf](W/Wat%20Res27,%20377.pdf)

Abstract: The evaluation of bulk specific deposit values forms an integral part of deep bed filtration modelling. As the observations in filtration experiments are generally restricted to the monitoring of headloss and filtrate concentration (in mass units), estimates of only absolute specific deposit values (m/v) are possible. In many previous studies, a term known as the ‘bulk factor’ is incorporated into the modelling of the filtration process such that the product of the bulk factor with the absolute specific deposit (m/v), gives an estimate of the bulk specific deposit (v/v). In these investigations the bulk factor is treated as constant. Alternatively, other authors have obtained the variation of the bulk factor with the absolute specific deposit by using Kozeny’s headloss model. Thus, it can be seen that so far the process of obtaining a particular variation of the bulk factor and its subsequent use in the modelling of a filtration process has not been adequately considered. The present study presents a novel approach based on the development of sequential decision-making algorithms. It is concluded that this approach has the advantages of being computationally more efficient and avoids the need to assume a headloss model.

Keywords: Absolute Specific Deposit, Bulk Factor, Bulk Specific Deposit, Filtration Modeling, Deep Bed Filtration, Headloss, Sequential Algorithms, Filtration

Powelson, D.K., Gerba, C.P. and Yahya, M.T. (1993), Virus transport and removal in wastewater during aquifer recharge. *Water Research*, **27** (4), 583-590.

Full Text: [W\Wat Res27, 583.pdf](W/Wat%20Res27,%20583.pdf)

Abstract: To assess soil-aquifer treatment of sewage effluent for removal of viruses, studies were conducted at a recharge/recovery site near Tucson, Ariz. Two 13 m2 basins were constructed in coarse sand alluvium, one for secondary-and one for tertiary-treated effluent. Bacterial viruses, MS2 and PRD1, and a chemical tracer, potassium bromide (KBr), were added to effluent applied to these basins. Infiltration rates ranged from 0.2 to 16.8 m/d. Samples of unsaturated flow from depths of 0.30-6.08 m below the basin were taken through porous stainless steel suction-samplers. Bromide and virus results indicated the presence of preferential flow conditions that produced irregular concentration profiles with depth. Virus transport was retarded (R = 1.9) at the beginning of a flooding cycle, but viruses were transported faster than the average water velocity (R = 0.47) when applied after the infiltration rate had declined following 4 days of flooding. Virus specific removal rates (b) during percolation through soil were 2.3-120 times greater than in bottles of effluent or ground water. PRD1 was removed more rapidly during percolation (b = 0.65 h-1) than MS2 (b = 0.23 h-1). Effluent type did not significantly affect b for MS2, but the PRD1 rate was nearly 3 times greater with secondary effluent (1.0 h-1) compared to tertiary effluent (0.35 h-1). Virus removals at the 4.3 m depth ranged from 37 to 99.7%.

Keywords: Reclamation of Water, Land Disposal, Recharge, Sewage, Effluent, Virus, Bacteriophage, MS2, PRD1, Removal, Transport, Bacteria Removal, Soils, Infiltration, Adsorption, Movement

Auer, M.T. and Niehaus, S.L. (1993), Modeling fecal-coliform bacteria. I. Field and laboratory determination of loss kinetics. *Water Research*, **27** (4), 693-701.

Full Text: [W\Wat Res27, 693.pdf](W/Wat%20Res27,%20693.pdf)

Abstract: Contamination of surface waters through the discharge of fecal material in surface run-off, combined sewer overflows and point source discharges is an important water quality problem in many urban environments. Field and laboratory studies were conducted to develop and verify the kinetic expressions and attendant coefficients required to simulate the loss of fecal coliform bacteria in lakes due to death [as mediated by irradiance (light) and temperature] and sedimentation. The dark death rate coefficient at 20-degrees-C (kd = 0.73 d-1) was established in laboratory experiments utilizing raw sewage diluted with filtered lake water. No consistent relationship was observed between the dark death rate coefficient and temperature (theta = 1). The irradiance-mediated death rate (ki) was shown to be proportional to irradiance (I) in water column incubations of raw sewage using a dialysis tube technique: ki = alphaI; alpha = 0.00824 cm2 cal-1. The settling loss rate (1.38 m d-1) was quantified by determining the association of fecal coliform bacteria with particles of various size classes and measuring the sedimentation rate for those particle classes using sediment traps. Individual loss terms are combined into a single predictive expression which may be used to simulate fecal coliform bacteria dynamics in lakes.

Battistioni, P., Fava, G. and Ruello, M.L. (1993), Heavy metalshock load in activated sludge uptake and toxic effects. *Water Research*, **27** (5), 821-827.

Full Text: [W\Wat Res27, 821.pdf](W/Wat%20Res27,%20821.pdf)

Abstract: Waste sludge from laboratory units at four different steady-state conditions (5-20 days sludge ages) was employed for studying heavy metal shock load by the jar test system. Metal uptake (Hg, Cd, Ni) and oxygen depletion rates were simultaneously followed. The potential adsorption constants (k(am)) measured reveal a metal affinity sequence Hg > Cd > Ni, in partial contrast to the metal toxicity (MT) one, Hg > Ni > Cd. This suggests different sludge adsorption sites. Hg is preferentially adsorbed on the cell, while Cd is adsorbed on extracellular polymer slimes and Ni on capsular polymers and the cellular wall. Therefore sludge age influences Cd and Ni toxicity, while no effect is observed for Hg.

Keywords: Activated Sludge, Heavy Metals, Adsorption, Bacterial Extracellular Polymers, Mercury Ions, Cadmium Ions, Nickel Ions, Bacterial Extracellular Polymers, Stability-Constants, Removal

? Buitron, G. and Capdeville, B. (1993), Uptake rate and mineralization of hexadecane and naphthalene by a mixed aerobic culture. *Water Research*, **27** (5), 847-853.

Full Text: [1993\Wat Res27, 847.pdf](1993/Wat%20Res27,%20847.pdf)

Abstract: Biodegradation and mineralization of n-hexadecane and naphthalene by acclimated activated sludge were studied using a batch reactor coupled to a quadripole mass spectrometer. Inital hydrocarbon concentration range was 52-320 mg hexadecane/l and 5-25 mg naphthalene/l, with an S0/X0 ratio between 0.37 and 4.00 mg hydrocarbon/mg MLSS. Mean biomass retention time was 15 days for hexadecane and 20 days for naphthalene. Hydrocarbons were the sole source of carbon utilized. The hydrocarbon degradation rate was modelled by second-order kinetics. The biokinetic coefficients Y(obs) and mu(max)/K(s), and their relation to the S0/X0 ratio were obtained. Total CO2 production was between 22 and 27% of the initial substrate concentration and the percentage of the metabolic products was between 2.6 and 4.0 for hexadecane and naphthalene, respectively. The rest of the substrate was converted to biomass. Respiratory coefficients for the hydrocarbons studied were calculated.

Keywords: Activated Sludge, Hydrocarbons, Biodegradation, Mineralization, Modeling, Mass Spectrometry, Respirometry, Hexadecane, Naphthalene, Fed-Batch Techniques, Biodegradation Kinetics, Activated-Sludge, Refinery, History, Growth, Model

? Urbain, V., Block, J.C. and Manem, J. (1993), Bioflocculation in activated sludge: An analytic approach. *Water Research*, **27** (5), 829-838.

Full Text: [1993\Wat Res27, 829.pdf](1993/Wat%20Res27,%20829.pdf)

Abstract: A study on the physico-chemical structure of activated sludge flocs was carried out to get a better insight in its relationship with sludge settleability. For this purpose, 16 sludge samples from different origins were analyzed in order to provide information with regard to their settleability, biomass and exocellular composition, surface characteristics and internal hydrophobicity. The presence of filamentous microorganisms was observed in all samples but was not always associated with poor settleability, supporting to some extent the idea of their role as a backbone in the flocs. Relationships between the measured variables were studied through their linear correlations. A high amount of exocellular polymers (ECP) was associated with poor settling conditions. The DNA fraction and the C/N ratio of the ECP, had also a negative influence on the adsorption of a cationic molecule in the sludge samples. Finally, sludge settleability was described with a mathematical model which shows the opposition between ECP and the internal hydrophobicity of the flocs. From the model, the positive role of hydrophobic interactions should provide a new approach in the understanding of flocculation mechanisms in activated sludge.

Keywords: Activated Sludge, Settleability, SVI, Exocellular Polymers, Hydrophobicity, Model, Surface Charge

Pettersson, C., Håkansson, K., Karlsson, S. and Allard, B. (1993), Metal speciation in a humic surface water system polluted by acidic leachates from a mine deposit in Sweden. *Water Research*, **27** (5), 863-871.

Full Text: [W\Wat Res27, 863.pdf](W/Wat%20Res27,%20863.pdf)

Abstract: A speciation study of some metals (Al, Fe, Cu, Zn and Cd) was performed in the surface water downstream from a deposit with sulphidic mine waste where acidic leachates were neutralized by mixing with well buffered groundwater and surface run-off. The water was rich in humic and fulvic acids (HFA). The chemical forms of the metals were characterized with respect to their cationic and anionic exchange properties.

In the present pH range (5-8) Al and Fe precipitated as solids that were partly retained by both cation and anion exchangers. Zinc and cadmium were dominated by cationic forms but for cadmium anionic forms were always present in minor amounts under the conditions of the study. Copper was predominantly anionic (as HFA-complex) except at low pH and high concentrations of Al and Fe, which evidently occupied all available complexing sites on the HFA.

Conditional stability constants were estimated for the corresponding metal-HFA complex entirely from field data. The values obtained with this empirical method (logbeta\* at pH 7; 4.7 Cu; 3.2 Zn; 4.0 Cd) are in reasonable agreement with measurements in controlled model systems.

Keywords: Aluminum, Cadmium, Copper, Iron, Zinc, Speciation, Anion-Exchangeable, Cation-Exchangeable, Mine Waste, Surface Water, Stability-Constants, Natural-Waters, Organic-Matter, Trace-Metals, Fulvic-Acid, River Water, Adsorption, Complexation, Substances, Extraction

Roy, D., Wang, G.T. and Adrian, D.D. (1993), A simplified solution technique for carbon adsorption model. *Water Research*, **27** (6), 1033-1040.

Full Text: [W\Wat Res27, 1033.pdf](W/Wat%20Res27,%201033.pdf)

Abstract: A new method of solving the homogeneous surface diffusion model for activated carbon absorption is presented. The method uses Laplace transforms on the equations developed by applying orthogonal collocation. The simultaneous equations developed are nonlinear. Consequently, an iterative method is used in order to calculate, from the batch absorption data, the surface diffusion coefficient and the film transfer coefficient. The model produces a good match between experiment and prediction for laboratory data on an agricultural waste, a dye waste and an aqueous waste stream containing a herbicide. The final form of the equations is presented in a readily usable form for applications to carbon absorption bed practice.

Sharma, D.C. and Forster, C.F. (1993), Removal of hexavalent chromium using sphagnum moss peat. *Water Research*, **27** (7), 1201-1208.

Full Text: [W\Wat Res27, 1201.pdf](W/Wat%20Res27,%201201.pdf)

Abstract: Batch adsorption studies have shown that sphagnum moss peat, which is essentially oligotrophic, in concentrations ranging from 4 to 40 g/l can be used effectively to remove hexavalent chromium from aqueous solutions. The process is pH dependent, the optimum range being 1.5-3. Treatment of the exhausted peat with 1 M NaOH removed only 50% of the sorbed metal, suggesting that the binding to the peat involved strong chemisorption forces.

Keywords: Peat, Hexavalent Chromium Adsorption, Activated Carbon, Exchange

Alves, M.M., Beca, C.G.G., Decarvalho, R.G., Castanheira, J.M., Pereira, M.C.S. and Vasconcelos, L.A.T. (1993), Chromium removal in tannery wastewaters ‘polishing’ by *Pinus sylvestris* bark. *Water Research*, **27** (8), 1333-1338.

Full Text: [W\Wat Res27, 1333.pdf](W/Wat%20Res27,%201333.pdf)

Abstract: The possibility of using ground, dried and classified *Pinus sylvestris* bark for trivalent chromium removal in tannery wastewater ‘polishing’ was studied. Tests were carried out with synthesized solutions whose chromium concentrations (5 and 20 mg/l) were similar to those found in some effluents of Portuguese tannery industries after physico-chemical treatment. Bark concentrations of 1 and 2 g/l were used (higher concentrations would have no practical value) and chromium removals ≥90% were achieved in a 4.5–5.0 pH range. Agitation was accomplished by means of both air bubbling and vibrating plate. Slight differences occurred. Bark wetting was achieved either by simple bark/solution contact or vacuum application. No marked differences were observed. From an industrial point of view air bubbling agitation and simple bark/solution contact certainly look more interesting. The presence of other ions decreased the chromium removal though this decrease was never greater than about 20%. Pretreatments of bark were carried out and, in some cases, an increase of about 6–11% in the chromium sorption capacity of bark was observed.

Keywords: Chromium Removal, Pinus Bark, Tannery Wastewater ‘Polishing’, Bark Chromium Adsorption

Saha, S. (1993), Treatment of aqueous effluent for fluoride removal. *Water Research*, **27** (8), 1347-1350.

Full Text: [W\Wat Res27, 1347.pdf](W/Wat%20Res27,%201347.pdf)

Abstract: Fluoride forms a common aqueous effluent in many chemical industries. Excess of fluoride in the effluent can cause a health hazard. So, effluent containing fluoride needs treatment to reduce its concentration to a disposable value before discharge into public sewage. By conventional methods, the fluoride concentration in the industrial effluent can not be reduced to less than 10-15 mg l-1 without the help of dilution with fresh water. A method of chemical treatment is discussed here which has been very effective to remove the fluoride ion from effluent to a concentration of 1.5 mg l-1 or less (which is disposable) by precipitation technique followed by complexation. In this method, precipitation reduces the fluoride ion to a concentration of about 15 mg l-1 and the balance (1.5 mg l-1) is complexed to a stable form which being already totally dissociated at that low concentration does not break on further dilution. This improved method has made it possible to save a huge quantity of fresh water which otherwise is needed to dilute the fluoride effluent after conventional treatment in order to meet the statutory requirement.

Keywords: Waste-Water Treatment, Fluoride Concentration, Aqueous Effluent, Chemical Method, Precipitation, Complexation, Fresh-Water Dilution of Effluent

Macchi, G., Pagano, M., Santori, M. and Tiravanti, G. (1993), Battery industry wastewater: Pb removal and produced sludge. *Water Research*, **27** (10), 1511-1518.

Full Text: [W\Wat Res27, 1511.pdf](W/Wat%20Res27,%201511.pdf)

Abstract: The process of neutralization with NaOH, in the presence of Fe(III) salt, of sulphuric acid battery industry wastewater seems to be more suitable than any other process for Pb removal because at the same time, it allows the exploitation of the scavenger action of Fe(III), which is often present in the same wastewater and precipitates as hydroxides. In order to optimize sludge production, a laboratory research study has been carried out to minimize the quantity of Fe(III) to be added. All aspects concerning the chemistry of wastewater have been taken into consideration step by step and discussed. As a result, a process which requires the addition of Fe(III) so that an Fe/Pb ratio, both expressed as ppm, of the order of 0.5 is achieved. The process has been applied to two artificial solutions, characterized by a content of H2SO4 of 1000 and 5000 ppm, respectively, and by 10 ppm of Pb, as well as to five samples of wastewater. The proposed process takes about 1 h to perform: 30 min for neutralization up to pH 8.5-9.5 and Fe(III) addition and 30 min for correction in the 9-9.5 pH range and for flocculation with the help of a polyelectrolyte. The Pb concentration of the treated effluent is below 0.2 ppm. Conditions for Pb removal using only NaOH or Na2CO3 have also been considered.

Keywords: Battery Waste-Water, Treatment, Sludge Production, Pb Removal, Surface Precipitation, Adsorption, Metals, Sorption, Oxides, Model, Lead

Namasivayam, C. and Periasamy, K. (1993), Bicarbonate-treated peanut hull carbon for mercury(II) removal from aqueous solution. *Wate**r Research*, **27** (11), 1663-1668.

Full Text: [W\Wat Res27, 1663.pdf](W/Wat%20Res27,%201663.pdf)

Abstract: Activated carbon prepared from bicarbonate-treated peanut hulls (BPHC) has been used for the adsorption of Hg(II) over a range of initial metal ion concentrations (10-20 mg dm-3), agitation time (5-180 min), adsorbent dosage (5-120 mg 100 ml-1) and pH (1.5-10.0). Adsorption of Hg(II) increased with increase in its initial concentration from 10 to 20 mg dm-3 and the equilibrium time of adsorption increased from 75 to 90 min for a BPHC dose of 100 mg 100 ml-1. The process of uptake obeys both the Freundlich and Langmuir isotherms. The applicability of the Lagergren kinetic model has also been investigated. Quantitative removal of 20 mg dm-3 Hg(II) in 100 ml by 70 mg adsorbent was observed over a pH range of 3.5-10.0. A comparative study with a commercial granular activated carbon (CAC) showed that BPHC is 7 times more effective compared to CAC.

Keywords: Bicarbonate-Treated Peanut Hull Carbon, Hg(II) Adsorption, Adsorption Isotherms, Adsorption Kinetics, pH Effect, Water

Diamadopulos, E., Ioannidis, S. and Sakellaropoulos, G.P. (1993), As(V) removal from aqueous solutions by fly ash. *Water Research*, **27** (12), 1773-1777.

Full Text: [W\Wat Res27, 1773.pdf](W/Wat%20Res27,%201773.pdf)

Abstract: The present work examines the possible use of fly ash, a by-product of coal power stations, as a means of removing arsenic(V) from water, or equivalently, of restricting its movement in the solid wastes or the soil. Kinetic and equilibrium experiments were performed in order to evaluate the removal efficiency of lignite-based fly ash. Both adsorption and desorption experiments were done at three pH levels, namely 4, 7 and 10. The results indicated that arsenic can be removed from water by fly ash, yet the degree of removal depended markedly on the pH. Removal at pH 4, as demonstrated by the adsorption isotherms, was significantly higher than that at the other two pH values. For 80% removal of arsenic, the solid phase concentration at pH 4 was up to 4 times greater than that at the other two pH levels. During the desorption studies only a small amount of the pre-adsorbed arsenic was released into the water. This amount was practically independent of the initial fly ash loading. This indicates that adsorption of arsenic on fly ash is almost irreversible and, therefore, there are good prospects for arsenic fixation on fly ash in practical applications.

Keywords: Fly Ash, Arsenic, Adsorption, Desorption, Activated Carbon, Natural Waters, Adsorbents, Adsorption, Desorption

Hespanhol, I. and Prost, A.M.E. (1994), Who guidelines and national standards for reuse and water-quality. *Water Research*, **28** (1), 119-124.

Full Text: [W\Wat Res28, 119.pdf](W/Wat%20Res28,%20119.pdf)

Abstract: Guidelines for reuse and drinking water quality are based on scientific research and epidemiological findings, and as such provide guidance for making risk management decisions related to the protection of public health and the preservation of the environment. Water quality standards are legal impositions enacted by means of laws, regulations or technical procedures, which are established by countries by adapting guidelines to their national priorities and taking in account their technical, economical, social, cultural and political characteristics and constraints. Several examples are presented with the objective of differentiating standards from guidelines, and to show how countries have been adapting WHO guidelines to their situations in order to produce national standards on drinking water quality, and for the use of treated wastewater for crop irrigation.

Zhou, J.L., Rowland, S., Mantoura, R.F.C. and Braven, J. (1994), The formation of humic coatings on mineral particles under simulated estuarine conditions: A mechanistic study. *Water Research*, **28** (3), 571-579.

Full Text: [W\Wat Res28, 571.pdf](W/Wat%20Res28,%20571.pdf)

Abstract: The adsorption of three humic substances isolated from the River Dodder (Eire) and one commercial humic acid (Aldrich) by six minerals was studied and found to be influenced by mineral type, the nature of the humics and by the solution characteristics. Adsorption was heavily pH-dependent, with lower uptake at higher pH values due to increased ionization of the humic substances. The amount of humic substances adsorbed was in the order: Aldrich humic acid > Dodder humic acid > Dodder fulvic acid > Dodder hydrophilic macromolecular acid corresponding to a decreasing aromatic carbon content and increasing O/C ratio. Desorption experiments showed Aldrich humic acid was the most difficult to be desorbed, followed by Dodder humic acid, Dodder fulvic acid then Dodder hydrophilic macromolecular acid. Humic uptake was found to increase with ionic strength due to the neutralization of charges on both mineral surfaces and humic substances, and more importantly, the compression of diffuse double layers; this also showed that van der Waals attraction is an important part of the interactive forces between humic substances and mineral particles. The amount of humic substances adsorbed varied with mineral type, particle size and surface area, with aluminium oxide having the highest capacity. The effect of temperature on humic adsorption was shown to vary with humic type and two types of reaction mechanism have been proposed responsible for the humic-clay interactions.

Keywords: Humic Coatings, Clay, Oxide, Physical Adsorption, Chemisorption, Desorption, Estuary, Hydrophobic Pollutants, Natural Sediments, Organic-Matter, Iron-Oxides, Adsorption, Sorption, Water, Substances, Aluminum, Carbon

? Qian, Y., Wen, Y.B. and Zhang, H.M. (1994), Efficacy of pretreatment methods in the activated-sludge removal of refractory compounds in coke-plant waste-water. *Water Research*, **28** (3), 701-707.

Full Text: [1994\Wat Res28, 701.pdf](1994/Wat%20Res28,%20701.pdf)

Abstract: In this study, the possibility and mechanism of anaerobic acidification, ultraviolet radiation, and ozonation as pretreatment methods for improving the biotreatability of coke-plant wastewater have been investigated, a new process-A-A/O system-has been proposed and experiments in lab-scale apparatus and pilot plant have been conducted. It has been concluded that the tested A-A/O system is an efficient and cost-effective way for removing refractory organics from coke-plant wastewater.

Keywords: Anaerobic, Anaerobic Acidification, Anaerobic Pretreatment, Coke Plant, Coke Plant Wastewater, Coke-Plant Waste-Water, Coke-Plant Wastewater, Ozonation, Refractory Organics, Ultraviolet Radiation, Wastewater

Pagga, U. and Taeger, K. (1994), Development of a method for adsorption of dyestuffs on activated sludge. *Water Research*, **28** (5), 1051-1057.

Full Text: [W\Wat Res28, 1051.pdf](W/Wat%20Res28,%201051.pdf)

Abstract: A simple screening method is suggested to predict the abiotic removal of dyestuffs in wastewater treatment plants by adsorption on activated sludge. Static and dynamic elimination tests with water soluble and poorly water soluble dyestuffs in activated sludge systems were performed. The influence of substance and sludge concentration, water hardness, test duration and analytical methods on the test results was investigated. A detailed description of the method is given.

Keywords: Adsorption, Activated Sludge, Dyestuffs, Abiotic Elimination, Static Elimination Test, Dynamic Elimination Test, Tests

Notes: highly cited

? Ahel, M., Giger, W. and Koch, M. (1994), Behaviour of alkylphenol polyethoxylate surfactants in the aquatic environment. I. Occurrence and transformation in sewage treatment. *Water Research*, **28** (5), 1131-1142.

Full Text: [1994\Wat Res28, 1131.pdf](1994/Wat%20Res28,%201131.pdf)

Abstract: Specific analytical techniques were used to study the behaviour of alkylphenol polyethoxylate surfactants (APnEO) in several full-scale mechanical-biological sewage treatment plants in the Glatt Valley, Switzerland. Both parent compounds and the major metabolic products were quantified. Untreated sewage and primary effluents contained considerable amounts of surfactant-derived nonylphenolic compounds (3.0–9.6% of the dissolved organic carbon). Parent nonylphenol polyethoxylates (nEO = 3–20) were efficiently eliminated during biological treatment. However, the overall rate of biodegradation was limited due to the formation of biorefractory metabolites, including nonylphenol (NP), nonylphenol mono- and diethoxylate (NP1EO, NP2EO) and nonylphenoxy carboxylic acids (NPEC). The abundance of a particular metabolite was very dependent on the treatment conditions. Studies of the mass flows of nonylphenolic compounds in sewage treatment plants indicated that their fate was determined not only by microbial transformation, but also by physicochemical processes.

**Keywords:** Non-Ionic Surfactants, Nonylphenol Polyethoxylates, Nonylphenol, Sewage Treatment, Transformation, HPLC

Wang, X. and Leslie Grady, Jr., C.P. (1994), Comparison of biosorption isotherms for di-N-butyl phthalate by live and dead bacteria. *Water Research*, **28** (5), 1247-1251.

Full Text: [W\Wat Res28, 1247.pdf](W/Wat%20Res28,%201247.pdf)

Abstract: Isotherms were determined for the sorption of di-n-butyl phthalate (DBP) on live and dead suspensions of *Pseudomonas* fluorescens IFO 12055. When isotherms were expressed in terms of the suspended solids concentration actually present in the sorption flasks, the dead biomass had an apparently higher affinity for DBP. However, when the loss of biomass due to cell lysis during autoclaving was considered, the isotherms on the two types of biomass were the same.

Keywords: Biosorption, Di-N-Butyl Phthalate, Hazardous Organic Pollutants, Water Partition-Coefficients, Microbial Biomass, Adsorption, Removal, Degradation, Desorption, Esters

Couillard, D. (1994), The use of peat in wastewater treatment. *Water Research*, **28** (6), 1261-1274.

Full Text: [W\Wat Res28, 1261.pdf](W/Wat%20Res28,%201261.pdf)

Abstract: Peat has been widely used in the treatment of wastewaters. The potential of using peat in wastewater treatment is reviewed with special attention to the following topics: (i) the properties of peat; (ii) the pretreatment of peat; (iii) the principles involved in the removal of wastewater pollutants by peat; and (iv) the applications of peat to the removal of impurities from wastewater.

Keywords: Peat, Water Pollution Control, Waste-Water Treatment, Waste-Water, Waste-Water Systems, Filtration, Peat Beds, Oil, Hydrocarbons, Water Renovation, Water Treatment, Effluent Treatment, Diffusion-Model, Acid Dye, Removal, Adsorption, Runoff, Batch, Adsorbent, Nutrients

Mota, A.M., Pinheiro, J.P. and Gonçalves, M.L. (1994), Adsorption of humic acid on a mercury/aqueous solution interface. *Water Research*, **28** (6), 1285-1296.

Full Text: [W\Wat Res28, 1285.pdf](W/Wat%20Res28,%201285.pdf)

Abstract: The adsorption on a mercury/water interface of a sample of humic acids from an Irish peat has been analyzed by a.c. voltammetry, using a hanging mercury drop electrode in an unstirred and/or stirred medium, at different pH values (pH = 2.5, 5 and 8) and two potential values (E =-0.5 and-0.9V), in order to have a better insight into the kinetics and equilibrium adsorption which may drastically affect the voltammetric signal in trace metal speciation of natural waters.

The results at pH 2.5 present a slower kinetic of adsorption but a higher coverage degree at the equilibrium when compared with pH 5 and/or 8 due to the charge of the molecules. At-0.5 V, close to the potential of zero charge, the kinetics of adsorption is discussed in terms of a diffusion mechanism, but at-0.9 V the experimental curves clearly show that the global adsorption process cannot be explained by a pure diffusion mechanism based on Frumkin isotherm.

Keywords: Humic Acid, Natural Waters, Adsorption Kinetics, Adsorption Equilibrium, Ac Voltammetry, Surface-Active Substances, Mercury Electrolyte Interface, Anodic-Stripping Voltammetry, Fulvic Substances, Fresh-Waters, Seawater, 2,3-Dimethylpyridine, Polarography, Kinetics, Colloids

? Logan, B.E., Alleman, B.C., Amy, G.L. and Gilbertson, R.L. (1994), Adsorption and removal of pentachlorophenol by white rot fungi in batch culture. *Water Research*, **28** (7), 1533-1538.

Full Text: [1994\Wat Res28, 1533.pdf](1994/Wat%20Res28,%201533.pdf)

Abstract: The adsorption and removal of pentachlorophenol (PCP) by 12 species of white rot fungi is a function of species and culture conditions. In general, PCP adsorption to mycelia was very low, ranging from 0.01 to 0.05 g PCP g mycelium−1 (dry wt basis) at 40 mg PCP l−1, with no apparent corellation between species. after long pre-incubation periods (8–20 d), all species of fungi reduced PCP by > 50% within 12 days of PCP addition. Several species of fungi, including Phanerochaete chrysosporium, Trametes versicolor, and all four Ganoderma sp. removed > 50% of the PCP within 24 h, although the largest overall reduction of PCP (96%) was achieved by Inonotus rickii. PCP removal in 250 ml flasks by shallow (10 ml) cultures was greater than removal by deep (50 ml) cultures indicating that the ratio of surface area to volume of liquid media is an important factor in the extent of PCP removal by white rot fungi.

Keywords: Adsorption, Biodegradation, White Rot Fungi, Pentachlorophenol, Phanerochaete Chrysosporium, Suspended Cultures

? Karanfil, T., Schlautman, M.A. and Weber, Jr., W.J. (1994), Impacts of dissolved-oxygen on the sorption of humic substances and the subsequent inhibition of o-cresol uptake by granular activated carbon. *Water Research*, **28** (7), 1673-1678.

Full Text: [1994\Wat Res28, 1672.pdf](1994/Wat%20Res28,%201672.pdf)

Abstract: The impacts of dissolved oxygen (DO) on the sorption of natural and model humic substances by granular activated carbon (GAC) were investigated. Among five substances tested, the sorptions of only two, polymaleic acid (PMA) and peat humic acid, were affected by the presence of DO. The uptake of the target compound o-cresol on virgin GAC and on GAC preloaded with PMA under oxic and anoxic conditions was also examined. The oxic and anoxic preloading conditions had similar effects on subsequent o-cresol reactions under both oxic and anoxic sorption conditions. A reduction of approximately 20% in o-cresol uptake observed under anoxic conditions by GAC preloaded under each condition is attributed to a decrease in the adsorption capacity of the GAC by preloading. In the presence of oxygen, however, an observed reduction of about 45% in o-cresol uptake by preloaded GAC appears to result from a combination of decreased adsorption and inhibited o-cresol polymerization.

Keywords: Activated Carbon, Adsorption, Chlorine, Dissolved Oxygen, Gac, Humic Acid, Humic Substances, O-Cresol, Organic-Matter, Oxidative Coupling, Oxygen, Phenols, Polymerization, Sorption, Transport

Smith, E.H. (1994), Bench-scale tests and modeling of adsorption of natural organic matter by activated carbon. *Water Research*, **28** (8), 1693-1702.

Full Text: [W\Wat Res28, 1963.pdf](W/Wat%20Res28,%201963.pdf)

Abstract: Adsorption equilibria for activated carbon removal of natural organic matter (NOM) were obtained for a lake water, a leaf extract humic material and a sample from a monitoring well serving a municipal solid waste landfill. A multicomponent model incorporating ideal adsorbed solution theory (IAST) and a non-adsorbable fraction more accurately described equilibrium data for the overall isotherm than a Freundlich single component isotherm model, and adequately simulated isotherms for variable initial concentration of the water as represented by a lumped parameter. A methodology is described for estimating equilibrium parameters for multiple hypothetic components that requires fewer parameter searches and is thus less computationally demanding than some other modeling schemes using IAST. The acquired equilibrium information was subsequently used to calibrate a dynamic, fixed-bed model in accordance with bench-scale column data for the lake water. Rate parameters evaluated therein were used to predict breakthrough profiles in bench-scale columns of greater bed depth. Generally speaking, dynamic modeling which incorporated the multicomponent equilibrium approach provided more accurate description and prediction of NOM breakthrough profiles than a single component modeling scheme. The multicomponent approach was better able to simulate both the slow approach to exhaustion in the bed and the effects of changes in influent concentration. Although not fully representative of a full-scale system operating over a lengthy time period, the exercise gives insight into dynamic and modeling phenomena which may accompany seasonal variations in natural water quality.

Keywords: Activated Carbon, Adsorption Equilibria, Adsorption Kinetics, Hypothetical Components, Ideal Adsorbed Solution Theory, Lumped Parameters, Mathematical Modeling, Microcolumn, Seasonal Effects

Sorial, G.A., Papadimas, S.P., Suidan, M.T. and Speth, T.F. (1994), Competitive adsorption of VOCs and BOM-Oxic and anoxic environments. *Water Research*, **28** (9), 1907-1919.

Full Text: [W\Wat Res28, 1907.pdf](W/Wat%20Res28,%201907.pdf)

Abstract: The effect of the presence of molecular oxygen on the adsorption of volatile organic compounds (VOCs) in distilled Milli-Q water and in water supplemented with background organic matter (BOM) is evaluated. Experiments are conducted under conditions where molecular oxygen is present in the test environment (oxic adsorption), and where oxygen is absent from the test environment (anoxic adsorption). Adsorption isotherms for tetrachloroethylene (PCE) and trichloroethylene (TCE) in Milli-Q water showed no impact of the presence of oxygen on their adsorption behavior, while adsorption isotherms for cis-1,2-dichloroethene (DCE) showed higher capacities under oxic conditions. VOC adsorption isotherms in BOM are conducted for three initial concentration sets of VOCs and two initial concentration sets of BOM. VOC isotherms collected under oxic and anoxic conditions in water supplemented with BOM showed that by keeping the initial concentration ratio of VOCs to BOM constant, the adsorption behavior of the VOC is very similar. VOC isotherms in BOM conducted under oxic conditions generally showed lower capacities than the anoxic isotherms. The ideal adsorbed solution theory (IAST) successfully predicted the VOCs anoxic adsorption isotherms in BOM. However, the IAST model did not predict the VOCs oxic adsorption isotherms in BOM. Analysis of the data was conducted using the isotherm parameters of the VOCs in Milli-Q water, and correlation parameters using a four fictive component approach for the BOM. The poor agreement between experimental data and model predictions obtained for the oxic isotherms is attributed to the presence of molecular oxygen which promotes conglomeration of BOM on the surface of carbon.

Keywords: Competitive Adsorption, Volatile Organic Compounds, Background Organic Matter, Oxygen, Activated Carbon, Synthetic Organics, Dissolved-Oxygen, Capacity, Gac, Isotherms

Chen, J.H, Lion, L.W., Ghiorse, W.C. and Shuler, M.L. (1995), Mobilization of adsorbed cadmium and lead in aquifer material by bacterial extracellular polymers. *Water Research*, **29** (2), 421-430.

Full Text: [W\Wat Res29, 421.pdf](W/Wat%20Res29,%20421.pdf)

Abstract: The mobility of cationic trace metals, such as ph and Cd, in porous media can be severely limited by their adsorption at the solid/solution interface. The transport of metals can be enhanced by complexation with a ligand of ‘carrier’ that (i) is soluble in water and does not strongly sorb to surfaces, (ii) has a high metal binding affinity and (iii) is not readily altered in soil by chemical or biological reactions. Extracellular polymers of bacterial origin are plausible carriers for metals in soil or aquifer systems. Bacterial extracellular polymers occur naturally in groundwaters and some have well established metal binding properties. In this study, extracellular polymers from 13 bacterial strains, including five subsurface isolates, were screened for their ability to mobilize Pb and Cd adsorbed to an aquifer sand. Batch adsorption isotherms were employed to screen polymers for their effect on metal phase distribution. Air of the extracellular polymers tested reduced the linear distribution coeffients of Cd and Pb. Reductions in metal adsorption by over 90% were achieved at an extracellular polymer concentration of 10.6 mgl-1 The sorption isotherm of a selected extracellular polymer indicated that it had a low affinity for the sand sorbent and suggested that the polymer would be mobile in the porous sand medium. The distribution coefficient of the polymer for the sand was not effected by the presence Cd at low concentrations. Independently determined distribution constants for Cd and extracellular polymer with the sand and the binding constant for Cd to polymer yielded reasonable estimates of the observed distribution of Cd in the presence of the extracellular polymer. Column experiments performed with Cd in the presence and absence of the selected extracellular polymer confirmed that application of polymer solutions can enhance metal mobility in porous media.

Keywords: Aquifer Material, Adsorption, Bacteria, Cadmium, Complexation, Extracellular Polymer, Facilitated Transport, Lead, *Pseudomonas-Atlantica*, Activated-Sludge, Transport, River, Water, Exopolysaccharide, Flocculation, Environment, Equilibrium, Adsorption

Notes: highly cited

Streat, M., Patrick, J.W. and Camporro Perez, M.J. (1995), Sorption of phenol and *para*-chlorophenol from water using conventional and novel activated carbons. *Water Research*, **29** (2), 467-472.

Full Text: [W\Wat Res29, 467.pdf](W/Wat%20Res29,%20467.pdf)

Abstract: A comparative study of the sorption of phenol and p-chlorophenol from water has been performed using novel samples prepared by carbonisation and subsequent activation of straw and used rubber tyres as well as conventional activated carbons based on coal, coconut shell and wood. Pseudo-equilibrium sorption of phenol and p-chlorophenol obeys a Freundlich type adsorption isotherm of the form; q = k c(n) in the adsorbate concentration range 0-6 mmol l-1. Measured values of k and n indicate that the sorption of phenol and p-chlorophenol onto active carbons derived from straw and used rubber tyres is almost identical to that for conventional activated carbons. The rate of adsorbate uptake has been measured and the sorption half-times lie in the range 1.4-15 min for phenol. The sorption kinetics of the straw and rubber tyre based carbons are likewise identical to conventional carbons based on coal and wood but appreciably faster than the coconut shell sample selected for comparison.

Keywords: Phenol, Para-Chlorophenol, Activated Carbon, Kinetics, Adsorption

Srivastava, S.K. and Tyagi, R. (1995), Competitive adsorption of substituted phenols by activated carbon developed from the fertilizer waste slurry. *Water Research*, **29** (2), 483-488.

Full Text: [W\Wat Res29, 483.pdf](W/Wat%20Res29,%20483.pdf)

Abstract: A study of the competitive effects on the uptake of 4 substituted phenols on a carbonaceous adsorbent derived from fertilizer waste. Waste slurry from fertilizer plants in India has been converted to low-cost carbonaceous adsorbent material, which shows potential in scavenging toxic metal ions and phenols in industrial effluents. The results indicate that the rate of adsorption of the 4 substituted phenols decreases in the order 2,4,6-trinitrophenol, 4-nitrophenol, 4-chlorophenol, 1,3-Dihydroxybenzene. The observed data for the mutual suppression of equilibrium adsorption due to competition between substituted phenols are closer to the values predicted by a modified Langmuir model than to those of the Langmuir equations for bisolute systems. However, the actual degree of suppression is greater than model predictions for 1,3-Dihydroxybenzene and smaller than model predictions for 2,4,6-trinitrophenol, probably because some sites are inaccessible to 1,3-Dihydroxybenzene due to is electron donating nature.

Keywords: Competitive Adsorption, Activated Carbon, Substituted Phenols, Fertilizer Waste

Arambašić, M.B., Bjelić, S. and Subakov, G. (1995), Acute toxicity of heavy metals (copper, lead, zinc), phenol and sodium on *Allium cepa L.*, *Lepidium sativm L.* and *Daphnia magna st.*: Comparative investigations and the practical applications. *Water Research*, **29** (2), 497-503.

Full Text: [W\Wat Res29, 497.pdf](W/Wat%20Res29,%20497.pdf)

Abstract: The investigations of the effects of various heavy metal: Cu (as CuSO4), Pb (as Pb(NO3)2) and Zn (as ZnSO4), phenol and Na (as Na2SO4 and NaCl) concentrations on root length of onion bulbs (Allium cepa L.) and garden cress (Lepidium sativum L.), as well as on the survival rate of great water flea (Daphnia magna St.) showed varied sensitivity of the above test organisms. Based on IC50 Value (50% inhibitory concentration) for A. cepa L. and L. salivum L. and on LC50 value for D. magna St., the acute toxicity of the tested substances decreased after a 48-hour exposition in the following order: A. cepa L.: Cu > Pb > Zn > phenol > Na2SO4 > NaCl; L. sativum L.: phenol > Cu > Pb > Zn > Na2SO4 > NaCl; D. magna St.: Cu > Zn > phenol > Pb > Na2SO4 > NaCl.

Keywords: Acute Toxicity, Ic50, Lc50, Copper, Lead, Zinc, Phenol, Sodium, Allium Cepa L, Lepidium Sativum L, Daphnia Magna St, Allium Test, Lepidium Test, Water-Toxicity Estimation, Chromosomal-Aberrations, Water, Products, Selenium, Cadmium, Growth, System, Fish

? House, W.A., Denison, F.H. and Armitage, P.D. (1995), Comparison of the uptake of inorganic phosphorus to a suspended and stream bed sediment. *Water Research*, **29** (3), 767-779.

Full Text: [1995\Wat Res29, 767.pdf](1995/Wat%20Res29,%20767.pdf)

Abstract: Results are presented describing the influx of soluble reactive phosphorus (SRP) to a stream sediment in an outdoor experimental channel, a laboratory channel and in well-mixed suspensions. The kinetics of phosphorus uptake are modelled using several kinetic equations including the Elovich, Bangham, diffusion and first-order equation. The Elovich equation is found to describe best the SRP influx to both bed and suspended sediments. The relative contribution of abiotic and biotic processes in the outdoor experimental channel are considered together with estimates of the flux to the bed-sediment predicted from the results describing the kinetics in the laboratory channel. The sediment is characterized by mineralogy, size fractionation and wet-chemical analyses including total phosphorus, iron and calcium determinations as well as biologically available phosphorus (BAP) by the iron-oxide stripping method and the equilibrium phosphate concentration, EPC(0), calculated from sorption measurements. The kinetic results from this sediment illustrate the importance of suspended sediment in the fast uptake of SRP. This contrasts with the control of the influx of SRP to the bed-sediment in channels with low concentrations of suspended solids, caused by the rate-limiting diffusional transfer across the sediment-water interface.

Keywords: Phosphorus, Phosphate, Rivers, Sediments, Suspended Sediments, Water Quality, Eutrophication, Nutrients, Adsorption, Phosphate Release, Elovich Equation, Lake Sediment, Adsorption, River, Coprecipitation, Prediction, Sorption, Kinetics, Exchange

Su, M.C., Cha, D.K., Anderson, P.R. (1995), Influence of selector technology on heavy metal removal by activated sludge: Secondary effects of selector technology. *Water Research*, **29** (3), 971-976.

Full Text: [W\Wat Res29, 971.pdf](W/Wat%20Res29,%20971.pdf)

Abstract: The purpose of this research is to compare the ability of metal removal between an aerobic selector activated sludge system and a conventional CSTR system. Metal biosorption by sludge harvested from experimental systems was determined by a series of batch experiments. Heavy metals studied in this research were zinc, cadmium and nickel. Results of experimental data revealed that metal biosorption by activated sludge was rapid; about 70% of the soluble metals in solution was removed during the first 30 min. The sorption isotherm showed that at metal equilibrium concentrations greater than 0.05 mg/l, the selector sludge had significantly higher sorption capacity than did the CSTR sludge. Metal biosorption behavior closely followed a Freudlich isotherm model for equilibrium concentrations above 0.05 mg/l. Results of the Freundlich model suggested that the adsorption capacity of sludge from the aerobic selector was significantly higher than that of the CSTR system.

Keywords: Heavy Metals, Activated Sludge, Aerobic Selector, Zoogloea Ramigera, Extracellular Polymers, Bacterial Extracellular Polymers, Culture

? Dentel, S.K., Bottero, J.Y., Khatib, K., Demougeot, H., Duguet, J.P. and Anselme, C. (1995), Sorption of tannic-acid, phenol, and 2,4,5-trichlorophenol on organoclays. *Water Research*, **29** (5), 1273-1280.

Full Text: [1995\Wat Res29, 1273.pdf](1995/Wat%20Res29,%201273.pdf)

Abstract: Sorption of the organic pollutants phenol, 2,4,5-trichlorophenol, and tannic acid (Fluka) onto montmorillonite-based sorbents was studied. The sorbents were homoionic Na- or Ca-montmorillonite, montmorillonite completely exchanged with the cationic organic surfactant dimethyldistearylammonium chloride (or DDA-M), and DDA-M partially re-exchanged with Ca2+ (Ca-DDA-M). The influence of pH on sorption of phenol and trichlorophenol was also investigated. The sorption capacities for phenol, trichlorophenol, and tannic acid were significantly enhanced by surfactant treatment of the homoionic clay. Uptake onto the organoclays increased in the order phenol < tannic acid < trichlorophenol, which corresponds to the order of increasing hydrophobicity. The significant role played by hydrophobicity was also observed in pH effects which generally favored sorption when the pH was low enough to assure that the uncharged (protonated) species was predominant. In the case of trichlorophenol, sorption could be shown to be quantitatively attributable to the neutral species. The results of X-ray diffraction measurements showed increased d001 spacings when the DDA was intercalated into the interlamellar spaces, increasing the available sorbent porosity. This, and the linkage of uptake to solute hydrophobicity, indicates that uptake is by a partitioning mechanism, though non-linear isotherms may be caused by site limitations. Surprisingly, if a portion of the intercalated DDA is removed by exchange with Ca2+, the d001 spacing decreases but the sorption capacity of the organoclays is improved. One possible mechanism is improved elementary sheets cohesion due to calcium ions, imparting molecular sieve characteristics to the solid. The extent and possible selectivity of sorption using these organoclays suggests that they may provide an alternative to activated carbon sorbents in water treatment.

Keywords: Water Treatment, Organoclays, Sorption, Dimethyldistearylammonium, Montmorillonite, Tannic Acid, Phenol, Chlorophenols, Organic Pollutants, Adsorption, Montmorillonite, Smectites, Amines

Marani, D., Patterson, J.W. and Anderson, P.R. (1995), Alkaline precipation and aging of Cu(II) in the presence of sulfate. *Water Research*, **29** (5), 1317-1326.

Full Text: [W\Wat Res29, 1317.pdf](W/Wat%20Res29,%201317.pdf)

Abstract: The effect of several operating parameters (reagents concentration, molar ratio, mixing protocol) on the composition and aging of the precipitates obtained by mixing cupric sulfate solutions with NaOH solutions was studied. The precipitate was characterized with chemical analysis (SO4/Cu molar ratio), scanning electron microscopy, and X-ray diffraction. pH, free cupric ion activity, and sulfate concentration were measured in the soluble phase. Precipitation of either basic cupric sulfates or cupric hydroxide/oxide may take place depending on the sequence of reagents addition. Provided that the base/CuSO4 molar ratio does not exceed 1.5, the slow addition of base to dilute CuSO4 solutions produces either pure posnjakite [CuSO4.3Cu(OH)2.H2O] or posnjakite and brochantite [CuSO4.3Cu(OH)2] mixtures. Upon aging, posnjakite converts to the more stable brochantite, in agreement with previous works indicating posnjakite as a kinetic precursor of brochantite. The addition of excess base to the basic salt induces its slow conversion to tenorite (CuO), changing the morphology of the precipitate from platelet-like basic salt particles to feathery bundles of tenorite needles. Aged precipitate suspensions contain brochantite or tenorite, the predicted stable solids at lower and higher pH, respectively. However, the actual predominance region of brochantite seems to extend itself, by at least one pH unit, over the tenorite predominance region predicted by the geochemical model MINTEQA2. This discrepancy has been attributed to the small dimensions, and consequent higher solubility, of tenorite crystals. Potentiometric measurements on aged tenorite suspensions support this hypothesis, indicating a solubility product of about one order of magnitude higher than expected. The results of this work can help to understand and control the formation and conversion of basic cupric sulfates, that are of great importance in such fields as removal and recovery of copper from industrial wastewaters and sludges, and patina formation in copper corrosion.

Keywords: Precipitation Copper, Brochantite, Posnjakite, Tenorite, Geochemical Modeling, Copper, Patina

Ho, Y.S., Wase, D.A.J. and Forster, C.F. (1995), Batch nickel removal from aqueous solution by sphagnum moss peat. *Water Research*, **29** (5), 1327-1332.

Full Text: [W\Wat Res29, 1327.pdf](W/Wat%20Res29,%201327.pdf)

Abstract: The batch adsorption of Ni(II) onto sphagnum moss peat has been studied. The reaction was pH dependent, the optimum range being 4.0-7.0. Langmuir and Freundlich isotherms, established for various initial nickel concentrations and for a range of pH values, were used to obtain a single relationship between initial metal concentration, metal removal and initial pH. The latter was found to control efficiency of nickel removal. Kinetic data suggested involvement of a chemical rate-limiting step and a predictive relationship was derived relating nickel removal to peat dose. In comparison with other metals, nickel removal is poor and possible reasons are discussed.

Keywords: Peat, Nickel, Adsorption, Langmuir and Freundlich, Bacterial Extracellular Polymers, Metal Removal, Peat, Complexation, Exchange, Kinetics, Acid

Al-A’ama, M.S. and Nakhla, G.F. (1995), Wastewater reuse in Jubail, Saudi-Arabia. *Water Research*, **29** (6), 1579-1584.

Full Text: [W\Wat Res29, 1579.pdf](W/Wat%20Res29,%201579.pdf)

Abstract: With the industrial development and urban construction in Madinat Al-Jubail Alsinaiya in Saudi Arabia, which has mostly arid regions and due to limited water resources depends on diminishing ground water and costly desalinated seawater, wastewater reuse is pursued using reclaimed municipal and industrial wastewater through treatment plants. This paper is an actual case study discussing the features of reuse, the processes used and the standards adopted. The effect of reuse upon the local environment is commented upon. This study also emphasizes the cost-competitiveness of wastewater reuse for irrigation in Saudi Arabia. Design data and operational results for the 19 MGD municipal wastewater water treatment plant and the 11 MGD industrial wastewater treatment plant will be discussed. Both plants utilize biological treatment followed by pressure filtration to meet the stringent standards governing the use of effluent in landscape irrigation. The effluent TDS, TSS, BOD, and SAR are valued 936, 4.4, 2.7, and 7.4, respectively, for the municipal wastewater treatment plant and 762, 2.1, 2.4 and 10.5, respectively, for the industrial wastewater treatment plant.

McEwan, J.R. and Gabric, A.J. (1995), A revised algorithm for calculating sample concentrations from spectrophotometric absorbances. *Water Research*, **29** (6), 1589-1590.

Full Text: [W\Wat Res29, 1589.pdf](W/Wat%20Res29,%201589.pdf)

Abstract: Standard colorimetric techniques require conversion of measured absorbances to concentrations. When blank absorbances are significant, use of the conventional algorithm under-estimates the true sample concentration. A revised algorithm is presented which allows a more accurate determination of sample concentration.

Keywords: Spectrophotometry, Analytical Techniques, Water Quality Assessment

Gros, N. and Gorenc, B. (1995), Anions in mineral waters: Facilitated transition to ion-chromatographic monitoring. *Water Research*, **29** (6), 1591-1594.

Full Text: [W\Wat Res29, 1591.pdf](W/Wat%20Res29,%201591.pdf)

Abstract: The usability of suppressed ion chromatography for the determination of anions in various mineral waters was shown. Because of the great variety in the composition of these samples, individualized method development is necessary. A generalized approach to method development that enables the rapid optimization of the experimental conditions with the smallest number of necessary experimental steps was examined.

Keywords: Ion Chromatography, Anions, Mineral Water, Optimization

Verran, J., Taylor, R., Christopher, N.S.J. and Robinson, J.S. (1995), Comments on the routine testing of water samples for *Legionella* sp. *Water Research*, **29** (6), 1595-1598.

Full Text: [W\Wat Res29, 1595.pdf](W/Wat%20Res29,%201595.pdf)

Abstract: Water samples analysed for *Legionella* sp. by a commercial company were studied over a 6 month period. Samples yielding *Legionella* were re-examined to determine the efficiency of heat or acid pre-treatment in isolating *Legionella* compared to untreated specimens. In addition, more than one colony of each colony type were tested serologically to determine whether serotypes in addition to those originally identified were present. Significantly (P < 0.01) higher *Legionella* colony numbers were found on the heat pre-treatment plates than on the acid pre-treatment plates. *Legionella*e were identified from only the untreated plate in 5.1% of positive water samples; in these instances the concentrations of *Legionella*e tended to be low. Six out of 18 positive samples were found to contain more than one serogroup of *Legionella* *Pneumophila* when more than one colony of each colony type was tested. It is recommended that the procedures used in *Legionella* screening be rationalised to facilitate maximum detection without excessive workload.

Keywords: *Legionella*, Water Testing, Environmental Samples, *Pneumophila*, Serogroups

? Blackburn, M.A. and Waldock, M.J. (1995), Concentrations of alkylphenols in rivers and estuaries in England and Wales. *Water Research*, **29** (7), 1623-1629.

Full Text: [1995\Wat Res29, 1623.pdf](1995/Wat%20Res29,%201623.pdf)

Abstract: A preliminary survey of concentrations of nonylphenol and octylphenol in rivers and estuaries in England and Wales was undertaken to establish environmental concentrations and to support a biological field programme. The analytes were quantified by GC/MS in MID mode after concentration onto C18 solid phase extraction columns. A concentration of 330 μg/l total nonylphenol was found in wastewaters from a sewage treatment works discharging into the river Aire, and up to 180 μg/l was measured at sites on the same river. Nonylphenol concentrations in the river Aire exceed Daphnia chronic effect levels and approach acute toxicity levels. Elsewhere, concentrations in rivers and sewage effluents were in the range <0.2−12 μg/l total nonylphenol and are below chronic effect levels. Estuarine concentrations were considerably lower. The highest concentrations were recorded in the outer Tees estuary (5.2 μg/l nonylphenol, 13 μg/l octylphenol) and in the Mersey estuary (up to 0.32 μg/l nonylphenol). Over 30% of the samples contained <0.1 μg/l total nonylphenol, and octylphenol was present only in the Tees.

Keywords: Nonylphenol, Octylphenol, Rivers, Estuaries, Wastewaters, Mass Spectrometry, Solid Phase Extraction

Notes: highly cited

Namasivayam, C. and Ranganathan, K. (1995), Removal of Cd(II) from wastewater by adsorption on ‘waste’ Fe(III)/Cr(III) hydroxide. *Water Research*, **29** (7), 1737-1744.

Full Text: [W\Wat Res29, 1737.pdf](W/Wat%20Res29,%201737.pdf)

Abstract: Effect of initial metal ion concentration, agitation time, temperature and pH on Cd(II) adsorption by ‘aste’ Fe(III)/Cr(III) hydroxide was investigated in batch mode studies. The equilibrium data could be described well by the Langmuir and Freundlich isotherm equations. The Lagergren rate constants of adsorption are reported. The intraparticle diffusion of Cd(II) through pores in the adsorbent was shown to be the main rate limiting step. Desorption of Cd(II) was 70% at pH 3.80. The studies showed that the ‘waste’ Fe(III)/Cr(III) hydroxide can be used as an efficient adsorbent material for Cd(II) removal from wastewater.

Keywords: Adsorbent, Adsorption, Agitation, Batch Mode, Cd(II), Cd(II) Removal, Desorption, Diffusion, Equilibrium, Fe(III), Cr(III) Hydroxide, Freundlich, Freundlich Isotherm, Intraparticle Diffusion, Isotherm, Isotherm Equations, Langmuir, Metal, pH, Rate Constants, Rate Limiting Step, Removal, Temperature, Wastewater

McKeon, D.M., Calabrese, J.P. and Bissonnette, G.K. (1995), Antibiotic-resistant gram-negative bacteria in rural groundwater supplies. *Water Research*, **29** (8), 1902-1908.

Full Text: [W\Wat Res29, 1902.pdf](W/Wat%20Res29,%201902.pdf)

Abstract: More than 250 coliform and noncoliform bacteria, isolated by standard membrane filtration methods from rural, untreated groundwater supplies, were examined for resistance to 16 antibiotics. All of the noncoliforms and 87% of the coliforms were resistant to at least one antibiotic, with resistance most commonly directed toward novobiocin, cephalothin, and ampicillin. The frequency of multiple antibiotic resistance (MAR) within each species was also determined. Approximately 60% of the coliforms were MAR, including 14, 64, and 94% of *Escherichia coli*, Citrobacter freundii, and Enterobacter cloacae isolates, respectively. In comparison, MAR was demonstrated by more than 95% of the noncoliforms and included isolates of Acinetobacter calcoaceticus, Aeromonas hydrophila, and Serratia marcescens. Ampicillin-resistant environmental isolates were assayed for ability to transfer resistance to ampicillin-sensitive strains of E. coli and Salmonella typhimurium. Environmental E. coli isolates were capable of in vitro transfer to both recipients in a nutrient-rich environment (trypticase soy broth) at frequencies ranging from 1.1×10-5 to 1.0×10-4. Isolates of C. freundii and Klebsiella pneumoniae exhibited resistance transfer to the E. coli recipient under similar conditions at reduced rates. None of the environmental isolates demonstrated transfer of ampicillin resistance when placed in an environment containing filter-sterilized well water. The presence of antibiotic resistant bacteria, and particularly MAR bacteria, in rural groundwater supplies used as drinking water sources may have important public health implications.

Nelson, Y.M., Lo, W.H., Lion, L.W., Shuler, M.L. and Ghiorse, W.C. (1995), Lead distribution in a simulated aquatic environment: Effects of bacterial biofilms and iron oxide. *Water Research*, **29** (8), 1934-1944.

Full Text: [W\Wat Res29, 1934.pdf](W/Wat%20Res29,%201934.pdf)

Abstract: Biofilms influence the transport and fate of heavy metals in aquatic environments both directly by adsorption and complexation reactions and indirectly via interactions with oxides of iron and manganese. These reactions were investigated by introducing lead into a continuous-flow biofilm reactor that was designed to simulate conditions in a flowing freshwater aquatic environment. The reactor provided controlled conditions, and use of a chemically-defined growth medium allowed calculation of lead speciation with a chemical equilibrium program (MINEQL). *Pseudomonas cepacia* was employed as a test cell strain because of its ability to grow and form biofilms in the defined medium. This bacterium affected lead distribution in the reactor by adsorbing lead both to adherent and suspended cells. When the aqueous bulk lead concentration was 1.4 ±0.1 μM and biofilm coverage (measured as chemical oxygen demand, COD) was 50 mequiv COD/m2, lead adsorption was increased by about a factor of five relative to bare glass. Of the total lead in solution, only 1% was adsorbed to suspended cells (5×107 cells/ml). Lead adsorption to biofilms followed a Langmuir isotherm with a maximum adsorption (Γmax) of 56 μmol Pb/equiv COD and an adsorption equilibrium constant (*K*) of 0.64 liter/μmol Pb. Lead complexed with dissolved bacterial exopolymer was below detection limits. Pretreatment of glass slides with colloidal iron also significantly increased lead adsorption relative to bare glass. Lead adsorption to adsorbed iron fit a Langmuir isotherm with Γmax = 50 μmol Pb/mol Fe, and *K* = 1.3 liter/3mmol Pb. Lead binding to glass coated with both cells and iron was additive, and could be predicted by summing adsorption predicted using isotherms for each constituent. The presence of iron surface coatings increased initial biofilm formation rates, but after reaching steady state conditions, biofilm coverage was similar for slides treated with iron and untreated slides. A concentration of 1 μM lead produced a transient reduction in suspended cell counts. Cell counts recovered to the original cell density over the course of five to ten reactor retention times. With iron present, the magnitude of the reduction in cell concentration in response to the addition of lead was greatly reduced, suggesting that toxic effects of lead may be reduced by iron. (C) 1995 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Aquatic, Environment, Bacteria, Biofilms, Bioreactor, Biopolymer, Complexation, Extracellular Polymer, Iron Oxide, Lead

Bilinski, H., Širac, S., Kozar, S., Branica, M. and Schwuger, M.J. (1995), Interactions between calcite, NaDBS, Pb(II) and Cd(II) ions in seawater. *Water Research*, **29** (8), 1993-1999.

Full Text: [W\Wat Res29, 1993.pdf](W/Wat%20Res29,%201993.pdf)

Abstract: It was demonstrated by a Coulter counter method in combination with photomicrographs that the commercially used anionic surfactant sodium dodecylbenzene sulfonate (NaDBS) forms solid crystals with major seawater cations as Na+, Mg2+, Ca2+ and Sr2+ and thus can be removed from seawater to sediments. In the presence of calcite particles suspended in seawater with variable concentrations of NaDBS, complicated mutual interactions occur resulting in partial calcite dissolution and consequently in surface area diminuation. Namely, from Coulter counter kinetic measurements simultaneous decrease of the total number and total volume of particles was observed. Partial dissolution of calcite was also confirmed by the weight loss in the presence of ct (NDBS) = 1.6×10-3 moll-1. Remobilization of lead and cadmium ions from calcite particles occurs up to ct (NaDBS) = 1×10-3 moll-1. At concentrations above that value, an increased removal of these ions can be explained with their adsorption on a reprecipitated calcium salt (either with DBS-or with SO42-from SW).

Keywords: Sodium Dodecylbenzene Sulfonate, Calcite, Adsorption, Lead(II), Cadmium(II), Seawater, Coulter Counter, Dpasv, Precipitation, Adsorption, Estuary

Pérez-Candela, M., Martín-Martínez, J.M. and Torregrosa-Maciá, R. (1995), Chromium(VI) removal with activated carbons. *Water Research*, **29** (9), 2174-2180.

Full Text: [W\Wat Res29, 2174.pdf](W/Wat%20Res29,%202174.pdf)

Abstract: Several activated carbons, in powder and granular form, prepared from different raw materials and obtained by different activation procedures, were used to remove chromium(VI) from solution. The porous texture of the activated carbons was characterized by adsorption of N2/77 K and Methylene Blue/298 K. The Cr(VI)-adsorption experiments were carried out to analyze the influence of (i) pH, (ii) initial Cr(VI) concentration and (iii) carbon-solution contact time, on the efficiency of Cr(VI) retention by the activated carbons. The amount of Cr(VI) retained increased with increasing both pH and initial Cr(VI) concentration. At pH < 1, the retention of Cr(VI) was found to be affected by its reduction to Cr(lll), the lower the pH the greater the facility to be reduced to Cr(III). The extent of adsorption and reduction processes depends on the porous texture, nature and preparation procedure of the activated carbons, the best performance being obtained with those prepared by physical activation.

Keywords: Activated Carbons, Chromium Removal, Porous Texture, Adsorption From Solution, Porous Texture, Adsorption, CO2

Gao, Y.M., Sengupta, A.K. and Simpson, D. (1995), A new hybrid inorganic sorbent for heavy metals removal. *Water Research*, **29** (9), 2195-2205.

Full Text: [W\Wat Res29, 2195.pdf](W/Wat%20Res29,%202195.pdf)

Abstract: Iron oxyhydroxides, commonly known as ferrihydrites, are unable to remove dissolved heavy metals at acidic pH, especially below 5.0, due to fierce competition from hydrogen ions. A new hybrid iron-rich inorganic sorbent has been identified and extensively studied in relation to heavy metals removals in fixed-bed processes for influent pH as low as 3.5. Every single particle of this new hybrid sorbent essentially contains ferrihydrite along with a crystalline silicate phase, akermanite, in close proximity (in the order of 100 Å) to one another. Akermanite has a unique ability to produce hydroxyl ions through incongruent hydrolysis reactions without being washed out from the fixed bed. The simultaneous presence of akermanite and ferrihydrite in a single particle has a synergistic effect on the sorption process: while akermanite helps neutralize aqueous-phase hydrogen ions (thus enhancing sorption capacity of ferrihydrites), neighboring sorption sites in ferrihydrites quickly remove dissolved heavy metals, thus avoiding precipitation. Equally important, the hybrid sorbent can be regenerated with any amine/ammoniacal solution and reused for multiple number of cycles. Some precipitations may occur within the column at relatively high influent concentrations of heavy metals (around 50 mg/l) or due to chromatographic effect. Such precipitates are, however, amenable to removals by conventional backwashing

Keywords: Heavy Metals, Iron Oxides, Ferrihydrite, Ion Exchange, Inorganic Sorbent

? Solozhenko, E.G., Soboleva, N.M. and Goncharuk, V.V. (1995), Decolourization of azodye solutions by Fenton’S oxidation. *Water Research*, **29** (9), 2206-2210.

Full Text: [1995\Wat Res29, 2206.pdf](1995/Wat%20Res29,%202206.pdf)

Abstract: The reaction of azodye active yellow lightfast 2 KT (AYL) with H2O2/Fe2+ system (Fenton’s reagent) causes a drop in colourization by 95-97% at the minimum dosage of 17 mg-1 H2O2. Intensification of the decolourization process is achieved under the influence of solar radiation or an increase in reaction temperature. The effectiveness of hydrogen peroxide action, characterized by the relation Delta[H2O2]/Delta[dye], depends upon its initial concentration. It has been suggested that during the reaction catalyst activity is reduced.

Keywords: Azodye, Decolourization, Fentons Reagent, Hydrogen Peroxide Consumption, Intensification, Reagent

Kennedy, K.J. and Pham, T.T. (1995), Effect of anaerobic sludge source and condition on biosorption of PCP. *Water Research*, **29** (10), 2360-2366.

Full Text: [W\Wat Res29, 2360.pdf](W/Wat%20Res29,%202360.pdf)

Abstract: Biosorption isotherms for pentachlorophenol (PCP), on granular and dispersed anaerobic sludge from five different industrial sources fit well to the Freundlich equation. No significant difference was observed in biosorption capacity between dispersed and granular anaerobic sludge. Some variation in biosorption capacity was observed among the different industrial sources of sludge. Comparison with results reported by other investigators suggested that biosorption by anaerobic biomass is lower than that by aerobic microorganisms. (C) 1995 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Pentachlorophenol, Anaerobic, Granular, Freundlich

Sletten, R.S., Benjamin, M.M., Horng, J.J. and Ferguson, J.F. (1995), Physical-chemical treatment of landfill leachate for metals removal. *Water Research*, **29** (10), 2376-2386.

Full Text: [W\Wat Res29, 2376.pdf](W/Wat%20Res29,%202376.pdf)

Abstract: A detailed treatability study investigating metals removal from leachates collected from a sanitary landfill is presented, Experiments investigated treatment of raw leachate from younger and older zones of the landfill and of a mixture of the two leachates (representing an average leachate from the landfill). The metal concentrations and COD in leachate from the older area were approximately one order of magnitude greater than in leachate from the active area. The leachates contained significant quantities of reduced iron and manganese that, upon aeration and base addition, were precipitated and served as sorbents for trace metals that were present at much lower concentrations. Most trace metals in the younger zone leachate and in the leachate mixture were removed by adjusting solution pH to 9.0, but in leachates collected from the older landfill area, even raising the pH to 11.0 did not remove all the trace metals efficiently. Various options for treating a blend of leachate from the older and younger areas (20%: 80% by volume) were evaluated. One of the key design decisions was whether to aerate the leachate poor to pH adjustment. Trace metals could be removed efficiently from the leachate with or without aeration. Benefits of aeration include increased formation of iron oxide adsorbent and a significant reduction in the amount of base required to raise the pH, since aeration strips large amounts of CO2 from the leachates. Drawbacks include decreased sludge settleability and the cost of the aeration process itself. The settleability of the aerated sludge could be increased 5-10 fold by the addition of anionic polymer. Sludge produced was not toxic as determined by TCLP. Trade-offs implicit in these results are addressed both experimentally and theoretically.

Keywords: Landfill, Leachate, Adsorption, Physical-Chemical Treatment, Oxygenation

Huang, C.P. and Yang, Y.L. (1995), Adsorption characteristics of Cu(II) on humus-kaolin complexes. *Water Research*, **29** (11), 2455-2460.

Full Text: [W\Wat Res29, 2455.pdf](W/Wat%20Res29,%202455.pdf)

Abstract: The sorption of Cu(II) was investigated on synthetic humus-kaolin complexes. Two groups of humic fractions were compared to investigate the effect of molar mass on the Cu(II) adsorption capacity. Another approach was to compare the capacities of humic acid (HA) and fulvic acid (FA) to adsorb Cu(II). The adsorption capacity of fulvic acid on kaolin is smaller than that of humic acid. The adsorption behavior of fulvic acid on kaolin can be described by a Langmuir-type isotherm. However, the adsorption isotherm of humic acid on kaolin exhibits non-Langmuir behavior. The results showed the affinity of Cu(II) on humic acid was greater than by fulvic acid. However, the affinity of Cu(II) adsorption by humic acid with large molar mass was equal to that by humic acid with small molar mass. A modified model incorporating a proton competition coefficient can differentiate the competitive effect from Cu(II) adsorption. A constant (K-m) independent of pH was derived from this model. HA-Kaolin complex has a greater Cu(II) affinity constant that FA-Kaolin complex according to models with either a single-site or a continuous distribution.

Keywords: Adsorption, Copper, Humic Acid, Kaolin

Mittal, A.K. and Gupta, S.K. (1995), Development of a method for adsorption of dyestuffs on activated-sludge: Comment. *Water Research*, **29** (11), 2618.

Full Text: [W\Wat Res29, 2618.pdf](W/Wat%20Res29,%202618.pdf)

Pagga, U. (1995), Development of a method for adsorption of dyestuffs on activated-sludge: Reply. *Water Research*, **29** (11), 2619.

Full Text: [W\Wat Res29, 2619.pdf](W/Wat%20Res29,%202619.pdf)

Hermosín, M.C., Pavlovic, I., Ulibarri, M.A. and Cornejo, J. (1996), Hydrotalcite as sorbent for trinitrophenol: Sorption capacity and mechanism. *Water Research*, **30** (1), 171-177.

Full Text: [W\Wat Res30, 171.pdf](W/Wat%20Res30,%20171.pdf)

Abstract: The aim of this work was to evaluate the sorbent power of hydrotalcite compound [Mg3Al(OH)8]2CO3.xH2O (HT) and its calcined product Mg3AlO4(OH) (HT500) for 2,4,6-trinitrophenol (TNP) from water solution. The adsorption behaviour of TNP was investigated at diverse solid/solution ratios, pH and TNP concentration by batch equilibration technique. The L and H type adsorption isotherms obtained in those sorbents respectively indicated a chemisorption process which was irreversible and fitted the Langmuir equation model well. Sorption capacity and energy were found to be very high for HT500. The X-ray diffraction and IR spectroscopy techniques applied to TNP-HT and TNP-HT500 products indicate that anionic TNP is adsorbed by anion exchange in the interlayer of HT to 20% of the anion exchange capacity (AEC) and, by reconstruction of the layered structure on HT500, to 40% of the AEC. The results suggested the potential use of HT500 as a tilter for TNP, being also easily recyclable.

Keywords: Hydrotalcite, Phenols, Contaminants, Filter, Adsorption, Layered Materials, Hydroxycarbonate, Physicochemical Properties, Chlorinated Phenols, Adsorption, Hydroxide

Crabtree, K.D., Ruskin, R.H., Shaw, S.B. and Rose, J.B. (1996), The detection of *Cryptosporidium oocysts* and *Giardia cysts* in cistern water in the US Virgin Islands. *Water Research*, **30** (1), 208-216.

Full Text: [W\Wat Res30, 208.pdf](W/Wat%20Res30,%20208.pdf)

Abstract: Most homes and public facilities in the U.S. Virgin Islands use a roof catchment system to obtain drinking water. Because water is so scarce throughout the islands, every building (except those federally owned) are required to have a cistern. Rainwater is collected in the cisterns and is subject to contamination from enteric pathogens found in the environment. The objective of this study was to determine the occurrence and concentrations of human enteric protozoa in cisterns originating from animal fecal contamination. Volumes of 4001 of water were filtered from nine private and four public cisterns four times over a 1-year period for a total of 44 samples. After processing the Alter, the entire volume was examined using *Cryptosporidium* and *Giardia* specific antibodies and epifluorescence microscopy to determine levels of *Cryptosporidium* oocysts and *Giardia* cysts. One or both of the protozoa were found in 81% of the public cisterns and this was statistically significant (P = 0.005) when compared to the private cisterns where 47% of the samples were positive. *Cryptosporidium* was found statistically more often in the 44 samples than *Giardia*. In addition, the use of a polyclonal antibody for *Cryptosporidium* which is genera-specific, also detected oocysts statistically more often than a monoclonal antibody which was more species-restrictive to *C. parvum*, which is associated with disease in humans, suggesting that non-mammalian oocysts were found more frequently in cistern waters. Levels ranged from 1 to 10 organisms/1001 with one sample at 70 oocysts. These levels are associated with estimated daily risks of 10-2 to 10-4 and are well above acceptable guidance as described for safe drinking water in the United States. On occasion high levels of heterotrophic bacteria (9.9×105 CFU/ml) and total coliforms (> 2000 CFU/100 ml) were also detected in these waters. A statistically significant correlation was found between the detection of *Cryptosporidium* s and *Giardia* s (r = 0.47853, P = 0.0008). The results of this study show that *Cryptosporidium* and *Giardia*, as well as bacteria, are present in these waters at levels which may involve significant public health risks. Public cistern systems are of particular concern because of the high percentage which were contaminated and the greater number of people exposed.

Sison, N.F., Hanaki, K. and Matsuo, T. (1996), Denitrification with external carbon source utilizing adsorption and desorption capablility of activated carbon. *Water Research*, **30** (1), 217-227.

Full Text: [W\Wat Res30, 217.pdf](W/Wat%20Res30,%20217.pdf)

Abstract: The adsorption-desorption capability of activated carbon was incorporated into biological denitrification process with the addition of external carbon source for nitrogen removal in water and wastewater treatment. Laboratory scale column packed with granular activated carbon (GAC) was fed with nitrate and sucrose in various modes. Other than continuous organic carbon addition (continuous mode), two different dynamic feeding modes, namely intermittent and injection modes were investigated. Under intermittent mode, organic carbon source was added in accordance with cycles consisting of two stages: an organic carbon feeding stage and an organic carbon starvation stage. Three cycle schedules in terms of duration of feeding stage and starvation period were examined. In injection mode, concentrated organic substrate was fed into the columns for 10 min at frequencies of 1, 2 or 3 times per day. With substrate C: N ratio of 1.88, influent NO3-N level of 20 mgl-1 and empty bed contact time (EBCT) of 80 min, intermittent mode produced high overall N removal efficiencies ranging from 89 to 95% which are comparable with levels attainable under continuous mode. Injection mode achieved slightly lower but reasonably high denitrification efficiencies. Under the conditions employed, once per day organic substrate injection was sufficient to remove 87% of the influent NO3-N. The performance of anthracite media was also compared with GAC under both continuous and intermittent modes using identical set of conditions. Anthracite performed equally well under continuous mode where organic carbon source was always available. However, under intermittent mode, anthracite gave a poor N removal efficiency of 29% during the starvation period due to the lack of adsorption and desorption capability in comparison with 90% obtained in GAC media. The adsorption and desorption property of activated carbon was also applied in denitrification process for the treatment of water or wastewater with fluctuating influent NO3-concentration levels. Two cases of NO3-fluctuation were examined and in both cases, overall N removal efficiencies of more than 93% were achieved.

Keywords: Denitrification, Granular Activated Carbon (GAC), External Carbon Source, Sucrose, Biological Activated Carbon, Adsorption, Desorption, Bioregeneration, Dynamic Feeding Mode, Anthracite, C: N Ratio

Dimitrova, S.V. (1996), Metal sorption on blast-furnace slag. *Water Research*, **30** (1), 228-232.

Full Text: [W\Wat Res30, 228.pdf](W/Wat%20Res30,%20228.pdf)

Abstract: The removal of Cu, Ni and Zn-ions from water solution by ungranulated blast-furnace slag has been studied depending on contact time, initial ion concentration, pH and solution temperature. The polymineral composition and the slag specific properties determine its high sorption activity in metal salts solutions. In the range of the concentrations studied (10-4-10-3 M), the sorption data for Cu2+ Ni2+ and Zn2+ have been described using Freundlich’s parabolic equation. The material’s own alkalizing activity creates conditions for effective metal ions sorption in a wide pH range. With the temperature increase the hydrolysis of the sorption matrix intensifies which leads to the sorption improvement, on the basis of both literature data and the author’s own data the mechanism of metal ions removed by blast-furnace slag has been discussed.

Keywords: Sorption, Removal, Blast-Furnace Slag, Metal Ions, Hydrooxocomplexes, Adsorption

Notes: highly cited

Jansson-Charrier, M., Guibal, E., Roussy, J., Delanghe, B. and Le-Cloirec, P. (1996), Vanadium(IV) sorption by chitosan: Kinetics and equilibrium. *Water Research*, **30** (2), 465-475.

Full Text: [W\Wat Res30, 465.pdf](W/Wat%20Res30,%20465.pdf)

Abstract: The adsorption of vanadium(IV) by chitosan, a naturally occurring material, is studied according to equilibrium and kinetics. Sorption isotherms are determined and single mechanisms of diffusion are studied. These are regarded as the main limiting steps. The parameters studied are: pH, the initial metal concentration, the particle size of the polymer and the stirring speed. While the fourth parameter has no effect on overall sorption performances, equilibrium and kinetics are greatly influenced by the other three. The speciation of metal in solution, relative to pH and total metal concentration, plays an important part in the separation factor between the solid and liquid phases and on the diffusion of solute through the polymer surface. It has been demonstrated that the sorption, in the case of chitosan is mainly located on the surface. The diffusion mechanisms are both external and intraparticle phenomena: but diffusion is restricted to a thin layer of the particle. An increase of the particle size results in a greater time to reach equilibrium. The Langmuir and Freundlich models show relative correlations difficult to estimate considering to the pseudo rectangular isotherm obtained: the equilibrium plateau is quickly reached.

Keywords: Activated Carbon, Adsorption, Ascorbic-Acid, Chitosan, Diffusion, Diffusion-Model, Equilibrium, External Diffusion, Freundlich, Glutamate Glucan, Intraparticular Diffusion, Ions, Isotherm, Isotherms, Kinetics, Langmuir, Mass-Transfer, Mechanisms, Metal, Metal Adsorption, Models, Particle Size, pH, Polymer, Rhizopus-Arrhizus Biomass, Separation Factor, Solute, Sorption, Sorption Isotherms, Speciation, Uranium Biosorption, Vanadium, Waste-Water, Wastewater

Aziz, H.A. and Smith, P.G. (1996), Removal of manganese from water using crushed dolomite filtration technique. *Water Research*, **30** (2), 489-492.

Full Text: [W\Wat Res30, 489.pdf](W/Wat%20Res30,%20489.pdf)

Abstract: This paper discusses manganese removal from water by filtration through low cost coarse media. A laboratory scale filtration technique was used to remove manganese from manganese bearing water to prove previous batch studies which showed that the removal of manganese was better in the case of limestone particle as compared to the gravel, crushed brick or with no media addition, and the conclusion made that removal mechanisms were due to the effect of rough solid surfaces and the presence of carbonate in the limestone particle. Filtration results indicated that at an input pH of 7 with manganese concentration of 1 Mn/l, a good removal was observed in the limestone media as compared to the gravel media, which validates the batch results. Results also show that water hardness did not significantly increase in this filtration technique. Studies on the effect of different parameters on the removal performance of manganese has shown that a smaller particle size, a greater filter depth, and a lower flow rate gave advantages in the removal efficiency.

Keywords: Manganese, Limestone, Filtration, Iron

de Jonge, R.J., Breure, A.M. and van Andel, J.G. (1996), Reversibility of adsorption of aromatic compounds onto powdered activated carbon (PAC). *Water Research*, **30** (4), 883-892.

Full Text: [W\Wat Res30, 883.pdf](W/Wat%20Res30,%20883.pdf)

Abstract: Desorption of sorbed compounds is an important process in the powdered activated carbon-activated sludge (PAC-AS) wastewater treatment system, where sorption and biodegradation interact. To assess the extent of desorption to be expected in the PAC-AS system, reversibility of adsorption was investigated using isotherm studies and a leaching technique under the conditions prevalent in the PAC-AS system. Two aromatic compounds, *o*-cresol and 3-chlorobenzoic acid (3-CB) and two types of powdered activated carbon (PAC) were used to study desorption. High degrees of irreversible adsorption were observed with both desorption techniques, depending on the type of PAC and the compound. The thermally activated, peat-based PAC (SA4) showed a high degree of irreversible adsorption compared to the chemically activated, wood-derived PAC (CA1). The phenolic compound, *o*-cresol, could be desorbed to a lesser extent than 3-CB from both types of PAC. Contact time between the PAC and the compound was found to affect the desorption of *o*-cresol adversely. Oxygen availability enhanced the adsorptive capacity of SA4 for *o*-cresol. Sorption of 3-CB proved unaffected by either contact time or oxygen. Oxidative polymerization as a probable mechanism for the irreversible adsorption observed is also discussed. Desorption kinetics from SA4 showed a first phase of rapid desorption followed by a second phase of slow desorption. CA1 displayed the first rapid desorption phase only.

Keywords: Activated Sludge, Activation Method, Adsorptive Capacity, 3-Chlorobenzoic Acid, O-Cresol, Desorption, Irreversible Adsorption, Leaching, 2-Methylphenol, Oxidative Polymerization, Oxygen, Wastewater Treatment, Waste-Water, Irreversible Adsorption, Sludge Treatment, Hydrocarbons, Mechanism, Phenols, Removal, Cresol, Oxygen

Cooper, V.A. and Nicell, J.A. (1996), Removal of phenols from a foundry wastewater using horseradish peroxidase. *Water Research*, **30** (4), 954-964.

Full Text: [W\Wat Res30, 954.pdf](W/Wat%20Res30,%20954.pdf)

Abstract: Horseradish peroxidase (HRP) catalyses the oxidation of phenols by hydrogen peroxide resulting in the formation of water-insoluble polymers which can be separated by coagulation and sedimentation: The feasibility of the enzyme process to treat a foundry wastewater containing 3.5 mM of total phenols (330 mg/l as phenol) was examined. Two enzyme stocks of different purities were used but total phenols removal was independent of enzyme purity. For both stocks, 97 to 99% of the phenolic contaminants were removed, despite the presence of other contaminants such as organic compounds and iron in the waste matrix. The quantity of HRP required for this degree of treatment was in the same range as for the treatment of a synthetic wastewater containing an equal amount of pure phenol. Polyethylene glycol, a chemical additive, reduced enzyme inactivation, allowing a 22-fold reduction in the amount of HRP required for 99% removal of phenols from the foundry waste. Residual chemical oxygen demands (GOD) varied depending on the enzyme source. The high purity HRP achieved more than 65% removal of GOD, bur due to a high concentration of other organic matter present in the low purity HRP, no reduction in COD was achieved with this enzyme source. A comparison was made between enzyme treatment and oxidation using Fenton’s reagent. Enzyme cost must be significantly reduced in order to make the enzyme treatment process economically competitive.

Keywords: Peroxidase Horseradish, Enzyme, Phenols, Polyethylene Glycol, Foundry Wastewater, Chemical Oxygen Demand, Enzyme-Catalyzed Polymerization, Aromatic-Compounds, Precipitation, Water

Dalmacija, B., Tamas, Z., Karlovic, E. and Miskovic, D. (1996), Tertiary treatment of oil-field brine in a biosorption system with granulated activated carbon. *Water Research*, **30** (5), 1065-1068.

Full Text: [W\Wat Res30, 954.pdf](W/Wat%20Res30,%20954.pdf)

Abstract: This work describes the possibility of application of a biosorption system with granulated activated carbon (GAG) for the tertiary treatment of oil-field brine. In addition to the dissolved and dispersed oil, the oil-field brine contained about 29 g/l of mineral matter, mainly NaCl. The investigation was carried out on two columns, each containing 300 g of GAG. To form the biofilm on GAC use was made of the microorganisms from the setup for the purification of refinery wastewaters by activated sludge procedure. The wastewater flow-rate through the columns was 40, 70, 95 and 130 l/d. It was found that the activated carbon in the columns was capable of removing 2.6 times more organic matter than was its adsorption capacity, and its adsorption power was not thus exhausted. The results indicate that the microorganisms present in the biofilm on activated carbon oxidize the adsorbed pollutants and thus regenerate the carbon surface. The procedure employed was very efficient-the organic matter content in the effluent did not exceed 2.5 mg/l (BOD5). Copyright (C) 1996 Elsevier Science Ltd.

Keywords: Oil-Field Brine, Tertiary Wastewater Treatment, Biologically Activated Carbon

Wasay, S.A., Haron, Md.J., Uchiumi, A. and Tokunaga, S. (1996), Removal of arsenite and arsenate ions from aqueous solution by basic yttrium carbonate. *Water Research*, **30** (5), 1143-1148.

Full Text: [W\Wat Res30, 1143.pdf](W/Wat%20Res30,%201143.pdf)

Abstract: A new method has been developed to remove arsenite and arsenate ions from aquatic systems by using basic yttrium carbonate (BYC). Various parameters such as pH, anion concentration and reaction time were studied to establish optimum conditions. The removal by adsorption of arsenite and arsenate ions was found to be > 99% depending on initial concentration in the pH range of 9.8-10.5 and 7.5-9.0, respectively. The arsenate was also removed by precipitation at pH lower than 6.5 due to dissolution of BYC. The kinetic study shows that the adsorption follows the first order reaction. The adsorption isotherms of these anions were also studied at different temperatures. The equilibrium data fit well in the Langmuir model of adsorption. The Langmuir constants were calculated at different temperatures and the adsorption capacity for both anions increases with temperature. Anions such as Cl-, Br-, I-, NO3-and SO42-have no interference in the removal process. The mechanism of the removal by adsorption was interpreted in terms of the surface charge and ligand orientation of BYC. The method was applied on synthetic wastewaters. Arsenite was oxidized to arsenate by 3% hydrogen peroxide. The yttrium was regenerated as basic yttrium carbonate.

Keywords: Basic Yttrium Carbonate, Arsenite and Arsenate Ions, Chemical Adsorption, Langmuir Isotherm, Precipitation, Surface Charge, Complexation, Water, Adsorption, Hydroxide, Adsorbent, Oxide

Gupta, K. and Saul, A.J. (1996), Specific relationships for the first flush load in combined sewer flows. *Water Research*, **30** (5), 1244-1252.

Full Text: [W\Wat Res30, 1244.pdf](W/Wat%20Res30,%201244.pdf)

Abstract: Many studies have identified the first Bush phenomenon as being a relatively high load of pollutants in the initial phases of combined sewer flow. In systems without storage, this first Bush of pollutants may be discharged from the system and result in the heavy pollution of the receiving watercourse. However, by the inclusion of a storage tank, this first Bush can be retained and the effluent be discharged in a controlled manner. To optimise the storage volume, both the total pollutant load discharged and the temporal variation in pollutant concentration within an event need to be predicted. Sophisticated models like QSIM and MOUSETRAP to predict the pollutants in urban sewer hows are already available. However, the data requirements for these models are extensive, which usually limit their application to major or environmentally sensitive schemes. This paper describes the development of site specific regressional relationships to predict the first flush load of suspended solids in combined sewer flow and these may be used for storage tank design. Data from two sites at Great Harwood and Clayton-le-Moors in the Northwest of England has been used to develop predictive equations which relate the first Bush load of suspended solids and the hydrological parameters most likely to influence sewer flow quality. A multiple stepwise linear regression technique has been utilised for this purpose. The maximum rainfall intensity, maximum inflow, rainfall duration and the antecedent dry weather period were found to be the most important parameters influencing the first flush load of suspended solids. The equations were verified using an independent set of data and gave good predictions of the first flush load for the sites considered. This study has the limitation that the equations are catchment specific. However, as more data for different catchments becomes available, it may be possible to establish standard coefficients for application to a wide range of catchment conditions.

Keywords: Urban Runoff Pollution, Combined Sewer Flows, Storage Tanks, Regression Model, First Flush, Suspended Solids

Ajmal, M., Rao, R.A.K. and Siddiqui, B.A. (1996), Studies on removal and recovery of Cr(VI) from electroplating wastes. *Water Research*, **30** (6), 1478-1482.

Full Text: [W\Wat Res30, 1478.pdf](W/Wat%20Res30,%201478.pdf)

Abstract: Phosphate treated sawdust shows remarkable increase in sorption capacity of Cr(VI) as compared to untreated sawdust. The adsorption process is pH dependent. 100% adsorption of Cr(VI) was observed in the pH range <2 for the initial Cr(VI) concentration of 8-50 mg1-1. The effect of various adsorbent doses at pH 2 confirms Langmuir adsorption isotherms. 100% removal of Cr(VI) from synthetic waste as well as from electroplating waste containing 50 mg1-1 Cr(VI) was achieved by batch as well as by column processes. The adsorbed Cr(VI) on phosphate treated sawdust was recovered (87%) using 0.01 M sodium hydroxide. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Phosphate Treated Sawdust, Hexavalent Chromium Adsorption and Recovery, Electroplating Waste Treatment, Activated Carbon, Chromium(VI)

Siddiqui, M., Zhai, W.Y., Amy, G. and Mysore, C. (1996), Bromate ion removal by activated carbon. *Water Research*, **30** (7), 1651-1660.

Full Text: [W\Wat Res30, 1651.pdf](W/Wat%20Res30,%201651.pdf)

Abstract: Bromate ion removal by powdered activated carbon (PAC) in batch mode and granular activated carbon (GAC) in continuous mode was evaluated under various operational conditions. For PAC, removal kinetics were found to be prohibitively slow, with high PAC doses required; removal improved with decreasing pH and decreasing natural organic matter. GAC was also influenced by these same water quality conditions, with an additional influence by empty bed contact time (EBCT). Bromate ion was found to be reduced to bromide ion and not all bromide in bromate was recovered supporting the theory that bromate reduction involves non-equilibrium sorption-reduction mechanisms. Both PAC and GAC results were found to be carbon-specific. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Bromate, Ozone, Activated Carbon, Reduction, Ozonation

Notes: highly cited

? Frølund, B., Palmgren, R., Keiding, K. and Nielsen, P.H. (1996), Extraction of extracellular polymers from activated sludge using a cation exchange resin. *Water Research*, **30** (8), 1749-1758.

Full Text: [1996\Wat Res30, 1749.pdf](1996/Wat%20Res30,%201749.pdf)

Abstract: The extraction of water soluble extracellular polymeric substances (EPS) from activated sludge was investigated. The extraction procedure was based upon cation exchange using a cation exchange resin (CER). Activated sludge from two different types of treatment plants responded very similarly to the extraction procedure. The EPS yield was enhanced by increasing the stirring intensity, the amounts of CER added and by increasing the extraction time. For the chosen extraction procedure the yield was twice as high as other commonly used procedures. The extract consisted mainly of protein but also humic compounds, carbohydrates, uronic acids and DNA were found in significant amounts. The extracted amounts and relative fraction of the individual compounds strongly depended on how the extraction was performed. The ratio between protein and carbohydrate was found in the range 3.9–5.1 depending on the extraction time. Humic compounds and DNA were the compounds most easily extracted. HPSEC investigation of the extract revealed that the extraction did not significantly degrade the EPS. Some cell lysis was identified during the extraction for extraction times greater than 1–2 h by observing a decrease in cell number (stained by DAPI, CTC and acridine orange). The lysis was not considered a significant problem for contaminating the EPS. Measurements of the cell number and cell size distribution in the sludge suggested that the cell mass did not account for more than approximately 10–15% of the total organic fraction of the investigated sludge. Two extraction strategies were formulated. One for a very gentle and one for a very effective method. Analytical methods for analysis of sludge and EPS extracts were compared and discussed. A corrected Lowry method for analyzing protein as well as humic compounds was implemented and found suitable.

**Keywords:** Activated Sludge, Extracellular Polymers, Extraction, Cation Exchange Resin, Cell Lysis, Protein, Polysaccharide, Humus, DNA

? Lin, S.H. and Wu, C.L. (1996), Removal of nitrogenous compounds from aqueous solution by ozonation and ion exchange. *Water Research*, **30** (8), 1851-1857.

Full Text: [1996\Wat Res30, 1851.pdf](1996/Wat%20Res30,%201851.pdf)

Abstract: Experiments were conducted to investigate the ammonia, nitrite and nitrate removal from aqueous solution using ozonation and ion exchange. The operating variables of the combined ozonation and ion exchange processes include the pH, initial concentration of nitrogenous compounds and flow rate of aqueous solution. The effects of those variables on the removal efficiencies of the nitrogeneous compounds by ozonation, or ion exchange or both were explored. Ozonation was found able to completely convert nitrite to nitrate. However its capability of ammonia removal is much limited. The anionic and cationic ion exchange resins were able to efficiently remove nitrate and residual ammonia. An optimal operating range of OH for ammonia removal by the combined ozonation and ion exchange was obtained. However, removal of nitrite and/or nitrate by combined ozonation and ion exchange was found to be relatively insensitive to pH. It was observed that the combined process is capable of efficiently maintaining the nitrogeneous compounds in the aqueous solution at very low concentration levels. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Nitrogeneous Compound Removal, Ozonation, Ion Exchange, Ammonia, Water

Huang, C. and Huang, C.P. (1996), Application of *Aspergillus oryzae* and *Rhizopus* *oryzae* for Cu(II) removal. *Water Research*, **30** (9), 1985-1990.

Full Text: [W\Wat Res30, 1985.pdf](W/Wat%20Res30,%201985.pdf)

Abstract: Biosorption of copper(II) by the untreated and acid-treated fungal biomass has been studied in both batch and column modes. Two species, *Aspergillus oryzae* and *Rhizopus* *oryzae*, were used in this study. *A. oryzae* mycelia (undergoing acid-washing) exhibit a clear advantage in Cu(II) removal, compared with other adsorbents. The acid-washing process can strongly enhance the adsorption capacity for *A. oryzae* mycelia. However, acid-washing does not alter the metal adsorption capacity of *R. oryzae* mycelia. The result indicates that acid-washing is not only a pretreatment step but also a regeneration step in the heavy metal removal process. These dual purposes, therefore, give the acid-washing biomass an indication of successful prospect.

Cultivating *A. oryzae* in pellet form is an effective means of mycelium immobilization. The method established in this study provides the high-yield, uniformly-sized particles (2-3 mm in diameter), which are effective in solid-liquid separation. This pellet column can completely remove metals before breakpoint. After the breakpoint, a significant amount of Cu(II) removal over a long period has been observed. This is thought to be the result of intracellular uptake. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Fungi, Copper, Adsorption, *Aspergillus oryzae*, *Rhizopus* *Oryzae*, Heavy Metal, Immobilization, Metal-Ions, Biomass, Uranium

Ning, Z., Kennedy, K.J. and Fernandes, L. (1996), Biosorption of 2,4-dichlorophenol by live and chemically inactivated anaerobic granules. *Water Research*, **30** (9), 2039-2044.

Full Text: [W\Wat Res30, 2039.pdf](W/Wat%20Res30,%202039.pdf)

Abstract: Equilibrium sorption isotherms and sorption kinetics of 2,4-dichlorophenol (2,4-dCP) on live and chemically inactivated anaerobic granules were investigated using batch serum bottle tests. A general metabolic inhibitor, sodium azide, was used to inactivate the biological activity of the anaerobic biomass. Experimental results showed that the difference in the biosorption of live and chemically inactivated anaerobic granules were not significant, suggesting that anaerobic biosorption is mainly a physical-chemical process and that metabolically mediated diffusion in the process is negligible. (C) 1996 Elsevier Science Ltd. All rights reserved.

Keywords: 2,4-dichlorophenol, Biosorption, Anaerobic, Granules, Sludge

Walley, W.J. and Hawkes, H.A. (1996), A computer-based reappraisal of the biological monitoring working party scores using data from the 1990 river quality survey of England and Wales. *Water Research*, **30** (9), 2086-2094.

Full Text: [W\Wat Res30, 2086.pdf](W/Wat%20Res30,%202086.pdf)

Abstract: The policies and procedures adopted by the Biological Monitoring Working Party in developing its score system are summarised. The conceptual basis of the reappraisal is described and then formulated mathematically. The analysis is based on some 17,000 biological samples and covers 85 families. The results are expressed in terms of derived scores which mirror the scores allocated to the families by the BMWP. Some of the differences between the derived and original scores are quite substantial and are shown to relate to policies and practices adopted by the Working Party. It is argued that the derived scores offer a more realistic representation of the families’ sensitivities to pollution than do the BMWP scores. The most significant differences are discussed in relation to their likely causes and are shown to be consistent with expectations. It is concluded that the system’s poor performance in some recent tests may be explained by these findings and that corrective action could improve performance.

Keywords: River, Quality, Pollution, Classification, Monitoring, Biology, Benthic, Invertebrates, Biotic Indices

Meng, X.G. and Letterman, R.D. (1996), Modeling cadmium and sulfate adsorption by Fe(OH)3/SiO2 mixed oxides. *Water Research*, **30** (9), 2148-2154.

Full Text: [W\Wat Res30, 2148.pdf](W/Wat%20Res30,%202148.pdf)

Abstract: Adsorption of cadmium and sulfate in a mixed Fe(OH)3/SiO2 system was studied using the triple-layer model. The uptake of H4SiO4 dissolved from the SiO2 particles was considered in modeling the cation and anion adsorption. The mixed oxides were formed with a range of Fe(OH)3: SiO2 ratios by controling the precipitation of ferric hydroxide in a suspension of fumed silica (Cab-O-Sil). Observation of the micromorphology of the mixed oxides by transmission electron microscopy showed that Fe(OH)3 formed separately from the SiO2 particles, therefore, an independent oxide model was used to simulate cation and anion adsorption. In this model Cd adsorption occurred on separate Fe(OH)3 and SiO2 surfaces, When the pH was lower than 8, Fe(OH)3 dominated Cd adsorption in the mixed system. Sulfate adsorption on the independent Fe(OH)3 surface was modeled for the mixed oxide system because no sulfate was adsorbed by the SiO2 surface at pH > 4. The uptake of H4SiO4 reduced sulfate adsorption, but it had a negligible effect on cadmium absorption due to a combination of sorbate competition and electrostatic interactions. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Adsorption, Cadmium, Sulfate, Oxide, Model, Surface Complex, Amorphous Iron Oxyhydroxide, Surface-Ionization, Anion Adsorption, Water Interface, Goethite, Complexation, Ions

Smith, E.H. (1996), Uptake of heavy metals in batch systems by a recycled iron-bearing material. *Water Research*, **30** (10), 2424-2434.

Full Text: [W\Wat Res30, 2424.pdf](W/Wat%20Res30,%202424.pdf)

Abstract: An iron-bearing material deriving from surface finishing operations in the manufacturing of cast-iron components demonstrates potential for removal of heavy metals from aqueous waste streams. Batch isotherm and rate experiments were conducted for uptake of cadmium, zinc and lead. In the pH range of 4-7, the iron sorbent had the highest capacity, on a mass-per-mass basis, for lead followed by zinc and cadmium. As anticipated, solution pH has a notable impact on metal removal, while ionic background and initial metal concentration exhibited a lesser impact on adsorptive behavior. Metal surface complexation with a developing oxide layer is postulated as the principal mechanism of heavy metal removal. Batch adsorption kinetics are quite rapid, with 90% or more of metal uptake occurring within the first 5-10 h of reaction for powdered fines. Larger, granular-sized particles exhibited a longer, slower approach toward the equilibrium position. Surface complexation as well as semi-empirical equilibrium and rate models provided a useful description of experimental phenomena in that conditional trends were reflected in the estimated values of the model coefficients. Given the availability and comparable metal uptake capacity of the recycled iron sorbent to natural metal oxides and some commercial adsorbents, use of the iron-bearing material offers potential environmental and economic benefit for certain industrial pretreatment applications.

Keywords: Adsorption, Batch Kinetics, Heavy Metals, Industrial Pretreatment, Iron Fines, pH Effects, Recycling Reuse, Cadmium Adsorption, Oxyhydroxide, Oxides, Model, Ions, Removal, Lead

Navarro, R.R., Sumi, K., Fujii, N. and Matsumura, M. (1996), Mercury removal from wastewater using porous cellulose carrier modified with polyethyleneimine. *Water Research*, **30** (10), 2488-2494.

Full Text: [W\Wat Res30, 2488.pdf](W/Wat%20Res30,%202488.pdf)

Abstract: An adsorbent for heavy metal was synthesized by introducing polyethyleneimine (PEI) into porous cellulose carriers. Evaluations of synthesis results and adsorbent properties were conducted. Elementary analysis of the adsorbent revealed extensive crosslinking of PEI with the modified matrix. Batch adsorption tests showed the ability of cell-PEI to selectively remove mercury even at acidic regions. At low concentration ranges, mercury adsorption by cell-PEI can be interpreted by the Langmuir isotherm. With this model, an adsorbent capacity and Hg-ligand stability constant of approximately 288.0 mgg-1 and 12.9 lmg-1, respectively, were obtained. From adsorption rate experiments, diffusivity of Hg in the carrier was found to be approximately equal to 7.30×10-14 m2s-1. Extensive crosslinking of PEI chains that restricts ligand mobility was cited as the foremost factor contributing to these observed properties.

Keywords: Adsorption, Crosslinking, Mercury, Polyethyleneimine, Porous Cellulose Carrier

Benjamin, M.M., Sletten, R.S., Bailey, R.P. and Bennett, T. (1996), Sorption and filtration of metals using iron-oxide-coated sand. *Water Research*, **30** (11), 2609-2620.

Full Text: [W\Wat Res30, 2609.pdf](W/Wat%20Res30,%202609.pdf)

Abstract: Iron oxides are good adsorbents for uncomplexed metals, some metal-ligand complexes, and many metal oxyanions. However, the adsorbent properties of these oxides are not fully exploited in wastewater treatment operations because of difficulties associated with their separation from the aqueous phase. This paper describes experiments in which iron oxides were coated onto the surface of ordinary filter sand, and this composite media was used in a fixed bed configuration for simultaneous filtration of particulate matter and sorption of dissolved metals. The process was successful in removing uncomplexed and ammonia-complexed cationic metals (Cu, Cd, Pb, Ni, Zn), as well as some oxyanionic metals (SeO3, AsO3), from simulated and actual waste streams over a wide range of metal concentrations. The adsorbent was stable during backwashing and regeneration operations, releasing most metals quantitatively; the exception was AsO3, which was not efficiently recovered by regeneration with either acid or base. The composite media is inexpensive to prepare and could serve as the basis of a useful metal removal and possibly metal recovery process in a variety of settings. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Adsorption, Iron Oxides, Metals, Coated Sand, Bearing Wastes, Adsorption, Removal, Oxyhydroxide, Ions

Smith, E.H., Lu, W.P., Vengris, T. and Binkiene, R. (1996), Sorption of heavy metals by Lithuanian glauconite. *Water Research*, **30** (12), 2883-2892.

Full Text: [W\Wat Res30, 2883.pdf](W/Wat%20Res30,%202883.pdf)

Abstract: Adsorption equilibria are evaluated for Cd(II), Pb(II) and Zn(II) on a sample of pass 200 mesh Lithuanian glauconite using two different experimental/analytical approaches. First, the impacts of total metal concentration, ionic strength and pH on adsorption capacity are quantified in terms of the Freundlich isotherm equation for isotherms conducted at a single initial pH value. Relative adsorption capacity for the metals was in the order Pb > Cd > Zn. Secondly, pH effects and sorption mechanisms were examined more closely using the triple layer-surface complexation model to describe pH-adsorption edges. Although glauconite is a complex clay mineral, a single site approach provided a satisfactory description for many of the cases studied. Discrepancies between model simulations and experimental data were observed for some instances involving large changes in ionic strength or sorbate-to sorbent ratio when using adsorption reactions and equilibrium constants evaluated for a baseline case. Analysis of the possible contributions of multi-site adsorption, cationic exchange, mineral dissolution and desorption phenomena are required to more accurately characterize metal uptake by glauconite.

Keywords: Adsorption, Montmorillonite, Removal, Models, Cu2+, Adsorption, Cadmium, Glauconite, Lead, Surface Complexation, Triple-Layer Model, Zinc

Mollah, A.H. and Robinson, C.W. (1996), Pentachlorophenol adsorption and desorption characteristics of granular activated carbon. I. Isotherms. *Water Research*, **30** (12), 2901-2906.

Full Text: [W\Wat Res30, 2901.pdf](W/Wat%20Res30,%202901.pdf)

Abstract: The adsorption/desorption of pentachlorophenol (PCP) with Calgon F300 granular activated carbon (GAG) was studied and modelled. A modified Radke-Prausnitz (1972) isotherm model, incorporating a temperature- and pH-dependent proportionality constant, was found to best describe the observed PCP adsorption and desorption. The modified isotherm is valid in the ranges 4 less than or equal to pH less than or equal to 11 and 10 less than or equal to T less than or equal to 60°C. The activation energy of PCP adsorption was calculated to be 5.2 kJ/mol. At 30°C, PCP adsorbed strongly, and the rate of subsequent desorption was very low. However, the amount of PCP desorbed could be increased significantly by increasing the temperature to 60°C. Copyright (C) 1996 Elsevier Science Ltd

Keywords: Adsorption, Desorption, Isotherm, Pentachlorophenol, Granular Activated Carbon, Microbial Regeneration Process, Organic Solutes, Capacity, Oxygen

Mollah, A.H. and Robinson, C.W. (1996), Pentachlorophenol adsorption and desorption characteristics of granular activated carbon. II. Kinetics. *Water Research*, **30** (12), 2907-2913.

Full Text: [W\Wat Res30, 2901.pdf](W/Wat%20Res30,%202901.pdf)

Abstract: The kinetics of pentachlorophenol (PCP) adsorption/desorption with Calgon F300 granular activated carbon (GAC) was studied. A previously-developed model of GAC adsorption/desorption kinetics was applied to the case of PCP for both batch and continuous plug-flow liquid conditions. The model predictions were found to be in good agreement with the experimental observations.

Keywords: Adsorption, Desorption, Pentachlorophenol, Granular Activated Carbon, Kinetic Model, Microbial Regeneration Process

Gabaldón, C., Marzal, P., Ferrer, J. and Seco, A. (1996), Single and competitive adsorption of Cd and Zn onto a granular activated carbon. *Water Research*, **30** (12), 3050-3060.

Full Text: [W\Wat Res30, 3050.pdf](W/Wat%20Res30,%203050.pdf)

Abstract: Single and competitive adsorption of cadmium and zinc onto granular activated carbon DARCO 12-20 mesh has been investigated. This activated carbon has been shown as an effective adsorbent for both metals. Cadmium and zinc removals increased with pH and decreased with molar metal/carbon ratio. Surface precipitation phenomena have been detected for the higher pHs and molar ratios. The adsorption process has been modelled on the surface complexation Triple Layer Model (TLM). For this purpose, the amphoteric nature of the activated carbon has been studied. Single metal adsorption data have been used to calibrate TLM parameters. A dependence of the adsorption constants on pH and molar metal/carbon ratio has been observed and a correlation for log *K*ads has been determined. In the competitive system, the removal efficiency of the activated carbon decreased for both metals. The TLM model, using surface complexation constants determined from single adsorption experiments, successfully predicted cadmium and zinc removal from the two metalsolutions.

Keywords: Oxide-Water Interface, Ionic-Strength, Metal, Sorption, Systems, Model, Adsorption, Surface Complexes, Heavy Metals, Activated Carbon, Triple-Layer Model

Zhou, J.L., Rowland, S.J., Mantoura, R.F.C. and Lane, M.C.G. (1997), Desorption of tefluthrin insecticide from soil in simulated rainfall runoff systems: Kinetic studies and modeling. *Water Research*, **31** (1), 75-84.

Full Text: [W\Wat Res31, 75.pdf](W/Wat%20Res31,%2075.pdf)

Abstract: The sorption and subsequent desorption from soil particles, of tefluthrin, a widely used soil-active pyrethroid insecticide, were studied in a simulated rainfall runoff system. Experimentation was facilitated by use of the 14C-labelled compound. The desorption of such highly hydrophobic organic compounds from soils has rarely been reliably determined previously. Sorption results showed that the partition coefficients (*K*p and *K*oc) were determined with good precision; although the resultant coefficients were shown to be underestimates of true adsorption to soil due to non-attainment of true equilibrium and the presence of colloidal material in the aqueous phase supernatants analysed. Once the adsorption slurries were diluted (30 mi of aqueous phase to 3.51) to simulate transport of soil to a larger water body after heavy rainfall, kinetic studies, using a centrifugation method, indicated that the soil phase concentration decreased once more, whilst at the same time a biphasic re-equilibration process occurred in the aqueous phase. A direct particle counting method was used to rapidly and reproducibly measure desorption of 14C-tefluthrin from soil under contrasting experimental conditions. Initial re-equilibration was shown to be rapid when soil-to-water ratios were changed significantly, temperature having a pronounced effect on this desorption. The results are important for the accurate modelling of tefluthrin behaviour in the environment.

Keywords: Pyrethroid Insecticide, Tefluthrin, Soil, Desorption, Kinetics, Modeling, Synthetic Pyrethroid Insecticides, Hydrophobic Organic-Compounds, Adsorption-Desorption, Mineral Particles, Sorption, Pesticides, Temperature, Pollutants, Partition, Sediments

Jain, C.K. and Ram, D. (1997), Adsorption of lead and zinc on bed sediments of the River Kali. *Water Research*, **31** (1), 154-162.

Full Text: [W\Wat Res31, 154.pdf](W/Wat%20Res31,%20154.pdf)

Abstract: The adsorption characteristics of the bed sediments collected from the River Kali in western Uttar Pradesh, India, have been studied for the uptake of lead and zinc ions. The parameters controlling the uptake, viz. initial metal ion concentration, the solution pH, sediment dose, contact time and particle size have been evaluated. The adsorption of metal ions increases with increasing initial metal ion concentration. The adsorption of the two metal ions on the bed sediments follows two phases: a linear phase of adsorption and then a quasi-equilibrium state (almost flat plateau). The quasi-equilibrium state was attained within 45 min for both the metal ions. It is observed that the extent of adsorption increases with the increase of pH of the solution and metal ion concentration decreases with increase in pH value. Further, the adsorption of metal ions increases with increasing adsorbent doses and decreases with adsorbent particle size. The geochemically important elements such as Fe and Mn have also been determined in various grain size fractions of the sediments and correlated with the adsorption of metal ions. The adsorption data of the two metal ions has also been analysed with the help of the Langmuir and Freundlich models to evaluate the mechanistic parameters associated with the adsorption process, viz. monolayer capacity and sorption intensity.

Walley, W.J. and Hawkes, H.A. (1997), A computer-based development of the biological monitoring working party score system incorporating abundance rating, site type and indicator value. *Water Research*, **31** (2), 201-210.

Full Text: [W\Wat Res31, 201.pdf](W/Wat%20Res31,%20201.pdf)

Abstract: A method of deriving BMWP (Biological Monitoring Working Party) scores and indicator values that incorporates the effects of abundance rating and site type is presented. This is an extension of earlier work by the authors, which reappraised overall BMWP family scores using biological data from the 1990 River Quality Survey of England and Wales. The method is only briefly explained but its formulation in mathematical terms is fully documented. Full details are given of the overall, site-related and site-abundance-related derived scores and indicator values of 34 selected families. New definitions of average score per taxon (ASPT) based on the derived scores and indicator values are presented and the potential impact of these on existing BMWP site scores and ASPTs is briefly examined via two examples. Some interesting variations in the derived scores with respect to site type and abundance rating are noted and explanations of these are given from an ecological point of view. It is concluded that the method described offers a means of significantly improving the reliability and hence utility of the BMWP score system.

? Mak, F.T., Zele, S.R., Cooper, W.J., Kurucz, C.N., Waite, T.D. and Nickelsen, M.G. (1997), Kinetic modeling of carbon tetrachloride, chloroform and methylene chloride removal from aqueous solution using the electron beam process. *Water Research*, **31** (2), 219-228.

Full Text: [1997\Wat Res31, 219.pdf](1997/Wat%20Res31,%20219.pdf)

Abstract: An innovative treatment process using high energy electrons has been shown to be effective for the destruction of various toxic (regulated) organic chemicals. This paper presents data for the destruction of chlorinated methanes, carbon tetrachloride, chloroform and methylene chloride in treated groundwater. The studies were conducted at pilot scale, using a 75 kW electron beam at a how rate of 0.38 m(3) min(-1) This study examined the effect of solute concentration and total alkalinity on removal efficiency. A kinetic model was used to describe the results of single solute experiments of the three chlorinated methanes. These model predictions were then compared to experimental results and showed a varying degree of predictability for the three compounds. These calculations suggest that the initial reactions which eventually lead to the mineralization of the three chlorinated methanes result primarily from aqueous electron initiated reactions. The subsequent reaction between O-2 and the carbon centered radicals with the formation of alkyl peroxides also appears important for their ultimate decomposition. Copyright (C) 1996 Elsevier Science Ltd.

Keywords: E-Beam, Kinetic Modeling, Carbon Tetrachloride, Chloroform And Methylene Chloride, Hydroxyl Radicals, Rate Constants, Energy, Irradiation, Benzene, Oxygen, Scale

Banerjee, K., Cheremisinoff, P.N. and Cheng, S.L. (1997), Adsorption kinetics of *o*-xylene by flyash. *Water Research*, **31** (2), 249-261.

Full Text: [W\Wat Res31, 249.pdf](W/Wat%20Res31,%20249.pdf)

Abstract: Relatively limited information is available regarding the kinetics of sorption of organic compounds from solution onto flyash. For this reason, a detailed study of the kinetics of sorption of o-xylene on flyash was conducted in a controlled batch system. The effects of solute concentration, particle size of the adsorbent and temperature on the adsorption rate were investigated. The results of this research demonstrate that the adsorption reaction can be approximated to first-order reversible kinetics. A significant correlation was observed between the rate of adsorption and the inverse of the square of the particle diameter. An examination of thermodynamic parameters shows that the adsorption of o-xylene by flyash is an exothermic process and is spontaneous at the temperature investigated. Activation energies for the sorption process ranged between 3.1 and 4.3 kcal/mol. The rate at which o-xylene is adsorbed onto flyash was found to be controlled by the diffusion process.

Keywords: Flyash, Adsorption, Kinetics, Rate Constant, O-Xylene, Diffusion, Activation Energy, Free Energy, Differential Heat of Adsorption, Entropy, Organic Contaminants, Aqueous-Solutions, Waste-Water, Ash, Sorption, Removal, Coal

Mellah, A. and Chegrouche, S. (1997), The removal of zinc from aqueous-solutions by natural bentonite. *Water Research*, **31** (3), 621-629.

Full Text: [W\Wat Res31, 621.pdf](W/Wat%20Res31,%20621.pdf)

Abstract: The equilibrium isotherms of zinc adsorption onto natural bentonite show that the data correlate well with Freundlich and Langmuir models and that the adsorption is physical in nature. The operating parameters (agitation-speed, solid-liquid ratio, temperature, particle size and initial zinc concentration) influenced the rate of adsorption. The maximum monomolecular capacity eo according to the Langmuir model is 52.91 mgg-1 for an initial zinc concentration of 300 mgL-1 at 20℃.

Michalakos, G.D., Nieva, J.M., Vayenas, D.V, and Lyberatos, G. (1997), Removal of iron from potable water using a trickling filter. *Water Research*, **31** (5), 991-996.

Full Text: [W\Wat Res31, 991.pdf](W/Wat%20Res31,%20991.pdf)

Abstract: A trickling filter for iron removal from potable water has been constructed and tested. Iron removal was found to be caused by both biological and physico-chemical iron oxidation. The extent of each oxidation type was assessed. in addition, iron concentration profiles were taken along the filter depth, for both biological and physico-chemical iron oxidation, under the same operating conditions. Significant quantities of iron precipitated, mandating a periodic filter backwash. The possible duration of the filter operating cycles was studied as a function of the inlet iron concentration and. the volumetric Bow-rate. The limits of feed iron concentration and hydraulic loadings on the filter were determined and appropriate operating diagrams were constructed. (C) 1997 Elsevier Science Ltd.

Keywords: Biofilm, Biological Oxidation, Iron Removal, Physico-Chemical Oxidation, Potable Water, Trickling Filter, Manganese

Artola, A., Balaguer, M.D. and Rigola, M. (1997), Heavy metal binding to anaerobic sludge. *Water Research*, **31** (5), 997-1004.

Full Text: [W\Wat Res31, 997.pdf](W/Wat%20Res31,%20997.pdf)

Abstract: Heavy metal interaction with anaerobically digested sludge was investigated using copper, cadmium and nickel chloride salt solutions. The behaviour of the well-known glycine-metal aqueous system was compared with the behaviour of the sludge-metal system. When equilibrium pH values are presented against the initial metal concentration for the glycine-copper system the profile obtained shows a sharp peak. This behaviour is similar to the behaviour of the experimental sludge-copper system. The peak also appears for cadmium and nickel-glycine systems. However, it is not as pronounced as in the glycine-copper system and cannot be observed in the sludge-metal systems. The similar behaviour of both copper systems suggests that the metal binding mechanism of the sludge involves amino acid functional groups which are present in the cell wall. Due to this similarity, an apparent molarity of the sludge can be evaluated by sludge titration with copper(II). The value obtained can be expressed as mmols of equivalent glycine per gram of sludge.

Keywords: Biosorption, Binding Capacity, Heavy Metals, Digested Sludge, Cadmium, Copper, Nickel, Sludge Titration

Loaëc, M., Olier, R. and Guezennec, J. (1997), Uptake of lead, cadmium and zinc by a novel bacterial exopolysaccharide. *Water Research*, **31** (5), 1171-1179.

Full Text: [W\Wat Res31, 1171.pdf](W/Wat%20Res31,%201171.pdf)

Abstract: The biosorption of the three metallic ions, lead, cadmium and zinc, in single component and bi-component mixtures in aqueous solutions by an exopolysaccharide (EPS) is reported. The isotherms are plotted to obtain the maximum of uptake capacities and apparent dissociation constants. A comparison is made between the one metal sorption system and the influence of a second metal on the uptake of the primary one. The competitive effect on the uptake of various heavy metals on the Alteromonas macleodii subsp fijiensis has been studied using the Langmuir model for bisolute systems; The isotherms indicate a competition for the same binding site with zinc and cadmium. Lead is preferentially complexed by EPS in the bi-component solutions. The hydrothermal bacterial exopolysaccharide is shown to possess an affinity for the tested metal ions which makes its use as a biosorbent a possible alternative to the other common methods. (C) 1997 Elsevier Science Ltd.

Keywords: Xopolysaccharide, Deep-Sea Hydrothermal Vent Bacterium, Heavy Metals, Complexation, Mechanism, Selectivity, *Saccharomyces-Cerevisiae*, Biosorption, Polysaccharides, Spectroscopy, Copper, Sludge, Cu

Notes: highly cited

? Young, L. and Yu, J. (1997), Ligninase-catalysed decolorization of synthetic dyes. *Water Research*, **31** (5), 1187-1193.

Full Text: [1997\Wat Res31, 1187.pdf](1997/Wat%20Res31,%201187.pdf)

Abstract: Many synthetic dyes in industrial wastewaters are resistant to degradation in conventional biological treatment process. Decolorization of eight synthetic dyes including azo, anthraquinone, metal complex and indigo were examined in white-rot fungal cultures and by fungal peroxidase-catalysed oxidation. The dyes were not decolorized by manganese-dependent peroxidase (MnP) while above 80% color was removed by ligninase-catalysed oxidation. Dye decolorization rate increased linearly with ligninase doses. Compared with fungal cultures in which ligninase was detected, partially purified ligninase showed a consistent and higher extent of dye decolorization with other essential components being provided such as veratryl alcohol, hydrogen peroxide and acidic pH (3.5–5). Veratryl alcohol had a critical concentration level above which no further effect on dye decolorization was observed. Depending on the influence of H2O2 on dye decolorization, the eight dyes can be divided into two groups; one had an optimum H2O2 concentration and the other showed increased decolorization with high H2O2 doses. Dye concentration had a negative effect on decolorization rate in general. The dye concentration above which the negative effect was observed varied from 10 to 125 mg/L, depending on individual dye structure. These results indicate that a highly efficient bioprocess using white-rot fungi to remove color from industrial effluents should produce ligninase, H2O2, veratryl alcohol continuously and coordinately under acidic condition and controlled back-mixing flow of wastewater.

Keywords: Dye, Decolorization, White-Rot Fungi, Peroxidase, Ligninase, Wastewater, Enzymatic Oxidation

Ginter, M.O. and Grobicki, A.M. (1997), Manganese removal mechanisms in a stirred USAB reactor. *Water Research*, **31** (6), 1261-1268.

Full Text: [W\Wat Res31, 1261.pdf](W/Wat%20Res31,%201261.pdf)

Abstract: The mechanisms of the removal from anaerobically treated wastewaters of those metal ions which do not form precipitates with sulphide or carbonate ions, or which form highly soluble precipitates, has been little studied to date. Therefore, the removal of manganese as a representative of this group was specifically investigated in the course of a wider project studying metal removal in laboratory-scale UASB reactors. Mn removal, in the absence of sulphate in the reactor feed, was low at 7.2%, but up to 40% Mn removal could be achieved in the presence of sulphate. Mn was removed by adsorption onto the existing solids in the sludge and onto newly grown biomass, and also by co-precipitation processes, which can be strongly enhanced by other heavy metal ions in solution. In the presence of cadmium in the reactor feed, manganese removal could be increased to 56%.

Keywords: Bacterial Sulfate Reduction, Heavy-Metals, Anaerobic-Digestion, Sludge, UASB, Manganese, Cadmium, Heavy Metals, Bio-Accumulation, Metal Removal, Acid-Insoluble Substances, Acid-Soluble Substances

Teunis, P.F.M., Medema, G.J., Kruidenier, L. and Havelaar, A.H. (1997), Assessment of the risk of infection by *Cryptosporidium* or *Giardia* in drinking water from a surface water source. *Water Research*, **31** (6), 1333-1346.

Full Text: [W\Wat Res31, 1333.pdf](W/Wat%20Res31,%201333.pdf)

Abstract: The significance of the presence in drinking water of the protozoan microparasites *Cryptosporidium* parvum and *Giardia* lamblia for public health may be analyzed by means of risk assessment. This requires quantitative knowledge of all the contributing factors, from the concentration of these organisms in the source water to the dose-response relation for the probability of infection or disease in a human host. The major contributing factors are: the concentration of cysts or oocysts in raw water, the recovery of the detection method, the viability of recovered cysts or oocysts, the removal of organisms in the treatment process, and the daily consumption of unboiled tap water. To enable analysis of the uncertainty in the calculated risk of infection, each of these factors is treated as a stochastic variable, for which a suitable distribution is proposed. A frequency distribution for the probability of infection is then constructed with standard sampling techniques. This first evaluation of the calculation of the risk of infection due to exposure to *Cryptosporidium* oocysts and *Giardia* cysts via drinking water, shows that the uncertainty in the estimated removal efficiency of the treatment process dominates over uncertainties in other contributing factors. (C) 1997 Elsevier Science Ltd.

Keywords: Drinking Water, Water Treatment, Infection, Risk Assessment, Uncertainty Analysis, *Cryptosporidium*, *Giardia*, Distributions, Inactivation, Outbreak, Disease, Viruses, Parvum, Ozone

Ćurković, L., Cerjan-Stefanović, Š. and Filipan, T. (1997), Metal ion exchange by natural and modified zeolites. *Water Research*, **31** (6), 1379-1382.

Full Text: [W\Wat Res31, 1379.pdf](W/Wat%20Res31,%201379.pdf)

Abstract: The lead and cadmium removal from wastewaters by natural and pretreatment zeolites was examined by using a batch-type method. The results demonstrated that the natural zeolites contained a complement of exchangeable Na, K and Ca ions but exposing them to 2 M NaCl solution at 22 and 70°C, respectively, converted them to a near homoionic state in Na-form. Lead and cadmium removal results using natural zeolites and treated zeolites showed that treatment improved both the exchange capacity and the removal efficiency. The influence of the temperature on the ion-exchange process was examined. It was found that the metal uptake was increased with increasing temperature during the ion-exchange process. Natural and modified zeolites remove toxic metals from waste waters. (C) 1997 Elsevier Science Ltd.

Keywords: Natural Zeolites, Modified Zeolites, Ion Exchange, Lead Removal, Cadmium Removal, Heavy-Metals, Clinoptilolite, Removal

Schramm, K.W., Winkler, R., Casper, P. and Kettrup, A. (1997), PCDD/F in recent and historical sediment layers of Lake Stechlin, Germany. *Water Research*, **31** (6), 1525-1531.

Full Text: [W\Wat Res31, 1525.pdf](W/Wat%20Res31,%201525.pdf)

Abstract: Lake Stechlin sediment layers were dated and analysed for PCDD/F. The concentrations of PCDD/F in the investigated sediment have increased by a factor of about 100 since the last century and have decreased by a factor of two since the 1970s. The latter finding can be confirmed by recent temporal trends in human samples and herring-gull eggs. The homologue patterns especially for PCDF are subject to temporal variations and can be mainly related to municipal waste incineration and the impact of the precursor PCB. The overall time trend corresponds roughly with the anthropogenic world-wide production of chlorine. (C) 1997 Elsevier Science Ltd.

Keywords: Lake Stechlin, PCDD/F, Dated Sediment, Dibenzofurans, Soils, River

Notes: highly cited

Chang, J.S., Law, R. and Chang, C.C. (1997), Biosorption of lead, copper and cadmium by biomass of *Pesudomonas aeruginosa* PU21. *Water Research*, **31** (7), 1651-1658.

Full Text: [W\Wat Res31, 1651.pdf](W/Wat%20Res31,%201651.pdf)

Abstract: In this study, the biosorption kinetics of lead (Pb), copper (Cu) and cadmium (Cd) ions on the biomass of *Pseudomonas aeruginosa* PU21 (Rip64) was investigated. Effects of environmental factors and growth conditions on the biosorption were studied. Efficiency of metal ion recovery from metal-loaded biomass and subsequent regeneration of the biosorbent were also determined. The results show that, at pH 5.5, the resting cells were able to uptake up to 110 mgPb/g dry cell and the inactivated cells can adsorb 70 mgPb/g dry cell. Biomass of P. aeruginosa PU21 (Rip64) had lower adsorption capacities for Cu and Cd ions than for lead ions. The resting cells had the maximum uptake of 23 mgCu/g dry cell (at pH 5.0) and had 58 mgCd/g dry cell (at pH 6.0). The saturation uptake capacities of inactivated cells were 19 mgCu/g dry cell (at pH 5.0) and 43 mgCd/g dry cell (at pH 6.0). The resting cells held optimal Pb adsorption capacity at the early stationary phase, whereas the best uptake of cadmium was observed with the cells which were of exponential growth phase. The growth phase exhibited no effects on the adsorption of Cu, however. The increase in mercury concentration (from 0 to 50 mgHg2+/litre) in the growth media did not significantly affect the adsorption capacities of Pb2+, CU2+ and Cd2+. However, the saturation uptake capacity and metal-cell affinity tended to increase as pH increased, until metals precipitated as metal hydroxides when the pH exceeded some threshold values. Adjusting the pH value to about 2.0 resulted in 98, 98 and 82% recovery of Pb, Cu and Cd, respectively. The biomass resulted from desorption processes was able to retain approximately 80% of original adsorption capacity fbr Pb and Cu with four repeated adsorption and recovery runs. Regeneration of biomass appears to enhance the uptake capacity of Cd by nearly 35% after four adsorption/desorption cycles.

Chegrouche, S., Mellah, A. and Telmoune, S. (1997), Removal of lanthanum from aqueous solutions by natural bentonite. *Water Research*, **31** (7), 1733-1737.

Full Text: [W\Wat Res31, 1733.pdf](W/Wat%20Res31,%201733.pdf)

Abstract: The aim of this work is the investigation of possible use of natural bentonite in the removal of lanthanum contained in aqueous solutions. The effect of temperature was examined in order to establish Langmuir and Freundlich adsorption isotherms. Langmuir and Freundlich constants were also determined.

Bousher, A., Shen, X.D. and Edyvean, R.G.J. (1997), Removal of coloured organic matter by adsorption onto low-cost waste materials. *Water Research*, **31** (8), 2084-2092.

Full Text: [W\Wat Res31, 2084.pdf](W/Wat%20Res31,%202084.pdf)

Abstract: Twelve different adsorbents, originating from waste materials, were used to treat an effluent. of complex composition. from a chemical Herbs. The effectiveness of each adsorbent was measured in terms of its effect on the colour (absorbance at 450 nm) and COD levels of the effluent and also in terms of its adsorption capacity towards individual constituents of the effluent, The results showed that all adsorbents would physically adsorb constituents in reversible processes. Some constituents were more readily adsorbed than others. This meant that little correlation was observed between changes to the colour and COD levels of the effluent, because individual constituents made different contributions to these properties. The problem is further complicated by adsorbents, particularly those which had not been processed, contributing new constituents to the effluent. Thermodynamic data obtained from this study were used to predict the relative distribution of three constituents on the surface of different adsorbents. These results suggest that, for this effluent, adsorption onto waste material would be most effectively applied by using it in combination with other removal techniques.

Keywords: Natural Adsorbents, Acid Dye, Equilibrium, Desorption, Effluents, Adsorption, Waste Material, Biomass, Colour Removal, COD Removal, Industrial Effluent, Adsorption Capacity

Walker, G.M. and Weatherley, L.R. (1997), Adsorption of acid dyes on to granular activated carbon in fixed beds. *Water Research*, **31** (8), 2093-2101.

Full Text: [W\Wat Res31, 2093.pdf](W/Wat%20Res31,%202093.pdf)

Abstract: This work involved the treatment of industrial wastewater from a nylon-carpet printing plant in Northern Ireland which currently receives no treatment and is discharged straight to sea. As nylon is particularly difficult to dye, acid dyes are required for successful colouration, but they cause major problems with the plant’s effluent disposal. Granular activated carbon Filtrasorb 400 was used to treat this effluent in a fixed-bed column system. Breakthrough curves from the fixed-bed column were shallow, even at low flow rates, which indicated a large mass transfer zone and inefficient use of adsorbent. Decrease in adsorbent particle size and decrease in linear flow rate produced a better bed performance. The bed depth service time (BDST) model proved effective for comparison of column variables, with calculated BDST constants providing a useful indication of bed performance. The BDST model also gave good approximation in predicting a bed performance using the relationships postulated by Hutchins (1973).

Keywords: Acid Dyes, Activated Carbon, Adsorbent, Adsorption, Bdst, Bed Depth Service Time, Breakthrough Curve, Dye, Dyes, Dyestuffs, Fixed Bed, Fixed Beds, Fixed-Bed Column, Flow Rate, Granular Activated Carbon, Model, Particle, Wastewater

Khan, A.R., Al-Bahri, T.A. and Al-Hadad, A. (1997), Adsorption of phenol based organic pollutants on activated carbon from multi-component dilute aqueous solutions. *Water Research*, **31** (8), 2102-2112.

Full Text: [W\Wat Res31, 2102.pdf](W/Wat%20Res31,%202102.pdf)

Abstract: Five organic phenolic compounds (phenol, o-chlorophenol, m-chlorophenol, p-chlorophenol and m-cresol) hale been used to determine the adsorption isotherms for single and bisolute systems from dilute aqueous solutions on activated carbon. An experimental technique for the analysis of the equilibrium concentration of a bisolute in aqueous solutions using a UV spectrophotometer has been successfully developed and employed. Experimental data were obtained by conducting experiments in a shaker-incubator at 30 C (local average ambient temperature). All common types of reported isotherms, including Langmuir. Freundlich, BET (Brunauer, Emmett and Teller) and empirical types, were tried. For single solute systems the experimental data were found to be best represented by the Freundlich isotherm for all cases except for phenol, which followed the Langmuir isotherm. For bisolute systems, the coefficients for all the most commonly used models were determined accurately applying a modified Rosenbrock method for non-linear optimization. The present and previous published experimental data and predicted model results have been analysed statistically to validate the applicability of the models. The generalized and empirical models have shown a better fit than the other most commonly used models (Langmuir and Freundlich). The empirical model has minimal error between predicted and experimental values due to more constants in the expression as compared to the generalized model, The generalized model has a unique characteristic, covering both extremes, Langmuir as well as Freundlich type isotherms, and could represent all types of data for multi-component systems with fewer coefficients with almost the same degree of accuracy as the empirical model. (C) 1997 Elsevier Science Ltd.

Keywords: Organic Pollutants, Multi-Component, Equilibrium, Adsorption Isotherm, Activated Carbon, Solutes

? Fang, H.H.P. and Chan, O.C. (1997), Toxicity of phenol towards anaerobic biogranules. *Water Research*, **31** (9), 2229-2242.

Full Text: [1997\Wat Res31, 2229.pdf](1997/Wat%20Res31,%202229.pdf)

Abstract: Toxity of phenol towards upflow anaerobic sludge blanket (UASB) biogranules treating wastewater containing different substrates was investigated. Under shock-loading conditions, the specific methanogenic activity (SMA) of the biogranules decreased with the increase of phenol concentration. The C-1.50 (i.e, the concentration at which bioactivity was 50% of the control) was 1750, 1000 and 1700 mg-phenol litre-1 for acetate-, propionate- and benzoate-degrading biogranules, respectively. Under continuous-loading conditions, however, phenol toxicity was not progressive. Instead, phenol had a threshold toxicity level for each type of biogranules: 1050-1600, >850 and 1100-1700 mg litre-1 for benzoate-, propionate- and acetate-degrading biogranules, respectively. Below these threshold levels, phenol was not inhibitive to the activity of biogranules; but above them, the inhibition was nearly 100%. Phenol toxicity was neither cumulative nor permanent. Once the phenol concentration in wastewater was lowered to levels below the threshold, biogranules were able to gradually regain 100% of their activity. Lowering substrate concentration expedited the recovering process. (C) 1997 Elsevier Science Ltd.

Keywords: Anaerobic, Biogranule, Inhibition, Methanogenic Activity, Phenol, Shock, SMA, Toxicity, UASB, Waste-Water, Methanogenic Ecosystems, Granular Sludge, UASB Treatment, Gen-Nov, Benzoate, Bacteria, Wastewaters, Biosorption, Degradation

Kratochvil, D., Volesky, B. and Demopoulos, G. (1997), Optimizing Cu removal/recovery in a biosorption column. *Water Research*, **31** (9), 2327-2339.

Full Text: [W\Wat Res31, 2327.pdf](W/Wat%20Res31,%202327.pdf)

Abstract: Biosorption of Cu2+ by Sargassum fluitans seaweed biomass protonated by an acidic wash or loaded with Ca2+ is based on ion exchange. The uptake of Cu2+ is respectively accompanied by a release of either H+ or Ca2+ into the solution phase. The effects of Ca-, H- and H/Ca-cycles on the performance of a continuous-flow biosorption fixed-bed were established. The Ca-cycle applied to Sargassum biomass in a packed bed led to a high degree of a column utilization but did not allow an effective Cu recovery. The H-cycle permitted 100% Cu recovery but also shortened the sorption column service time. The combined Ca/H-cycle was shown to be inefficient due to the time consuming regeneration of biomass from the H-form to the Ca-form. Biomass pretreatment with 1% (w) solution of CaCl2 and with 0.1 ha HCl resulted in the same Cu uptake of 75 mg/g. The Ca-pretreated biomass lost approximately 30% of its Cu capacity with subsequent acidic wash. The equilibrium aspects of Cu removal and recovery in a biosorption column were analyzed through the concept of ion-exchange isotherms. The dynamics of Cu sorption and of biomass regeneration in a fixed-bed column was predicted by numerically solving the equations of a proposed ion-exchange model. (C) 1997 Elsevier Science Ltd.

Keywords: Biosorption, Ion-Exchange, Cu Removal, Cu Recovery, Fixed-Bed Column, Regeneration, Ion-Exchange, Alginate Gel, Equilibria, Biomass, Removal, Models, Metals, Copper, pH

Kummerer, K., Steger Hartmann, T. and Meyer, M. (1997), Biodegradability of the anti-tumour agent ifosfamide and its occurrence in hospital effluents and communal sewage. *Water Research*, **31** (11), 2705-2710.

Full Text: [W\Wat Res31, 2705.pdf](W/Wat%20Res31,%202705.pdf)

Abstract: A portion of administered pharmaceuticals are excreted unmetabolised by patients and can be found in hospital effluent and municipal sewage. Some pharmaceuticals such as anti-tumour agents are carcinogenic, mutagenic, teratogenic and fetotoxic. Little is known about their environmental impact. Therefore, the biodegradability of the widely used anti-tumour agent ifosfamide (IF) was assessed with the modified Zahn-Wellens test (OECD 302 B) and a test simulating biological sewage treatment. The biodegradation was monitored by DOC and GC/MS. The concentration of IF in hospital effluent, communal sewage and the effluent from a communal sewage treatment plant (STP) was analysed as well as calculated by the amounts of water and IF used in hospitals. The expected concentration of IF in German surface waters was calculated. IF was not biodegradable in the Zahn-Wellens test and the STP simulation test. It was not adsorbed by the sewage sludge. The concentrations measured in the hospital effluents, the STP influent and the STP effluent were of the same order of magnitude as the calculated ones, indicating that no adsorption, biodegradation or other elimination of IF took place to any noticeable extent. (C) 1997 Elsevier Science Ltd.

Keywords: Anti-Tumour Agent, Ifosfamide, Biodegradability, Hospital Effluent, Communal Sewage, Sewage Treatment, Surface Water, Magnetic-Resonance Spectroscopy, Urinary-Excretion, Cyclophosphamide, Metabolites, Chromatography

Leighton, I.R. and Forster, C.F. (1997), The adsorption of heavy metals in an acidogenic thermophilic anaerobic reactor. *Water Research*, **31** (12), 2969-2972.

Full Text: [W\Wat Res31, 2969.pdf](W/Wat%20Res31,%202969.pdf)

Abstract: A two-phase, thermophilic anaerobic reactor was operated with a starch-based feed. Copper, zinc, nickel and lead (3 mM) were individually added to the feed each for a period of 30 h. The results were analysed to determine the extent of metal binding in the acidogenic, first-stage reactor and the degree of protection that this’ afforded to the traditionally more sensitive methanogenic phase. The results showed that zinc and nickel were not bound particularly well, that lead was bound very strongly and that copper had binding characteristics that were between these two extremes. When these findings were compared with an earlier study with a mesophilic sludge, zinc was shown to have a very different behaviour. A possible reason for this is given. An examination of the gas production by the methanogenic stage, in relation to the amount of metal reaching this stage, suggested that the phase separation did not offer any real protection from the toxic effects of heavy metals.

Keywords: Extracellular Polymers, Activated-Sludge, UASB-Reactor, Removal, Thermophilic Sludge, Acidogenic Sludge, Two-Phase Digestion, Heavy Metals, Binding

Afcharian, A., Levi, Y., Kiene, L. and Scribe, P. (1997), Fractionation of dissolved organic matter from surface waters using macroporous resins. *Water Research*, **31** (12), 2989-2996.

Full Text: [W\Wat Res31, 2989.pdf](W/Wat%20Res31,%202989.pdf)

Abstract: To obtain fractions enriched with biodegradable dissolved organic carbon (BDOC) or with organic compounds responsible for the chlorine demand (CID) and for trihalomethane formation potential (THMFP), Seine river water samples were percolated on various macroporous resins (anionic, cationic and non-ionic) and compared with granulated activated carbon (GAG). In addition, measurement of UV absorbance at 254 nm and the fluorescence index (lambda(excitation) 320 nm) had allowed to follow up the retention of dissolved organic matter by the different adsorbants. In contrast to cationic and non-ionic resins, anionic resins confirm their excellent retention capacity of organic compounds responsible for UV 254 absorbance and fluorescence index. The relative values of BDOC/DOC ratio (mg-C/mg-C) are slightly increased in the effluents of anionic resins, indicating that they retain a little preferentially the refractory fraction instead of the biodegradable fraction. There is no significant difference between the ratio of CID/DOC (mg-Cl-2/mg-C) in influent and effluent of anionic resins. Cationic resin has a low capacity for retention of DOG, but they seem to retain significantly the organic compounds responsible for ClD. The capability of anionic resins to retain THMFP is similar to that of GAG. (C) 1997 Elsevier Science Ltd.

Keywords: Surface Waters, Macroporous Resins, Biodegradable Dissolved Organic Carbon (BDOC), Chlorine Demand, Humic Substances, Granular Activated Carbon (GAC), Fractionation, Adsorption, Aquatic Humic Substances, Thm Precursors, Preparative Isolation, Natural-Waters, Acids, Chlorination, Exchange, Distributions, Filtration, Removal

Lee, H.S. and Volesky, B. (1997), Interaction of light metals and protons with seaweed biosorbent. *Water Research*, **31** (12), 3082-3088.

Full Text: [W\Wat Res31, 3082.pdf](W/Wat%20Res31,%203082.pdf)

Abstract: Based on their displacement by protons, the following ascending order of light metals affinity toward *Sargassum fluitans* biomass was observed: Na+ ≤≤ K+ < Mg2+ < Ca2+ < Al3+. Higher biomass-metal affinities resulted in lowering the leaching tendency of (polysaccharidic) biomass components during the sorption process. More than 12% weight loss of protonated biomass occurred during 2 min of sorption, which should be considered in all stoichiometric and sorption calculations. The rate of proton uptake for Na-loaded and Ca-loaded *S. fluitans* biomass at pH 4.5 was lower than the rate of desorption at pH 1.1. In the case of Na-loaded *S. fluitans*, the predominant proton uptake rate was of a zero order. Na uptake by protonated *S. fluitans* biomass did not take place at all in the presence of Ca and Al ions. However, it increased in the absence of other light metals. Since the affinity of Ca2+ for the biomass was much greater than that of Na+, the three-component system of Na+, H+ and Ca2+ could be simplified into proton-calcium ion exchange. The initial rate of Ca uptake with protonated *S. fluitans* biomass at pH 4.5 was lower than that of proton release from biomass. Approximately 20% of Ca2+ sorbed was bound to the binding site as a mono-valent ion. Titration and stoichiometric indications pointed to the fact that Al was being sorbed as a hydroxyl complex. (C) 1997 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Protonated Biomass, Light Metals, Protons, Marine Algae, Sargassum Fluitans Biomass

Gomez-Serrano, V., Macias-Garcia, A., Espinosa-Mansilla, A. and Valenzuela-Calahorro, C. (1998), Adsorption of mercury, cadmium and lead from aqueous solution on heat-treated and sulphurized activated carbon. *Water Research*, **32** (1), 1-4.

Full Text: [W\Wat Res32, 1.pdf](W/Wat%20Res32,%201.pdf)

Abstract: The adsorption of mercury, cadmium and lead from aqueous solutions on heat-treated and sulphurized activated carbon has been studied comparatively. The adsorption isotherms for the various metals were measured at 298 K, using adsorptive solutions at two pH values. The adsorption was much higher for mercury than for cadmium and lead for all adsorbents. The adsorption of mercury greatly increased for the samples of sulphurized carbon and also, though less, for the sample prepared in N2. The decrease of pH in the adsorptive solution to pH 2.0 drastically reduced the adsorption of mercury. The effect of pH change on the adsorption of Cd2+ and Pb2+ occurred with less adsorbents than for mercury. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Cadmium, Mercury, Lead

? Karanfil, T., Kilduff, J.E., Schlautman, M.A. and Weber, Jr., W.J. (1998), The oxygen sensitivity of organic macromolecule sorption by activated carbon: Effects of solution chemistry. *Water Research*, **32** (1), 154-164.

Full Text: [1998\Wat Res32, 154.pdf](1998/Wat%20Res32,%20154.pdf)

Abstract: The influence of solution chemistry (pH, ionic strength and calcium concentration) on the oxygen sensitivity of natural and synthetic dissolved organic macromolecule sorption by granular activated carbon was investigated. Sorption sensitivity to the presence of oxygen was found to decrease with decreasing pH, with increasing ionic strength and with increasing calcium concentration, The influence of oxygen on the extent of sorption by a basic GAC (pH(PZC) = 8.5) appears to be enhanced by increasing phenolic acidity and/or decreasing macromolecule size. The results suggest that open, flexible molecular configurations of organic macromolecules and the direct interactions of these substances with carbon surfaces are important factors with respect to the effects of oxygen on their sorption from aqueous phase. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Acids, Activated Carbon, Adsorption, Adsorption, Dissolved-Oxygen, Gac, Humic Substances, Humics, Matter, Models, Natural Organic Matter, Oxygen, Polymerization, Size-Exclusion, Sorption, Systems, Transport, Water Chemistry

Costa, C. and Márquez, M.C. (1998), Kinetics of the PACT process. *Water Research*, **32** (1), 107-114.

Full Text: [W\Wat Res32, 107.pdf](W/Wat%20Res32,%20107.pdf)

Abstract: Kinetics of textile dye removal from a dyeing wastewater was researched. Treatment was carried out in an activated sludge lab plant with powdered activated carbon (PACT). A kinetic model that involved dye adsorption on biomass and carbon and dye degradation by microorganisms was developed. The deduced mechanism of dye removal from the mathematical model showed that the PACT process must be considered basically as a biological process, because dye removal is 99% due to microorganisms.

Keywords: Activated Carbon, Powdered Activated Carbon, Kinetics, Dye Removal, Activated Sludge, Wastewater Treatment

Williams, C.J., Aderhold, D. and Edyvean, R.G.J. (1998), Comparison between biosorbents for the removal of metal ions from aqueous solutions. *Water Research*, **32** (1), 216-224.

Full Text: [W\Wat Res32, 216.pdf](W/Wat%20Res32,%20216.pdf)

Abstract: This study compared the ability of a brown seaweed Ecklonia maxima, a dealginated seaweed waste, alginate fibre and waste Linseed fibre to remove copper. nickel and cadmium from single and mixed metal ion solutions. All experiments were conducted using metal ion solutions of 10 mg/litre in concentration. The study has shown that alginate fibre generally exhibited the best overall metal ion uptake and cadmium ions were the most effectively sequestered by these biosorbents. The study indicates that the uptake of these metal ions is selective once saturation of the biosorbent has been achieved, with copper ions being adsorbed in preference to cadmium and nickel ions.

Keywords: Marine-Algae, Biosorption, Biomass, Copper, Adsorption, Sorption, Alginate, Cadmium, Biosorption, Seaweed Alginate, Wastewater, Copper, Nickel, Cadmium, Waste Biomass, Biomass Capacity

? Sakadevan, K. and Bavor, H.J. (1998), Phosphate adsorption characteristics of soils, slags and zeolite to be used as substrates in constructed wetland systems. *Water Research*, **32** (2), 393-399.

Full Text: [1998\Wat Res32, 393.pdf](1998/Wat%20Res32,%20393.pdf)

Abstract: Constructed wetlands are used to remove pollutants from wastewater. The performance of such wetlands to remove pollutants from wastewater can be improved by using suitable substrates. In this study the phosphorus (P) adsorption capacities of soils, two industrial by-products and a clinoptilolite material (zeolite) were examined for their potential use as substrates to remove P in constructed wetlands. Both Freundlich and Langmuir adsorption isotherms were used to describe the adsorption characteristics of these substrates. The Langmuir adsorption isotherm was used to calculate the maximum P adsorption capacity of these substrates. One of the industrial by-products, namely blast furnace slag, showed the highest P adsorption capacity (44.2 g P kg-1 slag) followed by soil samples collected from an operating (Byron Bay) constructed wetland system in Northern NSW (4.2 to 5.2 g P kg-1 soil). The surface soils collected from two regional constructed wetland systems were found to have the least P adsorption capacity (1153 and 934 mg P kg-1 soil, respectively for Richmond and Carcoar wetlands). The clinoptilolite material (zeolite), which is used to remove ammonium ion from wastewater, was found to have a P adsorption capacity of 2.15 g kg-1. The relationship between P adsorption and oxalate extractable iron (Fe) and aluminium (Al) showed that P adsorption related more closely to extractable Al (r2 = 0.890) than Fe (r2 = 0.736). Multiple regression analysis showed that P adsorption is more closely related to a combination of both oxalate extractable Fe and Al (r2 = 0.901) than extractable Fe or Al alone. The P saturation capacity of wetland systems incorporating these substrates is described. The results suggest that selected industrial by-products and adsorptive materials may be used alone or in combination with soils to improve the performance of constructed wetland systems subject to other properties Such as pH, permeability and structural stability of these materials. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Wastewater, Phosphorus, Adsorption, Freundlich, Langmuir, Slags, Zeolite, Phosphorus Removal, Sorption, Clay, pH

Butter, T.J., Evison, L.M., Hancock, I.C., Holland, F.S., Matis, K.A., Philipson, A., Sheikh, A.I. and Zouboulis, A.I. (1998), The removal and recovery of cadmium from dilute aqueous solutions by biosorption and electrolysis at laboratory scale. *Water Research*, **32** (2), 400-406.

Full Text: [W\Wat Res32, 400.pdf](W/Wat%20Res32,%20400.pdf)

Abstract: A multi-stage process has been developed at laboratory scale for the removal and recovery of cadmium from dilute aqueous solutions. Metal removal is achieved by biosorption of the metal cations onto a free cell suspension of dead Streptomyces biomass in a stirred tank reactor. The solids are then separated from the aqueous phase by flotation or sedimentation. The resulting water, which contains only 10 µg l-1 residual cadmium, can be safely discharged. The solids are diverted to a filtration unit where they become immobilised as a filter cake. The biomass is then eluted, using an electrolyte solution as the eluant, in order to desorb the bound cadmium ions from the biomass. The eluant is drawn through the biomass filter cake under a soft vacuum resulting in intimate contact between the eluant and the solids. The elution step regenerates the biomass for subsequent biosorption steps and also greatly concentrates the cadmium in the eluate with respect to the original wastewater. Finally, the cadmium is recovered from the eluate by electrolysis using a Rotating Cathode Cell, resulting in cadmium powder and cadmium-depleted electrolyte which is recycled as the eluant. This process is therefore capable of achieving very effective cadmium removal and produces only clean water and solid metal, both commercially useful products. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium Recovery, Biosorption, Streptomyces, Flotation, Sedimentation, Metal Desorption, Electrolysis, Rotating Cathode Cell, Clean Technology, Water Re-Use

Apak, R., Tütem, E., Hügül, M. and Hizal, J. (1998), Heavy metal cation retention by unconventional sorbents (red muds and fly ashes). *Water Research*, **32** (2), 430-440.

Full Text: [W\Wat Res32, 430.pdf](W/Wat%20Res32,%20430.pdf)

Abstract: Toxic heavy metals, i.e. copper(II), lead(II) and cadmium(II), can be removed from water by metallurgical solid wastes, i.e. bauxite waste red muds and coal fly ashes acting as sorbents. These heavy-metal-loaded solid wastes mag then be solidified by adding cement to a durable concrete mass assuring their safe disposal. Thus, toxic metals in water have been removed by sorption on to inexpensive solid waste materials as a preliminary operation of ultimate fixation. Metal uptake (sorption) and release (desorption) have been investigated by thermostatic batch experiments. The distribution ratios of metals between the solid sorbent and aqueous solution have been found as a function of sorbent type, equilibrium aqueous concentration of metal and temperature. The breakthrough volumes of the heavy metalsolutions have been measured by dynamic column experiments so as to determine the saturation capacities of the sorbents. The sorption data have been analysed and fitted to linearized adsorption isotherms. These observations are believed to constitute a database for the treatment of one industrial plant’s effluent with the solid waste of another, and also to utilize unconventional sorbents, i.e. metallurgical solid wastes, as cost-effective substitutes in place of the classical hydrous-oxide-type sorbents such as alumina, silica and ferric oxides.

Keywords: Silica-Gel Surface, Aqueous-Solutions, Sorptive Removal, Activated Carbon, Waste-Water, Adsorption, Cadmium, Cesium-137, Behavior, Sr-90, Cadmium(II), Lead(II), Copper(II), Sorption, Red Muds, Fly Ashes

Gharaibeh, S.H., Abu-El-Sha’r, W.Y. and Al-Kofahi, M.M. (1998), Removal of selected heavy metals from aqueous solutions using processed solid residue of olive mill products. *Water Research*, **32** (2), 498-502.

Full Text: [W\Wat Res32, 498.pdf](W/Wat%20Res32,%20498.pdf)

Abstract: The potential use of processed solid residue of olive mill products (SROOMP) to treat drinking water containing several heavy metals in trace concentrations, namely Cr(III), Ni(II), Pb(II), Cd(II), and Zn(II), was explored. Different experimental approaches including equilibrium batch mode experiments, S.C.anning electron microscopy (SEM), and X-ray fluorescence (XRF) were used to explore the feasibility of this material as an adsorbent far the removal of these heavy metals from aqueous solutions. Results indicate that SROOMP can be used to remove Pb(II) and Zn(II) from aqueous solutions by adsorption (data best fit Fruenlich isotherm) but does not remove the other heavy metals investigated in this study. (C) 1998 Elsevier Science Ltd. All rights reserved.

? Zhang, M., Tay, J.H., Qian, Y. and Gu, X.S. (1998), Coke plant wastewater treatment by fixed biofilm system for COD and NH3-N removal. *Water Research*, **32** (2), 519-527.

Full Text: [1998\Wat Res32, 519.pdf](1998/Wat%20Res32,%20519.pdf)

Abstract: Coke plant and coal gasification wastewater have similar characteristics. There are high concentrations of ammonia and organic compounds especially refractory and inhibitory organics in them. Coal is the main energy resource in China hence pollution caused by coke plant and coal gasification wastewater has been severe for decades. The anaerobic-anoxic-oxic (A(1)-A(2)-O) fixed biofilm system was used for coke plant wastewater treatment in this study. The experimental results showed that this system was efficient and stable in NH3-N and COD reductions. The effluent NH3-N and COD were 3.1, 114 mg/l with removal efficiencies of 98.8 and 92.4%, respectively, when the total HRT of the whole system was 31.6 hours. Microorganisms were enumerated and organic transformation in the system was analyzed by GC/MS equipment. Batch tests were also conducted and it was found that anaerobic treatment of coke plant wastewater differed from anoxic treatment. Biodegradable phenolics were removed at lower efficiencies while complicated and high molecular a eight organics were removed at higher efficiencies by anaerobic treatment in comparison with anoxic treatment. The biodegradability of anaerobic effluent was higher than that of anoxic effluent. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobic, Anoxic, Cod Removal, Coke Plant Wastewater, GC, MS, Microorganic Enumeration, NH3-N Removal, Organic Compounds, Organics Removal, Oxic, Wastewater, Wastewater Treatment, Water

Lawton, L.A., Cornish, B.J.P.A. and Macdonald, A.W.R. (1998), Removal of cyanobacterial toxins (microcystins) and cyanobacterial cells from drinking water using domestic water filters. *Water Research*, **32** (3), 633-638.

Full Text: [W\Wat Res32, 633.pdf](W/Wat%20Res32,%20633.pdf)

Abstract: Toxic cyanobacteria are increasingly found in drinking water reservoirs, with cells and/or dissolved toxins entering the potable water supply. The most commonly observed group of cyanobacterial toxins is the microcystins, and concern about their impact on human health has prompted investigations into remedial treatment methods. This study investigates the ability of domestic water filters to remove cyanobacterial cells and microcystins from drinking water. Cyanobacterial cell were removed by the filter, but the percentage removal (c. 60% of filamentous cells compared to only 10% of single cells) appeared to be dependent on the colony morphology. The removal of four microcystins was assessed and their percentage removal varied little, although microcystins-LR appeared to be removed to a slightly lesser extent. Toxin concentration and the presence of cell components did not affect the amount of soluble toxin removed from water. The performance of three different brands of water filter was compared, assessing the reproducibility of cartridges and their efficiency when both new and at the manufacturers recommended half-life. All brands of water filters investigated were found to remove a proportion of the soluble microcystin; however, none removed all the toxin in a single passage through the filter. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Blue-Green-Algae, Protein Phosphatase-1, Activated Carbon, LR, Purification, Adsorption, Microcystins, Cyanobacteria, Blue-Green Algae, Drinking Water

Majone, M., Papini, M.P. and Rolle, E. (1998), Influence of metalspeciation in landfill leachates on kaolinite sorption. *Water Research*, **32** (3), 882-890.

Full Text: [W\Wat Res32, 882.pdf](W/Wat%20Res32,%20882.pdf)

Abstract: The sorption onto kaolinite of Pb, Cd, Ni and Cu from a landfill leachate was studied in relation to the metalspeciation in the liquid phase. Metal speciation was determined by two different experimental procedures based on the exchangeability on a cation chelating resin (Chelex100) and on the separation by dialysis with membranes at different molecular weight (MW) cut off. The speciation procedures were applied on the leachate before and after equilibration with clay, in order to determine the contribution of the different fractions to the total sorption. As determined by the MW-based procedure, large fractions of dissolved metals were associated to substances with high MW (> 1000 and > 12000 daltons), even if these substances represent only 18% of the total organic content (as determined by chemical oxygen demand, COD). These high-MW fractions contribute to metalsorption onto kaolinite, as also confirmed by the concurrent removal of COD and phenolic substances. As determined by the exchange-based procedure, the main contribution to metalsorption derived from free/labile (rapidly exchangeable) or slowly exchangeable Fractions. However, Pb and Cd were also removed from the stable/inert (not exchangeable) fraction. Because metalsorption is partially due to species that are not exchangeable on Chelex100 and partially to species that have MW more than 1000 daltons, these experimental evidences strongly support that free metals are not the only species participating in the sorption onto kaolinite and that some metalspecies are adsorbed without previous dissociation.

Keywords: Solute Adsorption-Isotherm, Solid-Waste Leachates, Organic-Matter, General Treatment, Cadmium, Identification, Substances, Classification, Separation, Dialysis, Landfill Leachates, Heavy Metals, Speciation, Soil Sorption

Kuan, W.H., Lo, S.L., Wang, M.K. and Lin, C.F. (1998), Removal of Se(IV) and Se(VI) from water by aluminum-oxide-coated sand. *Water Research*, **32** (3), 915-923.

Full Text: [W\Wat Res32, 915.pdf](W/Wat%20Res32,%20915.pdf)

Abstract: Aluminum-oxide-coated sand (AOCS) was evaluated for the removal of selenite (Se(IV)) and selenate (Se(VI)) from water. Quartz sand was coated at 70°C using 1 M AlCl3 solution aging for 2 d at various coating pH (pH(coating)). The characteristics of the AOCS surface were pH-(coating)-dependent. The Al oxide coating was an X-ray noncrystalline, porous compound at low pH(coating), while at high pH(coating) the AOCS could better withstand acid/alkali and the coatings tended to form crystalline boehmite and bayerite. Adsorption of Se(IV) and Se(VI) was more effective using sand coated at low pH(coating) than at high pH(coating). AOCS produced at pH(coating) 5.98 had optimum properties and was employed as the adsorbent for the present adsorption studies. Adsorption experiments of Se(IV) and Se(VI) by AOCS performed as a function of pH, initial concentration, reaction time, and competing ion concentrations were examined. Removal of Se(IV) and Se(IV) increased with decreasing pH but was obviously greater for Se(IV) than Se(VI). In Se(IV) and Se(VI) mixed systems, the adsorption of Se(IV) was evidently inhibited by Se(VI) only at system pH ranging from 3 to 8, and the degree of inhibition was similar at Se(VI) to Se(IV) molar ratios of 1 and 3. However, Se(VI) adsorption significantly decreased with increasing Se(IV) concentration at all system pH. The sequence of foreign anions competing with respect to Se(IV) and Se(VI) adsorption was in the order of SO42-> HCO3-. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Iron-Oxide, Selenite Adsorption, Sulfate Adsorption, Surface-Charge, Mixed Oxides, Interface, Goethite, Complexation, Sorption, Selenate, Aluminum-Oxide-Coated Sand, Se(IV), Se(VI), Coating, Adsorption

Namasivayam, C. and Ranganathan, K. (1998), Effect of organic ligands on the removal of Pb(II), Ni(II) and Cd(II) by ‘waste’ Fe(III)/Cr(III) hydroxide. *Water Research*, **32** (3), 969-971.

Full Text: [W\Wat Res32, 969.pdf](W/Wat%20Res32,%20969.pdf)

Abstract: Adsorption of metal ions such as Pb(II), Ni(II) and Cd(II) onto ‘waste’ Fe(III)/Cr(III) hydroxide was studied both in the presence and absence of ligands such as ethylenediamine tetraacetic acid, citrate and acetate. All three ligands decreased the adsorption of Pb(II) in the pH range 3.5 to 8.5. Citrate and EDTA considerably decreased the adsorption of NI(II) but acetate showed a slight increase in adsorption. Cadmium adsorption decreased significantly in the presence of acetate and citrate.

Keywords: Complexing Ligands, Adsorption, Water, Cadmium, Adsorption, Metal Ions, Fe(III)/Cr(III) Hydroxide, Ligands

López-Delgado, A., Pérez, C. and López, F.A. (1998), Sorption of heavy metals on blast furnace sludge. *Water Research*, **32** (4), 989-996.

Full Text: [W\Wat Res32, 989.pdf](W/Wat%20Res32,%20989.pdf)

Abstract: An investigation into the use of sludge, a by-product of the steel industry, as an adsorbent for the removal of heavy metals from liquid effluents was carried out. Gases produced in the blast furnace were washed and led towards a Dorr thickener where the sludge was obtained as a suspension. The sorption of Pb2+, Zn2+, Cd2+, Cu2+ and Cr3+ on the sludge was investigated by determination of adsorption isotherms. The effects of time, equilibrium temperature and concentration of metalsolution on sludge adsorption efficiency was evaluated. The adsorption process was analyzed using the theories of Freundlich and Langmuir and the thermodynamic values of Delta G, Delta H and Delta S corresponding to each adsorption process were calculated. Blast furnace sludge was found to be an effective sorbent for Pb, Zn, Cd, Cu and Cr-ions within the range of ion concentrations employed.

Keywords: Aqueous-Solution, Adsorption, Ions, Adsorption, Heavy Metals, Industrial Effluents, Blast Furnace Sludge, Waste

Ivancev-Tumbas, I., Dalmacija, B., Tamas, Z. and Karlovic, E. (1998), Reuse of biologically regenerated activated carbon for phenol removal. *Water Research*, **32** (4), 1085-1094.

Full Text: [W\Wat Res32, 1085.pdf](W/Wat%20Res32,%201085.pdf)

Abstract: Granular biologically activated carbon (GBAC) is in principle suited for removal of phenolic substrate from wastewater. In this study a wastewater model was used and special attention was paid to the operation of separate aerobic bioregeneration of carbon and reuse of bioregenerated carbon in a new stage of the experiment. In order to assess the effectiveness of bioregeneration, the efficiency of the biosorption system both before and after its bioregeneration was monitored at the substrate concentrations ranging from 1.9 to 1053 mgl-1. All kinetic parameters for the biosorption system were determined for both fresh and already used GBAC. A 92-100% efficiency of phenol removal was achieved irrespective of whether the fresh or bioregenerated GBAC was used. The process of bioregeneration for the once-used GBAC was faster than for the one that was used several times. It was also faster when phenol alone was used as substrate than in the case of a phenol mixture. Respirometric measurements indicated that a mixture of substituted phenols showed inhibition effects on microorganisms. Calculations based on these measurements, as well as the findings of GC/MS analysis. indicated that deterioration of the adsorbent quality was taking place continuously. It was concluded that bioregeneration, carried out as a separate operation, could not be recommended for practice.

Keywords: Substituted Phenols, Waste-Water, Adsorption, Biosorption, Degradation, Bioregeneration, Granulated Biologically Activated Carbon, Phenol, Biodegradation, Respirometry, Biosorption

Zhou, M.L., Martin, G., Taha, S. and, Sant’Anna, F. (1998), Adsorption isotherm comparison and modelling in liquid phase onto activated carbon. *Water Research*, **32** (4), 1109-1118.

Full Text: [W\Wat Res32, 1109.pdf](W/Wat%20Res32,%201109.pdf)

Abstract: Activated carbon is used in many processes for the treatment of aqueous solutions or the cleaning of industrial waste water. If we want to know the dimension of a reactor, using an adsorbant material, it is necessary to provide the capacity and rate of adsorption. The study of the adsorption equilibrium allows the estimation of the material capacity to adsorb various molecules. The representation of adsorption isotherm onto activated carbon can be based on models with two, three or even more parameters. Nevertheless, when solute concentrations vary over many orders of magnitude (e.g. 10-4 to 20 mmol.l-1) (Snoeyink et at, 1969; Jossens et nl., 1978), the equations with two parameters cannot match the experimental results. Meanwhile, the equations with three parameters (Redlich and Peterson, 1959; Jossens er nl., 1978) match the experimental results better (Radke and Prausnitz, 1972; Mathews and Su, 1983).

The aim of this work is to compare the different adsorption isotherms in solution For aromatic compounds (nitrobenzene, benzaldehyde, nitro-4-phenol, 4-cresol, phenol and aniline) onto activated carbon Picactif NC60. Four representations of models with 2 or 3 parameters are discussed. The models with two parameters (Langmuir, 1915; Freundlich and Heller, 1939) fit experimental data over a narrow solute concentration range (Figs 3 and 4). For the Langmuir equation, the linear method has an effect on the estimation of isotherm parameters and simulation precision (Tables 1 and 2).

The values of q(m) obtained by linear method (I) are always lower than the values obtained by linear method (ir). On the other hand, the values of parameter b obtained by linear method (I) are higher than the values obtained by linear method (II). The method (I) leads to a higher absolute, standard deviation and a lower relative standard deviation, than those obtained by linear method (II). Therefore, linear methods (I) and (II) are unsuitable because neither of them takes the measurement range into account.

For a wide concentration range, models with three parameters (Redlich-Peterson and Jossens-Myers) correlate better to experimental results (Figs 5 and 6). Since if is based on the values of standard deviation (Table 2) for the studied molecules, the equation of Jossen-Myers is slightly better than the Redlich-Peterson one. According to these isotherm equations and calculated results (Table 3), we can give an average order of adsorbability for the studied compounds: (nitrobenzene > benzaldehyde > nitro-4-phenol > 4-cresol > phenol > aniline).

Keywords: Adsorption Isotherm, Model, Activated Carbon, Aromatic Compounds, Chromatography, Surface

Daifullah, A.A.M. and Girgis, B.S. (1998), Removal of some substituted phenols by activated carbon obtained from agricultural waste. *Water Research*, **32** (4), 1169-1177.

Full Text: [W\Wat Res32, 1169.pdf](W/Wat%20Res32,%201169.pdf)

Abstract: Equilibrium removal of phenol (P), m-, p-Cresol (Cr), 2- chlorophenol (2-CP), 4-nitrophenol (4-NP), 2,4-dichlorophenol (2,4-dCP), and 2,4-dinitrophenol (2,4-dNP) was tested by adsorption onto activated carbon prepared from apricot stone shells by chemical treatment with H3PO4 Disubstituted phenols are adsorbed in larger amounts than monosubstituted ones. No clear correlation seems to hold between the amount removed and texture characteristics of the sorbent. Uptake of phenols increases in the order P, Cr < 2-CP < 4-NP < 2,4-dNP < 2,4-dCP, which correlates well with respective increase in molecular dimensions and acidity and decrease in solubility of the sorbates. Abnormality shown by 2,4-dNP as a drop in its removal, is due to strong adsorption at the entrace or inside certain pores thus limiting Further diffusion of solute molecules and/or probable molecular sieve effect. (C) 1998 Elsevier Science Ltd. All rights reserved.

Nowack, B. (1998), The behavior of phosphonates in wastewater treatment plants of Switzerland. *Water Research*, **32** (4), 1271-1279.

Full Text: [W\Wat Res32, 1271.pdf](W/Wat%20Res32,%201271.pdf)

Abstract: The behavior of three phosphonates in seven Swiss wastewater treatment plants was investigated. The phosphonates ATMP (aminotrismethylene-phosphonic acid) and EDTMP (ethylenediamine-tetramethylenephosphonic acid) were found in the influents of wastewater treatment plants at concentrations between <0.05 µmoll-1 (detection limit) and 0.8 µmoll-1, DTPMP (diethylenetriamine-pentamethylenephosphonic acid) from <0.05 to 2 µmoll-1. The highest concentration was found in the influent of a wastewater treatment plant with significant input from the textile industry. The effluent of this wastewater treatment plant contained an average DTPMP concentration of 0.12 µmoll-1, which reflects a 85% decrease from the influent concentration. The phosphonate concentrations in all other effluents were below detectable levels. As phosphonates are not biodegradable, the elimination must be due to sorption processes. The phosphonates are almost quantitatively transferred to the anaerobic digester. The investigation of the anaerobic degradation showed no evidence for mineralization. Compared to EDTA (ethylenediaminetetraacetic acid) which is not eliminated during wastewater treatment, phosphonates have less impact on the metalspeciation in natural waters.

Keywords: Environmental Fate, Sludge Adsorption, Degradability, Speciation, Mobility, Water, Soils, EDTA, Phosphonates, Atmp, Edtmp, Dtpmp, EDTA, Sewage Treatment, Elimination, Anaerobic Degradation, Environmental Impact

Gonçalves, E.P. and Boaventura, R.A.R. (1998), Uptake and release kinetics of copper by the aquatic moss Fontinalis antipyretica. *Water Research*, **32** (4), 1305-1313.

Full Text: [W\Wat Res32, 1305.pdf](W/Wat%20Res32,%201305.pdf)

Abstract: Copper uptake and release rates by Fontinalis antipyretica were investigated. A contamination stage in which the plants were exposed to Cu concentrations in the range 0.09-0.75 mg l-1 was followed by a decontamination period, exposing the plants to metal-free water. Tanks were operated in perfectly mixed conditions and the illumination at water surface was 740 lux. Short and long duration experiments (217 and 1008 h, respectively) were carried out with plants collected in May and August, respectively. A simple mass transfer model was fitted to the experimental results in order to determine the uptake and release rate constants, k1 and k2, the Cu concentration at the end of the uptake phase, C-mu, and the equilibrium concentrations, C-me and C-mr, for the contamination and decontamination stages, respectively. In the short duration experiment, k1 decreased from 846 to 628 h-1 as Cu concentration increased from 0.14 to 0.60 mg l-1 In the long duration one, with plants in different physiological conditions, k(1) decreased From 448 to 293 h-1 as Cu concentration increased from 0.09 to 0.75 mg l-1. The release rate constant, k2, appears not to depend on the Cu concentration and averaged 0.020 and 0.011 h-1 in the first and second experiments, respectively. The ratio k1/k2 represents a bioconcentration factor, BCF (Cu concentration in the plant, dry wt/Cu concentration in the water). BCF values ranged between 40,000 and 30,000. A biological elimination factor

(BEF = 1-(C-mr/C-mu)

was also calculated. BEF values slightly increased with C-mu, varying from 0.58 to 0.62 (5203 < Cµ< 15762 mg kg-1 dry wt.) and from 0.46 to 0.66 (3127 < Cµ <23773 mg kg-1 dry wt.) in the short and long duration experiments, respectively. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: River Basin Portugal, Heavy-Metals, Rhynchostegium-Riparioides, Waste-Water, Accumulation, Pollution, Bryophytes, Plants, Sediments, Chromium

López, E., Soto, B., Arias, M., Núñez, A., Rubinos, D. and Barral, M.T. (1998), Adsorbent properties of red mud and its use for wastewater treatment. *Water Research*, **32** (4), 1314-1322.

Full Text: [W\Wat Res32, 1314.pdf](W/Wat%20Res32,%201314.pdf)

Abstract: With a view to simultaneously conserving the environment and an important natural resource, we assessed the feasibility of using red mud (RM), a residue from bauxite refining, for wastewater treatment. Moistened mixtures of RM and 8% (w/w) CaSO4 form aggregates which are stable in aqueous media. Batch experiments examining adsorption of phosphorus (P) by these aggregates for contact times of 3, 6, 24 and 48 h indicated that adsorption occurred by both fast and slow reactions. Likewise, comparison of experimental breakthrough curves (BTCs) for P retention on a column of RM aggregates (residence time 3 h) with MCMFIT-simulated BTCs indicated that fast and slow adsorption reactions were occurring. Actual P retention was predicted, taking into account both kinetics of fast and slow adsorption reactions. The RM aggregates had maximum adsorption capacities (evaluated from fits (0.90 < R2 < 0.99) of the Langmuir isotherm to batch adsorption data for contact time 48 h) for Cu2+, Zn2+, Ni2+ and Cd2+ of 19.72, 12.59, 10.95 and 10.57 mpg-1, respectively. In continuous adsorption experiments in which secondary effluent from an urban sewage treatment plant was percolated through RM aggregates packed into columns, purification efficiencies for P, Ni2+, Cu2+ and Zn2+ were 100, 100, 68 and 56% respectively. Aggregated RM is suitable for treatment of wastewaters, in particular those whose principal contaminants are P or heavy metals.

Keywords: Sewage Effluent, Amended Sand, Equilibrium, Phosphorus, Removal, Columns, Red Mud, Aggregation, Adsorption, Metals, Phosphorus, Column Experiments, Wastewater, Purification

Cabrero, A., Fernandez, S., Mirada, F. and Garcia, J. (1998), Effects of copper and zinc on the activated sludge bacteria growth kinetics. *Water Research*, **32** (5), 1355-1362.

Full Text: [W\Wat Res32, 1355.pdf](W/Wat%20Res32,%201355.pdf)

Abstract: A simple experimental set-up has been proposed to study the influence of Cu(II) and Zn(II) on the activated sludge growth kinetics by following the rate of change on biomass concentration during batch growth experiments. Data on biomass were fitted to a sigmoidal equation providing us the main biokinetics parameters (Y-xs, and μm). Inocula seeded to the system was obtained from a wastewater treatment plant operating at 14 days cell residence time. A synthetic feed solution containing 2000 mg/l gelatin (corresponding to 1630 mg/l COD) served as source of carbon. Different concentrations of Cu(II) and Zn(II) (1, 5, 10 and 20 mg/l) were introduced singly in the reactors keeping all environmental parameters constant (pH, T-a, basic nutrients). The combined effects of Cu(II) and Zn(II) were determined by mixing these metallic ions (5/5, 5/10, and 10/5 mg/l of Cu(II)/Zn(II) respectively). Experimental data showed that Zn(II) was less toxic than Cu(II), as expressed by a slight stimulating effect for 1 mg/l Zn(II). Moreover, biokinetic parameters were nor adversely affected by the presence of Cu(II) up to a concentration of 5 mg/l. However, a concentration of 10 mg/l and higher, caused serious upsets in the system. Combined effects of copper and zinc on the activated sludge growth kinetics, indicated that these two heavy metals acted neither synergistically nor antagonistically. The sigmoidal model very well fits the experimental data and could be used in a simulation study. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Sludge, Growth Kinetics, Heavy Metals, Wastewater, Sigmoidal Equation, Cu(II), Models

Tobin, J.M. and Roux, J.C. (1998), Mucor biosorbent for chromium removal from tanning effluent. *Water Research*, **32** (5), 1407-1416.

Full Text: [W\Wat Res32, 1407.pdf](W/Wat%20Res32,%201407.pdf)

Abstract: Waste industrial Muco, meihi biomass was found to be an effective biosorbent for the removal of chromium from industrial tanning effluents. Sorption levels of 1.15 and 0.7 mmol/g were observed at pH 4 and 2 respectively while precipitation effects augmented these values at higher pH ranges. Acid elution of biosorbed chromium increased with decreasing eluant pH to a maximium value of ca. 30% at approximately zero pH. Successive elution stages with increasingly strong acids resulted in a cumulative chromium recovery of in excess of 80%. Both acid and base treatments eluted biosorbed chromium and successive acid/base and base/acid treatments resulted in recovery values approaching 100% at low metal loadings. These values decreased to 80 to 60% at higher biomass metal loadings. in comparative studies with ion exchange resins, the Mucor biomass demonstrated chromium biosorption levels that correspond closely to those of commercial strongly acidic exchange resin while the pH behaviour mirrored that of the weakly acidic resins in solution. The chromium elution characteristics from the Mucor biomass were similar to those of both the weakly and strongly acid resins. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Chromium, Biosorption, Fungal Biomass, Tanning Effluent, Metal Uptake, Mucor Biosorbent, *Rhizopus-arrhizus* Biomass, *Saccharomyces-cerevisiae*, Metal-Ions, Biosorption, Copper, Adsorption, Mechanisms, Desorption, Recovery, Cadmium

Zhang, L., Zhao, L., Yu, Y.T. and Chen, C.Z. (1998), Removal of lead from aqueous solution by non-living *Rhizopus nigricans*. *Water Research*, **32** (5), 1437-1444.

Full Text: [W\Wat Res32, 1437.pdf](W/Wat%20Res32,%201437.pdf)

Abstract: Non-living *Rhizopus nigricans* obtained as waste byproduct from the pharmaceutical fermentation industry has been used for adsorption of lead over a range of metal ion concentrations, adsorption time, pH and co-ions. The process of uptake obeys both the Langmuir and Freundlich isotherms. The mechanism of lead sequestering by this type of biomass was also studied by using experimental techniques such as electron microscopy, X-ray energy dispersion analysis and IR spectroscopy. Comparison of uptake between NaOH-treated and untreated biomass shows that the adsorption takes place in the chitin structure of the cell wall.

Keywords: Biosorption, Uranium, *Rhizopus nigricans*, Lead Ion, Adsorption, Mechanism

Min, J.H. and Hering, J.G. (1998), Arsenate sorption by Fe(III)-doped alginate gels. *Water Research*, **32** (5), 1544-1552.

Full Text: [W\Wat Res32, 1544.pdf](W/Wat%20Res32,%201544.pdf)

Abstract: Although cationic metal contaminants can be effectively removed From wastewaters by treatment with biopolymers, application of biopolymers for the removal of anionic contaminants (such as As, Cr(VI), and Se) has been limited. The objective of this study was to examine the fundamental aspects of a possible remediation strategy for removal of anionic metalspecies employing the biopolymer alginic acid pretreated with Ca and Fe(III). Spherical gel beads (2 mm in diameter) were formed by dispensing the biopolymer solution dropwise into 0.1 M CaCl2; Ca beads were then washed and equilibrated with 0.1 M FeCl3 to achieve partial substitution of Fe(III) for Ca. The resulting Ca-Fe beads were found to be effective at removing As(V) from solution on a time scale of approximately 100 h. As(V) sorption was pH dependent; optimal removal and stability of the Ca-Fe beads was achieved at pH 4. At a given initial As(V) concentration, As(V) removal efficiency increased with increasing Fe content (number of beads); at an initial As(V) concentration of 400 µg/l, up to 94% removal was achieved at pH 4 after 120 h. For a given Fe content, uptake of As(V) increased with increasing initial As(V) concentration until saturation was reached. Sorption data was modeled using a single type of As(V) binding site. Data on As(V) sorption as a function of dissolved As(V) concentration and Fe content were used to obtain and validate the site density and conditional affinity constant for As(V) sorption.

Keywords: Physicochemical Properties, Semiconductor Industry, Waste Generation, Activated Carbon, Beads, Removal, Equilibrium, Adsorption, Recovery, Reactor, Oxyanion, Arsenic, Arsenate, Biopolymer, Alginate, Gel Bead, Fe(III)-Doped, Removal, Wastewaters

Uranowski, L.J., Tessmer, C.H. and Vidic, R.D. (1998), The effect of surface metal oxides on activated carbon adsorption of phenolics. *Water Research*, **32** (6), 1841-1851.

Full Text: [W\Wat Res32, 1841.pdf](W/Wat%20Res32,%201841.pdf)

Abstract: The adsorptive capacity of granular activated carbon (GAC) for many phenolic compounds has been found to increase in the presence of molecular oxygen (oxic condition). This enhanced adsorption is due to oxidative coupling of the adsorbed molecules and is accompanied by significant oxygen consumption and decreased adsorbate recovery by solvent extraction. The present study investigated the possible catalytic effect of metals and metal oxides on activated carbon surface for this reaction. The ash and metal content of seven GACs were compared to the enhanced adsorption found under the oxic conditions, oxygen consumption during adsorption and adsorbate recovery. No correlation between ash or metal content and these parameters was found. Reduction of metal content by acid washing did not impact the adsorptive properties of the carbon. In addition, a carbonaceous resin impregnated with metal oxides of copper, iron and manganese showed no ability to promote oxidative coupling of phenolics. The results of this study suggest that acid-washable metals and metal oxides that are present on the surface of activated carbon are not a key factor in promoting oligomerization of adsorbates in the presence of oxygen.

Kapoor, A. and Viraraghavan, T. (1998), Removal of heavy metals from aqueous solutions using immobilized fungal biomass in continuous mode. *Water Research*, **32** (6), 1968-1977.

Full Text: [W\Wat Res32, 1968.pdf](W/Wat%20Res32,%201968.pdf)

Abstract: Fungal microorganisms are being increasingly studied for the removal of heavy metal ions from aqueous solutions. The fungal biomass in powdered form is commonly used in metal adsorption studies. The use of powdered biomass can pose problems in its application in batch and continuous (column) type reactors treating wastewaters because fungal biomass becomes soft in contact with water, has low density, is difficult to separate from treated wastewater and fixed bed reactors using it can easily clog. Immobilization of fungal biomass in a solid polymer matrix will facilitate their application in industrial systems treating heavy metal bearing wastewater. In this study, *A. niger* biomass was immobilized in a polysulfone matrix. For this purpose an immobilizing unit was fabricated to produce an immobilized biomass matrix of spherical shape. The beads were found to have a porous structure. Majority of the beads had particle sizes in the range of 2.00 to 0.841 mm. The biomass beads packed in a column were able to remove metal ions such as cadmium, copper, lead and nickel. The breakthrough data obtained for cadmium, copper, lead and nickel was adequately described by the Thomas adsorption model. The amounts of metal adsorbed per unit weight of beads for cadmium, copper, lead and nickel were 3.60, 2.89, 10.05, and 1.08 mg/g respectively. The adsorbed metal ions were easily eluted from the column using 0.05N nitric acid. These beads may be easier to use in industrial wastewater treatment systems in comparison with the fungal biomass powder.

Keywords: Cadmium, Ions, Biosorbents, Biosorption, Wastewaters, Parameters, Sorption, Cu(II), *Aspergillus niger*, Adsorption, Immobilization, Cadmium, Copper, Lead, Nickel, Desorption

Yoon, S.H., Lee, C.H., Kim, K.J. and Fane, A.G. (1998), Effect of calcium ion on the fouling of nanofilter by humic acid in drinking water production. *Water Research*, **32** (7), 2180-2186.

Full Text: [W\Wat Res32, 2180.pdf](W/Wat%20Res32,%202180.pdf)

Abstract: The influence of the charge of humic acid (HA) on the fouling of nanofilters was investigated as a Function of pH and concentration of calcium ions. The charge of the humic acid as well as the zeta-potential of the membrane surface were measured to elucidate the mechanism of humic acid deposition on the membrane surface. The negative charge of humic acid as well as the negative zeta-potential of the membrane surface fouled with humic acid increased with higher pH. As a result the further deposition of humic acid on the membrane surface was expected to decrease with higher pH because of larger repulsive forces. With moderate calcium ion concentration, however, the adsorption of humic acid onto the membrane surface decreased until neutral pH and then increased again. It was attributed to calcium ion bridging between two free functional groups of humic acids. Calcium ion rejection decreased in the presence of humic acid deposited on membrane surface. This could be explained by the effect of humic acid on the net charge of the membrane. The addition of calcium chelating agent, EDTA, improved flux, especially at alkaline conditions. The diagram of Ca-EDTA vs pH was used to explain the flux improvement. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Ultrafiltration Membranes, Substances, Adsorption, Diffusion, Humic Acid, Nanofiltration, Calcium Ion, Zeta-Potential, EDTA

Tütem, E., Apak, R. and Ünal, Ç.F. (1998), Adsorptive removal of chlorophenols from water by bituminous shale. *Water Research*, **32** (8), 2315-2324.

Full Text: [W\Wat Res32, 2315.pdf](W/Wat%20Res32,%202315.pdf)

Abstract: Chlorophenols are among priority water pollutants which are taken up by aquatic fauna and flora and enriched in the food chains. Acid-activated bituminous shale has been used as an adsorbent for the removal of 2-chlorophenol (MCP) and 2,4-dichlorophenol (DCP) from water and the related process parameters were investigated. Kinetic analysis showed that the adsorption reaction could be approximated by a first-order rate equation for which pore-diffusion was the essential rate-controlling step. Adsorption was endothermic and basically of a physical character. Equilibrium modelling by linearized adsorption isotherms revealed that a Langmuir equation could well represent the observed data. The entropy change of adsorption was more positive for DCP due to its higher polarity. The saturation capacity of the sorbent for both chlorophenols were determined by dynamic column tests, this experimental capacity being lower than the theoretical monolayer capacity envisaged by the Langmuir equation. Adsorption was completely reversible as the retained DCP could be completely desorbed from the column with distilled water as eluant. The results were evaluated within the scope of utilization of cost-effective unconventional sorbents to remove chlorinated organics as possible substitutes for activated carbon. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: 2-Chlorophenol, 2,4-dichlorophenol, Adsorption, Bituminous Shale, Aqueous-Solutions, Activated Carbon, Fly-Ash, Unconventional Sorbents, Sorptive Removal, Waste-Water, Equilibrium, Cesium-137, Pollutants, Adsorbent

Cathalifaud, G., Ayele, J. and Mazet, M. (1998), Aluminium effect upon adsorption of natural fulvic acids onto PAC. *Water Research*, **32** (8), 2325-2334.

Full Text: [W\Wat Res32, 2325.pdf](W/Wat%20Res32,%202325.pdf)

Abstract: The removal of fulvic acids in natural water can be realised by several physico-chemical processes: activated carbon adsorption, coagulation-flocculation and oxidation. Activated carbon adsorption remains one of the most important processes used in water treatment. Many workers have demonstrated that the value of pH, the ionic composition, the temperature, the salt concentration and the type of carbon act upon the capacity of activated carbon to remove humic substances [Lee, M. C., Snoeyink, V. L. and Crittenden, J. C. (1981) Activated carbon adsorption of humic substances. JAWWA, 440-446; Randtke, S. J. and Jepsen, C. P. (1982) Effects of salts on actived carbon adsorption of fulvic acids. JAWWA 74, 84-93; Weber, W. J., Jr., Voice, T. C. and Jodellah, A. (1983) Adsorption of humic substances: The effect of heterogeneity and system characteristics. J. Am. Wat. Wks. Ass. 75, 612-619; Lafrance, P. and Mazet, M. (1985) Adsorption des acides humiques sur charbon active en poudre. Influence du triphosphate de sodium. Wat. Res. 19, 1059-1064]. Whereas the association of activated carbon and coagulant-flocculent for the removal of organic matter is usually used in the case of an accidental or chronical pollution, only few workers have studied the mechanisms of elimination. The purpose of the present study was to evaluate the percent of removal of natural fulvic acids onto powdered activated carbon and in the presence of aluminium salts. Initially, one method of dosage of the fulvic acids has been chosen. The KMnO4 oxidizability seemed to be the more efficient method because the pH and the presence of aluminium don’t affect the results. Secondly, curves of the function of the order of introduction of the components, function of the pH values and function of the presence or not of aluminium salts have been drawn. Our results (Fig. 9) show that the adsorption depends upon the values of the acidity constants (pKa) of the organic molecule, the order of introduction of the components, the PAC electrokinetic potential and the aluminium species (Al3+, Al(OH)2+, Al(OH)2+, Al(OH)3, Al(OH)4-, ...). The adsorption of the lone organic molecule was more important at low pH (80% of removal at pH 3) than at high pH (10% of removal at pH 8) and the removal decreased strongly between pH 4 and 6; this is certainly due to the formation of anionic substances (fulvates). The electrostatic interactions for a pH greater than 5.5 between PAC and aluminium salts are probably responsible for a modification in the adsorption of natural fulvic acids. If the pH is lower than 5.5 the adsorption of the organic molecule is increased because of a complexation between the fulvic acids and the aluminium ions.

Many workers have demonstrated that aluminium strongly complexes with organic molecules [Backes, C. A. and Tipping, E. (1987) Aluminium complexation by an aquatic humic fraction under acidic conditions. Wat. Res. 21(2) 211-216; Tipping, E., Backes, C. A. and Hurley, M. A. (1988) The complexation of protons, aluminium and calcium by aquatic humic substances: A model incorporating binding-site heterogeneity and macroionic effects. Wat. Res. 22(5) 597-611; Rakotonarivo, E., Tondre, C., Bottero, J. Y. and Mallevialle, J. (1989) Complexation de l’aluminium(III) polymerise et hydrolyse par les ions salicylate. Etude cinetique et thermodynamique. Wat. Res. 23(9) 1137-1145; Sikora, F. J. and McBride, M. B. (1989) Aluminium complexation by catechol as determined by ultraviolet spectrophotometry. Environ. Sci. Technol. 23(3) 349-356; Thomas, F., Bottero, J. Y., Masion, A. and Genevrier, F. (1990) Mechanism of aluminium III hydrolysis with acetic acid and oxalic acid. Geochemistry of the earth’s surface and of mineral formation. 2nd International Symposium, pp. 2-8. Aix en Provence; Cathalifaud, G., Ayele, J. and Mazet, M. (1997) Etude de la complexation des ions aluminium par des molecules organiques: Constantes et stoechiometrie des complexes. Application au traitement de potabilisation des eaux. Wat. Res. 31(4) 689-698]. The particular role of aluminium salts and pH in the adsorption of natural fulvic acids indicated that the carbon efficiency in removing humic substances can be significantly improved by the addition of aluminium salts in solution. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Coagulation, Adsorption, Activated Carbon, Aluminium, Natural Fulvic Acids, Activated-Carbon Adsorption, Aquatic Humic Substances, Complexation, Heterogeneity, Coagulation, Calcium, Salts, Ions

Gouzinis, A., Kosmidis, N., Vayenas, D.V. and Lyberatos, G. (1998), Removal of Mn and simultaneous removal of NH3, Fe and Mn from potable water using a trickling filter. *Water Research*, **32** (8), 2442-2450.

Full Text: [W\Wat Res32, 2442.pdf](W/Wat%20Res32,%202442.pdf)

Abstract: Manganese removal using a biological trickling filter was investigated. Manganese removal was found to be caused by both biological and chemical manganese oxidation. The extent of each oxidation type was assessed. The performance of the trickling filter was tested under both continuous and sequencing batch reactor operation. The effectiveness and throughput for each operational mode were determined as a function of retention time and the advantages of each operational mode were investigated. It was found that the continuous operational mode leads to higher percentage of manganese removal but lower throughput rates when compared with a sequencing batch reactor operation with the same feed concentration and retention time. A series of experiments was also performed in order to investigate the interactions between ammonia, iron and manganese removal when simultaneously present in a biological filter. For low ammonia concentrations there is no serious inhibition of manganese removal. For higher ammonia concentrations inhibition of manganese removal becomes substantial. The presence of iron affects both ammonia and manganese removal negatively, while ammonia and manganese do not significantly affect iron removal. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Ammonia, Biological Oxidation, Chemical Oxidation, Continuous Operation, Iron, Manganese, Potable Water Sequencing Batch Reactor Operation, Trickling Filter, Manganese

Hu, J.Y., Aizawa, T., Ookubo, Y., Morita, T. and Magara, Y. (1998), Adsorptive characteristics of ionogenic aromatic pesticides in water on powdered activated carbon. *Water Research*, **32** (9), 2593-2600.

Full Text: [W\Wat Res32, 2593.pdf](W/Wat%20Res32,%202593.pdf)

Abstract: The adsorptive characteristics of ionogenic pesticides on powdered activated carbon were described. The effects of pH on the adsorbabilities of MCPB (an acidic pesticide) and imazalil (a basic pesticide) onto-powdered activated carbon (PAC) were evaluated by correlating I-octanol-water partition coefficients (log P-ow) with the Freundlich adsorption constants over a pH range of 3 similar to 9. After being corrected with pH, the Values of log P-ow were found to be linearly related to the logarithm of k (i.e. log k). For MCPB, log k as well as log P-ow decreased with the increase of pH in the range of pH > pK (a) and became constant in the range of pH < pK (a) and vise versa for imazalil. Adsorption of ionic species ante PAC became negligible at an ionic strength of similar to 10-3 M when pH-pK (a) was lower than 4 for MCPB and pH-pK (a) higher than-4 for imazalil. Similar relationship between log k and log-p-ow was obtained for other four acidic pesticides (bentazone, : pentachlorophenol, denoseb and MCPP) and two neutral pesticides (imidacloprid and linuron), which suggested that the log P-ow values mainly determined the adsorbabilities of these pesticides onto PAC. The calculation results showed that the activated carbon amount needed (ACAN) for lowering pesticide concentration from 500 to 50 µg/l was also linearly related to log P-ow, and the ACAN for bentazone (log P-ow, 0.11 at pH = 7) Was 51.9 mg/l, while that for imazalil (log P-ow, 3.80 at pH = 8.0)was 3.1 mg/l. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Organic-Compounds, Aqueous-Solution, Chlorinated Phenols, Sorption, Octanol, Activated Carbon Adsorption, 1-Octanol-Water Partition Coefficient, Ionogenic Aromatic Pesticides, Drinking Water Treatment, Dissociation Constant, pH

Lücking, F., Köser, H., Jank, M. and Ritter, A. (1998), Iron powder, graphite and activated carbon as catalysts for the oxidation of 4-chlorophenol with hydrogen peroxide in aqueous solution. *Water Research*, **32** (9), 2607-2614.

Full Text: [W\Wat Res32, 2607.pdf](W/Wat%20Res32,%202607.pdf)

Abstract: Solid materials as iron powder, graphite and activated carbon were tested for their catalytic properties for the oxidation of 4-chlorophenol in aqueous solution with hydrogen peroxide. Batch tests were performed at 30°C, and continuous tests with granular activated carbon under ambient conditions (20°C). Iron powder was shown to act as a catalyst for the activation of hydrogen peroxide and owing to this for the oxidation of 4-chlorophenol. The catalytic activity is based on iron ions leached from the iron powder which act as homogeneous catalysts. Thus, the process can be described as a Fenton reaction enabled by a dissolution of iron powder. The same phenomenon was observed when iron impregnated activated carbon was applied as a catalyst. In contrast to iron powder, graphite and activated carbon were found to act as heterogeneous catalysts for the activation of hydrogen peroxide and the oxidation of 4-chlorophenol. During the oxidation of 4-chlorophenol with activated carbon as a catalyst the decomposition of H2O2 is significantly slower than in the absence of 4-chlorophenol. This can be explained by the adsorption of 4-chlorophenol, due to which the surface area of the activated carbon available for the decomposition of H2O2, is reduced. At the same concentration of catalytic material in batch tests, the oxidation of 4-chlorophenol proceeds much faster when iron powder instead of graphite or activated carbon is used. On the other hand, graphite and activated carbon are stable catalysts not affected by dissolution processes. Activated carbon can be utilized for a continuous process in a fixed bed reactor. For this purpose the efficiency of 4-chlorophenol oxidation in granular activated carbon filled columns was investigated and a 25% conversion of the 4-chlorophenol (1 g l−1) was achieved at a retention time of 26 min.

Keywords: Iron Powder, Graphite, Activated Carbon, Hydrogen Peroxide, 4-Chlorophenol, Aqueous Phase Oxidation

Sing, C. and Yu, J. (1998), Copper adsorption and removal from water by living mycelium of white-rot fungus Phanerochaete chrysosporium. *Water Research*, **32** (9), 2746-2752.

Full Text: [W\Wat Res32, 2746.pdf](W/Wat%20Res32,%202746.pdf)

Abstract: Adsorption of copper cation(II) in aqueous solutions by living mycelium pellets of Phanerochete chrysosporium was investigated to study the effects of metal concentration, pH, organic solvents and common cation. The maximum copper adsorption capacity of the fungal mycelium estimated with the Langmuir model was 3.9 mmol Cu per gram of dry mycelium compared with 1.04 mmol Cu per gram of a strong acidic ion-exchange resin. The living mycelium also showed a high affinity to copper in diluted solutions. The adsorption distribution coefficient (K) maintained a constant value around 1.61 per gram of adsorbent in the solutions of up to 100 mgCu/l. Ion-exchange of copper cations with fungal biomass accounted for a small part (< 1%) of copper uptake by the fungal mycelium. The high capacity of copper uptake by living mycelium was mainly attributed to adsorption of very tiny colloids of copper hydroxide formed around pH 6, which was observed with scanning electron microscope and indicated by the pH effect on metal adsorption. Compared with an ion-exchange resin which showed a quite consistent adsorption capacity in a pH range of 2.5-5, the living fungal mycelium had an optimal adsorption capacity in a quite narrow pH range around 6. Copper adsorption and desorption on the fungal mycelium was easily repeated by controlling pH, a unique property of the fungal mycelium for continuous removal and recovery of copper cation from water. Organic solvents had little or positive effect on the copper adsorption capacity of living fungal hyphae.

Keywords: Heavy-Metals, Biosorption, Uranium, Copper Adsorption, Metal Removal, Wastewater Treatment, Biosorption, White-Rot Fungus

Kratochvil, D. and Volesky, B. (1998), Biosorption of Cu from ferruginous wastewater by algal biomass. *Water Research*, **32** (9), 2760-2768.

Full Text: [W\Wat Res32, 2760.pdf](W/Wat%20Res32,%202760.pdf)

Abstract: The biosorbent prepared from *Sargassum* algal biomass binds approximately 2.3 meq/g of metal cations from water by ion exchange. The values of ion exchange equilibrium constants showed that the affinities of metals towards the biosorbent decrease in the following order Cu>Ca>Fe. A flow-through sorption column was used to continuously and selectively remove Cu2+ from the feed containing Cu and Fe ions. A chromatographic effect in the column performance caused by different sorption affinities of the metal ions studied was successfully predicted by the equilibrium column model. The biosorbent saturated with Cu was regenerated with 0.1 M HCl. When Fe(III) was present in the mixed feed solution as suspended solids (SS) the column removed Cu2+ by biosorption and Fe(III) solids by in-detpth filtration while producing effluent free ai heavy metals from the feed containing 25 mg/l of Cu2+ and Fe(III) as SS in the concentration range of 15-40 mg/l. Effective copper removal/recovery from ferruginous wastewater using *Sargassum* biosorbent was demonstrated.

Keywords: Heavy-Metal Biosorption, Acid-Mine Drainage, *Sargassum* Fluitans, Ion-Exchange, pH, Adsorption, Alginate, Cadmium, Fungal, Column, Cu(II) Removal, Biosorption, *Sargassum*, Ion Exchange

Pavlinić, S. and Piljac, I. (1998), Electrolytic desorption of silver from ion-exchange resins. *Water Research*, **32** (10), 2913-2920.

Full Text: [W\Wat Res32, 2913.pdf](W/Wat%20Res32,%202913.pdf)

Abstract: Strong base ion-exchange resins Lewatit M 500 and Lewatit M 504 have steep ascending parts of isotherm curves in the range of low silver concentration in solution and can be used for silver extraction from plating rinsing effluents. Common elution methods are very inefficient for silver removal from strong base ion-exchange resins. Hence, the silver regeneration was performed by the electrolysis coupled elution process. During the process, the mass of silver deposited on the cathode and the I(t)-t curves were recorded. The electrolysis current was allowed to decrease to a value that corresponds to about 10% of the silver capacity. This was achieved from Lewatit M 500 at -1.14 V electrolysis potential using the Pt cylinder gauze working electrode and at -1.30 V using the Ni cylinder working electrode and from Lewatit M 504, at -1.10 V using the Pt cylinder gauze working electrode and at -1.19 V using the Ni cylinder electrode. During the first 3 h of the process 60-80% of the silver can be removed. The desorption process depends on the hydrodynamic conditions provided between the resin beads and solution. It is possible to reuse Lewatit M 500 for the silver adsorption and desorption processes at least three times. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Galvanic Effluents, Silver Removal, Ion-Exchange Resins, Elution Process, Electrolysis Coupled, Elution Process, Cyanide Solutions, Extraction

Manju, G.N., Raji, C. and Anirudhan, T.S. (1998), Evaluation of coconut husk carbon for the removal of arsenic from water. *Water Research*, **32** (10), 3062-3070.

Full Text: [W\Wat Res32, 3062.pdf](W/Wat%20Res32,%203062.pdf)

Abstract: The adsorption isotherm of As(III) on copper impregnated activated carbon was obtained in a batch reactor. Various parameters such as reaction time, adsorbent dose, initial concentration of adsorbate, pH, and temperature were studied to establish optimum conditions. Maximum adsorption capacity was observed at pH 12.0. The adsorption isotherm was also affected by temperature since the adsorption capacity was increased by raising the temperature from 30 to 60°C. The experimental adsorption data fitted reasonably well to the Langmuir isotherm. The mass transfer coefficients as a function of initial sorbate concentration have been determined. Arsenic(III) can be successfully removed from synthetic and industrial wastewaters. Desorption studies revealed that spent adsorbent can be regenerated and reused by 30% H2O2 in 0.5 M HNO3. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic(III), Activated Carbon, Langmuir Isotherm, Mass Transfer Coefficient, Activated Carbon, Aqueous-Solution, Waste-Water, Adsorption, Hydroxide, Silica

Ajmal, M., Khan, A.H., Ahmad, S. and Ahmad, A. (1998), Role of sawdust in the removal of copper(II) from industrial wastes. *Water Research*, **32** (10), 3085-3091.

Full Text: [W\Wat Res32, 3085.pdf](W/Wat%20Res32,%203085.pdf)

Abstract: Sawdust, an inexpensive material has been utilised as an adsorbent for the removal of Cu(II) from waste water for their safe disposal. The effects of contact time, pH, concentration, temperature, dose, particle size of the adsorbent and salinity on the removal of Cu(II) have been studied. The equilibrium nature of copper(II) adsorption at different temperature (30-50°C) has been described by the Freundlich and Langmuir isotherm and a tentative mechanism has been proposed. The thermodynamic parameters like free energy, entropy and enthalpy changes for the adsorption of Cu(II) have also been computed and discussed. The kinetics and the factors controlling the adsorption process have also been studied. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Saw Dust, Copper(II), Surface Complex, Endothermic, Surface Heterogeneity, Chlorocomplex, Recovery, Adsorption, Metals

Notes: highly cited

? Ternes, T.A. (1998), Occurrence of drugs in German sewage treatment plants and rivers. *Water Research*, **32** (11), 3245-3260.

Full Text: [1998\Wat Res32, 3245.pdf](1998/Wat%20Res32,%203245.pdf)

Abstract: The occurrence of 32 drug residues belonging to different medicinal classes like antiphlogistics, lipid regulators, psychiatric drugs, antiepileptic drugs, betablockers and β2-sympathomimetics as well as five metabolites has been investigated in German municipal sewage treatment plant (STP) discharges, river and stream waters. Due to the incomplete removal of drug residues during passage through a STP, above 80% of the selected drugs were detectable in at least one municipal STP effluent with concentration levels up to 6.3 μg l−1 (carbamazepine) and thus resulting in the contamination of the receiving waters. 20 different drugs and 4 corresponding metabolites were measured in river and stream waters. Mainly acidic drugs like the lipid regulators bezafibrate, gemfibrozil, the antiphlogistics diclofenac, ibuprofen, indometacine, naproxen, phenazone and the metabolites clofibric acid, fenofibric acid and salicylic acid as well as neutral or weak basic drugs like the betablockers metoprolol, propranolol and the antiepileptic drug carbamazepine were found to be ubiquitously present in the riversand streams, mostly in the ng l−1-range. However, maximum concentrations were determined up to 3.1 μg l−1 and median values as high as 0.35 μg l−1 (both bezafibrate). The drugs detected in the environment were predominantly applied in human medicine. It can therefore be assumed that the load of municipal STP effluents in the surface water highly influences the contamination. Due to their wide-spread presence in the aquatic environment many of these drugs have to be classified as relevant environmental chemicals.

Keywords: Drugs, Antiphlogistics, Lipid Regulating Agents, Anticancer Agents, Diazepam, Betablockers, Β2-Sympathomimetics, Carbamazepine, Rivers And Streams, Sewage Treatment Plant Effluents

Dimitrova, S.V. and Mehandgiev, D.R. (1998), Lead removal from aqueous solutions by granulated blast-furnace slag. *Water Research*, **32** (11), 3289-3292.

Full Text: [W\Wat Res32, 3289.pdf](W/Wat%20Res32,%203289.pdf)

Abstract: The removal of lead by sorption on granulated blast-furnace slag has been investigated as a function of pH, the metal ion concentration, the particle size and the amount of sorbent. It has been established that the process occurs with increasing pH. It was found that the dependence of the process on pH is similar to the dependence of the formation of soluble and insoluble hydrolysis products of lead on pH. but the efficient lead removal by granulated slag is occurred at pH values lower than precipitation pH values, i.e, the sorption is a predominating process. The equilibrium in the slag/lead solution system is described by the Freundlich adsorption isotherm. The constants in the Freundlich equation have been calculated for different slag particle sizes at pH (in) = 5.0-5.1. The percentage of lead removal at equilibrium increases with increasing slag amount but the sorption capacity decreases. Depending on the conditions, a percent lead removal of 97-98% can be achieved. The results obtained could be useful for the application of granulated slag for the Pb-ions removal from industrial waste water.

Keywords: Heavy-Metals, Adsorption, Sorption, Pb-Ions, Removal, Granulated Blast-Furnace Slag, pH Effects

Degraffenreid, N. and Shreve, G.S. (1998), The effect of cadmium on the kinetics of trichloroethylene biodegradation by *Pseudomonas* (Burkolderia) picketti PK01 under denitrifying conditions. *Water Research*, **32** (11), 3398-3402.

Full Text: [W\Wat Res32, 3398.pdf](W/Wat%20Res32,%203398.pdf)

Abstract: Pollution resulting from leaking and failing landfills is of concern to public health due to contamination of community drinking water. Chlorinated aliphatic hydrocarbons such as trichloroethylene (TCE) are common to both municipal and hazardous waste landfills and are potential contaminants of groundwater. Landfill leachate typically contains large amounts of organic carbon, nitrogen, and heavy metals and possesses a low redox potential. The kinetics of TCE degradation using a toluene oxidizing bacteria *Pseudomonas* (Burkholderia) picketti PK01 under nitrate reducing conditions was determined both in the presence and absence of the common landfill contaminant cadmium. A first order rate law was found to describe TCE degradation by *Pseudomonas* (Burkholderia) picketti PK01 over the TCE concentration range investigated. The rate constant for TCE degradation under denitrifying conditions in the absence of cadmium was 2.1×10-4 ml/µg protein/h. The rate constant for TCE degradation in the presence of 5 ppm cadmium was determined to be 6.5×10-5 ml/µg protein/h: representing a sixty nine percent decrease in the rate constant. Significant TCE degradation occurred over the course of the experiments. Results indicate that the presence of 5 ppm of cadmium had the effect of decreasing the TCE degradation activity of the microorganism Burkholderia picketti PK01. Implications for remediation and prediction of biodegradation of TCE in landfill impacted groundwater is discussed. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: TCE Biodegradation, Kinetics, Denitrifying Conditions, Landfill Leachate

Lièvremont, D., Seigle-Murandi, F. and Benoit-Guyod, J.L. (1998), Removal of PCNB from aqueous solution by a fungal adsorption process. *Water Research*, **32** (12), 3601-3606.

Full Text: [W\Wat Res32, 3601.pdf](W/Wat%20Res32,%203601.pdf)

Abstract: Removal of PCNB from aqueous solutions by fungal mycelia was studied. Adsorption of the fungicide by dead biomass of M. racemosus, R. arrhizus and S. cyanescens was determined and compared with sorption on isolated cell walls of these three strains. Biosorptive uptake capacities are described by Freundlich equations of the form Qe = Kf. Ce (nr). Measured values of Kf and n (f) indicate significant differences in the curve shapes and sorption capacities between the three species. Better performances were revealed by M. racemosus and R. arrhizus. Sorption of PCNB by cell walls alone was lower and statistically different from sorption by heat-killed mycelia thus corroborating that biosorption involved both uptake by the cell walls and by other cellular components.

Keywords: Hazardous Organic Pollutants, *Rhizopus-arrhizus* Biomass, *Saccharomyces-Cerevisiae*, Microbial Biomass, Cell-Walls, Metal-Ions, Biosorption, Accumulation, Mechanism, Microorganisms, Biosorption, PCNB, Fungi, *Mucor racemosus*, *Rhizopus arrhizus*, Sporothrix Cyanescens

Notes: highly cited

Raji, C. and Anirudhan, T.S. (1998), Batch Cr(VI) removal by polyacrylamide-grafted sawdust: Kinetics and thermodynamics. *Water Research*, **32** (12), 3772-3780.

Full Text: [W\Wat Res32, 3772.pdf](W/Wat%20Res32,%203772.pdf)

Abstract: Batch sorption studies have been carried out to determine the effect of adsorbent dose, initial sorbate concentration and pH on the adsorption of Cr(VI) on polymer-grafted sawdust. The process was found to be pH, temperature and concentration dependent. An empirical relationship has been obtained to predict the percentage Cr(VI) removal at any time for known values of sorbent and initial sorbate concentration under observed test conditions. The effect of diverse ions has been studied and it is found that there is very little effect on the sorption of Cr(VI). The process was found to be exothermic with a maximum adsorption of 91.0% at 30°C for an initial concentration of 100 mg l-1 at pH 3. The process follows first-order kinetics and the data fits the Freundlich adsorption isotherm. Thermodynamic parameters were also evaluated. Desorption studies confirmed that adsorbent can be effectively regenerated using 0.2 M NaOH and 0.5 M NaCl and can then be reused. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Sawdust, Chromium Adsorption, Adsorption Isotherm, Regeneration, Aqueous-Solutions, Activated Carbon, Adsorption, Chromium

Maynard, H.E., Ouki, S.K. and Williams, S.C. (1999), Tertiary lagoons: A review of removal mechanisms and performance. *Water Research*, **33** (1), 1-13.

Full Text: [W\Wat Res33, 1.pdf](W/Wat%20Res33,%201.pdf)

Abstract: Tertiary lagoons, or maturation ponds, have generally been viewed as an effective and low-cost method of removing pathogens from wastewater. Their low operation and maintenance costs have made them a popular choice for wastewater treatment, particularly in developing countries since there is little need for specialised skills to run the systems. This paper provides a critical review of the literature on the removal mechanisms operating in tertiary lagoons, and their overall performance. Numerous physical and chemical parameters have been suggested as factors involved in bacterial removal, and particular attention is paid in this paper to the relationship between pH, dissolved oxygen concentration and light. Very little information is available on the mechanisms of removal for intestinal parasites or viruses, or for BOD, COD or heavy metals. The two proposed mechanisms for nitrogen removal (ammonia volatilisation and sedimentation of organic nitrogen) are discussed. It has become obvious from the wide variations in performance reported in the literature that the design criteria currently in use for lagoons are not adequate. It is thought that by gaining a better understanding of the removal mechanisms operating in the lagoons, the design of new lagoons can be improved. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Tertiary Lagoons, Maturation Ponds, Removal Mechanisms, Performance, Waste Stabilization Ponds, Nematode Egg Removal, NEAR-UV Radiation, Bacterial Die-Off, *Giardia* Sp Cysts, *Escherichia*-Coli, Vibrio-Cholerae, Northeast Brazil, Fecal-Coliforms, Water Treatment

Ning, Z., Fernandes, L. and Kennedy, K.J. (1999), Chlorophenol sorption to anaerobic granules under dynamic conditions. *Water Research*, **33** (1), 180-188.

Full Text: [W\Wat Res33, 180.pdf](W/Wat%20Res33,%20180.pdf)

Abstract: This study examined the nonideal sorption phenomena and the effect of mixing conditions on sorption of five chlorophenols (CPs) onto anaerobic granules (AG) under dynamic conditions in continuous bioreactors. Under dynamic bioreactor conditions, anaerobic sorption of CPs which follow sorption linearity and sorption-desorption singularity, can be described by a dynamic model incorporating linear sorption. Nonequilibrium sorption caused by diffusion limitations in anaerobic reactors was found to be negligible, which is a result of the strong hydrodynamic dispersion that prevails in anaerobic reactors and the high porosity of AG. However, minor nonideal sorption phenomena were observed for 3, 4-dichlorophenol and pentachlorophenol, both of which showed sorption-desorption isotherm hysteresis. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobic, Granules, Sorption, Chlorophenols, Bioreactor, Dynamic, Toxic Organic-Compounds, Waste-Water Solids, Nonequilibrium Sorption, Soil Columns, Transport, Sludge, Pentachlorophenol, Biosorption, Pollutants, Effluent

? Glass, C. and Silverstein, J. (1999), Denitrification of high-nitrate, high-salinity wastewater. *Water Research*, **33** (1), 223-229.

Full Text: [1999\Wat Res33, 223.pdf](1999/Wat%20Res33,%20223.pdf)

Abstract: Denitrification of a wastewater containing 36,000 mg/L NO3- (8,200 mg/L NO3-N) with ionic strength of 3.0 has been achieved using activated sludge in bench-scale sequencing batch reactors. An activated sludge culture was acclimated to denitrify the wastewater at pH 9, by step-wise increase in wastewater nitrate concentration from 2,700 mg/L NO3-N to 5,400 mg/L NO3-N and finally to 8,200 mg/L NO3-N. Simultaneously, wastewater ionic strength was increased from 0.8 to 2.7 and to 3.0 (5, 16, and 18% total dissolved solids (TDSI). Although complete denitrification occurred, the maximum specific nitrate reduction rate decreased from 50 to 19 mg NO3-N/g MLSS/h as wastewater nitrate and TDS concentration increased. Also, accumulation of nitrite increased and the maximum nitrite reduction rate decreased. A similar attempt to acclimate activated sludge to denitrify the high-TDS, high-nitrate wastewater at pH 7.5 was unsuccessful. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Denitrification, High Salinity Wastewater, Industrial Wastewater Treatment, Activated Sludge Acclimation, Sequencing Batch Reactor, Salt Concentrations, Water, Nitrite, Removal

Gebara, F. (1999), Activated sludge biofilm wastewater treatment system. *Water Research*, **33** (1), 230-238.

Full Text: [W\Wat Res33, 230.pdf](W/Wat%20Res33,%20230.pdf)

Abstract: Plastic nets were fitted vertically inside the aeration tank of a conventional activated sludge process in a laboratory scale model. The aeration tank thus became a hybrid growth reactor combining both suspended and fixed biomass. The addition of nets resulted in considerable improvements in BOD5 removal efficiency and sludge settling efficiency for a synthetic wastewater. Theoretical mathematical models predicting the performance of the hybrid growth reactor were proposed and their accuracy was affirmed by comparison with the experimentally measured results. The process has been termed Activated Sludge Biofilm Wastewater Treatment System (ASBWTS). Existing plants can be upgraded by the fitting of plastic nets in the aeration tank and new systems can be constructed at a reduced cost if plastic nets are used. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Wastewater Treatment, Activated Sludge, Hybrid Reactor, Upgrading, Biofilm Cultivation

Notes: highly cited

Matheickal, J.T., Yu, Q.M. and Woodburn, G.M. (1999), Biosorption of cadmium(II) from aqueous solutions by pre-treated biomass of marine alga *Durvillaea potatorum*. *Water Research*, **33** (2), 335-342.

Full Text: [W\Wat Res33, 335.pdf](W/Wat%20Res33,%20335.pdf)

Abstract: Cadmium(II) adsorption properties of pre-treated biomass (PTB) of marine alga *Durvillaea potatorum* were investigated. Pre-treatment of the native biomass with calcium chloride and subsequent thermal treatment considerably improved the swelling properties and physical stability of the biomass granules. Batch and column experiments were conducted to determine the adsorption properties of the modified biomass. The adsorption capacity of the biomass strongly depends on equilibrium solution pH. At solution pH of 5, the maximum adsorption capacity of the pre-treated biomass is 1.1 mmol/g. The kinetics of cadmium adsorption was fast with 90% of adsorption taking place within 30 min. The feasibility of using pre-treated biomass granules in a packed bed was also examined. This study demonstrated that the pre-treated biomass of D. potatorum can be used as an efficient biosorbent for the treatment of cadmium bearing waste streams.

Keywords: Heavy-Metal Biosorption, Alginate Gel Beads, *Rhizopus-arrhizus*, Removal, Adsorption, Ions, Lead, Water, Microalgae, Gelation, Biosorption, Cadmium Removal, *Durvillaea potatorum*, Heavy Metal, Waste Water Treatment

Knapp, J.S. and Newby, P.S. (1999), The decolourisation of a chemical industry effluent by white rot fungi. *Water Research*, **33** (2), 575-577.

Full Text: [W\Wat Res33, 575.pdf](W/Wat%20Res33,%20575.pdf)

Abstract: A wide range of strains of white rot fungi have been shown to be effective in the decolourisation of a chemical industry effluent containing a diazo-linked chromophore. The five most effective strains were selected for further study, all could give *ca*. 70–80% decolourisation. of these the best were strains of *Coriolus versicolor*. All five strains could decolourise the effluent at 5–40% v/v in nitrogen-limited medium. The greatest % decolourisation occurred at low effluent concentration but the initial rate and final extent of decolorisation was greatest at 40% v/v. At best, colour reductions of 119 and 147 absorbance units (at *λ*max) were achieved in 3 and 7days, respectively. The presence of added manganese ions did not affect decolourisation although it did stimulate production of a red side product by some fungi. These results demonstrate the potential of white rot fungi in the treatment of chemical industry wastes. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: White Rot Fungi, Coloured Effluents, Chemical Effluents, Decolourisation, Coriolus Versicolor

Notes: highly cited

Ho, Y.S. and McKay, G. (1999), The sorption of lead(II) ions on peat. *Water Research*, **33** (2), 578-584.

Full Text: [W\Wat Res33, 578.pdf](W/Wat%20Res33,%20578.pdf)

Abstract: The sorption of lead ions from aqueous solution onto peat has been studied. Kinetic studies have been carried out using an agitated batch and the effect of varying process parameters has been investigated; these include initial lead ion concentration, peat particle size, solution temperature and agitation speed. The data were analyzed using a pseudo-first order Lagergren equation and the data were correlated using a two-step first order reaction mechanism.

Keywords: Adsorption, Agitation, Aqueous Solution, First, First Order, Kinetic, Kinetics, Lagergren Equation, Lead, Lead(II), Mechanism, Particle Size, Peat, Pseudo-First Order, Pseudo-First-Order, Removal, Rights, Size, Solution, Sorption, Temperature

? Poeton, T.S., Stensel, H.D. and Strand, S.E. (1999), Biodegradation of polyaromatic hydrocarbons by marine bacteria: Effect of solid phase on degradation kinetics. *Water Research*, **33** (3), 868-880.

Full Text: [1999\Wat Res33, 868.pdf](1999/Wat%20Res33,%20868.pdf)

Abstract: Biodegradation kinetics for phenanthrene and fluoranthene, as a function of their dissolved concentrations, were determined for a marine PAH-degrading enrichment. Biodegradation rates in the presence of artificial (Celite coated with humic acid) or Puget Sound sediments with sorbed PAH were then determined. These rates were expected to be slower than for the tests without sediment, because of limited PAH in the soluble phase due to desorption limitations of PAH from the solid to liquid phases. Due to the low aqueous PAH concentrations that exist for PAH compounds, radiolabeled PAH compounds were used to follow the fate of the PAH compounds in batch degradation test. The radiolabeled compounds were followed as evolved CO2, unreacted PAH in the dissolved phase or sorbed to sediment, and as non-polar intermediate products. Epifluorescence microscopy was used to determine if the marine enrichment bacteria could attach to sediment during PAH degradation. Without sediment, first-order degradation rate coefficients with respect to PAH concentration for phenanthrene ranged from 0.033 to 0.139 L/mg-d. depending on when the marine enrichment was tested, Fluoranthene first-order degradation rate coefficients without sediment were 0.132 and 0.162 L/mg-d. With sediment present, degradation rates for phenanthrene rind fluoranthene were 2.1 to 3.5 and 2.1 to 5.3 times faster, respectively, than the degradation rates at the same aqueous PAH and biomass concentrations without sediment, With phenanthrene present about 50% of the biomass added to test samples was attached to the sediment. The results suggest that biomass interactions with sorbed PAH at the sediment particle surfaces account for increased PAH degradation rates in the presence of a solid phase material. (C) 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Phenanthrene, Fluoranthene, Marine Bacteria, Biodegradation Kinetics, Aerobic, Sediment, Sorption, Radiolabeled Carbon, Polyaromatic Hydrocarbons, Phenanthrene, Bioavailability, Surfactants, Attachment, Growth, Water

Morais, L.C., Freitas, O.M., Gonçalves, E.P., Vasconcelos, L.T. and González Beça, C.G. (1999), Reactive dyes removal from wastewaters by adsorption on eucalyptus bark: Variables that define the process. *Water Research*, **33** (4), 979-988.

Full Text: [W\Wat Res33, 979.pdf](W/Wat%20Res33,%20979.pdf)

Abstract: An attempt to help solving the pollution problem caused by the presence of reactive dyes in textile effluents, was undertaken. Owing to the fact that eucalyptus bark is a very abundant, inexpensive, forest residue in the authors’ country, Portugal, it was decided to experiment with it as a potential adsorbent for a certain type of the supracited pollutants used in cellulose fibers dyeing (Remazol BB). In order to study the variables that define the process, 24 and 25 factorial experimentations were carried out, in two stages. In the first one, the variables selected were: temperature, initial pH, sodium chloride concentration and initial dye concentration/bark concentration ratio. As tests showed that the last parameter did not describe the adsorption process, another stage followed, keeping the first three variables and substituting initial dye concentration and bark concentration separately for their ratio. It was verified that all the variables studied had significant influence on the adsorption process at the level of 1% probability. The influence order was: initial dye concentration > bark concentration > initial pH > sodium chloride concentration > temperature. Parallel adsorption tests, under similar conditions, carried out with a commercial activated carbon and with eucalyptus bark, showed for the last one an adsorption capacity about half of that of the first one. It is considered that the obtained results are quite encouraging, though there is still a long way to go before definitive conclusions may be withdrawn.

Keywords: Activated Carbon, Adsorption, Adsorption Capacity, Capacity, Eucalyptus Bark Adsorbent, Experiment, Peat, Pollutants, Pollution, Process, Reactive Dyes, Reactive Dyes Removal, Stages, Temperature, Waste-Waters

Hijnen, W.A.M., Jong, R. and Van der Kooij, D. (1999), Bromate removal in a denitrifying bioreactor used in water treatment. *Water Research*, **33** (4), 1049-1053.

Full Text: [W\Wat Res33, 1049.pdf](W/Wat%20Res33,%201049.pdf)

Abstract: Bromate (BrO3-), an anion with carcinogenic properties, may be present in drinking water when bromide-containing water is ozonated during treatment or when it is present in surface water used as the source. Experiments showed that the concentration of BrO3- was reduced in a denitrifying bioreactor supplemented with ethanol, when NO3- was almost completely removed. At BrO3- concentrations of 25 and 35 µg/l and a temperature of 12°C the removal rates were 0.6 and 0.8 pg l-1 min-1, respectively. Calculations based on bromate concentration profiles in the bioreactor revealed that contact times of 25-50 min will be necessary to obtain concentrations below 3 µg/l, the 10-5 cancer risk level. Furthermore, intensive post treatment of the filtrate is required to remove biomass and excess ethanol applied for complete denitrification. Therefore, bromate removal in a denitrifying bioreactor does not seem to be a realistic option in drinking water treatment. Soil passage under anoxic conditions as occurring during artificial recharge or river bank filtration may enable BrO3--removal from (ozonated) surface water. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Drinking Water, Ozonation, Bromate Reduction, Denitrifying Bioreactor, Ozonation, Bromide

Pelekani, C. and Snoeyink, V.L. (1999), Competitive adsorption in natural water: Role of activated carbon pore size. *Water Research*, **33** (5), 1209-1219.

Full Text: [W\Wat Res33, 1209.pdf](W/Wat%20Res33,%201209.pdf)

Abstract: The impact of pore size on the competition mechanism between natural organic matter (NOM) in Illinois groundwater and the micropollutant atrazine was assessed using activated carbon fibers (ACFs). Two microporous ACFs with narrow and broad pore size distributions, designated ACF-10 and ACF-25, respectively, were used. The average pore sizes of ACF-10 and ACF-25 were 6 and 13.4 Angstrom. Single solute adsorption, simultaneous adsorption and preloading experiments were performed. On ACF-10 it was found that the adsorption of atrazine was reduced significantly in the presence of NOM, even though the NOM loading was very small as a result of pore exclusion. The uptake of atrazine by ACF-10 in the presence of NOM (simultaneous adsorption) was comparable to the NOM-preloaded capacity. In addition, preloaded atrazine was not displaced by subsequently adsorbed NOM. The results support a pore blockage mechanism by which NOM molecules block access to, but do not penetrate into the primary micropores. Atrazine capacity on ACF-25 which has primary micropores as well as a large volume of secondary micropores, was reduced in the presence of NOM; however, the reduction in capacity was much less than that observed with ACF-10. Preloading with NOM showed further capacity reduction compared with simultaneous adsorption. These results combined with the result that preloaded atrazine exposed to NOM showed displacement of atrazine support a direct site competition mechanism in the secondary micropore region. Attempts to regenerate NOM preloaded ACF-10 and ACF-25 using a strong alkali solution failed to recover atrazine capacity, suggesting that NOM was strongly adsorbed at the fiber surface as well as within micropores. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: ACF, Pore Size Distribution, Competition Mechanism, Pore Blockage, Atrazine, Nom, Humic Substances, Organic-Compounds, Fibers, Adsorbents

Mameri, N., Boudries, N, Addour, L., Belhocine, D., Lounici, H., Grib, H. and Pauss, A. (1999), Batch zinc biosorption by a bacterial nonliving Streptomyces rimosus biomass. *Water Research*, **33** (6), 1347-1354.

Full Text: [W\Wat Res33, 1347.pdf](W/Wat%20Res33,%201347.pdf)

Abstract: The zinc biosorption capacity of a Streptomyces rimosus biomass was studied in the batch mode. After a heat pretreatment, optimum conditions of biosorption were found to be: an average saturation contact time of 4 h, a biomass particle size between 140 and 250 µm, the ambient temperature, a stirring speed of 250 rpm, and pH of 7.5. The equilibrium data could be fitted by a Langmuir isotherm equation. Under these optimal conditions, up to 30 mg (Zn)/g (biomass), was fixed. Moreover, additional chemical treatment of the biomass by NaOH (1 mol/L), increased the biosorption Capacity of about 80 mg (Zn)/g (biomass).

Keywords: Uranium Biosorption, Metal Biosorption, *Rhizopus-arrhizus*, Copper Adsorption, *Mucor-Miehei*, Heavy-Metals, pH, Removal, Strain, Cells, Zinc, Streptomyces Rimosus, Biosorption, Heavy Metals

Zhao, M., Duncan, J.R. and van Hille, R.P. (1999), Removal and recovery of zinc from solution and electroplating effluent using *Azolla filiculoides*. *Water Research*, **33** (6), 1516-1522.

Full Text: [W\Wat Res33, 1516.pdf](W/Wat%20Res33,%201516.pdf)

Abstract: The removal of zinc ions from aqueous solutions and electroplating rinse effluent by *Azolla filiculoides* on batch and column studies was investigated. The maximum zinc uptake by Azolla in batch systems at an optimum pH of 6.0 was found to be 45.2 mg/g, The dried Azolla filiculoides showed good mechanical stability and flow-permeability in repeated column operations. The zinc uptake in column operation at pH 6.2 and 60% breakthrough was between 25.8-30.4 mg/g with varying Row rates (from 32 to 160 ml/h.g). Complete desorption of bound zinc was accomplished with 120 mi of either 0.2 N H2SO4 or HCl. The data from regeneration efficiencies for six cycles, evidenced that the reusability of Azolla in the treatment of Zn2+-laden wastewater is viable. An effluent-free, closed loops of zinc treatment system, with Azolla biomass as the sorbent, is proposed. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Azolla Filiculoides, Zn2+, Heavy Metals, Column Sorprion, Desorption, Recovery, Regeneration, Heavy-Metal, Biomass, Biosorption, Regeneration, Yeast

Yu, Q.M., Matheickal, J.T., Yin, P.H. and Kaewsarn, P. (1999), Heavy metal uptake capacities of common marine macro algal biomass. *Water Research*, **33** (6), 1534-1537.

Full Text: [W\Wat Res33, 1534.pdf](W/Wat%20Res33,%201534.pdf)

Abstract: Biosorption of heavy metals is an effective technology for the treatment of industrial waste waters. The uptake capacities of the biomass of a group of nine marine macro algae for heavy metal ions (cadmium, copper and lead) were evaluated. Equilibrium isotherms for each biomass-heavy metalsystem were obtained from batch adsorption experiments. The maximum uptake capacities of the biomass ranged from around 0.8 to 1.6 mmol/g (dry), which were much higher than those of other types of biomass. The results indicated that the biomass of the marine algae is suitable for the development of efficient biosorbents for the removal and recovery of heavy metals from waste water.

Keywords: *Saccharomyces-Cerevisiae*, Aqueous-Solutions, Adsorption-Isotherms, Cadmium Biosorption, *Rhizopus-arrhizus*, Radiata, Lead(II), Removal, Uranium, Cu(II), Biosorption, Heavy Metal Removal, Marine Algae, Waste Water Treatment

Walker, G.M. and Weatherley, L.R. (1999), Kinetics of acid dye adsorption on GAC. *Water Research*, **33** (8), 1895-1899.

Full Text: [W\Wat Res33, 1895.pdf](W/Wat%20Res33,%201895.pdf)

Abstract: This work involves the treatment of simulated industrial waste water containing acid dyestuffs with granular activated carbon adsorption selected as the treatment method. Predicting the rate at which adsorption takes place for a given system is probably the single most important factor for adsorber design, with adsorbate residence time and ultimately the reactor dimensions controlled by the system’s kinetics. A fixed volume stirred tank reactor was used to study the kinetics of adsorption in a single component system. Process parameters including the rate of agitation, dye concentration and phase ratio were studied with results being modelled using a dual resistance external mass transfer and solid diffusivity model. A single value of solid diffusivity described the adsorption decay curves in most instances and also indicated that chemisorption is the likely process of acid dye adsorption onto activated carbon.

Keywords: Adsorption, Activated Carbon, Dyes, Solid Diffusion, External Mass Transfer, Stirred Tank Reactor

Zhou, P., Huang, J.C., Li, A.W.F. and Wei, S. (1998), Heavy metal removal from wastewater in fluidized bed reactor. *Water Research*, **33** (8), 1918-1924.

Full Text: [W\Wat Res33, 1918.pdf](W/Wat%20Res33,%201918.pdf)

Abstract: An innovative process for removing heavy metals including Cu, Ni and Zn From industrial wastewater has been developed. The new technology was based on inducing the nucleated precipitation of heavy metals on the sand surface in a fluidized bed reactor. The results showed that pH had a great effect on heavy metal removal efficiency and the optimum pH was about 9.0 to 9.1. At this pH value, heavy metal removal efficiency could be achieved above 92 and 95% when influent heavy metal concentrations were 10 and 20 mg/l, respectively. When pH was greater than 8.7, above 92.4% of the precipitation was composed of metal hydroxide. Hydraulic retention time (HRT) had almost no effect on heavy metal removal efficiency when HRT was greater than 7.1 min. Scanning electron microscope (SEM) analysis indicated that carbonate injection with a drip-wise manner was more conducive than that with a slug dosing manner for precipitation to be coated on the sand surface. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metal Removal, Fluidized Bed Reactor, Discrete Precipitation, Nucleation Precipitation, Precipitation Composition, Slug Dosing, Drip-Wise Dosing, Metal Carbonate, Metal Hydroxide, SEM, Sludge Generation

Yin, P.H., Yu, Q.M., Jin, B. and Ling, Z. (1999), Biosorption removal of cadmium from aqueous solution by using pretreated fungal biomass cultured from starch wastewater. *Water Research*, **33** (8), 1960-1963.

Full Text: [W\Wat Res33, 1960.pdf](W/Wat%20Res33,%201960.pdf)

Abstract: The biosorption removal of cadmium ions from aqueous solutions by using the fungal biomass obtained from cultivation using starch wastewater as a substrate was investigated. Batch experimental results showed that the biosorption capacities of the pretreated fungal biomass of *R. oryzae*, *R. oligosporus*, *A. oryzae* and *R. arrhizus* were up to 0.28, 0.35. 0.40 and 0.56 mmol Cd2+/g (dry weight), respectively. Pretreatment of the biomass with calcium solution and heat improved the stability and settling property and increased heavy metal uptake capacities of the biomass. The biosorption capacities were solution pH dependent. The effects of other cations (Pb2+, Cu2+. Cd2+ and Zn2+) were also investigated and the biosorption affinity sequence for the biomass is Pb2+ > Cu2+ > Cd2+ > Zn2+. This study indicated that the fungal biomass of *R. arrhizus* has a high capacity for cadmium.

Keywords: Heavy-Metal Biosorption, *Rhizopus-arrhizus*, Uranium, Radiata, pH, Cadmium Removal, Biosorption of Heavy Metals, Fungal Biomass, Starch Wastewater, *R-arrhizus*

Kondo, H., Ishiguro, Y., Ohno, K., Nagase, M., Toba, M. and Takagi, M. (1999), Naturally occurring arsenic in the groundwaters in the southern region of Fukuoka Prefecture, Japan. *Water Research*, **33** (8), 1967-1972.

Full Text: [W\Wat Res33, 1967.pdf](W/Wat%20Res33,%201967.pdf)

Abstract: In March, 1994, arsenic over the permissible level for drinking use (0.01 mg/l) was detected in wellwaters in the southern region of Fukuoka Prefecture, Japan. The highest concentration found was 0.293 mg/l, being quite high compared to other arsenic-containing wellwaters reported in japan. The polluted wellwaters contained NaHCO3 as the major dissolved inorganic component, which made the water weakly alkaline. The concentration of dissolved oxygen was much lower than those in unpolluted areas. The organic arsenic was not detected. These data combined with geological-geochemical inspections by boring proved that the arsenic pollution did not originate artificially but occurred naturally through an elution process long ongoing on the rocks and soils by the stagnant underground water. The mechanisms of arsenite/arsenate elution from the soil proposed were which involved (i) anion exchange with OH- and (ii) reductive labilization of arsenic through conversion of arsenate to arsenite. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic Pollution, Wellwaters, Physicochemical Characteristics, Arsenic Species, Ionic Components, Drinking-Water, Release, Area

Navarro, R.R., Sumi, K. and Matsumura, M. (1999), Improved metal affinity of chelating adsorbents through graft polymerization. *Water Research*, **33** (9), 2037-2044.

Full Text: [W\Wat Res33, 2037.pdf](W/Wat%20Res33,%202037.pdf)

Abstract: Modification of cellulose for heavy metal adsorption was conducted by the graft polymerization of glycidyl methacrylate utilizing ceric ammonium nitrate initiator, followed by the reaction with polyethyleneimine to introduce nitrogenous ligands. Infrared (IR) spectra of the reaction intermediates and products qualitatively revealed the presence of significant functional groups. Low amine to epoxide ratio (2 amines/epoxide) from elemental analysis of the products confirmed the occurrence of crosslinking between PEI and poly(GMA) side chain. Comparisons between metal adsorption isotherms of poly(CGMAPEI) adsorbent and cellulose-PEI, a previously synthesized adsorbent having extensive PEI crosslinking with the matrix, showed a higher metal affinity in the former. Based on these properties, an adsorbent structure model where ligands acquire an improved mobility was suggested. Optimization experiments further revealed that the metal affinity of the this adsorbent is affected by the amount of initiator during polymerization. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Cellulose, Chelating Adsorbent, Initiator, Graft Polymerization, Heavy Metals

Angelakis, A.N., Marecos Do Monte, M.H.F., Bontoux, L. and Asano, T. (1999), The status of wastewater reuse practice in the Mediterranean basin: Need for guidelines. *Water Research*, **33** (10), 2201-2217.

Full Text: [W\Wat Res33, 2201.pdf](W/Wat%20Res33,%202201.pdf)

Abstract: In Mediterranean environments, uneven distribution of precipitation and runoff spacially and temporarily, requires the construction of costly water storages and higher levels of wastewater treatment. Also, uneven occupation of the territory leads to a significant stress in coastal areas and requires the diversion of significant volumes of water. In most Mediterranean countries, the main problem may not be scarcity of water in terms of average per capita, but the high cost of making water available at the right place, at the right time with the required quality. In these countries, more than anywhere else, an integrated approach for water resources management including wastewater reclamation and reuse locally is required. As a result, and following a general increase in wastewater treatment, wastewater reclamation and reuse is expected to increase sharply in the Mediterranean basin over the next decade and become an important aspect of integrated water resources management. Important projects are being developed and wastewater reclamation and reuse facilities have been built. These projects have followed local or national guidelines where available such as for example in Israel, France, Tunisia or Cyprus. Regulations on wastewater reclamation and reuse are essential. They help protect public health, increase water availability, prevent coastal pollution and enhance water resources and nature conservation policies. Unifying wastewater reclamation and reuse regulations around the Mediterranean basin would also contribute to secure economic and touristic exchanges in the region. However, there is still a controversy between the defenders of strict water quality standards for an absolute protection of public health and the defenders of a pragmatic stance recognizing existing wastewater reuse practices and promoting non-potable water uses with less restrictive water quality standards. Despite the high potential for wastewater reclamation and reuse in the Mediterranean countries, only a few have systematically exploited this resource. This paper presents the status of wastewater reclamation and reuse around the Mediterranean basin and discusses existing guidelines and regulations. The possibility of developing uniform wastewater reuse standards is also presented.

Keywords: Water Resources Management, Water Availability, Wastewater Reclamation, Water Management, Wastewater Reuse Criteria, Guidelines and Regulations, Irrigation with Reclaimed Wastewater

Notes: highly cited

? Beun, J.J., Hendriks, A., Van Loosdrecht, M.C.M., Morgenroth, E., Wilderer, P.A. and Heijnen, J.J. (1999), Aerobic granulation in a sequencing batch reactor. *Water Research*, **33** (10), 2283-2290.

Full Text: [1999\Wat Res33, 2283.pdf](1999/Wat%20Res33,%202283.pdf)

Abstract: In a sequencing batch reactor (SBR) granules of aerobic heterotrophic microorganisms were cultured. The effect of different operational conditions on the formation of these aerobic granules were studied. The time allowed for settling was the main parameter to select for growth of bacteria in well settling granules. Both a short HRT and a relative high shear were found favorable for granulation. A substrate loading rate of 7.5 kg COD/(m3 day) was applied. This Ted to formation of granules with an average diameter of 3.3 mm and a biomass density of 11.9 gVSS/l(granule). Based on microscopic observations a hypothesis for the granulation process was formulated. The reactor was started up without any carrier material present. At the beginning filamentous fungal pallets dominated the reactor. These pellets functioned as an immobilization matrix in which bacteria could grow out to colonies. After a certain rime the fungal pellets fell apart due to lysis in the inner parr of the pellets, the bacterial colonies could now remain in the reactor because they were large enough to settle sufficiently Fast. These colonies further grew out to granules. This paper shows that granule formation in aerobic reactors is feasible and can be exploited to increase the volumetric conversion capacity of such reactors. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Aerobic Granules, Bacteria, Biofilms, Biomass, Capacity, Elsevier, Granulation, SBR, Science, Settling Time, Shear, Sludge

Juang, R.S., Wu, F.C. and Tseng, R.L. (1999), Adsorption removal of copper(II) using chitosan from simulated rinse solutions containing chelating agents. *Water Research*, **33** (10), 2403-2409.

Full Text: [W\Wat Res33, 2403.pdf](W/Wat%20Res33,%202403.pdf)

Abstract: The adsorption ability of Cu(II) using chitosan from simulated rinse solutions containing chelating agents was studied. Four chelating agents including ethylenediaminetetraacetic acid (EDTA), citric acid, tartaric acid and sodium gluconate were selected. It was shown that the concentration ratio of chelating agent to Cu(II) as well as the NaOH concentration significantly affected the adsorption capacity. Competition between coordination of Cu(II) with unprotonated chitosan and electrostatic interaction of Cu(II) chelates with protonated chitosan played an important role in this adsorption system. The maximum adsorption capacity was found within each optimal pH range. This work provided a simple criteria for adsorption removal of Cu(II) from such industrial rinse solutions (0.3-5.0 mol/m3) using chitosan. (C) 1999 Elsevier Science Ltd. Aii rights reserved.

Keywords: Activated Carbon, Heavy-Metals, Uranyl Ions, Edta, Sorption, Water, Crosslinking, Equilibrium, Isotherms, Uranium, Adsorption, Isotherm, Chitosan, Copper Ions, Rinse Solution, Chelating Agents

Notes: highly cited

Bailey, S.E., Olin, T.J., Bricka, R.M. and Adrian, D.D. (1999), A review of potentially low-cost sorbents for heavy metals. *Water Research*, **33** (11), 2469-2479.

Full Text: [W\Wat Res33, 2469.pdf](W/Wat%20Res33,%202469.pdf)

Abstract: The use of low-cost sorbents has been investigated as a replacement for current costly methods of removing heavy metals from solution. Natural materials or waste products from certain industries with a high capacity for heavy metals can be obtained, employed, and disposed of with little cost. Modification of the sorbents can also improve adsorption capacity, fn this review, an extensive list of sorbent literature has been compiled to provide a summary of available information on a wide range of potentially low-cost sorbents, including bark, chitosan, xanthate, zeolite, clay, peat moss, seaweed, dead biomass, and others. Some of the highest adsorption capacities reported for cadmium, chromium, lead and mercury are: 1587 mg Pb/g lignin, 796 mg Pb/g chitosan, 1123 mg Hg/g chitosan, 1000 mg Hg/g CPEI cotton, 92 mg Cr(III)/g chitosan, 76 mg Cr(III)/g pear, 558 mg Cd/g chitosan, and 215 mg Cd/g seaweed. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Capacity, Aqueous-Solutions, Biomass, Cadmium, Cadmium Removal, Capacity, Chitosan, Chitosan Beads, Chromium, Clay, Cotton, Economic, Elsevier, Fly-Ash, Heavy Metals, Ion Binding, Lead, Literature, Marine-Algae, Mercury, Metals, Modification, Peat, Review, Science, Sorption, Sorption, Sphagnum Moss Peat, Usa, Waste-Water, Water, Zeolite

Barker, D.J., Mannucchi, G.A., Salvi, S.M.L. and Stuckey, D.C. (1999), Characterisation of soluble residual chemical oxygen demand (COD) in anaerobic wastewater treatment effluents. *Water Research*, **33** (11), 2499-2510.

Full Text: [W\Wat Res33, 2499.pdf](W/Wat%20Res33,%202499.pdf)

Abstract: Anaerobic wastewater treatment processes cannot usually achieve discharge levels of COD without some form of post-treatment due to the high levels of soluble residual COD in the effluent. However, there is very little information in the literature on the nature of this material, and hence the aim of this work was to characterise effluents from several different anaerobic processes by their: molecular weight (MW) distributions (using the techniques of ultrafiltration and size exclusion chromatography); biodegradability (both aerobic and anaerobic) and activated carbon adsorption characteristics. The MW distribution data indicated that the majority (up to 89% w/w) of the material present in the effluents was in the low MW range (i.e. MW < 1 kDa), although there was a significant amount (up to 22% w/w) in the high MW range (i.e. MW > 300 kDa). Differences in the distributions were observed according to reactor type, with effluents From anaerobic baffled reactors (ABRs) containing a higher proportion of high MW material than effluents From other reactor types. Aerobic degradation of the effluents was significantly more successful than anaerobic, despite the fact that the low MW material was found to be the most difficult to degrade aerobically. Activated carbon adsorption revealed that the low MW material was more difficult to adsorb than the high MW compounds. The data was fitted to Freundlich, Langmuir and BET isotherms and it was concluded that the Freundlich model was the most accurate for predicting removal efficiencies especially with regard to scale up. Some generic patterns emerged with respect to the characterisation of the effluents and these will assist in decisions regarding post-treatment. Nevertheless, in order for these generic patterns to be confirmed more work is needed on characterising effluent samples from anaerobic treatments. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Soluble Microbial Products (SMP), Molecular Weight Distribution, Anaerobic Process Effluent, Biodegradability, Post-Anaerobic Treatment Processes, Activated Carbon, Microbial Products Smp, Molecular-Weight Distribution, Dissolved Organic-Matter, Baffled Reactor, Chromatography, Performance, Adsorption, Biodegradability, Waters

? Ledakowicz, S. and Gonera, M. (1999), Optimisation of oxidants dose for combined chemical and biological treatment of textile wastewater. *Water Research*, **33** (11), 2511-2516.

Full Text: [1999\Wat Res33, 2511.pdf](1999/Wat%20Res33,%202511.pdf)

Abstract: A test of inhibition of microbial growth of activated sludge in a synthetic textile wastewater under the influence of various oxidants applied in the advanced oxidation process (AOP) pretreatment has been proposed. The inhibitory action of single constituents of the textile wastewater was determined in terms of effective concentration, EC50. for a dyestuff and two detergents employed. The most inhibiting component of the textile wastewater (EC50 = 28 mg dm-3) appeared to be anthraquinone dyestuff, while the surfactants seemed to be partly biodegradable (EC50 = 128 mg dm-3 for the softening agent Tetrapol CLB and EC50 = 1700 mg dm-3 for the anionic detergent Avivage KG concentrate). The application of AOPs prior to biodegradation showed that the most advisable AOP is the ozonation combined with UV radiation or the combination of O3/UV/H2O2. The inhibitory effect of the AOPs on microbial growth during subsequent biodegradation of textile wastewater accounts for only 10%, while untreated wastewater exhibits 47% of inhibitory action. The applied biotest is one of the simplest methods of process optimisation of oxidant or radiation dose for the integrated chemical and biological oxidation of industrial wastewater. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Textile Wastewater, Advanced Oxidation Processes, Biodegradation, Integrated Biological and Chemical Treatment, Activated Sludge, Inhibition Test, Effective Concentration

Notes: highly cited

? Lay, J.J., Lee, Y.J. and Noike, T. (1999), Feasibility of biological hydrogen production from organic fraction of municipal solid waste. *Water Research*, **33** (11), 2579-2586.

Full Text: [1999\Wat Res33, 2579.pdf](1999/Wat%20Res33,%202579.pdf)

Abstract: Organic municipal solid waste (OFMSW) and two seed microorganisms, namely heat-pretreated digested sludge and hydrogen-producing bacteria enriched from soybean-meal silo, were varied according to a full factorial central composite experimental design with the aim of assessing the feasibility of hydrogen production from OFMSW. A simple model developed from the Gompertz equation was suitable for estimating the hydrogen production potential and rate. Through response surface methodology, empirical equations for specific hydrogen production potential and rate were fitted and plotted as contour diagrams in order to facilitate examination of experimental results. The contour plots showed that high hydrogen production potentials of 140 and 180 ml H-2.g TVS-1 occurred when the pretreated digested sludge and the hydrogen-producing bacteria consumed OFMSW, respectively. A high hydrogenic activity for the pretreated digested sludge (45 ml.g VSS-1.h-1) was obtained at a high food-ro-microorganism (F/M) ratio; however, that for the hydrogen-producing bacteria(36 ml.g VSS-1.h-1) was found at a low F/M ratio. The experimental results showed that the hydrogen composition of the biogas was greater than 60% except For initial incubation and no significant methane was found throughout this study. Further experiments confirmed that the results of this study were highly reliable and the OFMSW had a considerable potential on biological hydrogen production. Metabolic responses confirmed that characteristics of the heat-pretreated digested sludge converting the OFMSW into hydrogen were similar to that of anaerobic spore-forming bacteria of the genus Clostridium. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Acetone, Acid, Bacteria, Batch Cultures, Butanol, Characteristics, Clostridium, Clostridium-Acetobutylicum, Composite, Digested Sludge, Digestion, Elsevier, Factorial Central Composite Experimental Design, Hydrogen, Methane, Methane Production, Model, Organic Fraction of Municipal Solid Waste, pH, Response Surface Methodology, Science, Sludge, Solvent Production

Young, P.L. and Komisar, S.J. (1999), The variability introduced by partial sample analysis to numbers of *Cryptosporidium* oocysts and *Giardia* cysts reported under the information collection rule. *Water Research*, **33** (11), 2660-2668.

Full Text: [W\Wat Res33, 2660.pdf](W/Wat%20Res33,%202660.pdf)

Abstract: Subsampling of the concentrated sample pellet resulting from the information collection rule (ICR) method for detection of *Cryptosporidium* oocysts and *Giardia* cysts is often required to facilitate the terminal microscopy step. Variability in counts of (oo)cysts in subsamples suggests that sampling error may occur as a consequence of subsampling and subsequent partial analysis of this pellet. Variability is modeled hers as a Poisson distribution and is incorporated into a model that accounts for other uncertainties in the detection procedure. The result is to greatly expand confidence intervals (CI) around reported concentrations. For example, the 90% CI around the concentration reported based on detection of one (oo)cyst in a pellet subsample is increased nearly threefold when sampling error arising from partial sample analysis is added to other potential sources of variability. Consideration of a distribution in which (oo)cysts are clumped, such as a negative binomial distribution, further increases uncertainty, producing confidence intervals ranging over several orders of magnitude. The relevance of the uncertainty arising from partial sample analysis to risk assessment is demonstrated. For example, to produce water with an acceptable 1 in 10,000 risk of infection, the level of water treatment prescribed may increase from 3- to 4.5- for greater log removal of(oo)cysts. Implications of this additional uncertainty in the ICR method on reported (oo)cyst concentrations argue for expanded reporting procedures to include an indication of the uncertainties associated with reported concentrations and/or improvements in the detection method. (C)! 1999 Elsevier Science Ltd. All rights reserved.

Keywords: *Cryptosporidium*, *Giardia*, Uncertainty Analysis, Statistics, Drinking Water, Microbiological Risk Assessment, Drinking-Water

Bailey, H.C., Elphick, J.R., Potter, A. and Zak, B. (1999), Zinc toxicity in stormwater runoff from sawmills in British Columbia. *Water Research*, **33** (11), 2721-2725.

Full Text: [W\Wat Res33, 2721.pdf](W/Wat%20Res33,%202721.pdf)

Abstract: Samples of stormwater runoff from three sawmills on Vancouver Island BC, were tested for acute toxicity with juvenile rainbow trout. All except one of the 27 samples tested exhibited toxicity. Causes of toxicity were investigated using toxicity identification evaluation techniques; specifically, treatment with the chelating agent EDTA. Toxicity was attributed to divalent cations, particularly zinc, in 24 of these samples. The very low hardness associated with most of the samples increased the potential for metals toxicity. Zinc toxicity showed a strong dependence on hardness, with a range of LC(50)s of 72-272 µg/L between hardnesses of 9-100 mg/L. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Toxicity Identification Evaluation, Stormwater Runoff, Zinc, Sawmill, Rainbow Trout, Trout Salmo-Gairdneri, Rainbow-Trout, Hardness, pH, Alkalinity, Copper, Lethality, Water

Asami, M., Aizawa, T., Morioka, T., Nishijima, W., Tabata, A. and Magara, Y. (1999), Bromate removal during transition from new granular activated carbon (GAC) to biological activated carbon (BAC). *Water Research*, **33** (12), 2797-2804.

Full Text: [W\Wat Res33, 2797.pdf](W/Wat%20Res33,%202797.pdf)

Abstract: Bromate removal by activated carbon after ozonation in a subject of concern, since bromate is commonly found in the ozonation of bromide-containing water. Though new GAC (granular activated carbon) shows the capacity to reduce bromate to bromide, n the long-term use of GAC following ozonation, its bromate removal rate apparently decreases during transition from new GAC to BAC (biological activated carbon) after 3 months. Batch bromate reduction experiments using new GAC and BAC confirmed new GAC’s ability and BAC’s inability to reduce bromate to bromide. Our experiment also indicated that ion exchangeable bromate adsorption on new GAC was very limited. Based on the results of our long-term experiment, the bromate removal rate during the transition from new GAC to BAC was calculated: 1.5 mg BrO3/g carbon when bromate concentration was 50 µg/l. BAC’s inability to reduce bromate makes it necessary to optimize ozonation conditions to minimize the formation of bromate and other by-products while maintaining target levels trf organic matter decomposition. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Drinking Water, Bromate, Chloride, GAC, Biological Activated Carbon (BAC)

Jang, L.K., Nguyen, D. and Geeesey, G.G. (1999), An equilibrium model for absorption of multiple divalent metals by alginate gel under acidic conditions. *Water Research*, **33** (12), 2826-2832.

Full Text: [W\Wat Res33, 2826.pdf](W/Wat%20Res33,%202826.pdf)

Abstract: An extended Langmuir model was proposed in this work to describe the simultaneous absorption of multiple divalent metal ions and hydrogen ions from acidic metal-containing aqueous media by an absorbent having one kind of active functional group. A viscous Na-alginate solution was directly dispensed dropwise into the acidic aqueous media containing dissolved copper and zinc to form spherical Cu-Zn-H-alginate gels which subsequently absorb these ions until final equilibrium was reached in batch experiments. Initial pH of the aqueous media was in the range of 2.6-5.4. Binding group density and binding stability constants of alginic acid, cupric alginate and zinc alginate were obtained simultaneously by fitting data to the proposed model developed in this work. Application of the constants obtained to the prediction of the extent of absorption of copper and zinc from an aqueous medium having an initial pH in the range of 2.6-5.4 is illustrated and compared with experimental results. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Copper, Zinc, Alginate, Selectivity, Metal Recovery, Langmuir Model, Copper

Bao, M.L., Griffini, O., Santianni, D., Barbieri, K., Burrini. D. and Pantani, F. (1999), Removal of bromate ion from water using granular activated carbon. *Water Research*, **33** (13), 2959-2970.

Full Text: [W\Wat Res33, 2959.pdf](W/Wat%20Res33,%202959.pdf)

Abstract: This study investigated the feasibility of using granular activated carbon (GAC) to remove bromate ion (BrO3-) from drinking water through a rapid small-scale column test (RSSCT) method and a pilot-scale study. Results from RSSCT tests indicated that the GAC capacity for BrO3- removal was carbon-specific and dependent on the source water quality and empty bed contact time (EBCT). The presence of dissolved organic carbon (DOC) and anions, Such as bromide, nitrate, and sulfate, resulted in poor BrO3- reduction. On the other hand, BrO3- removal was improved by increasing EBCT. The reduction capacity of spent GAC could be completely recovered by thermal regeneration. Under RSSCT conditions, the results showed that preloading with natural water significantly decreased the capacity of GAC for BrO3- removal whereas in the pilot plant study, a GAC column (operating with 20-min EBCT) preloaded for 110 days achieved a BrO3- removal ranging from 57 to 92% for at least 98 days, and the BrO3- amount removed was found to be proportional to the influent BrO3- concentration. These limited data suggest that if suitable GAC is used, GAC performed in the biological mode may achieve a longer bedlife for BrO3- removal. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Bromate Reduction, Activated Carbon Filtration, Ozonation, Biologically Activated Carbon, Drinking Water Treatment, Bromide-Containing Waters, Ozonation, Ozone

Snukiškis, J.J., Kaušpėdienė, D.V. and Gefenienė, A.J. (1999), Simultaneous removal of nonionic surfactant and heavy metal(II). *Water Research*, **33** (13), 2978-2982.

Full Text: [W\Wat Res33, 2978.pdf](W/Wat%20Res33,%202978.pdf)

Abstract: Simultaneous sorption of nonionic surfactant (alkylmonoethers ALM-10) and heavy metal cations (lead, nickel) by Purolite C 106 carboxylic acrylcationic exchanger has been investigated. Sorption isotherms and kinetic curves were measured using spectrophotometric determination for nonionic surfactant and complexometric titration for heavy metals. The sorption of metal cations, surfactant molecules and products of their interaction takes place simultaneously. In the absence of surfactant the sorption of metal cations determined experimentally corresponds to that calculated from the change in the equilibrium solution pH, assuming that two hydrogen cations are replaced by one metal cation. In the presence of surfactant the change in pH is lower than that without surfactant: the total sorption of metal determined experimentally is higher than that calculated From the change in pH. It is because the sorption of metal takes place in the form of not only free cations but also cations bonded to the surfactant. The sorption of metal bonded to the surfactant can be evaluated from both the total metal adsorbed which was determined experimentally and the sorption of the free cations. The total sorption of lead(II) is higher than that of nickel(II) (transition metal). Subsequently the action of lead(II) results in the decrease of the equilibrium sorption of surfactant while the action of nickel(II) on the equilibrium sorption of surfactant is insignificant. The sorption of metal cations decreases in the presence of surfactant. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Lead(II), Nickel(II), Nonionic Surfactant, Cation Exchanger, Water Recycling, Copper, Nickel

Tran, H.H., Roddick, F.A. and O’Donnell, J.A. (1999), Comparison of chromatography and desiccant silica gels for the adsorption of metal ions. I. Adsorption and kinetics. *Water Research*, **33** (13), 2992-3000.

Full Text: [W\Wat Res33, 2992.pdf](W/Wat%20Res33,%202992.pdf)

Abstract: In this study desiccant silica gel (DSG was compared with chromatography silica gel (CSG) for its ability to remove metal ions including Pb2+, Cu2+, Ni2+, Zn2+, Cd2+ and UO22+ from solution. The equilibration lime was shorter for UO22+ (less than 1 h) than for the heavy metal ions (2-3 h) and adsorption by DSG look longer to reach equilibrium compared with CSG, probably due to the smaller mean diameter of its pores. The adsorption process showed first order kinetics for all the metals studied. The mass transfer coefficients and overall rate constants were determined for each of the metals. The adsorption rates of the metal ions, in order of decreasing magnitude, were UO22+ > Pb2+ >-Cu2+ > Zn2+ >Ni2+ > Cd2+ for both DSG and CSG. Metal uptake was found to increase rapidly within a two pH unit range characteristic for each metal. The adsorption of the metal ions obeyed the Langmuir isotherm and followed the preferential order UO22+ > Pb2+ > Cu2+ > Ni2+ >Zn2+ >Cd2+. Similarity of the isotherms for the individual metals was observed for both DSG and CSG, indicating a comparable removal capacity of DSG and its possible use as an alternative to CSG in adsorption applications. Adsorption from lead(II)-uranium(VI) solutions showed that the uptake of each metal was considerably reduced with an increasing concentration of the other, the adsorption of lead(II) being more strongly influenced by uranium(VI) than vice versa due to the higher affinity of silica gel for the latter.

Keywords: Uranyl Ions, Removal, Sorption, Silica Gel, Adsorption, Metal Ions, Uranium, Adsorption Kinetics

Tran, H.H. and Roddick, F.A. (1999), Comparison of chromatography and desiccant silica gels for the adsorption of metal ions. II. Fixed-bed study. *Water Research*, **33** (13), 3001-3011.

Full Text: [W\Wat Res33, 3001.pdf](W/Wat%20Res33,%203001.pdf)

Abstract: The adsorption of uranium(VI) and lead(II) on fixed beds of chromatography silica gel (CSG) and desiccant silica gel (DSG) was investigated at initial pH 5.15 and an initial concentration of 0.5 and 0.1 mM for uranium(VI) and lead(II), respectively, and exhibited a constant pattern of breakthrough curves at various bed heights and flow rates. The experimental data gave a good fit to the bed depth-service time (BDST) model at 50% breakthrough with the bed capacity close to the value predicted from batch study results. The adsorption performance of the silica gel columns could be well described by the Clark model at the ratios of concentration of effluent to influent (C/C0) up to 0.3 for uranium(VI) and 0.5 for lead(II). Above these levels, the model was approximately valid for uranium(VI), while a large deviation occurred with lead(II) adsorption. Application of the Wolborska model to the data at C/C0 ratios lower than 0.5 enabled the determination of the kinetic coefficients for mass transfer in these systems. Furthermore, it was found that uranium(VI) could be effectively separated from lead(II) by using a column packed either with CSG or DSG at pH 3.50. Complete removal of uranium(VI) adsorbed to a packed bed of silica gel was obtained by employing 4.5 M HNO3 as eluant. Six and seven bed volumes of 4.5 M HNO3 were required for the elution of uranium(VI) from CSG and DSC, respectively. For lead(II), complete desorption From the column required 3.0 and 3.5 bed volumes of 1.5 M HNO3 solution for CSG and DSG, respectively. For both uranium(VI) and lead(II) it was found that the DSG-packed column exhibited better performance than CSG in terms of service time and volume of solution treated, and gave similar value of the adsorbent usage rate, suggesting that DSG can be used instead of CSG in column applications.

Keywords: Activated-Carbon Systems, Removal, Silica Gel, Metal Ions, Uranium, Fixed Bed, Packed Bed

Caza, N., Bewtra, J.K., Biswas, N. and Taylor, K.E. (1999), Removal of phenolic compounds from synthetic wastewater using soybean peroxidase. *Water Research*, **33** (13), 3012-3018.

Full Text: [W\Wat Res33, 3012.pdf](W/Wat%20Res33,%203012.pdf)

Abstract: Experiments were conducted to investigate the efficiency of using soybean peroxidase (SBP) to remove several different phenolic compounds from unbuffered synthetic wastewater. The phenol derivatives studied included parent phenol, chlorinated phenols, cresols, 2,4-dichlorophenol and 4,4’-isopropylidenediphenol (commonly known as bisphenol A). Optimum conditions to achieve at least 95% removal of these compounds were determined for the following parameters: pn, SEP dose in the absence and presence of polyethylene glycol (PEG), hydrogen peroxide to substrate ratio, and PEG dose, Experimental results showed that SEP efficiently removed aromatic compounds from synthetic wastewater in the presence of hydrogen peroxide. An increase in the hydrogen peroxide to substrate ratio beyond the optimum resulted in enzyme inactivation in all cases except for bisphenol A. The optimum pH for different phenolic compounds ranged from 5.5 to 8. For each substrate. the optimum enzyme dose in the presence of PEG varied significantly. The studies showed that PEG only slightly reduced the amount of SEP required For 95% removal of the substrate. For most of the substrates, an increase in PEG dose beyond the optimum dose did not significantly change the removal efficiency. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Soybean Peroxidase, Aromatic Compounds, Enzymatic Removal, Polyethylene Glycol, Horseradish-Peroxidase, Additives, Optimization, Water

Chu, W. (1999), Lead metal removal by recycled alum sludge. *Water Research*, **33** (13), 3019-3025.

Full Text: [W\Wat Res33, 3019.pdf](W/Wat%20Res33,%203019.pdf)

Abstract: In this study, alum sludge was recycled using a chemical precipitation process to promote the removal of lead metal in wastewater. To make the process more cost-effective, two different pH ranges were suggested for daily operation, depending on the involvement or otherwise of an aluminum regeneration process at a later stage. If aluminum regeneration was expected, an elevated pH (11.6) was suggested to optimize both the aluminum regeneration and lead removal. Lead hydroxide coprecipitated with alum sludge in alkaline conditions, where the high pH would also facilitate the alkaline regeneration of alum at a later stage. With the use of recycled alum sludge (RAS) in the coagulation process, lead removal rates increased from 79% to 96-98% with 100-180 mg/l of RAS, while the required fresh alum dosage was reduced from 175 mg/l to 50-12.5 mg/l only, If no fresh alum is added to the system, the RAS can still remove up to 94% of lead at low recycling doses (75-100 mg/l), which suggests that the sweep-flee mechanism is crucial to the sludge reuse process. However, if the regeneration of aluminum is not required, a lower initial pH (10.5) should be used to decrease chemical costs. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Alum, Coagulation, Floc, Lead, Recycle, Sludge

Lu, X.Q., Chen, Z.L. and Yang, X.H. (1999), Spectroscopic study of aluminium speciation in removing humic substances by Al coagulation. *Water Research*, **33** (15), 3271-3280.

Full Text: [W\Wat Res33, 3271.pdf](W/Wat%20Res33,%203271.pdf)

Abstract: Removal of humic substances (HS) isolated from swamp water. surface soil. peat and brown coal by aluminium (Ai) coagulation under different conditions was studied using the jar test method and spectroscopic techniques. At lower pHs < 4.5, humic substances formed soluble complexes with Al3+ and the amounts of these HS-Al complexes increased with increasing concentration of the humic substances. Maximum removal of the humic substances was found to occur in the pH range from 5.0 to. 7.0, due to the adsorption of humic substances on the surface of Al(OH)3(s) crystal. Sequential extraction of the humic substances adsorbed on Al(OH)3(s) using the Soxhlet technique with different solvents showed that the adsorption forces involved were great. The effects of humic substances on the Al speciation are discussed and a model is proposed-to explain the mechanism for the removal of humic substances during the Al coagulation process. (C) 1999 Elsevier Science Ltd. Ail rights reserved.

Keywords: Humic Substances, Al Coagulation, Jar Test, Complexation, Adsorption, 27A1 NMR Spectroscopy, Micro-Infrared Spectroscopy, X-Ray Diffraction, Aqueous-Solutions, Acids, Chlorination, Complexes, Waters, Color, Mx

Yang, J.B. and Volesky, B. (1999), Biosorption of uranium on *Sargassum* biomass. *Water Research*, **33** (15), 3357-3363.

Full Text: [W\Wat Res33, 3357.pdf](W/Wat%20Res33,%203357.pdf)

Abstract: Protonated, non-living biomass of the brown alga *Sargassum fluitans* effectively sequestered uranyl ions from aqueous solution, with the maximum uranium sorption capacity exceeding 560 mg/g, 330 mg/g and 150 mg/g at pH 4.0, 3.2 and 2.6, respectively. At various pH levels, batch sorption equilibrium was reached within 3 h and the sorption isotherms were interpreted in terms of the Langmuir model. The sorption system pH profoundly affected uranium sorption capacities and sorption mechanisms through the hydrolysis of uranyl ions in aqueous solution. While only UO22+ ions existing at pH 2.6 were exchanging with protons on the biomass, the high uranium sorption at pH 4.0 was attributed to the existence of hydrolysed uranyl ions, UO2OH+, (UO2)3(OH)5+ and (UO2)2(OH)22+. Each mole of uranium binding to the biomass was accompanied by the consumption of approximately 2 mol of LiOH for maintenance of the desired constant pH. The uranium could be easily recovered from the metal-loaded biomass by elution with 0.1 N HCl. The desorption was complete and the damage to the biomass was slight. These findings indicate an enormous potential of biosorption in uranium removal from aqueous solutions. (C) 1999 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Biosorbent, Equilibrium, Uranium, Alga, *Sargassum*, Heavy-Metals, Marine-Algae, Bioaccumulation, Biotechnology

Swedlund, P.J. and Webster, J.G. (1999), Adsorption and polymerisation of silicic acid on ferrihydrite, and its effect on arsenic adsorption. *Water Research*, **33** (16), 3413-3422.

Full Text: [W\Wat Res33, 3413.pdf](W/Wat%20Res33,%203413.pdf)

Abstract: The interaction between silicic acid (H4SiO4) and ferrihydrite involves both adsorption and polymerisation, and has a significant effect on the adsorption of anionic species such as the oxyanions of arsenic. Using the diffuse layer model (DLM), the adsorption constants for H4SiO4, As(V), and As(III) adsorption onto ferrihydrite have been determined from experimental adsorption data. Silicic acid could be considered to adsorb as a monomer when the total Si to Fe mole ratio (Si-(T)/Fe) was < 0.1, and the inhibitory effect of H4SiO4 on As(III) and As(V) adsorption could be accurately modelled using the DLM. At higher Si-(T)/Fe ratios, H4SiO4 polymerisation on the ferrihydrite surface appeared to become increasingly important. However, even when Si-(T)/Fe = 1.8 and there would have been significant H4SiO4 polymerisation, the DLM continued to predict almost all of the observed effect of H4SiO4 on As(III) and As(V) adsorption while taking only H4SiO4 adsorption into account. This suggests that H4SiO4 adsorption inhibits Pls adsorption to a greater degree than H4SiO4 polymerisation. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Silicic Acid, Arsenic, Adsorption, Ferrihydrite, Diffuse Layer Model, Surface-Chemistry, Iron-Oxides, Spectroscopy, Mechanism, Sediments, Stability

? Wong, Y.X. and Yu, J. (1999), Laccase-catalyzed decolorization of synthetic dyes. *Water Research*, **33** (16), 3512-3520.

Full Text: [W\Wat Res33, 3512.pdf](W/Wat%20Res33,%203512.pdf)

Abstract: Commercial dyes are not uniformly susceptible to microbial attack in conventional aerobic treatment because of their unique and stable chemical structures. Three synthetic dyes with typical chromophores (anthraquinone, azo and indigo) were decolorized by a white-rot fungus *Trametes versicolor*. The responsible enzyme for dye decomposition was laccase, an extracellular oxidase released by the fungus under the conditions of slow growth or in its stationary phase. The mechanism of laccase-catalyzed dye decomposition, however, was different depending on dye structures. Anthraquinone dye was an enzyme substrate that was directly oxidized by laccase while decolorization of azo and indigo dyes involved some small molecule (<8 kDa) metabolites. It was demonstrated that azo and indigo dyes were not the substrates of laccase and the small molecule metabolites mediated the interaction between the dyes and the enzyme. The decolorization rate of the nonsubstrate dyes was actually limited by the concentration of mediating compounds rather than laccase activity in the solutions. Some synthetic compounds such as 2,2’-azino-bis(3-ethylthiazoline-6-sulfonate) or ABTS and anthraquinone dye could also mediate the decolorization of azo and indigo dyes. The mediating function of ABTS and anthraquinone dye was quantitatively compared in the decomposition of two nonsubstrate dyes. This fact implies that the laccase-substrate dyes in an industrial effluent can promote the decolorization of those nonsubstrate dyes. Effluent decolorization, therefore, may not be limited by the small molecule metabolites which are not produced in large amount by fungus in most industrial effluents. A laccase-catalyzed and mediator-involved dye degradation mechanism is proposed for further kinetic studies.

Keywords: Synthetic Dye, Decolorization, Laccase, Enzyme-Mediator Mechanism, White-Rot Fungus

van Noort, P.C.M. (1999), Comment on ‘The sorption of lead(II) ions on peat’ by Y. S. Ho and G. McKay, Water Research 33(2), 578-584 (1999). *Water Research*, **33** (16), 3541-3543.

Full Text: [W\Wat Res33, 3541.pdf](W/Wat%20Res33,%203541.pdf)

Ho, Y.S. and McKay, G. (1999), Comment on ‘The sorption of lead(II) ions on peat’ by Y.S. Ho and G. McKay, Water Research 33 (2), 578-584 (1999)-Authors’ reply. *Water Research*, **33** (16), 3544.

Full Text: [W\Wat Res33, 3544.pdf](W/Wat%20Res33,%203544.pdf)

Omoike, A.I. and Vanloon, G.W. (1999), Removal of phosphorus and organic matter removal by alum during wastewater treatment. *Water Research*, **33** (17), 3617-3627.

Full Text: [W\Wat Res33, 3617.pdf](W/Wat%20Res33,%203617.pdf)

Abstract: Ferron reagent and FTIR spectroscopy were used for the identification and characterization of the aluminum species formed during dephosphorization of simulated wastewater with and without organic matter. Evidence from FTIR spectroscopy showed the formation of aluminum hydroxyphosphate, hydroxy-Al-tannate and aluminum complexes containing both phosphorus and tannic acid. The surface reactivity of the solid products is proportional to the rate of reaction with ferron. The measured reactivities indicate that aluminum solid species with different surface properties were formed depending on solution components and method of precipitation. Tannic acid was found to inhibit phosphorus removal and the extent of inhibition increased with increasing concentration. When prehydrolyzed aluminum is exposed to tannic acid, the organic matter forms a coating on the surface of the inorganic solid during the aging process. Coprecipitation of aluminum, phosphate and tannic acid, which is synonymous with the addition of alum before or in the aerator, produces some soluble complex and some hydroxy-Al-phosphate-tannate complex, in the form of solid with very small particle size. This system gives high residual aluminum. The results suggest that it is advantageous to add at least a portion of the alum at the exit of the aerator. This enhances phosphorus removal by coprecipitation under conditions where the concentration of organic matter is relatively low and enhances removal of organic matter by postprecipitation onto the recycled sludge in the aerator. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Coprecipitation, Postprecipitaion, Wastewater, Surface Reactivity, Tannic Acid, Residual Phosphorus, Residual Tannic Acid, Tannic-Acid, Precipitation Products, Coagulation, Montmorillonite, Adsorption, Hydroxy-A1, Hydroxide, Surface, Ligands, Ions

Ivancev-Tumbas, I., Dalmacija, B., Tamas, Z. and Karlovic, E. (1999), The effect of different drinking water treatment processes on the rate of chloroform formation in the reactions of natural organic matter with hypochlorite. *Water Research*, **33** (18), 3715-3722.

Full Text: [W\Wat Res33, 3715.pdf](W/Wat%20Res33,%203715.pdf)

Abstract: This study is concerned with the changes in the rate of chloroform formation during the reactions of groundwater natural organic matter (NOM) and sodium hypochlorite caused by different drinking water treatments schemes: coagulation with FeCl3, Al2 (SO4)3 and polyaluminum chloride (PACl), filtration of the raw water through granular activated carbon (GAC) and filtration through the columns filled with strong base macroporous ion-exchange resins (Purolite A501P and A500P) with and without pretreatment by coagulation process. It was found that the change of the concentration of chloroform, within 2 h and c (Cl2) = 100 mg l-1, can be described by a kinetic equation of the form [CHCl3] = a + bt (c). On the basis of this equation rates of the reaction were calculated. All processes applied decreased the rate of chloroform formation (process of coagulation moderately decreased the rate of reactions, while GAC adsorption caused dramatically drop of the rate). Also, it was found that the resins have had a higher affinity towards slow-reacting chloroform precursors. The value of the chloroform formation potential was conventionally determined after a 7-day reaction at pH 7. In addition, the same parameter was estimated with a satisfactory deviation for raw water and for treated water on the basis of the kinetic constant (k) or by determining the chloroform concentration after 2 h (ChFP (2)) under rigourous chlorination conditions at pH 8.4. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Trihalomethane Formation, By-Products, Model, Groundwater, Chloroform Formation, Natural Organic Mater, Trihalomethane Formation Potential, Hypochlorite

Figueira, M.M., Volesky, B., Ciminelli, V.S.T. and Roddick, F.A. (2000), Biosorption of metals in brown seaweed biomass. *Water Research*, **34** (1), 196-204.

Full Text: [W\Wat Res34, 196.pdf](W/Wat%20Res34,%20196.pdf)

Abstract: Biosorption of Cd by biomass of the brown seaweeds Durvillaea, Laminaria Ecklonia and Homosira presaturated with Ca. Mg or K was coupled with the release of these light ions. The feasibility of biomass pre-treatment to develop a better biosorbent was evaluated by its biosorption performance, the degree of its component leaching (measured by the weight loss and TOC) as well as by the number of ion-exchange sites remaining in the biomass after the pre-treatment. Multicomponent Langmuir and ion exchange models applied to the equilibrium sorption data for pH 4.5 confirmed the ion exchange mechanism involved in the biosorption of metals. Both models fitted well the experimental data and their parameters can be used in the derivation of dimensionless ion-exchange isotherms which are instrumental in predicting the behavior of the biosorbents in dynamic flow-through biosorption systems. The sequence of biomass affinities established for the selected heavy metals can be correlated with the chemical pretreatment of the biomass. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Brown Seaweed, Heavy Metal, Ion Exchange, Heavy-Metal, Ion-Exchange, Marine-Algae, Binding, Biosorbent, Alginate, Polymers, Removal, Protons, Radiata

Carbonell-Barrachina, A.A., Jugsujinda, A., Burlo, F., Delaune, R.D. and Patrick, Jr., W.H. (2000), Arsenic chemistry in municipal sewage sludge as affected by redox potential and pH. *Water Research*, **34** (1), 216-224.

Full Text: [W\Wat Res34, 216.pdf](W/Wat%20Res34,%20216.pdf)

Abstract: This laboratory experiment systematically examines As speciation and solubility in sewage sludge suspensions as affected by pH and redox potential (Eh). Under oxidizing conditions, As solubility was low with the major portion of soluble As present as organic species; dimethylarsinic acid (DMAA) was always the dominant organic species. Under moderately reducing conditions (0-100 mV), arsenite a as the major inorganic As species in solution and As solubility significantly increased due to dissolution of iron oxyhydroxides. Upon reduction to -250 mV, As solubility was controlled by the formation of insoluble sulfides and as a result soluble As contents dramatically decreased as compared to levels measured at 0 mV. Speciation was drastically influenced by pH. Soluble As was maximum at a neutral pH value and decreased under both more acidic and alkaline concentrations. At pH 5.0, inorganic species were the dominant forms in solution, however, at pH 6.5, organic species were the major soluble forms. Alkaline conditions (pH 8.0) resulted in similar concentrations of soluble inorganic and organic As species. Arsenic biomethylation was measured at pH 6.5 and 8.0, but was drastically restricted at pH 5.0. (C) 1999 Elsevier Science Ltd. Ail rights reserved.

Keywords: Arsenic Speciation, Sewage Sludge, Redox Potential, Soil Amendment, Soil, Speciation, Selenium, Sediment, Adsorption, Reduction, Sorption, Cadmium, Water, Zinc

Tanaka, K., Padermpole, K. and Hisanaga, T. (2000), Photocatalytic degradation of commercial azo dyes. *Water Research*, **34** (1), 327-333.

Full Text: [W\Wat Res34, 327.pdf](W/Wat%20Res34,%20327.pdf)

Abstract: Seven azo dyes were photocatalytically degraded in TiO2 suspension. Their degradation rates were compared with disappearance and TOC elimination rates. It was demonstrated that diazo dye is less degradable than monoazo and the order of photocatalytic degradation rates was in approximate agreement with that of ozonation rates cited from literature. Major intermediates identified are aromatic amine, phenolic compounds and several organic acids. It was indicated from this study that in the photocatalytic degradation of azo dye the disappearance proceeds through both oxidation and reduction, whereas TOC is eliminated predominantly by oxidation. (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Azo Dye, Titanium Dioxide, Intermediate Products, Organic Acid, Waste-Water, TiO2, Acid, Decolorization, Photochemistry, Suspensions, Oxidation, Reduction, Sediment, Kinetics

Hong, H.B., Hwang, S.H. and Chang, Y.S. (2000), Biosorption of 1,2,3,4-tetrachlorodibenzo-p-dioxin and polychlorinated dibenzofurans by Bacillus pumilus. *Water Research*, **34** (1), 349-353.

Full Text: [W\Wat Res34, 349.pdf](W/Wat%20Res34,%20349.pdf)

Abstract: Microbial adsorption of 1,2,3,4-tetrachlorodibenzo-p-dioxin (1,2,3,4-TCDD) and various polychlorinated dibenzofurans (PCDFs) was investigated in an effort to determine the significance of microorganisms as potential agents in transferring the molecules in the environment. The microorganisms used in this study were cultivated under low nutrient conditions for 2 months. The increase and decrease of 1,2,3,4-TCDD and PCDFs in the samples were measured by GC/MS. The peak of dibenzofuran (DBF), added as an internal standard, was compared with the peaks of 1,2,3,4-TCDD and PCDFs. The results showed that the dead biomass of microorganisms could remove these molecules from the medium more effectively than live cells. The subsequent studies suggested that the removal of the molecules be concerned with the unknown biocompound(s) of which secretion is pronounced at high temperature. UV-VIS spectrometry was used to monitor the change in the concentration of biocompound(s). (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, 1,2,3,4-TCDD, PCDF, Bacillus Pumilus, Biomass

Dong, D.M., Nelson, Y.M., Lion, L.W., Shuler, M.L. and Ghiorse, W.C. (2000), Adsorption of Pb and Cd onto metal oxides and organic material in natural surface coatings as determined by selective extractions: New evidence for the importance of Mn and Fe oxides. *Water Research*, **34** (2), 427-436.

Full Text: [W\Wat Res34, 427.pdf](W/Wat%20Res34,%20427.pdf)

Abstract: Surface coatings (biofilms and associated minerals) were collected on glass slides in the oxic surface waters of Cayuga Lake (New York State, U.S.A.) and were used to evaluate the relative contributions of Fe, Mn and Al oxides and organic material to total observed Pb and Cd adsorption by the surface coating materials. Several alternative selective extraction techniques were evaluated with respect to both selectivity and alteration of the residual unextracted material. Pb and Cd adsorption was measured under controlled laboratory conditions (mineral salts solution with defined metal speciation, ionic strength 0.05 M, 25°C and pH 6.0) before and after extractions to determine by difference the adsorptive properties of the extracted component(s). Hydroxylamine hydrochloride (0.01 M NH2OH . HCl + 0.01 M HNO3) was used to selectively remove Mn oxides; sodium dithionite (0.3 M Na2S2O4) was used to remove Mn and Fe oxides, and 10% oxalic acid was used to remove metal oxides and organic materials. Several other extractants were evaluated, but preliminary experiments indicated that they were not suitable for these experiments because of undesirable alterations of the residual, unextracted material. The selected extraction methods removed target components with efficiencies between 71 and 83%, but significant amounts of metal oxides and organic materials other than the target components were also removed by the extractants (up to 39%). Nonlinear regression analysis of the observed Pb and Cd adsorption based on the assumption of additive Langmuir adsorption isotherms was used to estimate the relative contributions of each surface coating constituent to total Pb and Cd binding of the biofilms. Adsorption of Cd to the lake biofilms was dominated by Fe oxides, with lesser roles attributed to adsorption by Mn and Al oxides and organic material. Adsorption of Pb was dominated by Mn oxides, with lesser roles indicated for adsorption to Fe oxides and organic material, and the estimated contribution of Al oxides to Pb adsorption was insignificant. The fitted Pb adsorption isotherm for Fe oxides was in excellent agreement with those obtained through direct experiments and reported in independent investigations. The estimated Pb distribution between surface coating components also agreed well with that previously predicted by an additive adsorption model based on Pb adsorption isotherms for laboratory surrogates for Mn, Fe and Al oxides and defined biological components, (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Selective Extraction, Adsorption, Lead, Cadmium, Iron Oxide, Manganese Oxide, Trace-Metals, Lake-Sediments, Fresh-Waters, Iron, Manganese, Matter, Lead, Environment, Particles, Goethite

Morlay, C., Cromer, M. and Vittori, O. (2000), The removal of copper(II) and nickel(II) from dilute aqueous solution by a synthetic flocculant: A polarographic study of the complexation with a high molecular weight poly(acrylic acid) for different pH values. *Water Research*, **34** (2), 455-462.

Full Text: [W\Wat Res34, 455.pdf](W/Wat%20Res34,%20455.pdf)

Abstract: The aim of this work was to assess the possible removal of copper(II) or nickel(II) from dilute aqueous solution by a synthetic flocculant used in the water treatment field. The copper(II) or nickel(II) complex formation with the 3×106 g mol-1 average molecular weight poly(acrylic acid) (PAA 3×106) was examined at pH 6.0, 5.0 and 4.0 successively using differential pulse polarography as an investigation mean. The complexing capacity Cc of the polyacid towards copper(II) at pH 6.0 was estimated to be 5.8 mmol Cu(II)/g PAA 3×106 in the operative conditions considered here (NaNO3 0.1 mol l-1; 25°C). The conditional stability constant of the PAA 3×106/copper(II) complex species was determined using the method proposed by assuming that only the 1: 1 complex species was formed: log K’ = 5.2±0.2 at pH 6.0. Both values decreased with the pH of the aqueous medium. Whatever the pn considered, all the values of Cc and log K’ obtained with nickel(II) were significantly lower than these obtained with copper(II); this confirmed the conclusions of the previous potentiometric study of the PAA 3×106complexation properties (). (C) 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Poly(Acrylic Acid), Flocculant, Copper(II), Nickel(II), Complexation, Polarography, Natural Ionic Polysaccharides, Stripping Voltammetry, Metal Speciation, Waters, Binding

Tan, B.H., Teng, T.T. and Omar, A.K.M. (2000), Removal of dyes and industrial dye wastes by magnesium chloride. *Water Research*, **34** (2), 597-601.

Full Text: [W\Wat Res34, 597.pdf](W/Wat%20Res34,%20597.pdf)

Abstract: Magnesium chloride, as compared to alum and polyaluminium chloride (PAC) is a less commonly used coagulant in the field of wastewater treatment, with a cost in between alum and PAC. It has been used in this study as a coagulant to investigate the effectiveness in the chemical precipitation method for the removal of colouring matters. The colour concentration of dye solutions was measured by visible spectrophotometry. Parameters such as the effect of pH, the effect of coagulant and coagulant aid dosages and the effect of different coagulants have been studied. The results show that MgCl2 is capable of removing more than 90% of the colouring material at a pH of 11 and a dose of 4 g MgCl2/l of dye solution. MgCl2 is shown to be more effective in removing reactive dye than alum and PAC in terms of settling time and amount of alkalinity required. Optimal operating conditions such as pH value. coagulant dose and effect of polyelectrolyte have been determined. Wastewaters of a dyeing and printing mill on different days have been treated by MgCl2 aqueous solution in bench scale. The treatment of the industrial waste has shown a reduction of 88% in COD and 95% of suspended solids.

Keywords: Aqueous-Solutions, Activated Carbon, Adsorption, Water, Coagulation, Effluents, Dyestuffs, Chemical Coagulation, Colour Reduction, Textile Waste Effluent

Notes: highly cited

Ho, Y.S. and McKay, G. (2000), The kinetics of sorption of divalent metal ions onto sphagnum moss peat. *Water Research*, **34** (3), 735-742.

Full Text: [W\Wat Res34, 735.pdf](W/Wat%20Res34,%20735.pdf)

Abstract: A pseudo-second order rate equation describing the kinetics of sorption of divalent metal ions onto sphagnum moss peat at different initial metal ion concentrations and pear doses has been developed. The kinetics of sorption were followed based on the amounts of metalsorbed at various time intervals. Results show that sorption (chemical bonding) might be rate-limiting in the sorption of divalent metal ions onto peat during agitated batch contact time experiments. The rate constant, the equilibrium sorption capacity and the initial sorption rate were calculated. From these parameters, an empirical model for predicting the sorption capacity of metal ions sorbed was derived.

Keywords: Capacity, Copper, Elsevier, Equilibrium, Hong Kong, Kinetics, Kinetics And Sorption, Lead, Metal, Metal Ions, Model, Nickel, Peat, Peat, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Science, Sorption, Water

Ito, A., Umita, T., Aizawa, J., Takachi, T. and Morinaga, K. (2000), Removal of heavy metals from anaerobically digested sewage sludge by a new chemical method using ferric sulfate. *Water Research*, **34** (3), 751-758.

Full Text: [W\Wat Res34, 751.pdf](W/Wat%20Res34,%20751.pdf)

Abstract: The removal of heavy metals from anaerobically digested sewage sludge was studied by using ferric sulfate. The addition of ferric sulfate to the sludge caused the acidification of the sludge and the elution of heavy metals from the sludge. The pH of the sludge decreased with an increase in the amount of iron added and with a decrease in the sludge concentration. At a sludge solid concentration of 2% (w/w), the sludge pH dropped below 3 and the elution percentage of cadmium, copper and zinc was more than 80% when the added amount of ferric iron was more than 1.5g per L of wet sludge. Furthermore, the method using ferric sulfate was compared with that using sulfuric acid at pH 3 in order to clarify the effect of ferric iron as an oxidation reagent on elution of heavy metals. Ferric iron eluted cadmium, copper and zinc more effectively than sulfuric acid. This effective elution of heavy metals was caused by the oxidation of the sludge solid by ferric iron added. From these results, it was concluded that ferric iron played a role to acidify the sludge and to oxidize metallic compounds in the sludge and this new chemical method was useful for the removal of heavy metals from anaerobically digested sewage sludge. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobically Digested Sewage Sludge, Heavy Metals Removal, Ferric Sulfate, Sulfuric Acid, Sequential Selective Extraction Method, Kinetics

Lin, S.H. and Lai, C.L. (2000), Kinetic characteristics of textile wastewater ozonation in fluidized and fixed activated carbon beds. *Water Research*, **34** (3), 763-772.

Full Text: [W\Wat Res34, 763.pdf](W/Wat%20Res34,%20763.pdf)

Abstract: This study was to investigate the ozone oxidation of textile wastewaters in a fluidized or fixed granular activated carbon (GAC) bed. Experiments were conducted to examine the effects of various operating variables on the treatment efficienies of the combined ozonation and activated carbon adsorption. Ozonation was found to provide very efficient regeneration of exhausted GAC in the reactor, avoiding the costly ex situ GAC regeneration. It was also observed that the GAC acts not only as an adsorbent, but also as a catalyst in promoting ozone oxidation. The combined ozonation and GAC adsorption offers strong synergistic effects on the textile wastewater treatment. A generalized kinetic model consisting of multiple steps of ozonation and adsorption was proposed in this work to represent the combined process. The proposed adsorption/ozonation/desorption mechanism and the generalized kinetic model were shown to describe very well the combined treatment process.

Keywords: Water, Reagent, Ozonation, GAC Adsorption, In Situ GAC Regeneration, Adsorption/Reaction Mechanism, Generalized Kinetic Model

Notes: highly cited

Al-Degs, Y., Khraisheh, M.A.M., Allen, S.J. and Ahmad, M.N. (2000), Effect of carbon surface chemistry on the removal of reactive dyes from textile effluent. *Water Research*, **34** (3), 927-935.

Full Text: [W\Wat Res34, 927.pdf](W/Wat%20Res34,%20927.pdf)

Abstract: The removal efficiency of activated carbon Filtrasorb 400 (F-400) towards three highly used reactive dyes in the textile industry was investigated. In this work, the adsorption capacities for the anionic reactive dyes, namely; Remazol Reactive Yellow, Remazol Reactive Black and Remazol Reactive Red were determined. The adsorption capacity data showed a high removal ability for the three reactive dyes and a distinguished ability for R. Yellow. The high adsorption capacities for F-400 were attributed to the net positive surface charge during the adsorption process. Surface acidity, surface basicity, H+ and OH-adsorption capacities and pHZPC for F-400 were estimated and compared with other reported values.

Keywords: Acidity, Activated Carbon, Activated Carbons, Adsorbents, Adsorption, Adsorption, Adsorption Capacity, Aqueous-Solutions, Capacity, Chitosan, Ions, Isotherms, Oxides, pHZPC, Process, Reactive Dyes, Titration, Wastewater

Meng, X.G., Bang, S. and Korfiatis, G.P. (2000), Effects of silicate, sulfate, and carbonate on arsenic removal by ferric chloride. *Water Research*, **34** (4), 1255-1261.

Full Text: [W\Wat Res34, 1255.pdf](W/Wat%20Res34,%201255.pdf)

Abstract: Effects of silicate, sulfate, and carbonate on the removal of arsenite [As(III)] and arsenate [As(V)] by coprecipitation with ferric chloride were studied. Silicate significantly decreased As(III) removal when Si concentration was higher than 1 mg/l and the pH was greater than 5. The removal of As(V) was decreased moderately by silicate in 0.04 M KNO3 solution. Addition of Ca2+ and Mg2+ to the KNO3 solution reduced the adverse affect of silicate on As(V) removal. In the presence of 10 mg/l Si and at a pH of approximately 6.8, the adsorption capacity of ferric hydroxide for As(V) and As(III) was reduced from 864 and 116 µg/mg to 274 and 23 µg/mg Fe, respectively. Sulfate and carbonate had a negligible effect on the removal of As(III) and As(V). The triple layer model was used with site binding reactions to describe As(III) and As(V) removal by ferric hydroxide in the presence of silicate. The results obtained in the present study suggest that silicate in natural water can significantly decrease the efficiency of As(III) removal by coagulation treatment with ferric chloride. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Coprecipitation, Adsorption, Coagulation, Silicate, Sulfate, Anions, Model, Amorphous Iron Oxyhydroxide, Oxide-Solution Interfaces, Metal-Ions, Surface-Ionization, Water Interface, Drinking-Water, Natural-Waters, Mixed Oxides, Adsorption, Complexation

Gupta, V.K., Srivastava, S.K. and Tyagi, R. (2000), Design parameters for the treatment of phenolic wastes by carbon columns (obtained from fertilizer waste material). *Water Research*, **34** (5), 1543-1550.

Full Text: [W\Wat Res34, 1543.pdf](W/Wat%20Res34,%201543.pdf)

Abstract: The waste slurry generated in fertilizer plants in India has been converted into a cheap carbonaceous adsorbent material. The practical applicability of this product has been investigated in the column operations and the mass transfer kinetic approach has been successfully used for the determination of various parameters necessary for designing a fixed bed adsorber. The value of breakthrough capacity is more than the batch capacity. The total time (tx) involved for the establishment of the primary adsorption zone (PAZ), the time (tδ) required for the movement of PAZ down its length, the fractional capacity (f), the length of (PAZ) primary adsorption zone (δ), and percentage saturation of column at break point have been evaluated for carbon columns for the removal of phenols viz., 2,4,6-trinitrophenol, 4-nitrophenol, 4-chlorophenol and 1,3-dihydroxybenzene. Studies have also been performed for the recovery of phenols and chemical regeneration of the spent column. It was observed that 70 mL of 5% w/w NaOH or 50 mL of acetone are sufficient for almost complete desorption of phenols. After regeneration with 1M HNO3 the sorption capacity of the column is almost the same as that of virgin adsorbent material.

Keywords: Adsorption, Fertilizer Waste, Substituted Phenols, 2,4,6-Trinitrophenol, 4-Nitrophenol, 4-Chlorophenol, 1,3-Dihydroxybenzene, Column[,](http://www.sciencedirect.com/#hit9) Studies, Activated Carbon, Design Parameters

Notes: highly cited

Nam, S. and Tratnyek, P.G. (2000), Reduction of azo dyes with zero-valent iron. *Water Research*, **34** (6), 1837-1845.

Full Text: [W\Wat Res34, 1837.pdf](W/Wat%20Res34,%201837.pdf)

Abstract: The reduction of azo dyes by zero-valent iron metal (Fe-0) at pH 7.0 in 10 mM HEPES buffer was studied in aqueous, anaerobic batch systems. Orange II was reduced by cleavage of the azo linkage, as evidenced by the production of sulfanilic acid (a substituted aniline). Adsorption of the dyes on iron particles was less than 4% of the initial concentration, and > 90% mass balance was achieved by summing aqueous concentrations of dye and product amine. All of the 9 azo dyes tested were reduced with first-order kinetics. The kinetics of decolorization at the lambdamax of each dye were rapid: a typical k (obs) was 0.35±0.01 min-1 for Orange II at 130 rpm on an orbital shaker, corresponding to a surface area normalized rate constant (k (SA)) of 0.21±0.01 Lm-2min-1. The rate of reduction of Crocein Orange G varied with initial dye concentration in a way that suggests saturation of surface sites on the Fe-0, and varied with the square-root of mixing rate (rpm) in a manner indicative of mass transfer limited kinetics. Correlation analysis using k(obs) for all of the azo dyes, estimates of their diffusion coefficients, and calculated energies of their lowest unoccupied molecular orbitals (E-LUMO), gave no strong trends that could be used to derive structure-activity relationships. Using an authentic sample of wastewater from a dye manufacturing operation and construction-grade granular Fe-0, rapid decolorization was achieved that was consistent with reduction of azo dyes.

Keywords: In-Situ Remediation, Metallic Iron, Polychlorinated-Biphenyls, Water System, Ground-Water, Dechlorination, Nitrate, Kinetics, Transformation, Decolorization, Iron Metal, Decolorization, Kinetics, Mass Transport, Correlation Analysis

Kunz, A. and Jardim, W.F. (2000), Complexation and adsorption of copper in raw sewage. *Water Research*, **34** (7), 2061-2068.

Full Text: [W\Wat Res34, 2061.pdf](W/Wat%20Res34,%202061.pdf)

Abstract: Competition between complexation and adsorption of copper was evaluated in raw sewage samples. Dissociation constants of filtered and non-filtered samples were calculated by linearization of potentiometric titration data using a modified Gran method. Sewage samples were also titrated with cupric ions at three different pH values using an ion selective electrode to quantify the effect of pH, ligand concentration, and particulates in the speciation of copper. Three titratable groups with pKa values of 4.45, 6.42, and 9.31 were detected in non-filtered samples. Changes in pH showed a marked effect in the concentration of free metal caused by the competition between copper and hydrogen ions for organic ligands present in raw sewage. Particulate matter as well as carbonate did not show a significant contribution to control copper speciation in the system. Assuming a two binding sites model, conditional stability constants (K’) of copper complexes were dependent on pH, showing values around log K’ (1) = 8.00 and log K’ (2) = 6.30 at pH 5.8, whereas at pH 7.8, these constants increased to log K’ (1) = 10.60 and log K’ (2) = 8.70 for filtered samples. Particulates caused small changes in K’ Values due to adsorption contribution, and this effect was minimized in diluted samples. Ligand concentrations varied between 5 and 10 µmoll-1.

Keywords: Dissolved Organic-Matter, Metal Removal, Trace-Metals, River Water, Humic-Acid, Speciation, Bioavailability, Binding, Raw Sewage, Copper Speciation, Complexation, Adsorption, Dissociation Constants, Conditional Stability Constants

? Song, Z., Williams, C.J. and Edyvean, R.G.J. (2000), Sedimentation of tannery wastewater. *Water Research*, **34** (7), 2171-2176.

Full Text: [2000\Wat Res34, 2171.pdf](2000/Wat%20Res34,%202171.pdf)

Abstract: Tannery wastewater is a powerful pollutant. It can cause severe environmental problems related to its high chemical oxygen demand (COD) together with elevated chrome concentration and deep colour content. The strength parameters employed are COD and suspended solids (SS). Chromium (III) is widely used as tanning agent in the leather industry, and is a significant source of environmental contamination. Tannery effluent containing chromium (III) salts have to be treated to reduce the chromium concentration in the final works effluent to below the value specified in the discharge consent conditions. The objective of this study is to investigate the pretreatment of a tannery wastewater, typified by the mixed effluent from tannery operations. The behaviour of plain settling is described. The results demonstrate 41.5% removal of total GOD, 83.2% removal of chromium and 76.1% removal of suspended solid after 3 h of plain settling. The sludge Volume was 28% of the volume of the mixed wastewater, (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Tannery Wastewater, Sedimentation, Chromium, Plain Settling, COD, Suspended Solids, Industry, Sludge

Notes: highly cited

? Brillas, E., Calpe, J.C. and Casado, J. (2000), Mineralization of 2,4-D by advanced electrochemical oxidation processes. *Water Research*, **34** (8), 2253-2262.

Full Text: [2000\Wat Res34, 2253.pdf](2000/Wat%20Res34,%202253.pdf)

Abstract: The mineralization process for 2,4-dichiorophenoxyacetic acid (2,4-D) at pH ca. 3 has been studied by advanced electrochemical oxidation processes (AEOPs), such as electro-Fenton and photoelectro-Fenton processes, in which a Pt anode and a carbon-polytetrafluoroethylene O-2-fed cathode, for in situ production of H2O2 are used. A solution of 230 ppm 2,4-D with a low salt content can be completely mineralized by the photoelectro-Fenton process at low current, whereas the electro-Fenton process leads to ca. 90% of mineralization. In both methods. 2,4-D is quickly destroyed at the same rate. The high degradation power of these AEOPs is due to the large production of oxidizing hydroxyl radicals by reaction between electrogenerated H2O2 and Fe2+ added to the solution. The higher mineralization rate found for photoelectro-Fenton is accounted for by the fast photolytic decomposition of some intermediates by UV light. Classical anodic oxidation with a graphite cathode and anodic oxidation in the presence of electrogenerated H2O2 are much less efficient methods to degrade 2,4-D and its oxidation products. 2,4-Dichlorophenol. 4,6-dichlororesorcinol, chlorohydroquinone and chlorobenzoquinone have been identified as intermediates by GC-MS and their evolution for each process has been followed by reverse-phase chromatography. Chloride ion is released from these chloroderivatives and accumulates in the medium. Short-chain acids, as glycolic, glyoxylic, maleic, fumaric and oxalic, have been detected by ion-exclusion chromatography. A general reaction pathway involving all these intermediates is proposed. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: 2,4-Dichlorophenoxyacetic Acid, Mineralization, Water Treatment, Anodic Oxidation, Electro-Fenton Process, Photoelectro-Fenton Process, Waste-Water Treatment, Ptfe O-2-Fed Cathode, Hydrogen-Peroxide, Anodic-Oxidation, 2,4-Dichlorophenoxyacetic Acid, Photoelectro-Fenton, Electro-Fenton, Oh Radicals, Degradation, Aniline

? Barber, W.P. and Stuckey, D.C. (2000), Nitrogen removal in a modified anaerobic baffled reactor (ABR): 1, Denitrification. *Water Research*, **34** (9), 2413-2422.

Full Text: [2000\Wat Res34, 2413.pdf](2000/Wat%20Res34,%202413.pdf)

Abstract: In order to achieve nitrogen removal within a single reactor unit, an eight compartment anaerobic baffled reactor (ABR) was modified to accommodate an in-situ aerobic stage in the penultimate compartment, which allowed ammonia oxidation to nitrite and nitrate via nitrification, rn theory, the nitrite/nitrate may be recycled to the inlet of the ABR and be reduced via denitrification. This paper deals with the anoxic denitrification of a nitrate feed, while a later paper examines nitrification in the aerobic stage. Denitrification occurred almost exclusively in the front two compartments of the anaerobic baffled reactor, with rates of 0.335 (82% reduction) and 0.085 kg NO3/kg VSS.d (96% reduction) in compartments 1 and 2, respectively. Denitrification had several positive effects on overall reactor performance, and this was due to the following factors: the utilisation of an oxidisable electron donor in the form of the feed GOD; increased system pH at the reactor inlet thus improving environmental conditions; a high hydrogen demand during dissimilatory nitrate reduction to ammonium, therefore improving conditions for syntrophic bacteria; and, the generation of ammonium from dissimilatory reduction which provided slowly growing bacteria at the front of the ABR with a reduced nitrogen source. The overall effect of these influences was improved hydrogenotrophic methanogenesis. Denitrification also increased the residual COD in the first two compartments, and this was attributed to faster growth/decay rates of denitrifying bacteria. Nitrate reduction also influenced the ratio of volatile fatty acids produced and catabolised, with a significant reduction in propionate and butyrate, while acetate levels increased. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Acetate, Anaerobic Baffled Reactor, Bacteria, Biofilm, Demand, Denitrification, Dissimilatory Nitrate Reduction To Ammonium, Environmental, First, Generation, Glucose, Hydrogen, Kinetics, Microbial Products SMP, Nitrate, Nitrate Reduction, Nitrification, Nitrite, Nitrogen Removal, Oxidation, Performance, pH, Reduction, Removal, Residual COD, Rights, Theory, VFAS, Waste-Water Treatment

? Barber, W.P. and Stuckey, D.C. (2000), Nitrogen removal in a modified anaerobic baffled reactor (ABR): 2, Nitrification. *Water Research*, **34** (9), 2423-2432.

Full Text: [2000\Wat Res34, 2423.pdf](2000/Wat%20Res34,%202423.pdf)

Abstract: The oxidation of ammonia to nitrite/nitrate using chemolithoautotrophic nitrifying bacteria immobilised in polyvinyl alcohol (PVA) cubes and placed within an aerobic stage of a modified anaerobic baffled reactor (ABR) was investigated. Various system parameters known to affect nitrification were tested to determine the viability of the process. Nitrification efficiency was improved by increased mixing, increased oxygen levels and the initial addition of copper. In contrast, nitrification was reduced by; a reduction in bulk ammonia levels, a reduction in pH, continued copper addition and COD levels above 1000 mg/l. Whilst immobilisation appeared to protect against un-ionised ammonia, it simultaneously increased the saturation constant K-s for both oxygen and ammonia by orders of magnitude. Consequentially, the bacteria could survive in abnormally high bulk ammonia concentrations with no signs of inhibition, but were limited for oxygen below a partial pressure of 0.42 atm, and for ammonia below 160 mg NH3/l. A series of non-typical trends became evident during this work: the continued dependence of nitrite oxidation on the performance of ammonia oxidation; persistently low bulk nitrite concentrations; the ability of the pellets to produce high levels of nitrate even when bulk un-ionised ammonia concentrations were orders of magnitude higher than the inhibition coefficient for Nitrobacter; and, the high sensitivity of the bacteria to low concentrations of ammonia and oxygen. These results were due to significant increases in apparent K-s values for both groups, and were in accordance with reduced diffusion coefficients for the pellets. These findings were then used to propose a layered structure for the pellets, and in conjunction with other work on denitrification in an ABR, lay the basis for an integrated nitrogen removal technique in a single reactor. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Alcohol, Ammonia, Anaerobic Baffled Reactor, Bacteria, Copper, Copper Stimulation, Denitrification, Diffusion, Dissolved-Oxygen, DO, Efficiency, Gas Mixing, Immobilisation, Inhibition, Kinetics, Nitrate, Nitrification, Nitrite, Nitrogen Removal, Oxidation, pH, Pressure, Reduction, Removal, Rights, Saturation, Structure, Trends, Work

Cimino, G., Passerini, A. and Toscano, G. (2000), Removal of toxic cations and Cr(VI) from aqueous solution by hazelnut shell. *Water Research*, **34** (11), 2955-2962.

Full Text: [W\Wat Res34, 2955.pdf](W/Wat%20Res34,%202955.pdf)

Abstract: Removal of ions such as Cd2+, Zn2+, three-and hexavalent chromium from aqueous solutions using hazelnut shell as biosorbent substrate has been performed. Batch equilibrium tests showed that the metal sorption was dependent on both pH and surface loading. For Cd2+, Cr3+ and Zn2+ ions the maximum removal was observed only into a specific pH range. The metal ion sorption obeyed both the Langmuir and Freundlich isotherms. Experiments by mixed solutions showed that more Cr3+ ions were removed than both Cd2+ and Zn2+ ions. The binding capacities acid the affinities observed were consistent with the HSAB theory on hard and soft acid base. The Cr(VI) removal was pH dependent and fitted with the Langmuir isotherm model. It was proceeding effectively into a short acid pH interval (2.5-3.5) where both processes of Cr(VI) reduction and (Cr III) sorption are maximized. Mechanisms for removal of anions and cations studied have been proposed. The observed sorption data showed similarity with that of other fresh cellulosic materials found in literature. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Agricultural By-Product, Biosorbent, Hazelnut Shell, Hexavalent Chromium, Hsab Principle, Toxic Metals, Wastewater Treatment, Heavy-Metals, Biosorption, Adsorption, Chromium(VI), Ions

Chiarle, S., Ratto, M. and Rovatti, M. (2000), Mercury removal from water by ion exchange resins adsorption. *Water Research*, **34** (11), 2971-2978.

Full Text: [W\Wat Res34, 2971.pdf](W/Wat%20Res34,%202971.pdf)

Abstract: In this paper a detailed experimental and theoretical analysis of the adsorption process of mercury by ion exchange resins is presented. Experiments have been performed to study adsorption efficiency, the effect of pH on the uptake of mercury and the adsorption kinetics. The experimental apparatus was a batch mechanically stirred reactor (volume 1.5 dm3), under almost isothermal conditions (±0.1°C). The resin used in this study is Duolite GT-73, a chelating resin, macroreticular with thiol (S-H) functional groups. The studied resin has a very high adsorption efficiency, reaching 30-40% in weight and the efficiency decreases, decreasing pH, due to competition between ions H+ and Hg2+. Such a high efficiency confirms previous results and justifies the great interest for the application of ion exchange resins in water treatment plants. As in previous works, measurements of process kinetics show that the adsorption rate decreases as the initial mercury concentration is increased. This fact suggests that intraparticle diffusion rate can be the controlling step for the adsorption process. To verify this, a simplified mathematical model has been identified, accounting for a diffusional resistance inside solid particles and where the equilibrium relationship between Hg concentration in the liquid and in the solid is described by the. Freundlich isotherm, neglecting H+ competition: this model is very effective in the prediction of the change in the adsorption kinetics with the initial Hg concentration. Hence this preliminary approach can be held as the reference starting point for the adsorption model: further developments will concern the equilibrium thermodynamics (H+ competition). (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Mercury Adsorption, Ion Exchange Resins, Adsorption Kinetics, Diffusional Model, Adsorption Model, Waste-Water, Heavy-Metals

Solisio, C., Lodi, A., Converti, A. and Del Borghi, M. (2000), The effect of acid pre-treatment on the biosorption of chromium(III) by *Sphaerotilus natans* from industrial wastewater. *Water Resources*, **34** (12), 3171-3178.

Full Text: [W\Wat Res34, 3171.pdf](W/Wat%20Res34,%203171.pdf)

Abstract: Living cells of a strain of *Sphaerotilus natans* are employed to remove Cr(III) from acid wastewater. Batch experiments carried out at starting acid conditions (pH 3.0-3.5) show that the pH progressively increases but the removing activity Starts only when conditions closed to neutrality are reached. Studies carried out either at initial acid conditions or at standard conditions for this micro-organism (pH 7.0) confirm that the biomass is able to grow also on acid medium, although the lag phase is longer than the one observed at standard conditions. This strain shows its maximum ability to remove Cr(III) at a biomass concentration of about 0.4 g l-1 Tests carried out at both lower and higher biomass levels show lower yields, while the time necessary to reach the maximum removal considerably increases. Biomass previously adapted to acid conditions ensures a specific uptake of this metal of 120 mg g-1, which is much higher than that reported in the literature for other micro-organisms. Continuous tests in CSTR confirm the possibility of developing a biological treatment process for the continuous removal of Cr(III) from acid solutions. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, *Sphaerotilus Natans*, Chromium(III), Acid Wastewater, Batch Tests, Continuous Tests, Removal, Metals, Recovery, Cadmium, Biomass, Copper

Kratochvil, D. and Volesky, B. (2000), Multicomponent biosorption in fixed beds. *Water Resources*, **34** (12), 3186-3196.

Full Text: [W\Wat Res34, 3186.pdf](W/Wat%20Res34,%203186.pdf)

Abstract: The biosorption of Cu, Zn, Cd and Fe from multicomponent mixtures was studied in a flow-through column packed with Sargassum algal biosorbent in the Ca-form. The effects of competitive ion exchange such as the elution order of toxic metals from the column, and the concentration overshoots in column effluent were investigated both experimentally and by means of an ion exchange equilibrium column model (ECM). The ECM predicted, and the experiments confirmed, that from the feed containing Cu2+, Zn2+ and Cd2+, zinc broke through the column first, followed by cadmium and copper. When the binary mixtures containing 30 mg/l of Cu2+ and 4 mg/l of either Cd2+ or Zn2+ were passed through the column, the concentrations of Zn and Cd ions in the column effluent overshot the 4 mg/l feed concentration. The time interval between the overshoot of Zn and the breakthrough point of Cu was Significantly longer than that between the overshoot of Cd and the breakthrough point of Cu. However, Zn did not overshoot when the feed contained 50 mg/l of Cd and 4 mg/l of Zn. The ECM successfully predicted both the occurrence and the magnitude of the overshoots. The service time of a column treating multimetal mixtures was successfully predicted by combining the ECM with a mass transfer column model (MTCM). (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Sargassum, Muticomponent Sorption, Column, Ion-Exchange, Heavy-Metals, Removal, Column, Adsorption

Perret, S., Morlay, C., Cromer, M. and Vittori, O. (2000), Polarographic study of the removal of cadmium(II) and lead(II) from dilute aqueous solution by a synthetic flocculant. Comparison with copper(II) and nickel(II). *Water Research*, **34** (14), 3614-3620.

Full Text: [W\Wat Res34, 3614.pdf](W/Wat%20Res34,%203614.pdf)

Abstract: The aim of this work was to assess the possible removal of cadmium(II) or lead(II) from dilute aqueous solution by a synthetic flocculant used in the water treatment held. The cadmium(II) or lead(II) complex formation with the 3×106 g mol-1 average molecular weight poly(acrylic acid) (PAA 3×106) was examined at pH 6.0, 5.0 and 4.0 successively using differential pulse polarography as an investigation mean. The complexing capacity Cc of the polyacid towards lead(II) at pH 6.0 was estimated to be 6.3 mmol Pb(II)/g PAA 3×106 in the operative conditions considered here (NaNO3 0.1 mol l-1; 25°C). The conditional stability constant of the PAA 3 x 10(6)/lead(II) complex species was determined using the method proposed by Ruzic [(1982) Anal. Chim. Acta 140, 99-113] assuming that only the 1: 1 complex species was formed: log K’ = 5.3±0.2 at pH 6.0. Both values decreased with the pH of the aqueous medium. The results were compared to those previously obtained in the same conditions with copper(II) and nickel(II) [(2000) Wat. Res. 34, 455-462]. It appeared that the binding properties of PAA 3×106 increased in the following order, depending on the metal ion: Ni(II) < Cd(II) < Cu(II) < Pb(II). This result confirmed the conclusions of the previous potentiometric study [(1999) Talanta 48, 1159-1166]. Finally, the selectivity of PAA 3×106 towards copper(II) and lead(II) was examined. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Poly(Acrylic Acid), Flocculant, Cadmium(II), Lead(II), Complexation, Polarography, Metal-Polycarboxylate Complexes, Anodic-Stripping Voltammetry, Weight Poly(Acrylic Acids), Natural-Waters, Speciation, Cu(II), Ni(II)

? Rožić, M., Cerjan-Stefanović, Š., Kurajica, S., Vanćina, V. and Hodžić, E. (2000), Ammoniacal nitrogen removal from water by treatment with clays and zeolites. *Water Research*, **34** (14), 3675-3681.

Full Text: [W\Wat Res34, 3675.pdf](W/Wat%20Res34,%203675.pdf)

Abstract: The objective of the present study was to investigate the removal of nitrogen in the form of ammonium ions (N-NH+4) from aqueous solutions using natural clay and zeolite. The Croatian zeolite clinoptilolite from the area of Donje Jesenje and Croatian bentonite clay from the Kutina area were used as natural filtration materials. Alkaline and acid modification of natural clay was performed. The N-NH4+ removal efficiency by clays in a dry state as well as in a liquid colloidal state have been investigated. The highest removal efficiency value for N-NH+4 (61.1 wt%) was achieved with the natural zeolite at the lowest used initial concentration, i.e. at a concentration of 100 mg N-NH+4/l. With the increase of the initial concentration of ammoniacal nitrogen, the removal efficiency quickly decreases. This is expected as zeolites and clays have limited sorption capacities. The practical aspect is important since an ammoniacal nitrogen elimination of more than 60.0 wt% for water containing less than 100 mg N-NH+4/l can be achieved. The ammoniacal nitrogen removal efficiency is higher for clays in a liquid colloidal state compared to the clays in a dry state. It has been found that the acid modification of the clay decreases the efficiency of ammoniacal nitrogen removal.

Keywords: Natural Zeolite, Natural Clay, Modified Natural Clay, Clay in A Liquid Colloidal State, Ammoniacal Nitrogen Removal

Notes: highly cited

Brown, P.A., Gill, S.A. and Allen, S.J. (2000), Metal removal from wastewater using peat. *Water Research*, **34** (16), 3907-3916.

Full Text: [W\Wat Res34, 3907.pdf](W/Wat%20Res34,%203907.pdf)

Abstract: Peat has been investigated by several researchers as a sorbent for the capture of dissolved metals from wastestreams. Besides being plentiful and inexpensive, pear possesses several characteristics that make it an effective media for the removal of dissolved metal pollutants. The mechanism of metal ion binding to peat remains a controversial area with ion-exchange, complexation, and surface adsorption being the prevalent theories. Factors affecting adsorption include pH, loading rates, and the presence of competing metals. The optimum pH range for metals capture is generally 3.5-6.5. Although the presence of more than one metal in a solution creates competition For sorption sites and less of a particular ion may be bound, the total sorption capacity has been found to increase. Studies have also shown that metals removal is most efficient when the loading rates are low. In addition, recovery of metals and regeneration of the peat is possible using acid elution with little effect on peat’s sorption capacity. The utilization of peat and other biomass materials for the treatment of wastewater containing heavy metals is gaining more attention as a simple. effective and economical means of pollution remediation. Pelleting processes can now produce a robust media for a variety of applications where traditional methods of pollutant removal would he economically or technologically difficult. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Peat, Metals, Adsorption, Wastewater Treatment, Soil Organic-Matter, Sphagnum Moss Peat, Ion-Exchange, Heavy-Metals, Humic-Acid, Immobilized Biomass, Adsorption, Kinetics, Water, Copper

Liu, R.X. and Tang, H.X. (2000), Oxidative decolorization of direct light red F3B dye at natural manganese mineral surface. *Water Research*, **34** (16), 4029-4035.

Full Text: [W\Wat Res34, 4029.pdf](W/Wat%20Res34,%204029.pdf)

Abstract: In this paper, the characteristics of natural manganese mineral collected from Guangxi Province. China, including crystalline properties, elemental composition, organic substrates content (0.17%) and BET surface area (29.8 m2/g), were determined. By X-ray powder diffraction and fluorescence spectrograph analysis, it is shown that manganese oxide in the natural mineral exists in the crystal structure of alpha-Mn2O3 and the contents of manganese(II) and manganese(IV) oxides are 4.6 and 42.6%, respectively. The solubility experiments show that manganese dissolved in solution can be ignored at a higher pH value, but its significant solubility is observed with the decrease of pH value. Moreover. the decolorization properties of direct light red F3B dye on natural manganese mineral surface were studied by batch technique. The effects of pH value, temperature, inert electrolyte, light, particles concentration and size, the presence of calcium and phosphate as well as oxygen on the decolorization efficiency of the dye were investigated in detail. The results show that the decolorization of the dye is strongly dependent on pH value, with lower decolorization percentage at higher pH values, and the higher concentration of inert electrolyte and temperature favor the decolorization reaction of the dye on the particle surface. By Arrhenius Equation. the apparent activation energy is found to be at 71.7 kJ/mol, indicating the surface chemical reaction as a rate-limiting step in the overall interface process. The illumination enhances the surface chemical reaction of the dye on manganese mineral particles. The decolorization rate of the dye compound is increased with the increase of particle concentration and the decrease of size since the available surface sires grow in number. The presence of phosphate greatly inhibits the decolorization reaction by competitive adsorption on the mineral surface with the dye anion, while the addition of calcium promotes the decolorization rate of direct light red F3B dye. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Natural Manganese Mineral, Characteristic, Decolorization Properties, Direct Light Red F3B Dye, Effect Factors, Photocatalytic Oxidation, Substituted Phenols, Waste-Water, Oxides, Dissolution, Reduction, Organics, TiO2

Yetis, U., Dolek, A., Dilek, F.B. and Ozcengiz, G. (2000), The removal of Pb(II) by *Phanerochaete chrysosporium*. *Water Research*, **34** (16), 4090-4100.

Full Text: [W\Wat Res34, 4090.pdf](W/Wat%20Res34,%204090.pdf)

Abstract: The removal of Pb(II) by live, resting and dead cells of a lignolytic white-rot fungus, *Phanerochaete chrysosporium* was investigated. Kinetic studies revealed the fact that adsorption is a two-stage process: a very rapid surface adsorption within the first hour and a slow intracellular diffusion during 2 h of metal exposure. The results showed that the resting cells were able to uptake up to 80 mg Pb(II)/g dry cell. The saturation sorption capacities of live and dead cells were 9 and 20 mg Pb(II)/g dry cell, respectively. The biomass originated from different growth phases and exhibited different adsorption capacities for Pb(II). It appeared that the young resting cells held higher Pb(II) adsorption capacities than old ones. Acid and alkali pre-treatments of the old resting cells increased the sorption capacity; although the capacity of virgin young fungi was never attained. Acid treatment of the young cells reduced the adsorption capacity remarkably; however, alkali treatment improved it. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Pb(II) Removal, White-Rot Fungi, Phanerochaete Chrysosporium, Biosorption, Bioaccumulation, Pretreated Cell Mass, Heavy Metals, Dilute Aqueous-Solutions, Heavy-Metal Biosorption, *Saccharomyces-Cerevisiae*, Mucor-Miehei, Biomass, Cadmium, Copper, pH, Accumulation, Mechanisms

? Panswad, T. and Luangdilok, W. (2000), Decolorization of reactive dyes with different molecular structures under different environmental conditions. *Water Research*, **34** (17), 4177-4184.

Full Text: [2000\Wat Res34, 4177.pdf](2000/Wat%20Res34,%204177.pdf)

Abstract: Reactive dyes have been identified as problematic compounds in textile wastewaters as they are water soluble and cannot be easily removed by conventional aerobic biological wastewater treatment systems. Anaerobic systems could reduce the color intensity more satisfactorily than the aerobic processes. However, the intermediate products are carcinogenic aromatic amines which need to be further decomposed by an aerobic treatment. An anaerobic/aerobic SBR system was used to treat a synthetic dye wastewater with glucose and acetic acid (1000 mg/l GOD) as carbon sources, together with 20 mg/l of four different reactive dyes; i.e., bisazo vinylsulphonyl, anthraquinone vinylsulphonyl, anthraquinone monochlorotriazinyl and oxazine. The color reduction of the first three dyes was 63, 64 and 66%, respectively. The decolorization efficiency of the last or oxazine dye was not determined because of a strange phenomenon or re-appearance of the color when samples were disturbed. More color removal was achieved in the anaerobic phase than in the aerobic step. The initial decolorization rate was 11.9, 0.37 and 0.48 SU/h for the first three dyes, respectively. Though the system comprised anaerobic and aerobic tanks, the color reduction did not rely on phosphorus accumulating organisms (PAOs). High temperature and photo-oxidation through exposure to sunlight could increase the decolorization rate, and the decolorization was not possible if viable organisms were not present in the system. Nitrate. when present, could interfere with the color reduction while sulfate did not. The bisazo reactive dye was decolorized by the reductive reaction, which resulted in the cleavage of the azo bond. Meanwhile, the decolorization of anthraquinone dyes was through the adsorption of dyes on Roc materials. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Color Removal, Reactive Dyes, Azo Dyes, Dye Wastewaters, Biological Phosphorus Removal, Anaerobic-Aerobic Process, Biodegradation, Degradation, Dyestuffs

Davis, T.A., Volesky, B. and Vieira, R.H.S.F. (2000), *Sargassum* seaweed as biosorbent for heavy metals. *Water Research*, **34** (17), 4270-4278.

Full Text: [W\Wat Res34, 4270.pdf](W/Wat%20Res34,%204270.pdf)

Abstract: Six different species of non-living *Sargassum* biomass were compared on the basis of their equilibrium Cd and Cu uptake in order to evaluate potential variability in the sorption performance of different *Sargassum* species. Biosorption uptakes for Cd at the optimal pH of 4.5 ranged from qmax = 0.90 mmol/g for *Sargassum* sp. 1 to 0.66 mmol/g for S. filipendula I representing a 36% difference. Three species were evaluated for their Cu uptake where qmax = 0.93 mmol/g for S. vulgare; 0.89 mmol/g for S. filipendula I, and 0.80 for S. fluitans, representing a 16% difference between the lowest and highest values. Potentiometric titrations were carried out on S. vulgare, S. fluitans and S. filipendula I and yielded the similar results of 1.5 mmol/g weakly acidic sites for S. vulgare and S. fluitans, and 1.6 mmol/g for S. filipendula I. Estimates of 0.3 mmol/g of strongly acidic sites for S. *fluitans* and S. filipendula I and 0.5 mmol/g for S. vulgare were obtained. The total number of active sites averaged 1.9±0.1 mmol/g. The elution efficiency for Cu-desorption from S. filipendula was determined for CaCl2, Ca(NO3)2, and HCl at various concentrations and solid: liquid ratios (S/L). The highest elution efficiency was >95% for Cu for all elutants at S/L=1 g/l and decreased for both calcium salts with increasing S/L to less than 50% at S/L=10 g/l as a new batch sorption equilibrium was reached quickly. CaCl2 was chosen to be the most suitable metal-cation desorbing agent.

Keywords: Biosorption, *Sargassum*, Metals, Heavy Metals, Metal Removal, Desorption

Notes: highly cited

Al-Qodah, Z. (2000), Adsorption of dyes using shale oil ash. *Water Research*, **34** (17), 4295-4303.

Full Text: [W\Wat Res34, 4295.pdf](W/Wat%20Res34,%204295.pdf)

Abstract: The adsorption of reactive dyes on shale oil ash has been investigated during a series of batch adsorption experiments. The adsorption isotherm data were fitted to Langmuir isotherm. The two-resistance mass transfer model has been developed based on the film resistance and homogeneous solid phase diffusion.

A computer program has been developed to estimate the theoretical concentration-lime dependent curves and to compare them with the experimental curves by means of the best-fit approach. The model predicts that the external mass transfer coefficient K was not affected by varying the initial dye concentration, but it increases when the agitation speed and temperature was raised. The diffusion coefficient D was Found to increase when the initial dye concentration, and temperature was raised. (C) 2000 Elsevier Science Ltd. Ail rights reserved.

Keywords: Adsorption Kinetics, Adsorption Modeling, Industrial Wastewater Treatment, Reactive Dyes, Shale Oil Ash, Adsorbents, External Mass-Transfer, Aqueous-Solutions, Activated Carbon, Color Removal, Waste-Water, Fly-Ash, Dyestuffs, Particles, Wood

Othman, M.Z., Roddick, F.A. and Hobday, M.D. (2000), Evaluation of Victorian low rank coal-based adsorbents for the removal of organic compounds from aqueous systems. *Water Research*, **34** (18), 4351-4358.

Full Text: [W\Wat Res34, 4351.pdf](W/Wat%20Res34,%204351.pdf)

Abstract: Three activated carbons and two chars made from low rank coal were evaluated in terms of their ability to remove the organic compound 4-nitrophenol (4-NP) and natural organic matter (NOM) from aqueous systems. The adsorption equilibrium capacities of all adsorbents for 4-NP correlated with the micropore area of the adsorbents. Adsorption rates showed improved removal with decreasing particle size and higher carbon mass loadings. A pseudo first order model was used to fit the kinetic data, with a correlation coefficient of 0.995-0.999 for all systems.

The adsorption capacity for NOM, as measured by UV-absorbing DOG, correlated well with the pore volume and pore surface areas for pores with diameters in the range 2.7-21 nm. The trend in the adsorption capacities and removal rates of the adsorbents for NOM provided evidence that the pore size distribution is one of the most important physical characteristics of activated carbon for the adsorption of NOM.

The performance of activated low rank coal based materials was comparable to a high quality coconut-based commercial carbon in batch systems. Although the non-activated char adsorbents gave poor performance, they have potential for use in applications where poor performance can be outweighed by lower cost. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Activated Carbon, 4-Nitrophenol, Adsorption Kinetics, DOC, NOM, Activated Carbon Adsorption, Humic Substances, GAC, Matter, Size

Gupta, V.K. and Ali, I. (2001), Removal of DDD and DDDE from wastewater using bagasse fly ash, a sugar industry waste. *Water Research*, **35** (1), 33-40.

Full Text: [W\Wat Res35, 33.pdf](W/Wat%20Res35,%2033.pdf)

Abstract: Bagasse fly ash, a waste from the sugar industry, was converted into an effective adsorbent and was used for the removal of DDD [2,2-Bis(4-chlorophenyl)1,1-dichloroethane] and DDE [2,2-Bis(4-chlorophenyl)-1,1-dichloroethene] pesticides from wastewater. The DDD and DDE are removed by the developed adsorbent up to 93% at pH 7.0, with the adsorbent dose of 5 g/l of particle size 200-250 µm at 30 degreesC. The removal of these two pesticides was achieved up to 97-98% in column experiments at a flow rate of 0.5 ml/min. The adsorption was found to be exothermic in nature. The bagasse fly ash system has been used for the removal of DDD and DDE from the wastewater. The developed system is very useful, economic, and reproducible. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Bagasse Fly Ash, DDD, DDE, Low-Cost Adsorbent, Earth Elements, Water, Adsorption, Pesticides, Cadmium, Chromatography, Equilibrium, Oxides

Ebie, K., Li, F.S., Azuma, Y., Yuasa, A. and Hagishita, T. (2001), Pore distribution effect of activated carbon in adsorbing organic micropollutants from natural water. *Water Research*, **35** (1), 167-179.

Full Text: [W\Wat Res35, 167.pdf](W/Wat%20Res35,%20167.pdf)

Abstract: Adsorption isotherms of organic micropollutants in coexistence with natural organic matter (NOM) were analyzed to evaluate the impacts of pore size distribution of activated carbon (AC) on the competition effects of the NOM. Single solute adsorption experiments and simultaneous adsorption experiments with NOM contained in a coagulation-pretreated surface water were performed for four agricultural chemicals and three coal-based activated carbons (ACs) having different pore distributions. The results showed that, for all the carbons used, the adsorption capacity of the chemicals was reduced distinctly in the presence of NOM. Such a reduction was more apparent for AC with a larger portion of small pores suitable for the adsorption of small organic molecules and for the agricultural chemicals with a more hydrophilic nature. Ideal adsorbed solution theory (IAST) incorporated with the Freundlich isotherm expression (IAST-Freundlich model) could not interpret the impact of NOM on the adsorption capacity of the chemicals unless a pore blockage effect caused by the adsorption of NOM was also considered. By taking into account this effect, the adsorption isotherm of the chemicals in the presence of NOM was well described, and the capacity reduction caused by the NOM was quantitatively assessed from the viewpoints of the site competition and the pore blockage. Analytical results clearly indicated that pore blockage was an important competition mechanism that contributed to 10-99% of the total capacity reductions of the chemicals, the level depended greatly on the ACs, the chemicals and the equilibrium concentrations, and could possibly be alleviated by broadening the pore size distributions of the ACs to provide a large volume percentage for pores with sizes above 30 Angstrom. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Pore Size Distribution, Site Competition, Pore Blockage, Agricultural Chemicals, Natural Organic Matter, Humic Substances, Adsorption, Size, Fibers, Acids

Shubha, K.P., Raji, C. and Anirudhan, T.S. (2001), Immobilization of heavy metals from aqueous solutions using polyacrylamide grafted hydrous tin(IV) oxide gel having carboxylate functional groups. *Water Research*, **35** (1), 300-310.

Full Text: [W\Wat Res35, 300.pdf](W/Wat%20Res35,%20300.pdf)

Abstract: A new adsorbent containing a carboxylate group has been prepared by the surface modification of a polyacrylamide grafted hydrous tin(IV) oxide gel. The product exhibits a very high adsorption potential for Pb(II), Hg(II) and Cd(II). The effect of initial metal ion concentration, adsorbent dose pH concentration of light metal ions, and temperature on metal removal has been studied. The process follows a first-order rate kinetics. The intraparticle diffusion of metal ions through pores in the adsorbent was shown to be the main rate limiting step. The equilibrium data fit well with the Langmuir adsorption isotherm. The selectivity order of the adsorbent is Pb(II) > Hg(II) > Cd(II). Adsorption rate constants and thermodynamic parameters were also presented to predict the nature of adsorption. The method was applied on synthetic wastewaters. Acid regeneration has been tried for several cycles with a view to recover the adsorbed metal ions and also to restore the sorbent to its original state. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Polymer Grafted Metal Oxide, Metal Removal and Recovery, Adsorption Isotherm, Thermodynamic Parameters, Wastewater, Bituminous Coal, Silica-Gel, Adsorption, Sorption, Ions, Desorption, Water

Mier, M.V., Callejas, R.L., Gehr, R., Cisneros, B.E.J. and Alvarez, P.J.J. (2001), Heavy metal removal with Mexican clinoptilolite: Multi-component ionic exchange. *Water Research*, **35** (2), 373-378.

Full Text: [W\Wat Res35, 373.pdf](W/Wat%20Res35,%20373.pdf)

Abstract: This paper describes the interactions of Pb(II), Cd(II), and Cr(VI) competing for ion-exchange sites in naturally occurring clinoptilolite. Dissolved Pb and Cd were effectively removed within Ish in batch reactors, with higher removal efficiencies (> 95%) in the acidic pH range. The presence of Cr(VI); which can interact with these metals to form anionic complexes, significantly diminished the Pb and Cd removal efficiencies. A decrease in the efficiency of clinoptilolite to remove Pb was also observed in the high (greater than or equal to 10) pH range. This was attributed to the formation of anionic hydroxo-complexes with little affinity for cationic ion exchange sites. Pb outcompeted Cd for ion exchange sites in a flow-through column packed with clinoptilolite (contact time = 10 s). The preferential removal of Pb in column, but not in batch reactors, reflects that competitive retention can be affected by contact time because diffusion kinetics may influence the removal efficiency to a greater extent than equilibrium partitioning. Phenol, which was tested as a representative organic co-contaminant, slightly hindered heavy metal removal in batch reactors. This was attributed to the formation of organometallic complexes that cannot penetrate the zeolite exchange channels. Altogether, these results show that natural zeolites hold great potential to remove cationic heavy metal species from industrial wastewater. Nevertheless, process efficiency can be hindered by the presence of ligands that form complexes with reduced accessibility and/or affinity for ion exchange. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium, Chromium, Lead, Phenol, pH, Zeolite, Clinoptilolite, Natural Sedimentary, Adsorption, Zeolites, Capacity, Models, Design

Talarposhti, A.M., Donnelly, T. and Anderson, G.K. (2001), Colour removal from a simulated dye wastewater using a two-phase anaerobic packed bed reactor. *Water Research*, **35** (2), 425-432.

Full Text: [W\Wat Res35, 425.pdf](W/Wat%20Res35,%20425.pdf)

Abstract: In recent years, rapid technological advances in the textile and dyeing industry have yielded benefits to society but have also generated new and significant environmental problems. The treatment alternatives applicable for the removal of colour vary, depending upon the type of dye wastewater. A synthetic, simulated mixed dye waste (Basic Yellow 28, Basic Yellow 21, Basic Red 18.1, Basic Violet Red 16, Basic Red 46, Basic Blue 16, Basic Blue 41) representing a known waste from a fibre production factory, was investigated. The biological process of anaerobic digestion has been recognised as a simple and energy-efficient means of treating and stabilising a wide range of organic industrial wastewaters. This study sets out to demonstrate the effect of different loading rates, dye concentrations and hydraulic retention times (HRTs) on colour removal efficiency under mesophilic anaerobic conditions. The reactor was operated under mesophilic conditions at different organic loading rates (OLRs) and HRTs for nine months. The results of this study show that a 2-stage mesophilic anaerobic up-flow packed bed reactor can remove up to 90% of the colour from a mixed cationic dye containing 1000 mg/l of dye. Colour removal efficiency falls as the influent dye concentration increases, but rises with increased hydraulic retention time and increased organic loading. The primary colour removal mechanism was one of biosorption with subsequent biodegradation. Acetoclastic methanogens were moderately inhibited at low organic loading rates of 0.25 kg COD/m3d, at which level, acidogenesis and acetogenesis appeared to be unaffected. Inhibition of acidogenesis became marked at higher OLRs (1 kg COD/m3d) and when the HRT was reduced from 5 to 3 days. (C) 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Basic Dyes, Decolorisation, Anaerobic Packed Bed Reactor, Mesophilic Bacteria, Courtaulds Ltd

Quan, C., Khoe, G. and Bagster, D. (2001), Adsorption of sodium lauryl sulfate onto arsenic-bearing ferrihydrite. *Water Research*, **35** (2), 478-484.

Full Text: [W\Wat Res35, 478.pdf](W/Wat%20Res35,%20478.pdf)

Abstract: Ferrihydrite is an excellent adsorbent for binding trace toxic contaminants such as arsenic, and precipitate flotation of the arsenic-bearing ferrihydrite has been studied. Anionic surfactants such as sodium lauryl sulfate (SLS) and sodium oleate (NaOL) are suitable collectors for the flotiition. The adsorption of SLS both alone and after the subsequent addition of NaOL on these precipitates at pH 4-5 was measured. It has been shown that the synergistic effect of the two surfactants on notation is dependent on their addition order. The presence of NaOL before SLS in the conditioning stage call prevent the adsorption of SLS because of the electrostatic shielding of adsorption sites on the precipitates. The post addition of NaOL to the SLS-bearing precipitates can promote the flocculation of the precipitates and enhance entrainment of SLS for better Rotation. The SLS adsorption data fit better with the modified Frumkin isotherm than the Langmuir isotherm. Thermodynamic parameters (-DeltaG(ads)degrees, DeltaH(ads)degrees, and DeltaS(ads)degrees) have been derived from the analysis of the adsorption isotherms. The results suggest that the adsorption of SLS on AFH is physical and exothermic. (C) 2000 Elsevier Science Ltd. Ali rights reserved

Keywords: Precipitate Flotation, Arsenic and Ferrihydrite, Sodium Lauryl Sulfate, Sodium Oleate, and Modified Frumkin Adsorption Isotherms, Flotation, Hydroxide, Removal, Surface

Nakano, Y., Takeshita, K. and Tsutsumi, T. (2001), Adsorption mechanism of hexavalent chromium by redox within condensed-tannin gel. *Water Research*, **35** (2), 496-500.

Full Text: [W\Wat Res35, 496.pdf](W/Wat%20Res35,%20496.pdf)

Abstract: We have proposed a new recovery system of hexavalent chromium Cr(VI) that is of great toxicity utilizing condensed-tannin gels derived from a natural polymer with many polyhydroxyphenyl groups. The adsorption mechanism of Cr(VI) to the tannin molecules was clarified. The adsorption mechanism consists of four reaction steps; the esterification of chromate with tannin molecules, the reduction of Cr(VI) to trivalent chromium Cr(III), the formation of carboxyl group by the oxidation of tannin molecules and the ion exchange of the reduced Cr(III) with the carboxyl and hydroxyl groups. It was found in this recovery system that a large amount of proton was consumed accompanied with the reduction of Cr(VI) so that the acidic solution containing Cr(VI) was transferred automatically to neutral one by choosing an appropriate initial pH. The carboxyl group which was created by the oxidation of tannin molecules parallel to the reduction of Cr(VI) to Cr(III) contributed to an increase in the ion-exchange sites of the reduced Cr(III). The maximum adsorption capacity of Cr(VI) reached 287 mg Cr/g dry tannin gel under the conditions of 0.77 water content of tannin gel and the initial pH = 2. This adsorption capacity was five to ten times higher than that obtained by the ion exchange between ordinary Cr(III) and tannin molecules for the tannin gels prepared under similar conditions. The system proposed here will provide an important information on a zero-emission-oriented process because it has such advantages as higher adsorption capacity of chromium and lower volume of secondary wastes compared with conventional process. (C) 2000 Elsevier Science Ltd. All rights reserved

Keywords: Tannin, Gel, Hexavalent Chromium, Removal, Redox, Chromium, Plant Biomass, Removal

Martín-Gullón, I. and Font, R. (2001), Dynamic pesticide removal with activated carbon fibers. *Water Research*, **35** (2), 516-520.

Full Text: [W\Wat Res35, 516.pdf](W/Wat%20Res35,%20516.pdf)

Abstract: Rapid small-scale minicolumn tests were carried out to simulate the atrazine adsorption in water phase with three palletized pitch-based activated carbon fibers (ACF) and one commercial granular activated carbon (GAC). Initial atrazine solutions were prepared with pretreated ground water. Minicolumn tests showed that the performance of highly activated carbon fibers (surface area of 1700 m2/g) is around 7 times better than the commercial GAC (with surface area at around 1100 m2/g), whereas carbon fibers with medium activation degree (surface area of 1500 m2/g) had a removal efficiency worse than the commercial carbon. The high removal efficiency of the highly activated ACF is due to the wide-opened microstructure of the material, with an appreciable contribution of the low size mesopores, maintaining at these conditions a fast kinetic adsorption rate rather than a selective adsorbent for micropollutants vs. natural organic matter. (C) 2000 Elsevier Science Ltd. All rights reserved

Keywords: Atrazine, Natural Organic Matter, Minicolumn, Pore Size Distribution, Adsorption, Water

Lee, S.M. and Davis, A.P. (2001), Removal of Cu(II) and Cd(II) from aqueous solution by seafood processing waste sludge. *Water Research*, **35** (2), 534-540.

Full Text: [W\Wat Res35, 534.pdf](W/Wat%20Res35,%20534.pdf)

Abstract: Dried waste slurry generated in seafood processing factories has been shown to be an effective adsorbent for the removal of heavy metals from dilute solutions. Characterization of the sludge surface with scanning electron microscope and X-ray microanalyzer were carried out to evaluate the components on the sludge surface that are related to the adsorption of metal ions. Aluminum and calcium, as well as organic carbon are distributed on the surface of sludge. Alkalimetric titration was used to characterize the surface acidity of the sludge sample. The surface acidity constants, pK(a1)(s) and pK(a2)(s) were 5.50 and 9.55, respectively. Batch as well as dynamic adsorption studies were conducted with 10 to 5×10-3 M Cu(II) and Cd(II). A surface complexation model with the diffuse layer model successfully predicted Cu(II) and Cd(II) removals in single metal solutions. Predictions of sorption in binary-adsorbate systems based on single-adsorbate data fits represented competitive sorption data reasonably well over a wide range of conditions. The breakthrough capacity found from column studies was different for each metal ion and the data reflect the order of metal affinity for the adsorbent material very well, (C) 2000 Elsevier Science Ltd. Ail rights reserved

Keywords: Adsorption, Seafood Processing Sludge, Surface Acidity, Heavy Metals, Copper, Cadmium, Sewage-Sludge, Heavy-Metals, Activated Carbon, Fly-Ash, Adsorption, Complexation, Acid, Cd, Cu, Zn

Notes: highly cited

Cheung, C.W., Porter, J.F. and McKay, G. (2001), Sorption kinetic analysis for the removal of cadmium ions from effluents using bone char. *Water Research*, **35** (3), 605-612.

Full Text: [W\Wat Res35, 605.pdf](W/Wat%20Res35,%20605.pdf)

Abstract: The adsorption of cadmium ions onto bone char has been studied using a batch adsorber. The experimental data was analyzed using four sorption kinetic models-the pseudo-first order, the Ritchie second order, the modified second order and the Elovich equations-to determine the best fit equation for the sorption of metal ions onto bone char. The best-fit equation was identified using the sum of the errors squared (SSE). Finally, equilibrium studies were used to evaluate the sorption capacity of bone char for cadmium ions and experimental results showed this to be 0.57 mmol g-1 at an equilibrium solution concentration of 3.0 mmol dm-3. Since the sorption capacity is relatively high, bone char can be considered as a suitable sorbent for the adsorption of cadmium in wastewater treatment systems. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Analysis, Batch, Bone Char, Cadmium, Cadmium Ions, Capacity, Carbon, Char, Copper, Elovich Equation, Equilibrium, Equilibrium Studies, Experimental, Kinetic, Kinetic Analysis, Langmuir-Freundlich Isotherm, Metal, Metal Ions, Modified Second Order Equation, Peat, Pseudo-First Order, Pseudo-First Order Equation, Pseudo-First-Order, Removal, Rights, Ritchie Second Order Equation, Second Order, Second-Order, Solution, Sorbent, Sorption, Sorption Capacity, Treatment, Waste-Water, Wastewater, Wastewater Treatment

Notes: highly cited

Wu, F.C., Tseng, R.L. and Juang, R.S. (2001), Kinetic modeling of liquid-phase adsorption of reactive dyes and metal ions on chitosan. *Water Research*, **35** (3), 613-618.

Full Text: [W\Wat Res35, 613.pdf](W/Wat%20Res35,%20613.pdf)

Abstract: The rates of adsorption of three commercial reactive dyes and Cu(II) from water in the absence and presence of complexing agents using chitosan were measured at 30 degreesC. Three simplified kinetic models, i.e, pseudo-first-order, pseudo-second-order, and intraparticle diffusion, were tested to investigate the adsorption mechanisms. It was shown that the adsorption of reactive dyes and Cu(II) in the absence of complexing agents could be best described by the intraparticle diffusion model, whereas that of Cu(II) in the absence of complexing agents such as EDTA, citric acid, and tartaric acid by the pseudo-second-order equation. Kinetic parameters of the three models and the normalized standard deviations between the measured and predicted results were also calculated and discussed. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorbents, Adsorption, Aqueous-Solutions, Chelating-Agents, Chitosan, Complexing Agents, Desorption, Diffusion, Equilibrium, Kinetic Modeling, Liquid-Phase Adsorption, Metal Ions, Model, Modeling, Models, Polymers, Reactive Dyes, Removal, Sorbents, Sorption

McNevin, D. and Barford, J. (2001), Inter-relationship between adsorption and pH in peat biofilters in the context of a cation-exchange mechanism. *Water Research*, **35** (3), 736-744.

Full Text: [W\Wat Res35, 736.pdf](W/Wat%20Res35,%20736.pdf)

Abstract: A mathematical model of biofiltration McNevin and Barford (1998) has been augmented to include speciation, acid/base equilibria and pH dependence of adsorptive equilibria. It accurately predicts qualitative aspects of dynamic transients observed in an experimental perfusion column and supported a mechanism of adsorption by cation exchange with acidic functional groups on the surface of peat. It mirrored the buffering capacity of peat when solutions of high and low pH flow over the peat surface. This is a direct result of cation exchange where adsorption of cations increases with pH. This buffering capacity makes peat an attractive medium for engineered biological systems which must often operate within narrow pH bands to optimise biological activity.

Keywords: biofilter, Adsorption, Cation Exchange, pH, Mechanism, Peat

Shawwa, A.R., Smith, D.W. and Sego, D.C. (2001), Color and chlorinated organics removal from pulp mills wastewater using activated petroleum coke. *Water Research*, **35** (3), 745-749.

Full Text: [W\Wat Res35, 745.pdf](W/Wat%20Res35,%20745.pdf)

Abstract: Delayed petroleum coke, a waste by-product from the oil sand industry, was utilized in the production of activated carbon. The activated carbon was then evaluated for color and chlorinated organics reduction from pulp mill wastewater. The activation of the petroleum coke was evaluated using a fixed bed reactor involving carbonization and activation steps at temperature of 850 degreesC and using steam as the activation medium. The activation results showed that the maximum surface area of the activated coke was achieved at an activation period of 4h. The maximum surface area occurred at burnoff and water efficiency of 48.5 and 54.3%, respectively. Increasing the activation period to 6 h resulted in a decrease in the surface area. Methylene blue adsorption results indicated that the activation process was successful. Methylene blue adsorbed per 100 g of applied activated coke was 10 times higher than that adsorbed by raw petroleum coke. Adsorption equilibrium results of the bleached wastewater and the activated coke showed that significant color, COD, DOC and AOX removal (> 90%) was achieved when the activated coke dose exceeded 15.000 mg/L. Adsorption isotherms, in terms of GOD. DOG, UV and color were developed based on the batch equilibrium data. Based on these isotherms, the amount of activated coke required to achieve certain removal of color and AOX can be predicted. The utilization of the petroleum coke for the production of activated carbon can provide an excellent disposal option for the oil sand industry at the same time would provide a cheap and valuable activated carbon. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: AOX, Adsorption, Color, Isotherm, Pulp Mills, Petroleum Coke, Effluent

Schmitt, D., Muller, A., Csogor, Z., Frimmel, F.H. and Posten, C. (2001), The adsorption kinetics of metal ions onto different microalgae and siliceous earth. *Water Research*, **35** (3), 779-785.

Full Text: [W\Wat Res35, 779.pdf](W/Wat%20Res35,%20779.pdf)

Abstract: In the present work the adsorption kinetics of the six metal ions aluminum, zinc, mercury, lead, copper. and cadmium onto living microalgae were measured. The freshwater green microalga Scenedesmus subspicatus. the brackish water diatom Cyclotella cryptica the seawater diatom Phaeodactylum tricornutum, and the seawater red alga Porphyridium purpureum were the subject of investigation. In most cases the adsorption rate of the metals could be well described by using the equation of the Langmuir adsorption rate expression. Inverse parameter estimation allowed the determination of the rate constants of the adsorption process and the maximum metal content of the algae. The highest values for the rate constant were obtained for Porphyridium purpureum followed by Phaeodactylum tricormutum. High values for the maximum content were obtained for Cyclotella cryptica and Scenedesmus subspicatus. The maximum rate constant was 24.21 h-1 for the adsorption of Hg to Porphyridium purpureum whereas the maximum metal content (0.243 g g-1) was obtained for Zn on Cyclotella cryptica. A comparison of these values with those obtained for the mineral siliceous earth exhibiting low maximum content and high adsorption rates reveals that the mechanism of adsorption onto the algae is a mixture of adsorption and accumulation. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Microalgae, Adsorption, Kinetics, Metals, Biosorption, Bioaccumulation, Biosorption, Cadmium, Biomass

Olivie-Lauquet, G., Gruau, G., Dia, A., Riou, C., Jaffrezic, A. and Henin, O. (2001), Release of trace elements in wetlands: Role of seasonal variability. *Water Research*, **35** (4), 943-952.

Full Text: [W\Wat Res35, 943.pdf](W/Wat%20Res35,%20943.pdf)

Abstract: Dissolved concentrations were determined for Fe, Mn, Al, Cu, Zn, La, U, Th, Cd and As in a wetland and its recipient stream to reveal the effect of seasonal changes in environmental conditions on the cycling and transfer of trace elements at the transition between terrestrial and aquatic ecosystems. These preliminary results from the wetland show marked seasonal changes in dissolved concentration for all elements except Zn and Cu. Concentrations are found to be low until about mid-February and then increase abruptly. The onset of trace element release appears to coincide with a marked decline in redox potential and increase of organic carbon content. Because this decline is itself correlated with a pronounced increase in temperature and dissolved Fe, Mn and organic carbon content, we suggest that the microorganisms which use soil iron and manganese oxy-hydroxides as electron accepters catalyzed the change in redox conditions and induced an increase of DOC. Temporal changes were also observed in the recipient stream which showed marked positive concentration peaks during stormflow events (except Zn). The seasonal processes occurring in the wetland appear to play a major role in determining the amount of trace elements which are transferred from the wetland to the river. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Trace Elements, Dissolved Organic Carbon, Wetlands, Redox Conditions, Organic-Matter Decomposition, Hydromorphic Soils, Drainage-Basin, Water-Quality, Iron, Metals, Sediment, Carbon

Ricou-Hoeffer, P., Lecuyer, I. and Le Cloirec, P. (2001), Experimental design methodology applied to adsorption of metallic ions onto fly ash. *Water Research*, **35** (4), 965-976.

Full Text: [W\Wat Res35, 965.pdf](W/Wat%20Res35,%20965.pdf)

Abstract: The objective of this study was to define operating conditions which would conciliate a high removal of the five metallic cations (Cu2+, Ni2+, Zn2+, Cd2+, Pb2+) and a low desorption of these metal ions from the contaminated sorbents. To achieve this goal the strategy relied on the use of experimental design methodology. The influence of four parameters (fly ash/lime mass ratio, type of fly ash/lime sorbent solution temperature, and sorbent concentration) on the removal at pH = 5 and the stabilization of the five metallic ions was studied. In the first step, the influence of three parameters on the removal of Cu2+ ions was studied (R2 = fly ash/lime mass ratio, type of sorbent, temperature). It was found that the same set of parameter values would produce both the highest removal and the lowest desorption for this cation: R2 = 9g g-1, sorbent B (made by mixing fly ash and lime in water, then drying this paste at 105 degreesC for 24 h), temperature of suspension equal to 60 degreesC. The formation of calcium silicate hydrate (CSH), resulting from the pozzolanic activity of fly ash, is assumed to be partially responsible for these mechanisms. In the second step, simplex methodology and Doehlert matrix were used to find the conditions in a 2D space (sorbent concentration, temperature of solution) that would give the highest removal from a solution containing five metallic cations and the lowest desorption of these five cations adsorbed on the contaminated sorbents. Then, the system response that had to be optimized was the total metallic ions concentration (TMIC, mol L-1). A TMIC was measured both for adsorption and leaching experiments. These responses were modelized using a second-order polynomial and the surface responses were plotted for adsorption and desorption results. A difference was observed between operating conditions reaching the highest adsorption from those that gave the lowest desorption. However, an adsorbent concentration around 122 g L-1 and a solution temperature of 66 degreesC would lead simultaneously to a high adsorption and a low desorption. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Fly Ash/Lime Mixing, Metallic Ions, Adsorption, Experimental Design, Optimal Conditions, Leaching, Aqueous-Solution, Removal, Sorption, Cations, Water

? Chamarro, E., Marco, A. and Esplugas, S. (2001), Use of fenton reagent to improve organic chemical biodegradability. *Water Research*, **35** (4), 1047-1051.

Full Text: [2001\Wat Res35, 1047.pdf](2001/Wat%20Res35,%201047.pdf)

Abstract: Fenton reagent has been used to test the degradation of different organic compounds (formic acid, phenol, 4-chlorophenol, 2,4-dichlorophenol and nitrobenzene) in aqueous solution. A stoichiometric coefficient for the Fenton reaction was found to be 0.5 mol of organic compound/mol of hydrogen peroxide, except for the formic acid where a value of approximately one was obtained (due to the direct formation of carbon dioxide). The treatment eliminates the toxic substances and increases the biodegradability of the treated water (measured as the ratio BOD5/COD). Biodegradability is attained when the initial compound is removed.

Keywords: Fenton Reagent, Advanced Oxidation Technologies (AOT)

Notes: highly cited

Gupta, V.K., Gupta, M. and Sharma, S. (2001), Process development for the removal of lead and chromium from aqueous solutions using red mud: An aluminium industry waste. *Water Research*, **35** (5), 1125-1134.

Full Text: [W\Wat Res35, 1125.pdf](W/Wat%20Res35,%201125.pdf)

Abstract: Red mud, an aluminium industry waste, has been converted into an inexpensive and efficient adsorbent and used for the removal of lead and chromium from aqueous solutions. Effect of various factors on the removal of these metal ions from water (e.g. pH, adsorbent dose, adsorbate concentration, temperature, particle size, etc.) has been studied and discussed. The effect of presence of other metal ions/ surfactants on the removal of Pb2+ and Cr6+ has also been studied. The material exhibits good adsorption capacity and the data follow both Freundlich and Langmuir models. Thermodynamic parameters indicate the feasibility of the process. Kinetic studies have been performed to understand the mechanism of adsorption. Dynamic modelling of lead and chromium removal on red mud has been undertaken and found to follow first-order kinetics. The rate constant and mass transfer coefficient have also been evaluated under optimum conditions of removal in order to understand the mechanism. Column studies have been carried out to compare these with batch capacities. The recovery of Pb2+ and Cr6+ and chemical regenertion of the spent column have also been tried. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Lead, Chromium Removal, Adsorption, Red Mud, Low-Cost Adsorbent, Bagasse Fly-Ash, Activated Carbon, Fertilizer Waste, Water Treatment, Sugar-Industry, Metal-Ions, Adsorption, Sorption, Cadmium

Dönmez, G. and Aksu, Z. (2001), Bioaccumulation of copper(II) and nickel(II) by the non-adapted and adapted growing *Candida* sp. *Water Research*, **35** (6), 1425-1434.

Full Text: [W\Wat Res35, 1425.pdf](W/Wat%20Res35,%201425.pdf)

Abstract: The effect of copper(II) and nickel(II) ions on the growth and bioaccumulation properties of non-adapted and adapted growing cells of a non-pathogenic *Candida* sp. has been tested under laboratory conditions as a function of initial pH and initial metal ion concentration. Optimum pH value for maximum metal ion accumulation was determined as 4.0 for both the metal ions. Although the copper(II) adapted *Candida sp*. was capable of removing of copper(II) with the maximum specific uptake capacity of 36.9 mg g-1 at 783.6 mg dm-3 initial copper(II) concentration, non-adapted Candida was only capable of bioaccumulating copper(II) with 23.1 mg g-1 maximum uptake capacity from aqueous solution at 578.7 mg dm-3 initial copper(II) concentration. The non-adapted and nickel(II) adapted Candida cells also showed the highest nickel(II) uptake capacities (46.8 and 30.8 mg g-1, respectively) at 321.5 and 300.6 mg dm-3 initial nickel(II) concentrations, respectively. For both the non-adapted and nickel(II) adapted Candida sp., the growth of cells was totally inhibited by 500 mg dm-3 of nickel(II) ions. The results also indicated that copper(II) adapted Candida sp. has been found to be more efficient to accumulate larger amounts of copper(II) than that of nickel(II) bioaccumulated by nickel(II) adapted Candida at higher initial metal ion concentrations without loosing its biological activity. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Bioaccumulation, Copper(II), Nickel(II), Adapted, Non-Adapted, *Candida sp.*, *Saccharomyces-Cerevisiae*, Metal-Ions, Biosorption, Removal, Cu(II), Cr(VI), Yeasts, Water, Cells

Gregor, J. (2001), Arsenic removal during conventional aluminium-based drinking-water treatment. *Water Research*, **35** (7), 1659-1664.

Full Text: [W\Wat Res35, 1659.pdf](W/Wat%20Res35,%201659.pdf)

Abstract: The changing forms and concentrations of arsenic through aluminium-based coagulation treatment processes were tracked for three drinking-water treatment plants. This has provided direct evidence of where and how arsenic is removed. In general, soluble As(V) is converted to particulate As(V) by adsorption during rapid mixing, and is removed along with naturally occurring particulate arsenic predominantly by clarification. Soluble As(III) tracks through the treatment processes and is converted to soluble As(V) during final chlorination. The ability of a water treatment process to achieve the maximum acceptable concentration for arsenic in drinking water is dependent on the concentration of As(III) in the source water. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Forms, Removal, Aluminium, Coagulation, Coagulation, River

Lu, X.Q. and Jaffe, R. (2001), Interaction between Hg(II) and natural dissolved organic matter: A fluorescence spectroscopy based study. *Water Research*, **35** (7), 1793-1803.

Full Text: [W\Wat Res35, 1793.pdf](W/Wat%20Res35,%201793.pdf)

Abstract: Interaction between Hg(II) and dissolved organic matter (DOM) collected from surface water samples of the Florida Everglades was studied using different fluorescence spectroscopic methods. Complexation between Hg(II) and DOM leached from mangrove leaves, sawgrass, and periphyton was investigated. Both fluorescence emission and synchronous fluorescence spectra showed that these dissolved organic materials, whether they are highly degraded or are freshly leached, can ‘complex’ Hg(II) since fluorescence intensity was quenched upon addition of Hg(II) to the DOM samples. Synchronous fluorescence spectra disclosed structural information on the DOM sample, regarding possible binding sites for Hg(II). Chemical parameters on the complexation of Hg(II), including the conditional stability constants and the percentage of fluorophores participating in the complexation, were estimated by the modified Stern-Volmer equation. A detailed investigation under different experimental conditions showed that the complexation of the DOM samples collected from the Everglades was influenced by pH, Cl-(aq)(-) anion, and cations such as Ca2+ and Mg2+. Experimental results suggest that DOM-Hg(II) complexes run be removed from the water column through adsorption on biogenically precipitated CaCO3(s). (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Dissolved Organic Matter, Hg(II), Fluorescence, Complexation, Stability Constants, Fulvic-Acid, Complexing Capacities, Florida Everglades, Humic Substances, Surface Waters, Metal-Ions, Mercury, Copper, Complexation, Mobilization

Coro, E. and Laha, S. (2001), Color removal in groundwater through the enhanced softening process. *Water Research*, **35** (7), 1851-1854.

Full Text: [W\Wat Res35, 1851.pdf](W/Wat%20Res35,%201851.pdf)

Abstract: The source of water for Miami-Dade County, Florida is groundwater derived from the Biscayne aquifer. The raw water is rich in natural organic material producing correspondingly high color levels. Currently, breakpoint chlorination is used at the water treatment plant to control the color problem. However, this results in the formation of disinfection by-products. Proposed alternatives to reduce color and avoid by-product formation include the addition of coagulants such as ferric chloride and organic polymers, and the operation of the existing lime softening process at a higher pH. This study uses jar tests to evaluate the relative effectiveness of the proposed alternatives. Results indicate that significant color reduction is achieved using the existing lime softening process with activated silica coagulant by increasing the softening pH to 11 or more. Elevated pH also produced a > 30% reduction in total organic carbon. In the presence of higher raw water color (greater than or equal to 80 units), the addition of ferric chloride as coagulant at dosages of 80 mg/L is recommended. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Natural Organic Matter, Lime Softening, Breakpoint Chlorination, Disinfection By-Products

Notes: highly cited

? Tiehm, A., Nickel, K., Zellhorn, M. and Neis, U. (2001), Ultrasonic waste activated sludge disintegration for improving anaerobic stabilization. *Water Research*, **35** (8), 2003-2009.

Full Text: [2001\Wat Res35, 2003.pdf](2001/Wat%20Res35,%202003.pdf)

Abstract: The pretreatment of waste activated sludge by ultrasonic disintegration was studied in order to improve the anaerobic sludge stabilization. The ultrasound frequency was varied within a range from 41 to 3217 kHz. The impact of different ultrasound intensities and treatment times was examined. Sludge disintegration was most significant at low frequencies. Low-frequency ultrasound creates large cavitation bubbles which upon collapse initiate powerful jet streams exerting strong sheer forces in the liquid. The decreasing sludge disintegration efficiency observed at higher frequencies was attributed to smaller cavitation bubbles which do not allow the initiation of such strong shear forces. Short sonication times resulted in sludge floc deagglomeration without the destruction of bacteria cells. Longer sonication brought about the breakup of cell walls, the sludge solids were disintegrated and dissolved organic compounds were released. The anaerobic digestion of waste activated sludge following ultrasonic pretreatment causing microbial cell lysis was significantly improved, There was an increase in the volatile solids degradation as well as an increase in the biogas production. The increase in digestion efficiency was proportional to the degree of sludge disintegration. To a lesser degree the deagglomeration of sludge flocs also augmented the anaerobic volatile solids degradation. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobic Digestion, Sludge Stabilization, Biogas, Ultrasound, Cavitation, Disintegration, Digestion

Notes: highly cited

Lin, T.F. and Wu, J.K. (2001), Adsorption of arsenite and arsenate within activated alumina grains: Equilibrium and kinetics. *Water Research*, **35** (8), 2049-2057.

Full Text: [W\Wat Res35, 2049.pdf](W/Wat%20Res35,%202049.pdf)

Abstract: Equilibrium and kinetic adsorption of tri-valent (arsenite) and penta-valent (arsenate) arsenic to activated alumina is elucidated. The properties of activated alumina. including porosity. specific surface area, and skeleton density were first measured. A batch reactor with temperature control was employed to determine both adsorption capacity and adsorption kinetics For arsenite and arsenate to activated-alumina grains. The Freundlich and Langmuir isotherm equations were then used to describe the partitioning behavior for the system at different pH. A pore diffusion model, coupled with the observed Freundlich or Langmuir isotherm equations, was used to interpret an observed experimental adsorption kinetic curve for arsenite at one specific condition. The model was found to fit with the experimental data Fairly well, and pore diffusion coefficients can be extracted. The model. incorporated with the interpreted pore diffusion coefficient, was then employed to predict the experimental data Tor arsenite and arsenate at various conditions, including different initial arsenic concentrations, grain sizes of activated alumina, and system pHs. The model predictions were found to describe the experimental data fairly well, even though the tested conditions substantially differed From one another. The agreement among the models and experimental data indicated that the adsorption and diffusion of arsenate and arsenite can be simulated by the proposed model. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Alumina, Adsorption, Arsenate, Arsenic, Arsenite, Diffusion, Diffusion, Ferrihydrite, Transport, Sorption, Pellets

Inglezakis, V.J., Hadjiandreou, K.J., Loizidou, M.D. and Grigoropoulou, H.P. (2001), Pretreatment of natural clinoptilolite in a laboratory-scale ion exchange packed bed. *Water Research*, **35** (9), 2161-2166.

Full Text: [W\Wat Res35, 2161.pdf](W/Wat%20Res35,%202161.pdf)

Abstract: The impact of the operational and chemical conditions of pretreatment upon the effective capacity of clinoptilolite has been investigated. Pretreatment tests have been performed in an ion exchange packed bed. The parameters examined for the pretreatment solution were the volumetric flow rate, the concentration, the total volume and the pH; and for washing after pretreatment the volume of washing water used. An optimal flow rate and a minimum concentration were determined, for a pretreatment that leads to a high effective capacity of the material, while pH adjustment did not result in a higher effective capacity and one washing (10 bed volumes) after pretreatment was found to be sufficient. Furthermore, the water quality (use of tap water) as well as the surface dust of the original material (about 5% w, w) did not alter its effective capacity. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Ammonia Removal, Capacity, Clinoptilolite, Ion Exchange, Lead, Metals, Packed Bed, Pretreatment, Zeolites

Bayhan, Y.K., Keskinler, B., Cakici, A., Levent, M. and Akay, G. (2001), Removal of bivalent heavy metal mixtures from water by *Saccharomyces cerevisiae* using crossflow microfiltration. *Water Research*, **35** (9), 2191-2200.

Full Text: [W\Wat Res35, 2191.pdf](W/Wat%20Res35,%202191.pdf)

Abstract: The removal of heavy metal ions, Ni2+, Cu2+ and Pb2+ using yeast (*Saccharomyces cerevisiae*) as carriers in a crossflow microfiltration is investigated The affects of yeast cell and electrolyte concentrations on the transient and steady-state permeate flux and metal ion rejections are established. It is found that the metal ion rejection reaches a plateau if yeast cell concentration is greater than similar to 2 g/l as a result of cell aggregation. The binding affinity of the metals to yeast cell is Pb2+ > Cu2+ > Ni2+, which is also reflected in the metal ion rejection under identical process conditions. Because of the formation of yeast cell flocks in the presence of Pb2+, permeate flux is also higher for this metal. The presence of NaCl decreases both rejection and permeate flux for Ni2+ and Cu2+ but not for Pb2+. When binary or ternary metal mixtures are used, the rejection of the individual metals is reduced except that of Pb2+. It is found that the pseudo-gel concentration is unaffected by the presence of metal ions. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metals, Sacharomyces Cerevisiae, Crossflow Microfiltration, Wastewater Treatment, Flow Filtration, Surfactant Dispersion, Aqueous-Solutions, Permeate Flux, Erythrocytes, Separation, Rejection, Polymers

Dantas, T.N.D., Neto, A.A.D. and Moura, M.C.P.D. (2001), Removal of chromium from aqueous solutions by diatomite treated with microemulsion. *Water Research*, **35** (9), 2219-2224.

Full Text: [W\Wat Res35, 2219.pdf](W/Wat%20Res35,%202219.pdf)

Abstract: In order to evaluate the sorption of heavy metals, a crude diatomite was impregnated with a microemulsion which showed remarkable increase in chromium sorption capacity as compared to untreated diatomite. Samples with two different granulometries were investigated, both yielding practically complete adsorption. The adsorption process is pH dependent and the best results for the initial Cr(III) concentration of 1.5g/L were obtained at pH 2.95. The effect of the concentration of the chromium synthetic solution was also investigated. The adsorption isotherms were obtained (30, 40 and 50°C) and the Freundlich and Langmuir models were used to determine the adsorption capacity of the adsorbent. Following the adsorption step, a desorption process was carried out using several eluant solutions. The best results were obtained using hydrochloric acid (100%) as eluant. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metals, Diatomite, Microemulsion, Chromium, Adsorption, Desorption, Heavy-Metals, Adsorption, Wastes, Lead

Seida, Y., Nakano, Y. and Nakamura, Y. (2001), Rapid removal of dilute lead from water by pyroaurite-like compound. *Water Research*, **35** (10), 2341-2346.

Full Text: [W\Wat Res35, 2341.pdf](W/Wat%20Res35,%202341.pdf)

Abstract: Rapid removal of disserved dilute lead (Pb) by pyroaurite-like compound MgxFey(OH)(2(x+y)) (CO32-)(y/2). MH2O; anionic clay: one of layered double hydroxides) from water was studied through batch and column experiments. The Pb-removal property of the compound was evaluated as a function of concentration of Pb in the treated solution, space Velocity (Sv) of the solution in the column packed with the compound, pH of the solution and contaminated humic substance. The compound showed a highly effective Pb-removal property that was comparable to the other conventional adsorbents. The Pb was removed rapidly by the column packed with the compound over the wide range of the Sv. The buffering pH function of the compound contributed to the Pb removal producing weak-alkali atmosphere. The contamination of humic substance in the treated solution reduced the Pb removal largely depending on its amount. The effectiveness of the compound for the rapid Pb removal was confirmed through a series of experiments. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Lead, Removal, Pyroaurite, Layered Double Hydroxide, Humic Substance, Adsorption, Ion-Exchange, Precipitation, Adsorption, Ions, Adsorbent, Cadmium, Carbon, Oxide, Iron

Chen, J.P. and Lin, M.S. (2001), Equilibrium and kinetics of metal ion adsorption onto a commercial H-type granular activated carbon: Experimental and modeling studies. *Water Research*, **35** (10), 2385-2394.

Full Text: [W\Wat Res35, 2385.pdf](W/Wat%20Res35,%202385.pdf)

Abstract: Systematic studies on metal ion adsorption equilibrium and kinetics by a commercial H-type granular activated carbon were carried out. Titration of the carbon showed that the surface charge density decreased with an increasing pH. Higher copper adsorption was obtained with increasing solution pH and ionic strength. Metal removal was in the descending order: Cu2+ > Zn2+ approximate to Co2+. Copper removal was not affected by addition of zinc or cobalt, while copper can reduce both zinc and cobalt removal. Kinetic experiments demonstrated that the copper adsorption rapidly occurred in the first 30-60 min and reached the complete removal in 3-5 h. Removal of zinc and cobalt was slightly slower than that of copper. It was found that the mass transfer is important in the metal adsorption rate. The surface complex formation model was used successfully to describe the surface change density, as well as the single-and multi-species metal adsorption equilibrium. The copper removal was due to adsorption of Cu2+, CuOH+, and CuCl+, while the zinc and cobalt uptake was due to the formation of surface-metal complexes of SOM2+ and SOMOH+ (M = Zn and Co). It was found that the diffusion-control model well described the adsorption kinetics with various metal ions and pH values. Finally sensitivity analysis on the kinetic model’s parameters was carried out. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Single-and Multi-Species Metal Adsorption, H-Type Granular Activated Carbon, Equilibrium, Kinetics, Experimental, Modeling, Mercury(II), Copper(II), Lead(II), Removal, Water

Maine, M.A., Duarte, M.V. and Suñé, M.L. (2001), Cadmium uptake by floating macrophytes. *Water Research*, **35** (11), 2629-2634.

Full Text: [W\Wat Res35, 2629.pdf](W/Wat%20Res35,%202629.pdf)

Abstract: Cd uptake capacity of a group of floating macrophytes (Salvinia herzogii. Pistia stratiotes. Hydromistia stolonifera and Eichhornia crassipes) was determined in outdoors experiments during the lowest temperature period of the year. Although all studied species were highly efficient in the Cd uptake. Pistia stratiotes was selected for further research because of its superior performance and its higher average relative growth rate. Cadmium% removal by Pistia stratiotes was greater in the first 24 h of the experiments (63.65, 72 and 74% of the added Cd for 1, 2. 4 and 6 mg Cd l-1, respectively) After 31 days of growth. Pistia stratiotes efficiently removed Cd at the studied concentrations. The macrophyte was able to keep its capacity for Cd removal even though some toxicity symptoms appeared at 4 and 6 mg Cd l-1. The greater the initial concentration, the greater Cd bioaccumulation rates, The increase of Cd concentration in plant tissues occurred especially in roots and was linearly related to the quantity of Cd added. Cd sorption by roots is faster than translocation to the plant aerial part and it occurs mainly during the first 24 h. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium Uptake, Macrophytes, Pistia Stratiotes, Roots, Water Pollution, Waste-Water Treatment, Nutrient Removal, Aquatic Plants, Heavy-Metals, Hyacinth, Environments, Toxicity, Wetlands

Huang, S.L. (2001), Cadmium adsorption by sediment in a turbulence tank. *Water Research*, **35** (11), 2635-2644.

Full Text: [W\Wat Res35, 2635.pdf](W/Wat%20Res35,%202635.pdf)

Abstract: The mechanism of sediment motion that affects cadmium (Cd) adsorption on sediment particles was studied in a turbulence tank in the presence (and absence) of bed mud. The experimental results were verified by a mathematical model for heavy metal transport-transformation developed for the turbulence tank. The mathematical model includes the equations of water Row, sediment motion. heavy metal transport-transformation. heavy-metal reaction kinematics and equations for prescribing the initial conditions and boundary conditions for the experiment. The model conforms the transport transformation of heavy-metal pollutants in surface waters to following the law of convective-diffusive of common tracers and the characteristics of fare and transport of sediment motion. Variations of dissolved Cd concentrations and suspended particulate Cd concentrations with time and in the water column were measured and computed. The experimental measurements correspond with the computed results. Both the experimental measurements and computed results show that it takes about 6 h to reach equilibrium condition for cadmium adsorption by sediment particles. This is different from the result obtained from experiments conducted in continuously stirred tank reactors (or batch reactors) in which adsorption equilibrium can be achieved in about 20 min. Determination of the model parameters for sediment adsorption-desorption of metals in the tank is discussed. The experimental and computed results obtained in this study are useful to solve practical engineering problems in surface waters. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Water-Sediment-Pollutant Interaction, Turbulence Tank, Mathematical Modeling, Metal Transport-Transformation, Surface Waters, Fresh

Navarro, R.R., Tatsumi, K., Sumi, K. and Matsumura, M. (2001), Role of anions on heavy metal sorption of a cellulose modified with poly(glycidyl methacrylate) and polyethyleneimine. *Water Research*, **35** (11), 2724-2730.

Full Text: [W\Wat Res35, 2724.pdf](W/Wat%20Res35,%202724.pdf)

Abstract: The influence of anions on the equilibrium and kinetic uptake of heavy metals from an aqueous solution by a novel nitrogen-type chelating adsorbent was evaluated. Equilibrium experiments revealed that stoichiometric amounts of metals and anions are adsorbed by the resin. Kinetic studies showed that during the initial stage of adsorption, the anions are adsorbed by the adsorbent prior to the metal ions. This occurred almost simultaneously with an increase in solution pH. At equilibrium, the pH returned towards its initial value. The concentration of anion also fluctuated during the entire equilibration process. Following these observations, mechanisms governing the role of anions on enhancing capacity and rate of metal uptake of this type of chelating adsorbent type were established. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Cellulose, Chelating Adsorbent, Heavy Metal, Anions, Removal

Othman, M.Z., Roddick, F.A. and Snow, R. (2001), Removal of dissolved organic compounds in fixed-bed columns: Evaluation of low-rank coal adsorbents. *Water Research*, **35** (12), 2943-2949.

Full Text: [W\Wat Res35, 2943.pdf](W/Wat%20Res35,%202943.pdf)

Abstract: Characterisation of a range of Victorian low-rank coal (VLRC) based and commercial adsorbents under continuous flow conditions was conducted in down flow fixed-bed columns. The effect of bed depth, hydraulic loading and initial concentration of the adsorbate 4-nitrophenol (4-NP) was studied. Prediction of the performance of the columns using bed-depth/service time analysis showed good agreement with the experimental results. The VLRC-based activated carbons gave lower service times for removal of 4-NP compared with the coconut-based commercial activated carbon Picactif. However, they showed comparable efficiency in terms of bed volumes treated and carbon usage rate (CUR). The VLRC-activated power station char (APSC) showed the lowest CUR of 0.57 g/L in comparison with 0.62 and 3.61 g/L exhibited by the commercial carbons Picactif and Hydraffin, respectively. The power station char (PSC) and Auschar gave poor CUR of 11.23 and 75.36 g/L, respectively. Three adsorbents were evaluated for the removal of natural organic matter (NOM) from aqueous solution. The breakthrough behaviour indicated that the pore size distribution of the adsorbents is an important physical characteristic for the adsorption of the NOM. There was a non-adsorbable fraction of the NOM that was a function of the type of adsorbent. In the presence of NOM, Picactif gave longer service time for the removal of 4-NP compared with APSC, consistent with the trend obtained in the absence of NOM. However, lower breakthrough times (at 10% C0) of 44 and 47% were obtained for APSC and Picactif, respectively. Further removal (35%) of 4-NP was achieved over extended operation of the beds, however more frequent backwashing was required as a result of the biological growth exhibited in the presence of NOM.

Keywords: Adsorption, Low-Rank Coal, Victorian Coal, NOM, DOC, 4-NP, fixed-bed Column

Chu, W. (2001), Dye removal from textile dye wastewater using recycled alum sludge. *Water Research*, **35** (13), 3147-3152.

Full Text: [W\Wat Res35, 3147.pdf](W/Wat%20Res35,%203147.pdf)

Abstract: The removal of dyes from textile dying wastewater by recycled alum sludge (RAS) generated by the coagulation process itself was studied and optimized. One hydrophobic and one hydrophilic dye were used as probes to examine the performance of this process. It was found that RAS is a good way of removing hydrophobic dye in wastewater, while simultaneously reducing the fresh alum dosage, of which one third of the fresh alum can be saved. The back-diffusion of residued dye from the recycling sludge is detected but is easily controlled as long as a small amount of fresh alum is added to the system. The use of RAS is not recommended for the removal of hydrophilic dyes, since the high solubility characteristics of such dyes can cause deterioration in the water quality during recycling. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Alum, Dye, Hydrophilic, Hydrophobic, Recycle, Sludge, Water

Chen, B., Hui, C.W. and McKay, G. (2001), Film-pore diffusion modeling for the sorption of metal ions from aqueous effluents onto peat. *Water Research*, **35** (14), 3345-3356.

Full Text: [W\Wat Res35, 3345.pdf](W/Wat%20Res35,%203345.pdf)

Abstract: The sorption of three metal ions, namely, copper, nickel and lead onto sphagnum peat moss has been studied using an agitated batch sorber system. The equilibrium isotherms were determined and kinetic runs were performed over a range of concentrations for each metal ion. A film-pore diffusion mass transfer model has been developed based on a single effective diffusion coefficient for each system. Error analysis of the experimental and theoretical data indicated relatively large errors at low initial metal ion concentrations. Therefore the model was modified to introduce a surface coverage concentration dependent effective diffusivity to account for a contribution from surface diffusion. (C) 2001 Elsevier Science Ltd. Alt rights reserved.

Keywords: Batch Adsorption, Modeling, Film-Pore Diffusion, Metal Ions, Peat, Shrinking-Core Model, Bovine Serum-Albumin, Surface-Diffusion, Activated Carbon, Mass-Transfer, Multicomponent Adsorption, Concentration-Dependence, Intraparticle Diffusion, Heterogeneous Surfaces, Exchange Kinetics

Meshko, V., Markovska, L., Mincheva, M. and Rodrigues, A.E. (2001), Adsorption of basic dyes on granular acivated carbon and natural zeolite. *Water Research*, **35** (14), 3357-3366.

Full Text: [W\Wat Res35, 3357.pdf](W/Wat%20Res35,%203357.pdf)

Abstract: The adsorption of basic dyes from aqueous solution onto granular activated carbon and natural zeolite has been studied using an agitated batch adsorber. The influence of agitation, initial dye concentration and adsorbent mass has been studied. The parameters of Langmuir and Freundlich adsorption isotherms have been determined using the adsorption data. Homogeneous diffusion model (solid diffusion) combined with external mass transfer resistance is proposed for the kinetic investigation. The dependence of solid diffusion coefficient on initial concentration and mass adsorbent is represented by the simple empirical equations. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Basic Dye, Activated Carbon, Natural Zeolite, Homogeneous Diffusion Model, External Mass Transfer Resistance, Activated Carbon, Surface-Diffusion, Mass-Transfer, Liquid, Equilibrium, Adsorbents

Ćurković, L., Cerjan-Stefanović, Š. and Rastovèan-Mioè, A. (2001), Batch Pb2+ and Cu2+ removal by electric furnace slag. *Water Research*, **35** (14), 3436-3440.

Full Text: [W\Wat Res35, 3436.pdf](W/Wat%20Res35,%203436.pdf)

Abstract: An evaluation of the application of electric furnace slag (EFS) as an adsorbent to remove Pb2+ and Cu2+ from industrial effluents is presented. The paper examines phase composition or EFS X-ray diffraction of powder. In the batch experiments, parameters studied include the effect of initial concentration of lead and copper ions, temperature, and contact time. Over the temperature range studied (293-313 K) the results of adsorption experiments could be Fitted by using both Langmuir and Freundlich models and thermodynamic values of DeltaG(0), DeltaH(0) and DeltaS(0) corresponding to each adsorption process were calculated. Satisfactory conformity between experimental data and the model-predicted values was expressed by the correlation coefficient (R2). Both Langmuir and Freundlich models described the Pb2+ and Cu2+ sorption processes adequately, with correlation coefficient (R2) values ranging from 0.9760 to 0.9994. Data from this study indicated the potential use of the tested electric furnace slag, a by-product from ‘Felis’ foundry in Sisak, Croatia, as Pb2+ and Cu2+ sorbents front the industrial effluents. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Lead, Copper, Heavy Metals, Electric Furnace Slag, Adsorption, Metal-Ion Exchange, Aqueous-Solution, Equilibrium Uptake, Sorption Dynamics, Column Operations, Activated Slag, Zeolites, Adsorption, Carbon

An, H.K., Park, B.Y. and Kim, D.S. (2001), Crab shell for the removal of heavy metals from aqueous solution. *Water Research*, **35** (15), 3551-3556.

Full Text: [W\Wat Res35, 3551.pdf](W/Wat%20Res35,%203551.pdf)

Abstract: The ability of crab shell to remove heavy metals from aqueous solution was evaluated by comparing with that of several sorbents (cation exchange resin, zeolite, granular activated carbon, powdered activated carbon). All experiments were conducted using several heavy metal ion solutions (Pb, Cd, Cu, Cr). The orders of heavy metal removal capacity and initial heavy metal removal rate were found as crab shell>cation exchange resin>zeolite>powdered activated carbon greater than or equal to granular activated carbon. Therefore, crab shell is satisfactory as a good biosorbent for the heavy metal removal. The study indicates that the removal of these heavy metals is selective, with Pb and Cr being removed in preference to Cd and Cu. The sorption equilibrium of heavy metal ions on sorbents was modeled on the applications of Langmuir and Freundlich. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorbents, Heavy Metal, Crab Shell, Cation Exchange Resin, Zeolite, Granular Activated Carbon, Powdered Activated Carbon, *Rhizopus-arrhizus* Biomass, Ions, Biosorbents, Biosorption

? Yu, J., Wang, X.W. and Yue, P.L. (2001), Optimal decolorization and kinetic modeling of synthetic dyes by *Pseudomonas* strains. *Water Research*, **35** (15), 3579-3586.

Full Text: [2001\Wat Res35, 3579.pdf](2001/Wat%20Res35,%203579.pdf)

Abstract: Pseudomonas spp were isolated from an anaerobic-aerobic dyeing house wastewater treatment facility as the most active azo-dye degraders. Decolorization of azo dyes and non-azo dyes including anthraquinone, metal complex and indigo was compared with individual strains and a bacterial consortium consisting of the individual strain and municipal sludge (50:50 wt). The consortium showed a significant improvement on decolorization of two recalcitrant non-azo dyes, but little effect on the dyes that the individual strains could degrade to a great or moderate extent. Decolorization of Acid violet 7 (monoazo) by a Pseudomonas strain GM3 was studied in detail under various conditions. The optimum decolorization activity was observed in a narrow pH range (7-8), a narrow temperature range (35-40 degreesC), and at the presence of organic and ammonium nitrogen. Nitrate had a severe inhibitory effect on azo dye decolorization: 10 mg/L led to 50% drop in decolorization activity and 1000 mg/L to complete activity depression. A kinetic model is established giving the dependence of decolorization rate on cell mass concentration (first-order) and dye concentration (half order). The rate increased with temperature from 10 to 35 degreesC, which can be predicted by Arrhenius equation with the activation energy of 16.87 kcal/mol and the frequency factor of 1.49×1011 (mgL)(1/2)/g DCM min. (C)2001 Elsevier Science Ltd. All rights reserved.

Keywords: Activation, Activation Energy, Activity, Ammonium, Anaerobic Azo Reduction, Anaerobic-Aerobic Treatment, Azo Dye, Azo Dyes, Azo-Dye, Bacterial Consortium, Biodegradation, Biotreatment, Complex, Concentration, Decolorization, Degradation, Dependence, Depression, Drop, Dye, Dyeing, Dyes, Energy, First Order, Granular Sludge, Indigo, Inhibitory Effect, Kinetic, Kinetic Model, Kinetic Modeling, Mass Concentration, Metal, Model, Modeling, Municipal, Municipal Sludge, Nitrogen, Order, Organic, pH, Pseudomonas, Pseudomonas Decolorization Kinetics, Range, Simulated Textile Effluent, Sludge, Synthetic, Synthetic Dye Degradation, Synthetic Dyes, System, Temperature, Treatment, Waste-Water, Wastewater, Wastewater Treatment

Costley, S.C. and Wallis, F.M. (2001), Bioremediation of heavy metals in a synthetic wastewater using a rotating biological contactor. *Water Research*, **35** (15), 3715-3723.

Full Text: [W\Wat Res35, 3715.pdf](W/Wat%20Res35,%203715.pdf)

Abstract: Immobilised microorganisms provide a potential system for the treatment of metal-contaminated waters. This study investigates the efficiency of a rotating biological contactor (RBC) in the treatment of waters contaminated with cadmium, copper and zinc in multiple sorption–desorption cycles. Each sorption cycle extended over a period of 12 weeks at an HRT of 24h to determine the efficiency of the system over a protracted period of time. The removal pattern observed in the initial cycle, namely Cu>>Zn>Cd, was repeated in both subsequent cycles. After completion of each cycle metals were successfully desorbed by means of an acid wash. The sorption ability of the biofilm was not adversely affected by the desorption process as evidenced by the similar metal removal rates obtained in each of the three sorption cycles. These results suggest that RBCs can be used successfully in the treatment of high-strength metal-contaminated wastewaters. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Rotating Biological Contactor, Biofilms, Heavy Metals, Sorption, Desorption, Cadmium, Copper, Zinc

Al-Degs, Y., Khraisheh, M.A.M. and Tutunji, M.F. (2001), Sorption of lead ions on diatomite and manganese oxides modified diatomite. *Water Research*, **35** (15), 3724-3728.

Full Text: [W\Wat Res35, 3724.pdf](W/Wat%20Res35,%203724.pdf)

Abstract: Naturally occurring diatomaceous earth (diatomite) has been tested as a potential sorbent for Pb(II) ions. The intrinsic exchange properties were further improved by modification with manganese oxides. Modified adsorbent (referred to as Mn-diatomite) showed a higher tendency for adsorbing lead ions from solution at pH 4. The high performance exhibited by Mn-diatomite was attributed to increased surface area and higher negative surface charge after modification. Scanning electron microscope pictures revealed a birnessite structure of manganese oxides, which was featured by a plate-like-crystal structure. Diatomite filtration quality was improved after modification by manganese oxides. Good filtration qualities combined with high exchange capacity emphasised the potential use of Mn-diatomite in filtration systems. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Diatomaceous Earth (Diatomite), Manganese Oxides, Adsorption and Filtration

Ahsan, S., Kaneco, S., Ohta, K., Mizuno, T. and Kani, K. (2001), Use of some natural and waste materials for waste water treatment. *Water Research*, **35** (15), 3738-3742.

Full Text: [W\Wat Res35, 3738.pdf](W/Wat%20Res35,%203738.pdf)

Abstract: A fundamental study was conducted to assess removal and filtration capacity of waste and natural indigenous materials as treatment mediums e.g., shell, limestone, waste paper mixed with refuse concrete, refuse cement, also processed nitrolite, charcoal-bio and charcoal. Under room temperature condition removal of phosphoric, nitric a-nd ammonium-ions, filtration of suspended substance (SS) together with removal of COD in waste water was investigated. Influence of particle size effect for all treatment mediums except for waste paper was pursued. Significant improvement of waste water quality with respect to SS, phosphoric ions and decrease in COD is possible by treating with these filtration mediums. With specific reference to some treatment mediums NO3-N and NH4-N showed reasonable improvement in quality, although generally removal effect was not very significant. Efficacy of treatment was dependent on the particle size of treatment mediums in general, however, nitrolite for NH4-N, charcoal-A for SS and COD, refuse cement mixed with waste paper for PO4 ion removal showed insignificant variability on the particle size effect. Results of this fundamental study demonstrate effectiveness and feasibility for applied application of these proposed waste and naturally available treatment ingredients at lower cost. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Waste Treatment, Removal, Filtration, Indigenous Materials, Removal

Li, Z.H. and Bowman, R.S. (2001), Retention of inorganic oxyanions by organo-kaolinite. *Water Research*, **35** (16), 3771-3776.

Full Text: [W\Wat Res35, 3771.pdf](W/Wat%20Res35,%203771.pdf)

Abstract: A natural kaolinite (KGa-1b) was treated with the surfactant hexadecyltrimethylammonium bromide (HDTMA-Br) to a level twice that of the cation exchange capacity (CEC). Sorption of nitrate. arsenate, and chromate by the resultant organo-kaolinite was then quantified. Sorption of each oxyanion was well-described by the Langmuir isotherm. Sorption of nitrate was the greatest. with a Langmuir sorption maximum of 24 mmol/kg, although chromate showed the highest sorption affinity of 20 L/kg. Sorption of nitrate. arsenate, and chromate on organo-kaolinite was at least two orders of magnitude greater than their sorption on unmodified kaolinite. Desorption of the bromide counterion indicated that each of the oxyanions was retained by ion exchange on an HDTMA bilayer formed on the organokaolinite. Chromate sorption on the organo-kaolinite was unaffected by solution pH in the range 5-9, but decreased at pH 11 due to competition of OH- for anion exchange sites. Similarly, chromate exchange by organo-kaolinite was reduced in the presence of high background levels of chloride. Chromate was effectively retained when flowing through a packed bed of organo-kaotinite: after an input of more than 40 pore volumes. the effluent concentration of chromate was less than 10% of the input concentration. and 90% of the original HDTMA remained on the organo-kaolinite. The results demonstrate that properly prepared organoclays can remove oxyanions, as well as nonpolar organics, from contaminated waters. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Hdtma, Surfactant, Organoclay, Sorption, Anion Exchange, Surfactant-Modified Zeolite, Cationic Surfactant, Natural Clinoptilolite, Sorption, Chromate, Clay, Contaminants, Hexadecyltrimethylammonium, Adsorption, Stability

Ko, D.C.K., Porter, J.F. and McKay, G. (2001), Film-pore diffusion model for the fixed-bed sorption of copper and cadmium ions onto bone char. *Water Research*, **35** (16), 3876-3886.

Full Text: [W\Wat Res35, 3876.pdf](W/Wat%20Res35,%203876.pdf)

Abstract: The sorption of copper and cadmium ions onto bone char in single component systems has been studied using fixed-bed column adsorbers. The effects of solution flowrate, initial metal ion concentration and bone char particle size have been studied. A film-pore diffusion model has been developed to predict the fixed-bed breakthrough curves for the two metal ions. A sensitivity analysis has been carried out to investigate the influence of the external mass transfer coefficient (film resistance), the effective diffusion coefficient (pore diffusion) and the solid phase loading capacity. It is round that under the experimental conditions employed in the study, film diffusional resistance was tow and the Biot numbers were relatively high. Furthermore. a constant effective pore diffusivity was not sufficient to correlate the breakthrough curves accurately and a variable dependent effective diffusivity was required; suggesting a possible contribution front surface diffusion. Since the metal ion-bone char systems take a long time to reach equilibrium. the solid phase loading capacity as predicted by the ‘best-fit’ equilibrium isotherm. was not Suitable for use in the diffusional mass transport model and the mass balance solid phase loading was utilised instead. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption Column, Metal Ions, Bone Char, Film-Pore Diffusion, Sorption, Activated Carbon Columns, Impregnated Macroporous Resins, Intraparticle Mass-Transport, Multicomponent Adsorption, Water-Purification, Binary Adsorption, Fluidized-Beds, Metal Sorption, Lead Removal, Batch Tests

Naseem, R. and Tahir, S.S. (2001), Removal of Pb(II) from aqueous/acidic solutions by using bentonite as an adsorbent. *Water Research*, **35** (16), 3982-3986.

Full Text: [W\Wat Res35, 3982.pdf](W/Wat%20Res35,%203982.pdf)

Abstract: The ability of bentonite clay to remove Pb(II) from aqueous solutions and from nitric acid, hydrochloric acid and perchloric acid solutions (1.0 . 1×10-5) has been studied at different optimized conditions of concentrations. amount of adsorbent, temperature, concentration of electrolyte and pH. Maximum adsorption of Pb(II), i.e. > 98% has been achieved in aqueous solutions, while 86% is achieved from 1.0×10-5 M HCl using 0.5 g of bentonite. The adsorption decreases by increasing the concentration of electrolytes. Flame atomic absorption spectrometer was used for measuring lead concentration. Isotherm analysis of adsorption data obtained at 25°C, 30°C, 40°C and 50°C showed that the adsorption pattern of lead on bentonite followed the Langmuir isotherm and Freundlich isotherm. respectively. ΔH° and ΔS° were calculated from the slope and intercept of 1n K-D vs. I/T plots. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Lead, Adsorption, Isotherms, Bentonite, Electrolytes, Thermodynamics, Adsorption Behavior, Lead

Notes: highly cited

Gupta, V.K., Shrivastava, A.K. and Jain, N. (2001), Biosorption of chromium(VI) from aqueous solutions by green algae *Spirogyra* species. *Water Research*, **35** (17), 4079-4085.

Full Text: [W\Wat Res35, 4079.pdf](W/Wat%20Res35,%204079.pdf)

Abstract: Biosorption of heavy metals is an effective technology for the treatment of industrial wastewaters. Results are presented showing the sorption of Cr(VI) from solutions by biomass of filamentous algae Spirogyra species. Batch experiments were conducted to determine the adsorption properties of the biomass and it was observed that the adsorption capacity of the biomass strongly depends on equilibrium pH. Equilibrium isotherms were also obtained and maximum removal of Cr(VI) was around 14.7×103 mg metal/kg of dry weight biomass at a pH of 2.0 in 120 min with 5 mg/l of initial concentration. The results indicated that the biomass of Spirogyra species is suitable for the development of efficient biosorbent for the removal and recovery of Cr(VI) from wastewater. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Adsorption, Biosorbent, Algae, Wastewater, Heavy-Metal Biosorption, *Saccharomyces-Cerevisiae*, Azolla-Filiculoides, Cadmium Uptake, Marine-Algae, Waste-Water, Removal, Biomass, Recovery, Lead

Chern, J.M. and Wu, C.Y. (2001), Desorption of dye from activated carbon beds: Effects of temperature, pH, and alcohol. *Water Research*, **35** (17), 4159-4165.

Full Text: [W\Wat Res35, 4159.pdf](W/Wat%20Res35,%204159.pdf)

Abstract: The adsorption isotherms of yellow and red dye solutions onto granular activated carbon at varying solution pHs (2-8), temperatures (15-50 degreesC), and alcohol concentrations (0 20%) were experimentally determined by batch tests and the Tóth model was found to best fit the adsorption isotherm data for varying solution pHs, temperatures, and alcohol concentrations. The maximum adsorption capacity was found to decrease with increasing solution pH and alcohol concentration and could be predicted by the correlation equations obtained in this study. A correlation equation was also obtained to account for the effects of solution temperature on the adsorption equilibrium constant. The 25 degreesC water was found to be a very poor regenerant for the carbon bed presaturated with the yellow dye compared with 20% alcohol solution. A simple equation was derived, based on non-linear wave propagation theory, to predict the desorption curves of activated carbon bed. Given presaturation concentration, bed density and void fraction, and adsorption isotherm, the wave propagation theory predicted the desorption curves quite satisfactorily. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Dye Wastewater, Activated Carbon, Adsorption Isotherm, Desorption Curve, Wave Theory, Wave Propagation Theory, Fixed-Beds, Acid Dyes, Adsorption, Removal

Mohamed, Z.A. (2001), Removal of cadmium and manganese by a non-toxic strain of the freshwater cyanobacterium *Gloeothece magna*. *Water Research*, **35** (18), 4405-4409.

Full Text: [W\Wat Res35, 4405.pdf](W/Wat%20Res35,%204405.pdf)

Abstract: The ability of both living and dry cells of Gloeothece magna, a non-toxic freshwater cyanobacterium, to adsorb cadmium and manganese is demonstrated in this study. Chlorophyll a content of living cells was not influenced by either cadmium or manganese concentrations, indicating that adsorption of both Cd2+ and Mn2+ by living cells of G. magna, was independent of the metabolic state of the organism. Moreover, the adsorption of both Cd2+ and Mn2+ to living cells and dry cells, was dependent on the metal concentrations, and fitted the Freundlich adsorption isotherm. However, dry cells had larger binding capacity for both Cd2+ (Kf = 912.6) and Mn2+ (Kf = 2398) than living cells (Kf = 151.4 & 63, respectively). The role of the capsular polysaccharides, the main constituents of the cyanobacterial envelope, in binding these two metals was also studied. Polysaccharide extracts of this organism adsorbed high amounts of both Cd2+ (115-425 µg mg-1) and Mn2+ (473-906 µg mg-1). This study suggests that G. magna would probably be cultured in water bodies contaminated by heavy metals to ameliorate their toxicity. Also dry material of this cyanobacterium being a non-toxic species, could be used as a safe biofilter to remove toxic metals from drinking water. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metals, Biosorption, Cyanobacteria, Gloeothece Magna, Polysaccharides, Neurospora-Crassa, Metal-Ions, Biosorption, Biomass, Accumulation, Polysaccharides

Tse, K.K.C. and Lo, S.L. (2002), Desorption kinetics of PCP-contaminated soil: Effect of temperature. *Water Research*, **36** (1), 284-290.

Full Text: [W\Wat Res36, 248.pdf](W/Wat%20Res36,%20248.pdf)

Abstract: A thermally enhanced pump-and-treatment method for pentachlorophenol (PCP)-contaminated soil and ground-water has shown potential advantages over the traditional pump-and-treatment method. Studies on the desorption kinetics of PCP from aquifer soil are the first step toward quantitative assessment of the newly proposed method. Five series of desorption batch tests were conducted at different temperatures, and the test results were analyzed by linear regression to determine the best-fit kinetic model for PCP desorbed from the contaminated field soil under all temperature conditions. The first-order kinetic model, parabolic diffusion model. and modified Freundlich model were discussed in linear regression work. A modified Freundlich model was found to describe the PCP desorption kinetics from soil in consideration of a temperature effect. (C) 2001 Elsevier Science Ltd. All rights reserved.

Keywords: PCP, Thermal Desorption Kinetics, Steam Injection, Thermally Enhanced Pump-And-Treatment, Adsorption, Behavior

Wang, W.J., Wang, W.H., Zhang, X.L. and Wang, D.H. (2002), Adsorption of *p*-chlorophenol by biofilm components. *Water Research*, **36** (3), 551-560.

Full Text: [W\Wat Res36, 551.pdf](W/Wat%20Res36,%20551.pdf)

Abstract: Through batch equilibrium experiments under the conditions of temperature 25 °C, pH values of 2.7, 5.3 and 6.1, the *p*-chlorophenol (4-cp) adsorption to biofilm components was investigated in this study. The contributions of biofilm components to 4-cp adsorption were discussed by comparing four adsorption systems, i.e. 4-cp adsorbed by model suspended particulate matter (kaolin) with biofilm coating, bacteria, bacterial exopolysaccharide (EPS) and kaolin, respectively. Langmuir and Freundlich isotherm equations were used to evaluate the experiment data. All the four adsorptions fitted for the two equations. Equilibrium isotherms were obtained for 4-cp adsorption on different adsorbents. The kinetic characteristics of 4-cp adsorption by biofilm components and the effect of pH on the kinetic process were investigated. The time to reach the highest adsorption amount and near equilibrium state in the four systems was different. The 4-cp adsorption by kaolin with biofilm coating reached near equilibrium at 60 min at pH 6.1. The 4-cp adsorption by EPS and kaolin reached near equilibrium at 150 and 180 min, respectively. But the 4-cp adsorption by bacteria showed no evident near equilibrium during 3 h in the experiment. The impact of pH value on the adsorption was also examined. The adsorption amount slightly increased with increasing pH from 2.7 to 6.1 for the adsorption systems of bacterial EPS and kaolin, but it slightly decreased in the systems of kaolin with biofilm coating and bacteria. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Biofilm, 4-CP, Bacteria, Exopolysaccharide, Kaolin, Adsorption

Sotelo, J.L., Ovejero, G., Delgado, J.A. and Martínez, I. (2002), Comparison of adsorption equilibrium and kinetics of four chlorinated organics from water onto GAC. *Water Research*, **36** (3), 599-608.

Full Text: [W\Wat Res36, 599.pdf](W/Wat%20Res36,%20599.pdf)

Abstract: This study deals with the adsorption of four chlorinated pollutants onto GAC (F-400); two pesticides (lindane and alachlor) and two PCB congeners: 2-PCB (MPCB) and 2,2’,5,5’-PCB (TPCB). Equilibrium and kinetic parameters have been obtained for the adsorption of alachlor and each PCB, whereas the kinetic results for lindane presented elsewhere (Proc. First World Water Congr. Int. Water Assoc., Texts of Posters, CD-ROM, AGHTM, Paris, 2000) are reanalyzed in this work. A model assuming a bidisperse structure (macro- and micropores), each region having a different adsorption isotherm, is used to study the adsorption kinetics in a batch system in the period dominated by macropore diffusion. Both the saturation capacity and the rate of internal transport of TPCB are much lower than those of the other solutes. This difference is attributed to a chemisorption mechanism for this compound, which is favored by its very low solubility. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Alachlor, PCB, Activated Carbon, Adsorption

Chakravarty, S., Dureja, V., Bhattacharyya, G., Maity, S. and Bhattacharjee, S. (2002), Removal of arsenic from groundwater using low cost ferruginous manganese ore. *Water Research*, **36** (3), 625-632.

Full Text: [W\Wat Res36, 625.pdf](W/Wat%20Res36,%20625.pdf)

Abstract: A low cost ferruginous manganese ore (FMO) has been studied for the removal of arsenic from groundwater. The major mineral phases present in the FMO are pyrolusite and goethite. The studied FMO can adsorb both AS(III) and As(V) without any pre-treatment, adsorption of As(III) being stronger than that of As(V). Both As(III) and As(V) are adsorbed by the FMO in the pH range of 2–8. Once adsorbed, arsenic does not get desorbed even on varying the pH in the range of 2–8. Presence of bivalent cations, namely, Ni2+, Co2+, Mg2+ enhances the adsorption capability of the FMO. The FMO has been successfully used for the removal of arsenic from six real groundwater samples containing arsenic in the range of 0.04–0.18ppm. Arsenic removals are almost 100% in all the cases. The cost of the FMO is about 50–56 US$ per metric tonne. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Ferruginous Manganese Ore, Arsenic Removal, Groundwater

Chern, J.M. and Chien, Y.W. (2002), Adsorption of nitrophenol onto activated carbon: Isotherms and breakthrough curves. *Water Research*, **36** (3), 647-655.

Full Text: [W\Wat Res36, 647.pdf](W/Wat%20Res36,%20647.pdf)

Abstract: The adsorption isotherm of *p*-nitrophenol onto granular activated carbon in 25°C aqueous solution was experimentally determined by batch tests. Both the Freundlich and the Redlich-Peterson models were found to fit the adsorption isotherm data well. A series of column tests were performed to determine the breakthrough curves with varying bed depths (3–6cm) and water flow rates (21.6–86.4cm3/h). Explicit equations for the breakthrough curves of the fixed-bed adsorption processes with the Langmuir and the Freundlich adsorption isotherms were developed by the constant-pattern wave approach using a constant driving force model in the liquid phase. The results show that the half breakthrough time increases proportionally with increasing bed depth but decreases inverse proportionally with increasing water flow rate. The constant-pattern wave approach using the Freundlich isotherm model fits the experimental breakthrough curves quite satisfactorily. A correlation was proposed to predict the volumetric mass-transfer coefficient in the liquid phase successfully. The effects of solution temperature and pH on the adsorption isotherm were also studied and the Tóth model was found to fit the isotherm data well at varying solution temperatures and pHs. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption Isotherm, Adsorption Isotherms, Aqueous-Solution, Breakthrough, Breakthrough Curve, Breakthrough Curves, Degradation, Dye Adsorption, Fixed Bed, Fixed-Bed Adsorption, Flow Rate, Kinetics, Langmuir, Model, P-Nitrophenol, P-Nitrophenol, Removal, Substituted Phenols, Wave Propagation Theory, Wave Theory

Zhao, X., Höll, W.H. and Yun G. (2002), Elimination of cadmium trace contaminations from drinking water. *Water Research*, **36** (4), 851-858.

Full Text: [W\Wat Res36, 851.pdf](W/Wat%20Res36,%20851.pdf)

Abstract: Raw waters polluted with trace heavy metals present serious problems to the part of the Chinese water supply. One of the important contaminants is cadmium. Removal of trace amounts of heavy metals can be achieved by means of selective sorption processes. One of the possibilities is the application of weak base anion exchangers. LEWIS-base; acid interactions lead to an exclusive sorption of heavy metal cations and an equivalent amount of anions of strong acids. The respective elimination of cadmium from pure solutions and spiked natural water and the regeneration of the exhausted exchanger has been investigated. The results demonstrate a very efficient elimination. The standards for drinking water are met for a very large relative volume of treated water. In addition, even a considerable share of dissolved organic matter is adsorbed. Regeneration requires a first step with sulfuric acid to remove the metals and a second one with sodium hydroxide to neutralize the exchanger and to displace the DOC adsorbed. The heavy metals can be concentrated in a small volume which facilitates the discharge of the waste. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium, Weakly Basic Exchange Resin, Drinking Water

Solisio, C., Lodi, A., Converti, A. and Borghi, M.D. (2002), Removal of exhausted oils by adsorption on mixed Ca and Mg oxides. *Water Research*, **36** (4), 899-904.

Full Text: [W\Wat Res36, 899.pdf](W/Wat%20Res36,%20899.pdf)

Abstract: Adsorption tests were performed on two different exhausted oils to reduce their polluting and health hazard potential: a ‘water-insoluble oil’, utilised for automotive engine lubrication, and an ‘emulsified’ oil, used as coolant for metal-cutting tools. Dolomite, a low-cost recovery material, was used to prepare two effective adsorbents: (a) a mixed Ca and Mg oxide obtained by thermal decomposition of dolomite at 1800°C, and (b) an activated material obtained by submitting this product to chemical treatment with HCl. Preliminary tests carried out with an excess of the former material showed that the insoluble oil was adsorbed with lower yield (*Y=0.40*) than the soluble (emulsified) oil (*Y=0.60*). The material activation with HCl remarkably improved the adsorption of soluble oil organic fraction (*Y>0.90*), while only a little increase in the removal yield was observed for the insoluble oil (*Y=0.44*). The results presented and discussed in this work pointed out that the products of dolomite calcination can successfully replace the conventional adsorbing materials in the removal of organic pollutants, with particular concern to exhausted soluble oils, which cannot usually be recycled, thus reducing the operational costs of their treatment. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Emulsified Oil, Insoluble Oil, Adsorption, Mixed Ca and Mg Oxide, Pollutants Removal

Notes: highly cited

? Esplugas, S., Giménez, J., Contreras, S., Pascual, E. and Rodríguez, M. (2002), Comparison of different advanced oxidation processes for phenol degradation. *Water Research*, **36** (4), 1034-1042.

Full Text: [2002\Wat Res36, 1034.pdf](2002/Wat%20Res36,%201034.pdf)

Abstract: Advanced Oxidation Processes (O3, O3/H2O2, UV, UV/O3, UV/H2O2, O3/UV/H2O2, Fe2+/H2O2 and photocatalysis) for degradation of phenol in aqueous solution have been studied in earlier works. In this paper, a comparison of these techniques is undertaken: pH influence, kinetic constants, stoichiometric coefficient and optimum oxidant/pollutant ratio. Of the tested processes, Fenton reagent was found to the fastest one for phenol degradation. However, lower costs were obtained with ozonation. In the ozone combinations, the best results were achieved with single ozonation. As for the UV processes, UV/H2O2 showed the highest degradation rate.

Keywords: Phenol, Ozone, UV radiation, Hydrogen Peroxide, Fenton, Photocatalysis

Shen, Y.H. (2002), Removal of phenol from water by adsorption–flocculation using organobentonite. *Water Research*, **36** (5), 1107-1114.

Full Text: [W\Wat Res36, 1107.pdf](W/Wat%20Res36,%201107.pdf)

Abstract: Bentonite modified with short chain cationic surfactant might be the basis of a new approach to removing organic pollutants from water. The treatment process involves dispersing bentonite to the contaminated water and then adding a small cationic surfactant so as to result in flocs which are agglomerates of organobentonite and bound organic pollutants. The flocs are then removed from the solution by sedimentation. Experimental results indicate that BTMA-bentonite displays a high affinity for phenol, possibly because phenol molecules interact favorably with the benzene ring in BTMA ion through increased π–π type interactions. Under appropriate operating conditions, 90% phenol removal and nearly 100% bentonite recovery could be achieved by the adsorption–flocculation process using BTMA-bentonite. Additionally, the insensitivity of the process to the changing ionic strength of the solution and rapid adsorption kinetics made adsorption–flocculation with BTMA-bentonite attractive for continuous treatment of large volumes of industrial wastewater. The bentonite may function as a recyclable surfactant support for the adsorption and subsequent combustion of organic pollutants.

Keywords: Organobentonite, Adsorption, Flocculation, Phenol

Bai, R.S. and Abraham, T.E. (2002), Studies on enhancement of Cr(VI) biosorption by chemically modified biomass of *Rhizopus nigricans*. *Water Research*, **36** (5), 1224-1236.

Full Text: [W\Wat Res36, 1224.pdf](W/Wat%20Res36,%201224.pdf)

Abstract: This study reports the biosorption of Cr(VI) by chemically modified biomass of *Rhizopus nigricans* and the possible mechanism of Cr complexation to the adsorbent. The cell wall of this fungus possesses strong complexing property to effectively remove Cr(VI) anions from solution and wastewater. The mechanism of Cr adsorption by *R. nigricans* was ascertained by chemical modifications of the dead biomass followed by FTIR spectroscopic analysis of the cell wall constituents. Treatment of the biosorbent with mild alkalies (0.01 N NaOH and ammonia solution) and formaldehyde (10%, w/v) deteriorated the biosorption efficiency. However, extraction of the biomass powder in acids (0.1N HCl and H2SO4), alcohols (50% v/v, CH3OH and C2H5OH) and acetone (50%, v/v) improved the Cr uptake capacity. Reaction of the cell wall amino groups with acetic anhydride reduced the biosorption potential drastically. Blocking of the –COOH groups by treatment with water soluble carbodiimide also resulted in initial lag in Cr binding. Biomass modification experiments conducted using Cetyl Trimethyl Ammonium Bromide (CTAB), Polyethylenimine (PEI), and Amino Propyl Trimethoxy Silane (APTS) improved the biosorption efficiency to exceptionally high levels. The FTIR spectroscopic analysis of the native, Cr bound and the other types of chemically modified biomass indicated the involvement of amino groups of *Rhizopus* cell wall in Cr binding. The adsorption data of the native and the most effectively modified biomass were evaluated by the Freundlich and the Langmuir adsorption isotherms and the possible adsorption phenomena are also discussed. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Chemical Modification, Heavy Metals, *Rhizopus nigricans*, Binding Sites, FTIR Spectroscopy, Hexavalent Chromium

Gin, K.Y.H., Tang, Y.Z. and Aziz, M.A. (2002), Derivation and application of a new model for heavy metal biosorption by algae. *Water Research*, **36** (5), 1313-1323.

Full Text: [W\Wat Res36, 1313.pdf](W/Wat%20Res36,%201313.pdf)

Abstract: An equilibrium model for describing the relationships between important parameters for heavy metal sorption by algae was derived through a thermodynamics approach. In this model, both the removal efficiency of heavy metal and metal adsorption per unit algal biomass are considered to be simple functions of the ratio of algal biomass concentration to the initial metal concentration for selected conditions, i.e. as at constant pH and temperature. The model was found to fit the experimental results well (judged by the correlation–regression coefficient, *R*2), for the adsorption of cadmium, copper, lead and zinc by two algal species, *Oocystis* sp. (both living and non-living) and *Chlorococcum* sp. The applicability of the model was also supported by the reprocessed results of experimental data given in the literature, i.e. for the metal species, Cd, Pb, Cu and Ag, the algal species, *Chlorella vulgaris*, *Scenedesmus quadricauda* and *Cladophora crispata*, and both batch and continuous fixed-bed reactors. It was also demonstrated that the model could be applied over a broad range of pH for cadmium and copper adsorption by *Oocystis* sp*.* However, the model was not applicable at very low and high pH levels, due to negligible adsorption and precipitation, respectively. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Heavy Metal, Biosorption, Algal Biomass, Equilibrium Model, Cadmium (Cd), Copper (Cu)

? Jiang, J.Q. and Lloyd, B. (2002), Progress in the development and use of ferrate(VI) salt as an oxidant and coagulant for water and wastewater treatment. *Water Research*, **36** (6), 1397-1408.

Full Text: [2002\Wat Res36, 1397.pdf](2002/Wat%20Res36,%201397.pdf)

Abstract: This paper reviews the progress in preparing and using ferrate(VI) salt as an oxidant and coagulant for water and wastewater treatment. The literature revealed that due to its unique properties (viz. strong oxidizing potential and simultaneous generation of ferric coagulating species), ferrate(VI) salt can disinfect microorganisms, partially degrade and/or oxidise the organic and inorganic impurities, and remove suspended/colloidal particulate materials in a single dosing and mixing unit process, However, these findings have not yet lead to the full-scale application of ferrate(VI,) in the water industry owing to difficulties associated with the relatively low yield of ferrate(VI), the instability of the chemical depending on its method of preparation, and the lack of adequate studies that have demonstrated its capabilities and advantages over existing water and wastewater treatment methods. Fundamental study is thus required to explore the new preparation methods focusing on increasing the production yield and product’s stability and avoiding using hypochlorite or chlorine as the oxidant. Also, the application of ferrate(VI) in drinking water treatment has not been studied systematically and future work in this field is recommended. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Water Treatment Chemicals, Ferrate(VI) Salts, Potassium Ferrate, Coagulant, Disinfectant, Oxidant, Wastewater Treatment, Anodic Iron Dissolution, Alkali Hydroxide Solutions, White Cast-Iron, Potassium Ferrate, Current Efficiency, Current Yields, Electrochemical Generation, Pulse-Radiolysis, Amino-Acids, Pure Iron

Notes: highly cited

? Fromme, H., Küchler, T., Otto, T., Pilz, K., Müller, J. and Wenzel, A. (2002), Occurrence of phthalates and bisphenol A and F in the environment. *Water Research*, **36** (6), 1429-1438.

Full Text: [2002\Wat Res36, 1429.pdf](2002/Wat%20Res36,%201429.pdf)

Abstract: Certain xenoestrogens, namely bisphenol A (BPA), bisphenol F (BPF), butylbenzyl phthalate (BBP), dibutyl phthalate (DBP), and di(2-ethylhexyl)phthalate (DEHP), were measured in various compartments (surface water, sediments, sewage treatment plant effluents, sewage sludge, dump water, liquid manure) in order to contribute to a better understanding of exposure to these compounds in different environments.

Hundred and sixteen surface-water samples and 35 sediments from rivers, lakes and channels, 39 sewage effluents, and 38 sewage sludges were collected in Germany. Furthermore, ten liquid manure, two waste-dump and two compost-runoff water samples were also analysed.

BPA measurements showed low concentrations from 0.0005 to 0.41 mug L-1 in surface water, in sewage effluents from 0.018 to 0.702 mugL(-1), in sediments from 0.01 to 0.19 mg kg(-1) and in sewage sludge from 0.004 to 1.363 mg kg(-1) dw. Measured concentrations of BPF were clearly lower than BPA in all environmental media.

DEHP dominated the phthalate concentrations, which ranged from 0.33 to 97.8 mugL(-1) (surface water), 1.74 to 182 mug L-1 (sewage effluents), 27.9 to 154 mg kg(-1) dw (sewage sludge) and 0.21 to 8.44 mg kg(-1) (sediment). DBP was found only in minor concentrations and BBP, only in a few samples in low amounts. Very high concentrations of BPA and phthalates were confirmed in waste dump water and compost water samples as well as in the liquid manure samples. (C) 2002 Published by Elsevier Science Ltd.

Keywords: Xenoestrogen, Bisphenol A, Bisphenol F, Phthalate, Di(2-Ethylhexyl)Phthalate, Dibutyl Phthalate, Surface Water, Sediment, Sewage Treatment Plant Effluent, Sewage Sludge, Liquid Manure, Dump Water, Esters, Water, Separation, Pesticides, Samples, River, Fate

Al-Shamrani, A.A., James, A. and Xiao, H. (2002), Destabilisation of oil-water emulsions and separation by dissolved air flotation. *Water Research*, **36** (6), 1503-1512.

Full Text: [W\Wat Res36, 1503.pdf](W/Wat%20Res36,%201503.pdf)

Abstract: The roles of aluminium and ferric sulphates as destabilising agents for oil-water emulsions that have been stabilised by a non-ionic surfactant (Span 20) are investigated in terms of oil removal. The effects of coagulant dose, pH, and the duration and intensity of both slow and fast mixing are considered. Electrokinetic measurements indicate that oil droplets have a negative zeta potential that is weakly dependent on pH. The chosen coagulants are shown to be effective in reducing the zeta potential of the oil droplets, and charge reversal was observed for aluminium sulphate. Oil removals up to 99.3% at pH 8 and 99.94% at pH 7 are seen for aluminium sulphate and ferric sulphate respectively. Rapid mixing times of around 120s and flocculation times ranging from 15 to 20 min appear to be optimal for the DAF separation. It is concluded that relatively low average mixing speeds for coagulation and flocculation are essential for efficient operation. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Emulsion, Flocculation, Flotation, Industrial Wastewater, Zeta Potential, Coagulation, Flocculation, Optimization, Removal

Manohar, D.M., Krishnan, K.A. and Anirudhan, T.S. (2002), Removal of mercury(II) from aqueous solutions and chlor-alkali industry wastewater using 2-mercaptobenzimidazole-clay. *Water Research*, **36** (6), 1609-1619.

Full Text: [W\Wat Res36, 1609.pdf](W/Wat%20Res36,%201609.pdf)

Abstract: The 2-mercaptobenzimidazole loaded natural clay was prepared for the removal of Hg(II) from aqueous media. Adsorption of the metal ions from aqueous solution as a function of solution concentration. agitation time, pH, temperature, ionic strength, particle size of the adsorbent and adsorbent dose was studied. The adsorption process follows a pseudo-second-order kinetics. The rate constants as a function of initial concentration and temperature were Given. The adsorption of Hg(II) increased with increasing pH and reached a plateau value in the pH range 4.0-8.0. The removal of Hg(II) was found to be >99% at an initial concentration of 50mg/l. Mercury(II) uptake was found to increase with ionic strength and temperature. Further, the adsorption of Hg(II) increased with increasing adsorbent dose and decrease with adsorbent particle size. Sorption data analysis was carried out using Langmuir and modified Langmuir isotherms for the uptake of metal ion in an initial concentration range of 50-1000 mg/l. The significance of the two linear relationships obtained by plotting the data according to the conventional Langmuir equation is discussed in terms of the binding energies of the two population sites involved which have a widely differing affinity for Hg(H) ions. Thermodynamic parameters such as changes of free energy, enthalpy, and entropy were calculated to predict the nature of adsorption. It was found that the values of isosteric heat of adsorption were varied with surface loading. The chlor-alkali industry wastewater samples were treated by MBI-clay to demonstrate its efficiency in removing Hg(II) from wastewater. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption Kinetics, Langmuir Isotherm, Hg(II) Removal, 2-Mercaptobenzimidazole-Clay, Thermodynamic Parameters, Wastewater, Heavy-Metal Ions, Coconut Husk, Adsorption, Cadmium, Water, Kinetics, Sorption, Carbon, Hg(II), pH

Rengaraj, S. and Moon, S.H. (2002), Kinetics of adsorption of Co(II) removal from water and wastewater by ion exchange resins. *Water Research*, **36** (7), 1783-1793.

Full Text: [W\Wat Res36, 1783.pdf](W/Wat%20Res36,%201783.pdf)

Abstract: The capacity of ion exchange resins, IRN77 and SKN1, for removal of cobalt from aqueous solution has been investigated under different conditions namely initial solution pH, initial metal-ion concentration, and contact time. The equilibrium data obtained in this study have been found to fit both the Langmuir and Freundlich adsorption isotherms. The adsorption of Co(II) on these resins follows first-order reversible kinetics. The film diffusion of Co(II) in these ion exchange resins was shown to be the main rate limiting step. The studies showed that these cation exchange resins can be used as efficient adsorbent material for the removal of Co(II) from aqueous solutions. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Cobalt(II), Ion Exchange Resin, Adsorption Isotherms, Adsorption Kinetics, Wastewater, Activated Carbon, Aqueous-Solution, Lead

Nakajima, A. (2002), Electron spin resonance study of copper biosorption by bacteria. *Water Research*, **36** (8), 2091-2097.

Full Text: [W\Wat Res36, 2091.pdf](W/Wat%20Res36,%202091.pdf)

Abstract: The biosorption of copper by bacteria was studied by using ESR spectroscopy. Among bacteria tested, *Arthrobacter nicotianae* has the most excellent ability to sorb copper. The biosorption of copper by *Arthrobacter* cells was so rapid, affected by the solution pH, and obeys the Langmuir adsorption equilibrium. The electron spin resonance (ESR) spectra of Cu(II) in bacterial cells are axial type, having a major absorption to higher field at *g* and lesser absorption to lower field at *g*║ with four lines. The ESR parameters showed that Cu(II) in the cells has the tetragonally distorted octahedral structure with nitrogen and oxygen as ligand atoms, which suggests that most of copper in bacterial cells combined with amino acid residues in the cell surface proteins. The variation of spectral patterns among bacteria could explain as the change of ligand circumstances caused by the pH of the cell surface. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Copper Biosorption, ESR of Cu(II) Ion, Arthrobacter Nicotianae

Ringqvist, L. and Öborn, I. (2002), Copper and zinc adsorption onto poorly humified *Sphagnum* and *Carex* peat. *Water Research*, **36** (9), 2233-2242.

Full Text: [W\Wat Res36, 2233.pdf](W/Wat%20Res36,%202233.pdf)

Abstract: Peat generally has a high adsorption capacity and has been suggested as an adsorbent for metals in polluted waters. However, the adsorption potential of peat can be expected to be strongly dependent on the chemical properties of the water. In this study, the effect of pH, ionic strength (CaCl2 and NaCl concentrations), and metal concentration on Cu and Zn adsorption onto poorly humified *Sphagnum* and *Carex* peat was investigated in batch experiments using a fractional factorial experimental design. The pH value was varied between 4 and 8, the CaCl2 and NaCl concentrations between 1.2–6.2 and 0.4–43 mM, respectively, and the Cu and Zn concentrations between 0.05 and 0.5 mM. The amount of Zn adsorbed increased more with increasing pH than the amount of Cu adsorbed. The effect of NaCl/CaCl2 concentration was minor. It was found that Zn adsorption in particular, but also Cu adsorption, increased more with pH onto *Carex* peat than onto *Sphagnum* peat. In the pH interval 4–8, the removal of Zn from the solution increased from 0% to 80% using *Carex* peat and from 10% to 65% using *Sphagnum* peat as the adsorbent. The *Carex* peat sample decreased the Cu concentration by 80% at pH 4 and by 95% at pH 8 and for *Sphagnum* peat a decrease of 85% was maintained in the pH range investigated. The differences between *Sphagnum* and *Carex* peat were attributed to the habitat conditions at the time of peat formation. *Carex* peat has higher ash, nitrogen and sulphur concentrations, while *Sphagnum* peat contains a higher amount of uronic acid.

In treating polluted waters with peat, a higher degree of metal removal can be expected at high pH values than at low. The removal of Cu, which has a high affinity to the peat surface, was less dependent on pH than Zn removal. Poorly humified *Carex* peat should be chosen in treating wastewaters high in pH. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Sphagnum Peat, Carex Peat, Heavy Metal, Adsorption, Zinc, Copper, pH, Ionic Strength

Notes: highly cited

Mohan, D. and Singh, K.P. (2002), Single- and multi-component adsorption of cadmium and zinc using activated carbon derived from bagasse: An agricultural waste. *Water Research*, **36** (9), 2304-2318.

Full Text: [W\Wat Res36, 2304.pdf](W/Wat%20Res36,%202304.pdf)

Abstract: The use of low-cost activated carbon derived from bagasse, an agricultural waste material, has been investigated as a replacement for the current expensive methods of removing heavy metals from wastewater, With a view to find a suitable application of the material, activated carbon has been derived, characterized and utilized for the removal of cadmium and zinc. The uptake of cadmium was found to be slightly greater than that of zinc and the sorption capacity increases with increase in temperature. The adsorption studies were carried out both in single- and multi-component systems. Adsorption data on derived carbon follows both the Freundlich and Langinuir models. The data are better fitted by the Freundlich isotherm as compared to Langmuir in both the single- and multi-component systems. Isotherms have been used to obtain the thermodynamic parameters. 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 temperature, initial adsorbate concentration, particle size of the adsorbent and solid-to-liquid ratio. On the basis of these studies, various parameters such as mass transfer coefficient, effective diffusion coefficient, activation energy and entropy of activation were evaluated to establish the mechanisms. It was concluded that the adsorption occurs through a film diffusion mechanism at low as well as at higher concentrations. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorbent, Adsorption, Aqueous-Solutions, Bagasse, By-Products, Cadmium, Cadmium and Zinc Removal, Freundlich Isotherm, Heavy Metals, Heavy-Metals, Isotherm, Langmuir, Metal-Ions, Metals, Peat, Pine Bark, Removal, Solid Waste Utilization, Sorption, Waste, Wastewater Treatment, Water Treatment, Zinc

Ringqvist, L., Holmgren, A. and Öborn, I. (2002), Poorly humified peat as an adsorbent for metals in wastewater. *Water Research*, **36** (9), 2394-2404.

Full Text: [W\Wat Res36, 2394.pdf](W/Wat%20Res36,%202394.pdf)

Abstract: Metal adsorption and surface charge determinations were performed previously on well-characterised *Sphagnum* and *Carex* peat samples. The aim of this investigation was to determine metal adsorption from complex wastewaters onto these peat samples and compare it to the adsorption onto peat granules, clinoptilolite, glauconite and a flue dust from steel production. A sulphide mine leachate, a landfill leachate and a laundry wastewater were chosen, giving a variation in pH, ionic strength, total organic carbon and concentrations of metals. Metal adsorption was determined in batch and column experiments. The wastewater composition was of great importance for metal removal efficiency, mainly due to the difference in dominating metal species. In the sulphide mine leachate, containing free metal ions, a high metal adsorption was observed onto both peat and inorganic adsorbents. In the landfill leachate the metals formed carbonate and organic complexes and a low metal removal was achieved. Contrary to the leachates, the laundry wastewater contained suspended particles. The high amount of metals removed, 80% of the Cu and 30–60% of the Zn concentration, was probably withdrawn bound to the particle fraction. The highest removal of metal ions was obtained in the sulphide mine leachate with *Carex* peat, removing 97–99% of the Zn and 85–100% of the Cu content. The *Sphagnum* peat sample removed 37–77% of the Zn and 80–100% of the Cu content. The differences found between *Sphagnum* and *Carex* peat were attributed to the original chemistry of the plant material and the habitat conditions at the time of peat formation. Generally, the combination of glauconite or clinoptilolite with the peat samples in column experiments gave a minor improvement in metal removal. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Sphagnum Peat, Carex Peat, Wastewater, Heavy Metals, Adsorption

Notes: highly cited

Benguella, B. and Benaissa, H. (2002), Cadmium removal from aqueous solutions by chitin: Kinetic and equilibrium studies. *Water Research*, **36** (10), 2463-2474.

Full Text: [W\Wat Res36, 2463.pdf](W/Wat%20Res36,%202463.pdf)

Abstract: A fundamental investigation on the removal of cadmium ions from aqueous solutions by chitin was conducted in batch conditions. Kinetic data and equilibrium removal isotherms were measured. The influence of different experimental parameters such as time contact, initial concentration of cadmium, chitin mass, particles size, agitation speed, temperature and the nature of cadmium salt, on the kinetics of cadmium removal was studied. The main parameters that play an important part in removal phenomenon were initial cadmium concentration, particle size and chitin mass. Other parameters such as agitation speed, temperature and the nature of cadmium salt, showed a restricted effect on the removal kinetics. The process follows a pseudo second-order kinetics. The cadmium uptake of chitin was quantitatively evaluated using sorption isotherms. In order to describe the isotherm mathematically, the experimental data of the removal equilibrium were correlated by either the Langmuir or Freundlich equations. Results indicated that the Langmuir model gave a better fit to the experimental data than the Freundlich equation. Scanning electron microscopy coupled with a X-ray energy dispersed analysis for cadmium-equilibrated chitin, demonstrated that cadmium-containing nodules existed on the surface chitin. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Removal, Kinetic, Equilibrium, Cadmium, Chitin, Wastewater Treatment, *Rhizopus-arrhizus*, Heavy-Metals, *Saccharomyces-Cerevisiae*, Biosorption, Adsorption, Sorption, Uranium, Mechanism, Lead, Accumulation

Gupta, V.K., Jain, C.K., Ali, I., Chandra, S. and Agarwal, S. (2002), Removal of lindane and malathion from wastewater using bagasse fly ash: A sugar industry waste. *Water Research*, **36** (10), 2483-2490.

Full Text: [W\Wat Res36, 2483.pdf](W/Wat%20Res36,%202483.pdf)

Abstract: The bagasse fly ash, obtained from the local sugar industry, has been used as inexpensive and effective adsorbent for the removal of lindane and malathion from wastewater. The optimum contact needed to reach equilibrium was found to be 60 min. Maximum removal takes place at pH 6.0. The removal of the pesticides increases with an increase in adsorbent dose and decreases with adsorbent particle size. The optimum adsorbent dose is 5 g/l of particle size 200-250 pm. Removal of the two pesticides was achieved up to 97-98% under optimum conditions. The material exhibits good adsorption capacity and follows both Langmuir and Freundlich models. Thermodynamic parameters also indicate the feasibility of the process. The adsorption was found to be exothermic in nature. At lower concentrations, adsorption is controlled by film diffusion, while at higher concentrations, it is controlled by particle diffusion mechanisms. The adsorbent is a very useful and economic product for the removal of lindane and malathion. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Removal, Wastewater, Bagasse Fly Ash, Lindane, Malathion, Chromatography Mass-Spectrometry, Gas-Chromatography, Aqueous-Solutions, Red Mud, Water, Pesticides, Cadmium, Copper, Lead, Slag

Notes: highly cited

? Laspidou, C.S. and Rittmann, B.E. (2002), A unified theory for extracellular polymeric substances, soluble microbial products, and active and inert biomass. *Water Research*, **36** (11), 2711-2720.

Full Text: [2002\Wat Res36, 2711.pdf](2002/Wat%20Res36,%202711.pdf)

Abstract: We present a critical review of the relationships among three microbial products: extracellular polymeric substances (EPS), soluble microbial products (SMP), and inert biomass. Up to now, two different “schools” of researchers have treated these products separately. The “EPS school” has considered active biomass and EPS, while the “SMP school” has considered active biomass, SMP, and inert biomass. Here, we provide a critical review of each of the microbial products. Then, we develop a unified theory that couples them and reconciles apparent contradictions. In our unified theory, cells use electrons from the electron-donor substrate to build active biomass, and they also produce bound EPS and utilization-associated products (UAP) at the same time and in proportion to substrate utilization. Bound EPS are hydrolyzed to biomass-associated products (BAP), while active biomass undergoes endogenous decay to form residual dead cells. Finally, UAP and BAP, being biodegradable, are utilized by active biomass as recycled electron-donors substrates. Our unified theory shows that the apparently distinct products from the SNIP and EPS schools overlap each other. Soluble EPS is actually SMP, or the sum of UAP and BAR Furthermore, active biomass, as defined by the SNIP school, includes bound EPS, while inert biomass includes bound EPS and the residual dead cells. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Biofilm, Extracellular Polymeric Substances (EPS), Hydrolysis, Inert Biomass, Soluble Microbial Products (SMP), Pseudomonas-Aeruginosa, Exopolysaccharide Production, Continuous-Culture, Biofilms, Kinetics, Sludge, Model, Polysaccharides, Nitrification, Biosynthesis

Inglezakis, V.J. Loizidou, M.D. and Grigoropoulou, H.P. (2002), Equilibrium and kinetic ion exchange studies of Pb2+, Cr3+, Fe3+ and Cu2+ on natural clinoptilolite. *Water Research*, **36** (11), 2784-2792.

Full Text: [W\Wat Res36, 2784.pdf](W/Wat%20Res36,%202784.pdf)

Abstract: In the present study ion exchange of Pb2+, Cu2+, Fe3+ and Cr3+ on natural clinoptilolite is examined at 27±1°C and initial concentration of 10 meq/dm3. Equilibrium is favorable for Pb2+, unfavorable for Cu2+ and sigmoid for Cr3+ and Fe3+. Selectivity series deduced from equilibrium isotherms is Pb2+ > Cr3+ > Fe3+ > Cu2+, while when maximum exchange levels (MELs) are considered, selectivity series is Pb2+ > Cr3+ ≅ Cu2+ ≥ Fe3+. Cu2+ manifests the higher value of diffusion coefficient in the clinoptilolite particles among the metals studied, equal to 1.40×10-9 cm2/s. According to the fixed bed experiments the upflow rate (5–15 Bed Volumes (BV)) is influencing the breakthrough point for all metals studied. The breakthrough point varies between 12.3 BV for Pb2+ and 1.18 for Cu2+. Flow rate is also influencing the operating capacity, giving values between 0.433 meq/gclinoptilolite for Pb2+ and 0.053 for Fe3+. Breakthrough point values confirm the selectivity order deduced from the equilibrium isotherms, while operating capacity values confirm the selectivity order deduced from MEL experiments.

Keywords: Clinoptilolite, Heavy Metals, Ion Exchange, Fixed Beds

Robinson, T., Chandran, B. and Nigam, P. (2002), Removal of dyes from a synthetic textile dye effluent by biosorption on apple pomace and wheat straw. *Water Research*, **36** (11), 2824-2830.

Full Text: [W\Wat Res36, 2824.pdf](W/Wat%20Res36,%202824.pdf)

Abstract: This paper deals with two low-cost, locally available, renewable biosorbents; apple pomace and wheat straw for textile dye removal. Experiments at total dye concentrations of 10, 20, 30, 40, 50, 100, 150, and 200 mg/l were carried out with a synthetic effluent consisting of an equal mixture of five textile dyes. The effect of initial dye concentration, biosorbent particle size, quantity of biosorbent, effective adsorbance, dye removal and the applicability of the Langmuir and Freundlich isotherms were examined. One gram apple pomace was found to be a better biosorbent, removing 81% of dyes from the synthetic effluent at a particle size of 2mm×4mm and 91% at 600 μm. Adsorption of dyes by apple pomace occurred at a faster rate in comparison to wheat straw. Both the isotherms were found to be applicable in the case of dye adsorption using apple pomace.

Keywords: Adsorption, Apple Pomace, Dye Removal, Textile Dyes, Wheat Straw

Chegrouche, S. and Bensmaili, A. (2002), Removal of Ga(III) from aqueous solution by adsorption on activated bentonite using a factorial design. *Water Research*, **36** (11), 2898-2904.

Full Text: [W\Wat Res36, 2898.pdf](W/Wat%20Res36,%202898.pdf)

Abstract: The purpose of the work is to study the adsorption of gallium(III) on bentonite from aqueous solutions. The important parameters, which affect the adsorption, such as pH of solution, mass of bentonite and temperature have been investigated. The results of parameters study showed that when pH and mass of bentonite increase there was a significant increase of Ga(III) at 20°C and the optimum conditions were as follows: pH of solution (2.50), mass of bentonite (3.50 g) and temperature (20°C). An experimental test carried out using a factorial design 23 indicated that pH and mass of bentonite have a positive effect, whereas temperature has negative effect. The interaction effect between pH and mass of bentonite was an important significant factor for gallium adsorption.

Keywords: Gallium(III), Bentonite, Adsorption

Pala, A. and Tokat, E. (2002), Color removal from cotton textile industry wastewater in an activated sludge system with various additives. *Water Research*, **36** (11), 2920-2925.

Full Text: [W\Wat Res36, 2920.pdf](W/Wat%20Res36,%202920.pdf)

Abstract: The low biodegradability of many dyes and textile chemicals indicates that biological treatment is not always successful in the treatment of cotton textile wastewater, in terms of color removal. In this study, a specific organic flocculant (Marwichem DEC), powdered activated carbon (PAC), bentonite, activated clay and commercial synthetic inorganic clay (Macrosorb) were directly added into the activated sludge laboratory pilot plant model. Before dosage, the optimum sludge retention time and hydraulic retention time were determined as 30days and 1.6days, respectively. The Monod kinetic constants were determined as *Y=0.76* kg MLSS/kg COD, *K*d*=0.026* 1/day, *K*s*=113.3* mg/L, *k=0.42* 1/day and *μ*max*=0.32* kg MLSS/kg CODday. Under these conditions the average COD removal was 94% and color removal was 36%. The addition of these materials did not change COD removal significantly. The most effective materials were found to be DEC and PAC for color removal. While the color removal efficiency for 120 mg/L DEC addition was 78%, it was 65% for 100 mg/L, 77% for 200 mg/L and 86% for 400 mg/L PAC addition.

The advantage of DEC compared to PAC was the lower sludge production. Statistical analyses using multiple linear regression indicate that there is no relationship between the effluent color with the influent color and total suspended solids (TSS) for DEC and PAC addition. On the other hand, when only bentonite, activated clay and Macrosorb were added, the effluent color was primarily dependent on the influent color and the TSS concentration had little effect. When the data is examined by using Kruskal–Wallis H and Mann–Whitney U tests and it was found that there was a significant difference between the color data groups.

Keywords: Activated Sludge, Textile Industry Wastewater, Color Removal, Adsorbents

Juang, R.S. and Shao, H.J. (2002), A simplified equilibrium model for sorption of heavy metal ions from aqueous solutions on chitosan. *Water Research*, **36** (12), 2999-3008.

Full Text: [W\Wat Res36, 2999.pdf](W/Wat%20Res36,%202999.pdf)

Abstract: The amounts of sorption of Cu2+, Ni2+, and Zn2+ from water on cross-linked chitosan were measured. Experiments were performed as a function of initial pH (2–5), total metal concentration (0.77–17 mol/m3), and metal concentration ratio (0.25–4) at 25 °C in single- and binary-metal systems. The sorption was so highly pH dependent that the isotherm could not be described by one specific equation. A simplified equilibrium model was thus proposed considering competitive sorption of proton and metal ions. The number of active sites on chitosan bound with one metal ion was adjustable and model parameters could be graphically determined. Given initial metal concentrations and solution pH, the proposed model could predict the amounts of sorption of proton and metals as well as the equilibrium pH. In general, application of the model parameters calculated in single-metal systems to the prediction of sorption in binary-metal systems was not satisfactory due to a remarkable effect of competitive sorption. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Chitosan, Binary Metals, Sorption, Equilibrium, Simplified Model

Aksu, Z., Açikel, U., Kabasakal, E. and Tezer, S. (2002), Equilibrium modelling of individual and simultaneous biosorption of chromium(VI) and nickel(II) onto dried activated sludge. *Water Research*, **36** (12), 3063-3073.

Full Text: [W\Wat Res36, 3063.pdf](W/Wat%20Res36,%203063.pdf)

Abstract: The biosorption of chromium(VI) and nickel(II) ions, both singly and in combination, by dried activated sludge was investigated in a batch system as a function of initial pH and single- and dual-metal ion concentrations. The working initial pH values for single chromium(VI) and nickel(II) biosorptions were determined as 1.0 and 4.5, respectively. It was observed that the co-ion effect on the equilibrium uptake became more pronounced as the co-ion concentration in solution increased and pH level increased for chromium(VI) and decreased for nickel(II). Adsorption isotherms were developed for both the single- and dual-metal ion systems at these two pH values and expressed by the mono- and multi-component Langmuir and Freundlich adsorption models and model parameters were estimated by the non-linear regression. It was seen that the mono-component adsorption equilibrium data fitted very well to both the monocomponent adsorption models for both the components and the pH values studied while the multi-component Freundlich adsorption model adequately predicted the multi-component adsorption equilibrium data at moderate ranges of initial mixture concentrations for both the studied pH values. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Simultaneous Biosorption, Chromium(VI), Nickel(II), Dried Activated Sludge, Mono- and Multi-Component Adsorption Models, Multicomponent Adsorption-Isotherms, *Chlorella-Vulgaris*, Aqueous-Solution, Heavy-Metals, *Saccharomyces-Cerevisiae*, Removal, Cations, Ions, Iron(III), Biomass

? Feleke, Z. and Sakakibara, Y. (2002), A bio-electrochemical reactor coupled with adsorber for the removal of nitrate and inhibitory pesticide. *Water Research*, **36** (12), 3092-3102.

Full Text: [2002\Wat Res36, 3092.pdf](2002/Wat%20Res36,%203092.pdf)

Abstract: In this study, the treatment characteristics of nitrate and toxic pesticide by a combined bioelectrochemical reactor (BER)/adsorption process was investigated. Experimental results showed that the disappearance of NO3- in BER was in accordance with the applied current. NO2- was not detected in the effluent, but the production of NO was increased with increasing IPT loading. In the presence of IPT, up to 30% of the nitrate nitrogen consumed was converted to N2O, while more than 95% converted to N-2 in the absence of IPT. In adsorption column, IPT was efficiently removed onto either granular activated carbon or silicone resin so as to meet the guideline value (40 mug/l) and to reduce the N2O accumulation. A simplified kinetic model that considers the sequential reduction of nitrate and inhibition of the N2O reduction step by pesticide as well as Langmuir adsorption isotherm was developed and used to evaluate the process performance. Theoretically predicted effluent concentrations were in good agreement with the observed results for nitrate, nitrite, N2O, N-2 and IPT. It was considered that high removal performance of nitrate and pesticide by the combined process is attributable to high affinity of adsorbates for IPT in comparison with relatively large inhibition constant (K-i). (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption Isotherm, Ber, Biofilm Reactor, Column, Combined Process, Contaminated Groundwater, Denitrification, Drinking Water, Drinking-Water, Inhibition, Isotherm, Kinetic, Model, Nitrate, Nitrogen, Pesticide, Removal, Science, Treatment

Evans, J.R., Davids, W.G., MacRae, J.D. and Amirbahman, A. (2002), Kinetics of cadmium uptake by chitosan-based crab shells. *Water Research*, **36** (13), 3219-3226.

Full Text: [W\Wat Res36, 3219.pdf](W/Wat%20Res36,%203219.pdf)

Abstract: Crushed crab shells were chemically treated to transform the chitin present into chitosan. Three particle sizes with average diameters of 0.65, 1.43 and 3.38 mm, average pore diameters ranging from ≈300 to 540 Å, and a specific surface area of ≈30 m2/g were obtained. Batch experiments were performed to study the uptake equilibrium and kinetics of cadmium by chitosan. Adsorption equilibrium followed a Freundlich relationship and was found to be independent of particle size indicating that adsorption takes place largely in the pore space. A high initial rate of cadmium uptake was followed by a slower uptake rate suggesting intraparticle diffusion as the rate-limiting step. The kinetic uptake data were successfully modeled using a pore diffusion model incorporating nonlinear adsorption. The effect of boundary layer resistance was modeled through inclusion of a mass transfer expression at the outside boundary. Two fitting parameters, the tortuosity factor (τ) and the mass transfer coefficient at the outside boundary (*k*c) were used. These parameters were unique for all solute and sorbent concentrations. The tortuosity factors varied from 1.5 for large particles to 5.1 for small particles. The mass transfer coefficient varied from 2×10-7 m/s at 50 rpm to 2×10-3 m/s at 200 rpm. At agitation rates below 100 rpm, boundary layer resistance reduced the uptake rate significantly. Its very high sorption capacity and relatively low production cost make chitosan an attractive sorbent for the removal of heavy metals from waste streams.

Keywords: Chitosan, Cd Removal, Heavy Metals, Sorption, Mass Transfer, Intraparticle Diffusion

Dambies, L., Vincent, T. and Guibal, E. (2002), Treatment of arsenic-containing solutions using chitosan derivatives: Uptake mechanism and sorption performances. *Water Research*, **36** (15), 3699-3710.

Full Text: [W\Wat Res36, 3699.pdf](W/Wat%20Res36,%203699.pdf)

Abstract: Modified chitosan gel beads, which had been prepared by the molybdate adsorption and coagulation (in the presence of molybdate) methods, were tested for As(III) and As(V) removal from dilute solutions (in the range 5-20 mg As L-1). The sorbent is very efficient at removing As(V) from acid solutions (optimum pH close to pH 2-3), whereas the sorption capacities are significantly lower for As(III) uptake (230 mg As(V) g-1 Mo, 70 mg As(III) g-1 Mo, respectively). Since the sorption proceeds in acidic solutions with a partial release of molybdate and with residual concentrations (ca. 500 μg As L-1) above the regulations for drinking water, the process appears to be directed to the treatment of industrial effluents or as a pre-concentration process. The mechanism of As(V) sorption is related to the ability of molybdate ions to complex As(V) ions in acid solutions. The uptake mechanism was confirmed by XPS analysis and desorption studies. In the case of As(III) sorption the mechanism of uptake is not identified since no complex has been cited in the literature regarding As(III) binding to Mo(VI), which was also identified by XPS analysis as the sorption site. As(V) sorption is not influenced by the presence of co-ions, with the exception of phosphate anions at low concentration, and silicate at high relative concentration. Arsenic desorption can be performed using phosphoric acid solutions. (C) 2002 Published by Elsevier Science Ltd.

Keywords: Chitosan Gel Beads, Molybdate, Arsenic(III), Arsenic(V), Sorption, Isotherms, Kinetics, X-Ray Photoelectron Spectroscopy, Hydrous Zirconium-Oxide, Activated Carbon, Aqueous-Solution, Ferric-Chloride, Ion-Exchange, Adsorption Characteristics, Alginate Gels, Removal, Groundwater, Bangladesh

? Sabah, E., Turan, M. and Çelik, M.S. (2002), Adsorption mechanism of cationic surfactants onto acid- and heat-activated sepiolites. *Water Research*, **36** (16), 3957-3964.

Full Text: [2002\Wat Res36, 3957.pdf](2002/Wat%20Res36,%203957.pdf)

Abstract: Systematic adsorption tests were carried out to determine the uptake of typical quaternary amines, dodecyltrimethylammonium bromide and hexadecyltrimethylammonium bromide and a primary amine, dodecylamine hydrochloride by sepiolite. Bottle adsorption tests conducted with untreated, acid- and heat-activated sepiolites exhibit two distinct regions. The first stage is characterized by low rate and governed through an ion exchange process between ammonium ions and magnesium ions in the octahedral sheet. The second stage is ascribed to a combination of chain–chain interactions through Van der Waals forces and ion exchange process. Despite several-fold increases in surface areas upon activation, surprisingly no improvement in adsorption is observed. The observed differences are explained on the basis of partial collapse of the sepiolite crystal structure, the removal of zeolitic and bound waters and modification of the pore size distribution of sepiolite upon treatments.

Keywords: Adsorption, Clay Minerals, Sepiolite, Cationic Surfactants, Amines, Waste Water Treatment

Dimitrova, S.V. (2002), Use of granular slag columns for lead removal. *Water Research*, **36** (16), 4001-4008.

Full Text: [W\Wat Res36, 4001.pdf](W/Wat%20Res36,%204001.pdf)

Abstract: The use of granular blast furnace slag (GBFS)-packed columns to treat lead-containing solutions has been investigated. The results obtained indicated that the slag usage rate decreased with increasing flow velocity, particle size, initial lead concentration and decreasing with bed height. Lead removed selectively in the presence of other heavy metal ions. High concentrations of sodium and especially calcium in the solutions impeded the uptake of lead. For 20 mg l−1 lead concentration an empty bed contact time greater of 4 min provided to efficient use of the slag bed. Column pH was an important parameter to lead removal under dynamic conditions and reflected the influence of the investigated factors. During all runs lead breakthrough coincided with an abrupt drop in effluent pH. The apparent mechanisms of lead removal in GBFS column are sorption (ion exchange and adsorption) on the slag surface and precipitation.

Keywords: Granular Slag, Lead, Fixed-Bed, Metal Ions, Removal, Sorption

? Singer, P.C. and Bilyk, K. (2002), Enhanced coagulation using a magnetic ion exchange resin. *Water Research*, **36** (16), 4009-4022.

Full Text: [2002\Wat Res36, 4009.pdf](2002/Wat%20Res36,%204009.pdf)

Abstract: The objective of this investigation was to examine the effectiveness of a magnetic ion exchange resin (MIEX(R)) to enhance the coagulation of disinfection by-product precursors in nine surface waters, each representing a different element of the USEPA's 3 x 3 enhanced coagulation matrix. The effect of MIEX-pretreatment on the requisite alum dose needed for subsequent coagulation of turbidity was also evaluated.

Enhanced coagulation with MIEX was found to be very effective for removing trihalomethane (THM) and haloacetic acid (HAA) precursors from the nine waters examined. THM and HAA formation potential was reduced by more than 60% in all of the waters studied; reductions approaching 90% were seen in the waters with the highest specific ultraviolet absorbance values. The residual total organic carbon concentration, ultraviolet absorbance, and THM and HAA formation potential were all substantially lower as a result of MIEX and alum treatment compared to alum coagulation alone. MIEX pre-treatment also lowered the coagulant demand of each of the waters substantially. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Ion Exchange, Disinfection By-Products, Trihalomethanes, Haloacetic Acids, Total Organic Carbon, Coagulation, Coagulant Demand, Drinking-Water, Chlorination, Precursors, Removal, Products, Organics, Alum

Pagnanelli, F., Esposito, A. and Vegliò, F. (2002), Multi-metallic modelling for biosorption of binary systems. *Water Research*, **36** (16), 4095-4105.

Full Text: [W\Wat Res36, 4095.pdf](W/Wat%20Res36,%204095.pdf)

Abstract: In this paper a specially propagated biomass of Sphaerotilus natans was tested as adsorbent for binary solutions of Cu-Cd. Cu-Pb and Cu-Zn at different equilibrium pH. The experimental results outline the buffering effect of H+ at low pH. which masks the competition among metals. In each binary system the biomass affinity follows the acidic properties of the heavy metals probably due to an ionic exchange mechanism operating among active sites and metals in solution. The experimental results ere fitted according to an empirical approach with growing complexity that outlines the inadequacy of the predictive models and the non-ideal interactions among metals. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption, Heavy Metal, Modelling, Multi-Metal Systems, Environment, Positive Soil Bacterium, Isolated Cell-Walls, Competitive Adsorption, Heavy-Metals, Multicomponent Adsorption, Sphaerotilus Natans, Chlorella-Vulgaris, Ion-Exchange, Binding, Cadmium

Gyliene, O., Rekertas, R. and Šalkauskas, M. (2002), Removal of free and complexed heavy-metal ions by sorbents produced from fly (*Musca domestica*) larva shells. *Water Research*, **36** (16), 4128-4136.

Full Text: [W\Wat Res36, 4128.pdf](W/Wat%20Res36,%204128.pdf)

Abstract: Fly larva shells (FLS) are formed as a side product in the biological treatment of organic wastes, and chitin and chitosan produced from the FLS have been used as sorbents for heavy-metal ions. Sorbents are characterised by FT-IR measurements and pH-potentiometric titration and by determination of their surface area, and the content of main elements (C, N, P, S) and ashes. Free metal ions are sorbed best (up to 0.5-0.8 mmol g-1) onto chitin and chitosan. The sorption ability for free metal ions of chitin decreases in the order Fe(III) > Cu(II) (Pb(II) > Zn(II). > Ni(II) > Mn(II) and that of chitosan decreases in the order Cu(II) > Mn(II) > Ni(II) > Zn(II) > Pb(II) > Fe(III). The complexed metal ions are sorbed by the FLS up to 0.2-0.4 mmol g‾1. The sorption ability for metal ions and ligands depends on pH, concentration of complexed metal ions and the ligand species in the solution. Glycine has the retarding effect on the sorption of Ni(II) and Cu(II) ions, and EDTA enhances the Cu(II) ion sorption. Ni(II) and glycine sorption obeyed the Langmuir isotherm. The observed sorption data show the promising potentialities of the FLS for the heavy-metal removal from the solutions, containing strong complexing agents. Mechanisms for the removal of free and complexed metal ions by chitin, chitosan and the FLS have been discussed. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Fly Larva Shells (FLS), Chitin, Chitosan, Sorption, Heavy Metals, Nickel Ions, Copper Ions, Glycine, EDTA

? Karcher, S., Kornmuller, A. and Jekel, M. (2002), Anion exchange resins for removal of reactive dyes from textile wastewaters. *Water Research*, **36** (19), 4717-4724.

Full Text: [2002\Wat Res36, 4717.pdf](2002/Wat%20Res36,%204717.pdf)

Abstract: Sorption onto an easily regenerable sorbent in fixed bed filters would be an interesting option for removal of reactive dyes from textile wastewaters. A previous screening with model solutions (Dyes Pigm 51 (2001)111) had shown two anion exchangers (strong basic S6328a and weak basic MP62, both Bayer) to exhibit good sorption characteristics for reactive dyes. The aim of this study was to evaluate these materials more closely. Thus filter breakthrough, the behavior with original wastewater samples, and the effect of inorganic wastewater parameters as well as regeneration were studied. Breakthrough curves for both materials are relatively unfavorable with a flat gradient, but throughput until breakthrough (100-800 bed volumes) should be sufficient for technical use. With both resins dye uptake is influenced little by competition of inorganic anions (sulfate, carbonate, phosphate) and they perform well in original wastewaters. However, the weak basic type is only efficient up to pH 8. Alkaline regeneration works well for MP62, for S6328a acid regeneration works for most dyes. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Anion Exchange Resins, Reactive Dyes, Sorption, Textile Wastewater, Husk

Bosso, S.T. and Enzweiler, J. (2002), Evaluation of heavy metal removal from aqueous solution onto scolecite. *Water Research*, **36** (19), 4795-4800.

Full Text: [W\Wat Res36, 4795.pdf](W/Wat%20Res36,%204795.pdf)

Abstract: Scolecite is a zeolite associated to basalts of the Parana Continental Igneous Province (PCIP, South America). The potential of scolecite as a new material for heavy metal removal (Pb2+, Cu2+, Zn2+, Ni2+, Co2+ and Cd2+) from aqueous solutions is evaluated. The experiments were carried out by immersion of 0.5 g of sample in solutions containing the metal ions, and kept under constant agitation for 24 h, at ambient temperature. The meq of cations retained per mass of scolecite was evaluated as a function of: initial concentration (5–60 mg L−1), pH (4–6), liquid/solid ratio (200, 1000 and 2000) and particle size. The results indicated a great affinity of scolecite for Cu2+ with a retention value of 130 μeq g−1 at pH 6, Ci = 30 mg L−1 and liquid/solid ratio of 200. In the same conditions, the maximum retention measured for the other ions were 64 μeq g−1 (Zn2+), 56 μeq g−1 (Pb2+), 31 μeq g−1 (Ni2+), 7.8 μeq g−1 (Co2+) and 3.2 μeq g−1 (Cd2+). These values increase substantially when the L/S ratio is increased. The affinity of copper and lead for scolecite is discussed based on their free ionic forms (i.e., their hydrated bivalent ions) and their hydrolysis products. The remaining ions are retained as free ions. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Cation Exchange, Heavy Metal, Natural Zeolite, Scolecite

? Prosnansky, M., Sakakibara, Y. and Kuroda, M. (2002), High-rate denitrification and SS rejection by biofilm-electrode reactor (BER) combined with microfiltration. *Water Research*, **36** (19), 4801-4810.

Full Text: [2002\Wat Res36, 4801.pdf](2002/Wat%20Res36,%204801.pdf)

Abstract: In this study, a multi-cathode biofilm-electrode reactor (BER) combined with microfiltration (MF) was investigated using a laboratory-scale experimental apparatus for treatment of nitrate-contaminated water. The multi-cathode electrodes were composed of multiple-granular activated carbons (GACs). GACs attached to each cathode to enlarge surface area of electrodes and to attach bacteria quickly and firmly. In BER, H-2 gas is produced by applying electric current, which serves as an electron donor in biological reduction of nitrate to N-2 gas. Since some suspended solids were escaping from BER, MF membrane with plate modules and a pore size of 0.2 mum was placed after BER. Experimental results demonstrated that it was possible to operate the multi-cathode BER with high denitrification rates and hydraulic retention time (HRT) as low as HRT = 20 min. The denitrification rate was enhanced by 3-60 times in comparison with former studies. MF membrane successfully rejected the bacteria escaping from BER, so that the effluent concentration of SS was kept below 1 mg SS/l throughout the experiment. It was also possible to operate MF membrane at flux 2-9 times higher and pressure 2.5-31 times smaller than in former studies. This higher performance was mainly brought about by using biofilm and H-2 gas as an electron donor. Also, an economic evaluation of BER/MF was included, showing the feasibility of this process. The present BER/MF process is considered advantageous for the enhanced treatment of nitrate-polluted groundwater. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Denitrification, Microfiltration, Multi-Electrode System, BER, Groundwater, Electrolysis, Nitrate-Contaminated Groundwater, Membrane Separation, Performance, System

Kozlowski, C.A. and Walkowiak, W. (2002), Removal of chromium(VI) from aqueous solutions by polymer inclusion membranes. *Water Research*, **36** (19), 4870-4876.

Full Text: [W\Wat Res36, 4870.pdf](W/Wat%20Res36,%204870.pdf)

Abstract: The transport through polymer inclusion membranes (PIMs) was found as the effective and selective method of chromium(VI) anions removal from chloride acidic aqueous solutions. The optimal PIMs content was as follows: 41wt% of cellulose triacetate as the support, 23wt% of tri-*n*-octylamine as the ionic carrier, and 36wt% of *o*-nitrophenyl pentyl ether as the plasticizer. The results obtained show a linear decrease of permeability coefficient and initial flux values with source phase pH increase. Also linear decrease of initial flux in log–log scale with chromium(VI) concentration increase was observed. Value of slope of this relationship was found to be 0.96 which indicates a first order of chromium(VI) reaction with tri-*n*-octylamine at membrane/aqueous source interface. Transport of chromium(VI) through PIMs reduces the concentration of chromium(VI) in source aqueous phase from 1.0 to 0.0028 ppm, which is below permissible limit in drinking water in Poland. Competitive transport of chromium(VI), cadmium(II), zinc(II), and iron(III) from acidic aqueous solution across PIMs was found to be efficient for chromium(VI) (99%), and cadmium(II) (99%). (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Chromium(VI), Tri-*n*-Octylamine, Polymer Inclusion Membrane, Waste Water Treatment

Lai, C.H., Chen, C.Y., Wei, B.L. and Yeh, S.H. (2002), Cadmium adsorption on goethite-coated sand in the presence of humic acid. *Water Research*, **36** (20), 4943-4950.

Full Text: [W\Wat Res36, 4943.pdf](W/Wat%20Res36,%204943.pdf)

Abstract: Heat was employed to coat crystalline goethite onto a quartz sand surface so that the adsorbent properties of the coating could be utilized. The adsorption characteristics of cadmium and humic acid onto goethite-coated sand were examined. Results show that the goethite-coated sand surface had a higher specific surface area and more mesopores than the uncoated sand. The adsorption of both cadmium and humic acid was highly pH-dependent: cadmium adsorption increased with pH, but humic acid adsorption decreased as pH increased. The presence of humic acid resulted in increasing cadmium adsorption in a specific pH range. The order of reacting humic acid with cadmium was found to have a noticeable effect on the final adsorption capacity. The adsorption capacity of cadmium for humic acid that is adsorbed onto goethite-coated sand before reacting with a cadmium system, exceeds that of humic acid that is mixed with cadmium ions before goethite-coated sand is added.

Keywords: Adsorption, Cadmium, Coating, EDAX, Goethite, Humic Acid

Nishi, Y., Iwashita, N., Sawada, Y. and Inagaki, M. (2002), Sorption kinetics of heavy oil into porous carbons. *Water Research*, **36** (20), 5029-5036.

Full Text: [W\Wat Res36, 5029.pdf](W/Wat%20Res36,%205029.pdf)

Abstract: Sorption kinetics of heavy oil into porous carbons was evaluated by a concept of liquid sorption coefficient obtained from the weight increase of heavy oil with sorption time, which was measured by a wicking test. Exfoliated graphite, carbonized fir fibers and carbon fiber felts were used as porous materials. It was found that the liquid sorption coefficient of fibrous carbons was twice larger than that of exfoliated graphite. Such a difference in the liquid sorption coefficient between the exfoliated graphite and two fibrous carbons was caused by a difference in effective sorption porosity and tortuosity between them. For the exfoliated graphite and carbonized fir fibers, the liquid sorption coefficient and the effective sorption porosity were strongly dependent on their density. The maximum values of both liquid sorption coefficient and effective sorption porosity of the exfoliated graphite were shown at the bulk density around 16 kg/m3. The liquid sorption coefficient of the carbonized fir fibers increased with increasing the density in the range from 6 to 30 kg/m3. When the carbonized fir fibers were densified above 30 kg/m3, the sorption rate was saturated. On the other hand, the sorption kinetics into the carbon fiber felt was almost independent of the bulk density, because the density of the carbon fiber felt is not effective for the pore structure. The effect of bulk density on the sorption kinetics could be supported from an analysis of pore structure of the porous carbons with different densities, which was measured by mercury porosimeter.

Keywords: Sorption Kinetics, Heavy Oil Recovery, Porous Carbon, Wicking Test, Liquid Sorption Coefficient, Effective Sorption Porosity

Katsoyiannis, I.A. and Zouboulis, A.I. (2002), Removal of arsenic from contaminated water sources by sorption onto iron-oxide-coated polymeric materials. *Water Research*, **36** (20), 5141-5155.

Full Text: [W\Wat Res36, 5141.pdf](W/Wat%20Res36,%205141.pdf)

Abstract: The modification of polymeric materials (polystyrene and polyHIPE) by coating their surface with appropriate adsorbing agents (i.e. iron hydroxides) was investigated in the present work, in order to apply the modified media in the removal of inorganic arsenic anions from contaminated water sources. The method, termed adsorptive filtration, has been classified as an emerging technology in water treatment processes as it presents several advantages towards conventional technologies: the production of high amounts of toxic sludge can be avoided and it is considered as economically more efficient; whereas it has not yet been applied in full-scale treatment plants for low-level arsenic removal. The present experiments showed that both modified media were capable in removing arsenic from the aqueous stream, leading to residual concentration of this toxic metalloid element below 10 μg/L, which is the new maximum concentration limit set recently by the European Commission and imposed by the USEPA. Though, among the examined materials, polyHIPE was found to be more effective in the removal of arsenic, as far as it concerns the maximum sorptive capacity before the filtration bed reaches the respective breakthrough point. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Drinking Water, Iron Oxides, Polymeric Materials, Upflow Filtration, Drinking-Water, Adsorption, Coagulation, Filtration, Sand, Mechanism, Goethite, Metals, As(V)

DeMarco, M.J., Sengupta, A.K. and Greenleaf, J.E. (2003), Arsenic removal using a polymeric/inorganic hybrid sorbent. *Water Research*, **37** (1), 164-176.

Full Text: [W\Wat Res37, 164.pdf](W/Wat%20Res37,%20164.pdf)

Abstract: A fixed-bed sorption process can be very effective in removing trace concentrations of arsenic from contaminated groundwater provided: the sorbent is very selective toward both As(III) and As(V) species; the influent and treated water do not warrant any additional pre- or post- treatment; pH and composition of the raw water with respect to other electrolytes remain unchanged besides arsenic removal, and the sorbent is durable with excellent attrition resistance properties. In addition, the sorbent should be amenable to efficient regeneration for multiple reuse. This study reports the results of an extensive investigation pertaining to arsenic removal properties of a polymeric/inorganic hybrid sorbent. Each hybrid sorbent particle is essentially a spherical macroporous cation exchanger bead within which agglomerates of nanoscale hydrated Fe oxide (HFO) particles have been uniformly and irreversibly dispersed using a simple chemical-thermal treatment. The new sorbent, referred to as hybrid ion exchanger or HIX, combines excellent mechanical and hydraulic properties of spherical polymeric beads with selective As(III) and As(V) sorption properties of HFO nanoparticles at circum-neutral pH. Comparison of the results of fixed-bed column runs between the new sorbent and the polymeric anion exchanger confirmed that both As(V) and As(III) were removed very selectively with HIX. Equally important, no pH adjustment, pre- or post-treatment was warranted. Besides the absence of arsenic, the treated water composition was identical to that of influent water. HIX was amenable to efficient in situ regeneration with caustic soda and could subsequently be brought into service following a short rinse with carbon dioxide sparged water. During fixed-bed column runs, intraparticle diffusion was identified as the primary rate-limiting step for both As(III) and As(V) sorption. Repeated use of the same HIX particles during various laboratory investigations provided strong evidence that the new sorbent possesses excellent attrition resistance properties and retains its arsenic removal capacity over cycles. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Sorbent, Ion Exchange, Toxic, Drinking Water, Ion-Exchange, Water-Treatment, Intraparticle Diffusion, Ground-Water, Contaminants, Adsorption, Stability, Sorption

Kara, M., Yuzer, H., Sabah, E. and Celik, M.S. (2003), Adsorption of cobalt from aqueous solutions onto sepiolite. *Water Research*, **37** (1), 224-232.

Full Text: [W\Wat Res37, 224.pdf](W/Wat%20Res37,%20224.pdf)

Abstract: Adsorption of Co(II) ions from aqueous sepiolite suspensions has been systematically investigated as a function of several variables including activation conditions, solid to liquid ratio, pH and temperature. The results are analyzed to identify the mechanism of cobalt uptake by sepiolite. Both abstraction and real adsorption isotherms were constructed to isolate the precipitation of cobalt from the real adsorption. Also, for the first time a plausible correlation between the released Mg(II) ions from sepiolite matrix and those adsorbed Co(II) ions is made. A one to one ion exchange mechanism is found to describe the results. The data obtained from adsorption isotherms at different temperatures were fitted to various adsorption models to calculate thermodynamic quantities such as the free energy of adsorption, heat of adsorption and entropy of adsorption. The thermodynamic data indicate that Co(II) adsorption onto sepiolite is entropically driven and characterized by physical adsorption.

Keywords: Adsorption, Clay Minerals, Sepiolite, Cobalt, Wastewater Treatment

Haussard, M., Gaballah, I., Kanari, N., de Donato, Ph., Barrès, O. and Villieras, F. (2003), Separation of hydrocarbons and lipid from water using treated bark. *Water Research*, **37** (2), 362-374.

Full Text: [W\Wat Res37, 362.pdf](W/Wat%20Res37,%20362.pdf)

Abstract: This paper explores the possibility of using treated bark to remove oily compounds from water. Bark was first biologically or chemically treated and saturated with transition metal ions (TMI) to avoid the release of soluble organic compounds from the bark in the treated effluents.

Several experimental parameters affecting the oil removal efficiency (RE) were studied (initial oil concentration, temperature, time. etc.). Saturated bark was characterized using Fourier transform infrared (FTIR) spectroscopy and bark wetting index was determined. Results of the retention of lipids suggested that their removal could exceed 95% of initial oil concentration. The uptake of lipid by treated bark varied from 0.2 to 2.0 g of organic oil/g of dry sorbent. No significant chemical modifications of saturated bark were observed in infrared spectroscope after the sorption of oleic acid on bark treated with transition metal ions. The structure of adsorbed tridimentional layer of oleic acid molecules seemed to take place through the double bond. The hydrocarbon RE exceeded 95% using oil-water mixture with a hydrocarbon/bark ratio of one.

The sorption reaction of hydrocarbons and lipids was quasi-instantaneous and seemed to be influenced by the temperature. This indicated that the retention mechanism was related to the capillary action. Results of FTIR spectroscopy suggested that no chemical bonds between barks and oily compounds were established. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Acid, Adsorption, Adsorption, Bark, Chemical Modifications, Hydrocarbons, Lipids, Metal, Metal Ions, Oily Wastes, Removal, Sorption, Treated Bark

Wang, L., Chua, H., Zhou, Q., Wong, P.K., Sin, S.N., Lo, W.L. and Yu, P.H. (2003), Role of cell surface components on Cu2+ adsorption by *Pseudomonas putida* 5-x isolated from electroplating effluent. *Water Research*, **37** (3), 561-568.

Full Text: [W\Wat Res37, 561.pdf](W/Wat%20Res37,%20561.pdf)

Abstract: A Gram-negative bacterium *Pseudomonas putida* 5-x with high Cu2+ accumulating capability was isolated from electroplating effluent in Kwun Tong, Hong Kong. The pretreated cells without superficial layer-capsule, isolated cell envelopes and the separated peptidoglycan layer materials were obtained from fresh *P. putida* 5-x cells, their Cu2+ adsorption capacities and properties were compared with that of the fresh cells. Pretreatment by 0.1 mol L−1 HCl enhanced Cu2+ adsorption capacity due to the degradation of cell superficial layer-capsule of *P. putida* 5-x cells. Isolated cell envelopes possessed five times more Cu2+ adsorption capacity than that of fresh intact cell. The Cu2+ adsorption of separated peptidoglycan layer materials indicated that the peptidoglycan layer only played 10–15% part of the Cu2+ adsorption capacity, and implied other cell surface components such as outer membrane or inner membrane might play an important role in such high Cu2+ binding of the cell envelopes. The adsorption process of fresh cells, pretreated cells and cell envelopes of *P. putida* 5-x could be described with *Freundlich* isotherm, while the adsorption of Cu2+ by separated peptidoglycan layer materials was better described with *Langmuir* isotherm. (C) 2003 Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption Isotherm, Cell Capsule, Cell Envelopes, Cu2+ Adsorption Capacity, Peptidoglycan Layer (PEG), *Pseudomonas putida*

Pagnanelli, F., Esposito, A., Toro, L. and Vegliò, F. (2003), Metal speciation and pH effect on Pb, Cu, Zn and Cd biosorption onto *Sphaerotilus natans*: Langmuir-type empirical model. *Water Research*, **37** (3), 627-633.

Full Text: [W\Wat Res37, 627.pdf](W/Wat%20Res37,%20627.pdf)

Abstract: Biosorption data of lead, copper, zinc and cadmium onto *Sphaerotilus natans* at different equilibrium pH (3–5 units) were here reported and analysed. Experimental results outlined the positive effect of pH increase on pollutant uptake and also the biomass affinity series (Pb > Cu > Zn > Cd) reflecting the hydrolytic properties of metals. An original empirical model was proposed to represent the effect of pH on heavy metal biosorption inserting *q*max vs. pH empirical functions into the classical Langmuir isotherm.

Keywords: Heavy Metal, Biosorption, Speciation, Modelling, Langmuir

Netpradit, S., Thiravetyan, P. and Towprayoon, S. (2003), Application of ‘waste’ metal hydroxide sludge for adsorption of azo reactive dyes. *Water Research*, **37** (4), 763-772.

Full Text: [W\Wat Res37, 763.pdf](W/Wat%20Res37,%20763.pdf)

Abstract: The capacity and mechanism of metal hydroxide sludge in removing azo reactive dyes from aqueous solution was investigated with different parameters, such as charge amount of dyes, system pH, adsorbent particle size, and adsorbent dosage. The three anionic dyes used were CI Reactive Red 2, CI Reactive Red 120, and CI Reactive Red 141, increasing in number of sulfonic groups, respectively. Only 0.2% (w/v) of powdered sludge (<75 μm) achieved color removal from 30 mg l-1 reactive dye solutions within 5 min without pH adjustment. The larger the charge amount of the dyes, the greater the adsorption (>90%) on the metal hydroxide sludge. The system pH played a significant role in the adsorption on metal hydroxides and formation of dye–metal complexes. The optimum system pH for dye adsorption was 8–9 which was close to the pHzpc of the sludge while the precipitation of dye–metal complexes occurred at system pH 2. The maximum adsorption capacity (*Q*°) of the sludge for the reactive dyes was 48–62 mg dye g-1 adsorbent. The Langmuir and Freundlich models showed that the higher charged dyes had a higher affinity of adsorption. The smaller particle size and the greater amount of adsorbent showed the faster process, due to an increase in surface area of adsorbent. Desorption studies elucidated that metal hydroxide sludge had a tendency for ion exchange adsorption of sulfonated azo reactive dyes. Leaching data showed that the treated water was nontoxic at a system pH above 5 or a solution pH above 2.

Keywords: Adsorption, Desorption, Ion Exchange, Metal Hydroxides, Reactive Dyes

? Li, Q.L., Snoeyink, V.L., Mariaas, B.J. and Campos, C. (2003), Elucidating competitive adsorption mechanisms of atrazine and NOM using model compounds. *Water Research*, **37** (4), 773-784.

Full Text: [2003\Wat Res37, 773.pdf](2003/Wat%20Res37,%20773.pdf)

Abstract: Based on the relative adsorbability of natural organic matter (NOM) fractions with different molecular weights (MWs), two model compounds, poly(styrene sulfonate) (PSS) (nominal MW = 1800 Dalton) and p-dichlorobenzene (DCB), were chosen to study the competitive effect of large and small NOM molecules on atrazine adsorption by two powdered activated carbons (PACs) with different pore size distributions. Both isotherm and kinetic tests of atrazine adsorption were conducted using fresh PAC and PAC preloaded with the model compounds. The model compounds were found to affect atrazine adsorption through two different mechanisms due to their size difference: direct competition for sites by p-DCB and pore constriction/blockage by PSS-1.8k. p-DCB was found to significantly reduce atrazine adsorption capacity but to have no effect on atrazine adsorption kinetics. In contrast, the effect of PSS-1.8k on atrazine adsorption capacity was very small. Furthermore, during simultaneous adsorption, PSS-1.8k had no effect on atrazine surface diffusion. However, preloading PAC with PSS-1.8k lowered the atrazine surface diffusion coefficient, D-s, by more than three orders of magnitude; D-s decreased with increasing solid phase PSS-1.8k concentration. The pore size distribution of the PAC was found to play an important role in competitive adsorption. A high mesopore surface area could alleviate pore blockage significantly. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbons, Adsorption, Adsorption Kinetics, Aquatic Humic Substances, Atrazine, Capacity, Carbons, Competitive Adsorption, Diffusion, GAC Adsorption, Granular Activated Carbon, Isotherm, Kinetic, Kinetics, Model, Model Compounds, Molecular, Natural, Natural Organic Matter, Natural-Water, Nom, Organic-Matter, PAC, Pore Blockage, Pore Size Distribution, Pore-Size, Powdered Activated Carbon, Science, Size-Exclusion Chromatography, Spectroscopic Properties, Surface Diffusion, TCE Adsorption

Notes: highly cited

Yavuz, Ö., Altunkaynak, Y. and Güzel, F. (2003), Removal of copper, nickel, cobalt and manganese from aqueous solution by kaolinite. *Water Research*, **37** (4), 948-952.

Full Text: [W\Wat Res37, 948.pdf](W/Wat%20Res37,%20948.pdf)

Abstract: The removal of some heavy metals such as Mn(II), Co(II), Ni(II), and Cu(II) from aqueous solution is studied using a raw kaolinite. The sorption of these metals on kaolinite conformed to linear form of Langmuir adsorption equation. Langmuir *C*m constants for each metal were found as 0.446 mg/g (Mn), 0.919 mg/g (Co), 1.669 mg/g (Ni), 10, 787 mg/g (Cu) at 25°C, respectively. Also, kinetic and thermodynamic parameters such as enthalpy (Δ*H*), free energy (Δ*G*) and entropy (Δ*S*) were calculated and these values show that adsorption of heavy metal on kaolinite was an endothermic process and the process of adsorption was favoured at high temperatures.

Keywords: Heavy Metals, Removal, Adsorption, Kaolinite

Notes: highly cited

? von Gunten, U. (2003), Ozonation of drinking water: Part I. Oxidation kinetics and product formation. *Water Research*, **37** (7), 1443-1467.

Full Text: [2003\Wat Res37, 1443.pdf](2003/Wat%20Res37,%201443.pdf)

Abstract: The oxidation of organic and inorganic compounds during ozonation can occur via ozone or OH radicals or a combination thereof. The oxidation pathway is determined by the ratio of ozone and OH radical concentrations and the corresponding kinetics. A huge database with several hundred rate constants for ozone and a few thousand rate constants for OH radicals is available. Ozone is an electrophile with a high selectivity. The second-order rate constants for oxidation by ozone vary over 10 orders of magnitude, between <0.1 M(-1)s(-1) and about 7 x 10(9) M(-1)s(-1). The reactions of ozone with drinking-water relevant inorganic compounds are typically fast and occur by an oxygen atom transfer reaction. Organic micropollutants are oxidized with ozone selectively. Ozone reacts mainly with double bonds, activated aromatic systems and non-protonated amines. In general, electron-donating groups enhance the oxidation by ozone whereas electron-withdrawing groups reduce the reaction rates. Furthermore, the kinetics of direct ozone reactions depend strongly on the speciation (acid-base, metal complexation). The reaction of OH radicals with the majority of inorganic and organic compounds is nearly diffusion-controlled.

The degree of oxidation by ozone and OH radicals is given by the corresponding kinetics. Product formation from the ozonation of organic micropollutants in aqueous systems has only been established for a few compounds. It is discussed for olefines, amines and aromatic compounds. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Ozone, Advanced Oxidation, Water Treatment, Kinetics, Micropollutants, Product Formation, Of-the-Art, Ethylenediaminetetraacetic-Acid Edta, Oxygenated Aqueous-Solution, Radical-Induced Oxidation, Disinfection By-Products, Dissociating Organic-Compounds, Rate Constants, Pulse-Radiolysis, Hydroxyl Radicals, Ozone Decomposition

Notes: highly cited

Sun, Q.Y. and Yang, L.Z. (2003), The adsorption of basic dyes from aqueous solution on modified peat-resin particle. *Water Research*, **37** (7), 1535-1544.

Full Text: [W\Wat Res37, 1535.pdf](W/Wat%20Res37,%201535.pdf)

Abstract: Modified peat was prepared by mixing thoroughly raw peat with sulfuric acid, and modified peat-resin particle was obtained, by mixing modified peat with solutions of polyvinylalcohol (PVA) and formaldehyde. In this paper, the adsorption of Basic Magenta and Basic Brilliant Green onto modified peat-resin particle is examined. The adsorption isotherm showed that the adsorption of basic dyes on modified peat-resin particle deviated from the Langmuir and Freundlich equations. The pseudo-first order, pseudo-second order and intraparticle diffusion models were used to fit the experimental data. By comparing the standard deviation, it was found that the intraparticle diffusion model could be used to well describe the adsorption of two basic dyes on modified peat-resin particle. According to the change of intraparticle diffusion parameter, the adsorption processes could be divided into different stages. The kinetics experiment also indicated that initial dye concentrations, particle dose and particle size could affect the adsorption processes of basic dyes. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Modified Peat-Resin Particle, Basic Dyes, Adsorption Isotherm, Adsorption Kinetics, Kinetic Models, Acid Dye, Natural Adsorbents, Waste-Water, Metal-Ions, Sorption, Removal, Diffusion, Moss

Abollino, O., Aceto, M., Malandrino, M., Sarzanini, C. and Mentasti, E. (2003), Adsorption of heavy metals on Na-montmorillonite: Effect of pH and organic substances. *Water Research*, **37** (7), 1619-1627.

Full Text: [W\Wat Res37, 1619.pdf](W/Wat%20Res37,%201619.pdf)

Abstract: Clays (especially montmorillonite and bentonite) are widely used as barriers in landfills to prevent contamination of subsoil and groundwater by leachates containing heavy metals. For this reason it is important to study the adsorption of metals by these clays. The sorption of seven metals (Cd, Cr, Cu, Mn, Ni, Pb and Zn) on Na-montmorillonite was studied as a function of pH and in the presence of ligands, forming complexes of different stabilities with the metals of interest. The continuous column method was used as it better simulates natural conditions. The total capacity of Na-montmorillonite towards these metals was determined. The pH variations influence to a higher extent the concentrations of Cu, Pb and Cd in the effluent. Moreover the results suggest that complex formation hinders the sorption of the metals on the clay, with an increasing influence in the order: Mn less than or equal to Pb less than or equal to Cd less than or equal to Zn < Ni < Cu < Cr. The evaluation of the total capacity of Na-montmorillonite shows that this clay is a good sorbent towards all examined metals. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Na-Montmorillonite, Heavy Metals, Adsorption, Metal Complexes, Breakthrough, Sorbents, Surface

Notes: highly cited

? Ternes, T.A., Stuber, J., Herrmann, N., McDowell, D., Ried, A., Kampmann, M. and Teiser, B. (2003), Ozonation: A tool for removal of pharmaceuticals, contrast media and musk fragrances from wastewater? *Water Research*, **37** (8), 1976-1982.

Full Text: [2003\Wat Res37, 1976.pdf](2003/Wat%20Res37,%201976.pdf)

Abstract: A pilot plant for ozonation and UV-disinfection received effluent from a German municipal sewage treatment plant (STP) to test the removal of pharmaceuticals, iodinated X-ray contrast media (ICM) and musk fragrances from municipal wastewater. In the original STP effluent, 5 antibiotics (0.344.63 mug l(-1)), 5 betablockers (0.18-1.7 mug l(-1)), 4 antiphlogistics (0.10-1.3 mug l(-1)), 2 lipid regulator metabolites (0.12-0.13 mug l(-1)), the antiepileptic drug carbamazepine (2.1 mug l(-1)), 4 ICM (1.1-5.2 mug l(-1)), the natural estrogen estrone (0.015 mug l(-1)) and 2 musk fragrances (0.14.73 mug l(-1)) were detected by LC-electrospray tandem MS and/or GC/MS/MS. ICM, derived from radiological examinations, were present with the highest concentrations (diatrizoate: 5.7 mug l(-1), iopromide: 5.2 mug l(-1)). By applying 10-15 mg l(-1) ozone (contact time: 18 min), all the pharmaceuticals investigated as well as musk fragrances (HHCB, AHTN) and estrone were no longer detected. However, ICM (diatrizoate, iopamidol, iopromide and iomeprol) were still detected in appreciable concentrations. Even with a 15 mg l(-1) ozone dose, the ionic diatrizoate only exhibited removal efficiencies of not higher than 14%, while the non-ionic ICM were removed to a degree of higher than 80%. Advanced oxidation processes (O-3/UV-low pressure mercury arc, O-3/H2O2), which were non-optimized for wastewater treatment, did not lead significantly to a higher removal efficiency for the ICM than ozone alone. (C) 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Pharmaceuticals, Estrogens, Contrast Media, Polycyclic Musks, Ozonation, Wastewater, Drinking-Water Treatment, Aquatic Environment, Agents, Samples, Drugs

? Poboży, E., Halko, R., Krasowski, M., Wierzbicki, T. and Trojanowicz, M. (2003), Flow-injection sample preconcentration for ion-pair chromatography of trace metals in waters. *Water Research*, **37** (9), 2019-2026.

Full Text: [2003\Wat Res37, 2019.pdf](2003/Wat%20Res37,%202019.pdf)

Abstract: Selected trace transition metal ions have been determined in an FIA/HPLC hyphenated system using on-line preconcentration on cellulose functionalised sorbent Cellex P. For HPLC separation ion-pair chromatography was employed with spectrophotometric detection at 510 nm using post-column derivatisation with PAR. Favourable kinetic conditions of sorption and elution as well as optimisation of hyphenated system allowed to obtain detection limits at sub-mug L-1 level at 25 min preconcentration time. The developed method was employed for determination of Co(II), Ni(II), Cd(II) and Mn(II) in river water with reasonable agreement of obtained results with electrothermal AAS determination. (C) 2003 Elsevier Science Ltd. All rights reserved.

Keywords: Cd(II), Cellex, Co(II), Complexes, Copper, Enrichment Methods, Flow-Injection Analysis, HPLC, Ion-Chromatography, Ions, Kinetic, Mercury, Metal, Metals, Nickel, Performance Liquid-Chromatography, Science, Separation, Sorbent, Sorption, Trace Metals, Water Analysis

Walker, G.M., Hansen, L., Hanna, J.A. and Allen, S.J. (2003), Kinetics of a reactive dye adsorption onto dolomitic sorbents. *Water Research*, **37** (9), 2081-2089.

Full Text: [W\Wat Res37, 2081.pdf](W/Wat%20Res37,%202081.pdf)

Abstarct: A novel wastewater treatment technique has been investigated, for reactive dye removal, in batch kinetic systems. These experimental studies have indicated that charred dolomite has the potential to act as an adsorbent for the removal of Brilliant Red reactive dye from aqueous solution. The effect of initial dye concentration, adsorbent mass: liquid volume ratio, and agitation speed on dye removal have been determined with the experimental data mathematically described using empirical external mass transfer and intra-particle diffusion models. The experimental data show conformity with an adsorption process, with the removal rate heavily dependent on both external mass transfer and intra-particle diffusion.

Keywords: Adsorption, Dyestuff, Wastewater, Dolomite, Kinetics

Lázaro, N., Sevilla, A.L., Morales, S. and Marqués, A.M. (2003), Heavy metal biosorption by gellan gum gel beads. *Water Research*, **37** (9), 2118-2126.

Full Text: [W\Wat Res37, 2118.pdf](W/Wat%20Res37,%202118.pdf)

Abstarct: The Ni2+ accumulation in batch mode from diluted solutions by gel beads of gellan gum (GG), alginate, κ-carrageenan, agar, agarose, silica gel, polyacrylamide and two mixtures of GG+agar was investigated. All polymeric materials studied accumulated Ni2+, but gel beads of GG were stable, easily obtainable and showed the highest Ni2+ accumulation. The pH of the Ni2+ solution was not critical for Ni2+ accumulation. Accumulation of metals Cu2+, Co2+, Ni2+, Pb2+, Cd2+ and Zn2+ by GG gel beads reached the equilibrium after 24 h. The removal of Pb2+ and Cu2+ from the aqueous solution was very efficient, with maximum metal uptake (*q*max) of 0.85 and 0.75 mmol/g dw GG, respectively. The general *q*max sequence was Pb > Cu > Ni ≈ Zn = Co > Cd. In an equimolar metal mixture sorption experiment a clear reduction in accumulation was observed, except for Pb2+ (30%). Heavy metals were desorbed with 100 mM sodium citrate.

Keywords: Heavy Metal Accumulation, Gel Beads, Gellan Gum, Adsorption Isotherm, Sorbent Affinity, Desorption

Notes: highly cited

Ho, Y.S. (2003), Removal of copper ions from aqueous solution by tree fern. *Water Research*, **37** (10), 2323-2330.

Full Text: [W\Wat Res37, 2323.pdf](W/Wat%20Res37,%202323.pdf) [W\Wat Res37, 2323-1.pdf](W/Wat%20Res37,%202323-1.pdf)

Abstract: Tree fern, an agricultural by-product, was used for the sorptive removal of copper ions from aqueous solution. The experimental data was analysed by Langmuir, Freundlich and Redlich-Peterson isotherms. The equilibrium sorption capacity of copper ions was determined from the Langmuir equation and found to be 11.7 mg/g. A batch sorption model, based on the assumption of the pseudo-second-order mechanism, was developed to predict the rate constant of sorption, the equilibrium sorption capacity and the initial sorption rate with the effect of initial copper ion concentration and the tree fern dose. Various thermodynamic parameters, such as Δ*G*0, Δ*H*0 and Δ*S*0, have been calculated. The thermodynamics of copper ion/tree fern system indicates spontaneous and endothermic nature of the process. (C) 2003 Elsevier Science Ltd. All rights reserved.

Keywords: Isotherm, Kinetics, Copper, Tree Fern, Pseudo-Second-Order Sorption Kinetics, Thermodynamic, Waste-Water, Metal-Ions, Sorption

Chern, J.M. and Chien, Y.W. (2003), Competitive adsorption of benzoic acid and *p*-nitrophenol onto activated carbon: Isotherm and breakthrough curves. *Water Research*, **37** (10), 2347-2356.

Full Text: [W\Wat Res37, 2347.pdf](W/Wat%20Res37,%202347.pdf)

Abstract: Three series of batch tests at 25°C were performed to determine the benzoic acid and *p*-nitrophenol (PNP) binary adsorption isotherms onto GAC in the aqueous solutions and the experimental data were fitted to the extended Langmuir isotherm model successfully. The experimental data and the isotherm model parameters showed that the GAC used in this study had a higher affinity to PNP than benzoic acid. Three column tests were performed to determine the breakthrough curves and effluent solution pH with varying feed compositions. According to the experimental results, the weakly adsorbed BA exhibited an intermediate zone of effluent concentration higher than its feed one; the effluent solution pH could serve as a good indicator for breakthrough. The breakthrough curves with varying feed compositions could be predicted by the non-linear wave propagation theory satisfactorily. Only the adsorption isotherm models were required to construct the composition path diagram with which the breakthrough curves could be predicted.

Keywords: Activated Carbon, Benzoic Acid, *p*-Nitrophenol, Adsorption, Isotherm, Breakthrough Curve

Ahn, J.S., Chon, C.M., Moon, H.S. and Kim, K.W. (2003), Arsenic removal using steel manufacturing byproducts as permeable reactive materials in mine tailing containment systems. *Water Research*, **37** (10), 2478-2488.

Full Text: [W\Wat Res37, 2478.pdf](W/Wat%20Res37,%202478.pdf)

Abstract: Steel manufacturing byproducts were tested as a means of treating mine tailing leachate with a high As concentration. Byproduct materials can be placed in situ as permeable reactive barriers to control the subsurface release of leachate from tailing containment systems. The tested materials had various compositions of elemental Fe, Fe oxides, Ca–Fe oxides and Ca hydroxides typical of different steel manufacturing processes. Among these materials, evaporation cooler dust (ECD), oxygen gas sludge (OGS), basic oxygen furnace slag (BOFS) and to a lesser degree, electrostatic precipitator dust (EPD) effectively removed both As(V) and As(III) during batch experiments. ECD, OGS and BOFS reduced As concentrations to <0.5 mg/l from 25 mg/l As(V) or As(III) solution in 72 h, exhibiting higher removal capacities than zero-valent iron. High Ca concentrations and alkaline conditions (pH ca. 12) provided by the dissolution of Ca hydroxides may promote the formation of stable, sparingly soluble Ca–As compounds. When initial pH conditions were adjusted to 4, As reduction was enhanced, probably by adsorption onto iron oxides. The elution rate of retained As from OGS and ECD decreased with treatment time, and increasing the residence time in a permeable barrier strategy would be beneficial for the immobilization of As. When applied to real tailing leachate, ECD was found to be the most efficient barrier material to increase pH and to remove As and dissolved metals.

Keywords: Steel Manufacturing Byproducts, Permeable Reactive Material, Arsenic Removal, Mine Tailings

Lazaridis, N.K. and Asouhidou, D.D. (2003), Kinetics of sorptive removal of chromium(VI) from aqueous solutions by calcined Mg-Al-CO3 hydrotalcite. *Water Research*, **37** (12), 2875-2882.

Full Text: [W\Wat Res37, 2875.pdf](W/Wat%20Res37,%202875.pdf)

Abstract: The sorptive removal of hexavalent chromium from aqueous solutions by calcined Mg–Al–CO3 hydrotalcite was investigated in a batch mode. The influence of agitation speed, solution pH, initial chromium concentration, sorbent concentration and temperature has been tested in kinetic runs. Three kinetic models have been evaluated to fit the experimental data: the pseudo-first order, the modified-second order and the Elovich equation. It was shown that the first-order model could best describe the sorpti106on kinetics. A Freundlich isotherm was used to fit equilibrium experiments. Hydrotalcite presents a sorption capacity of approximately 120 mg Cr/g, under the investigated experimental conditions. The calculated activation energy for process studied was around 40 kJ/mol.

Keywords: Adsorption, Chromium(VI), Hydrotalcite, Kinetics, Freundlich Isotherm

Lazaridis, N.K., Karapantsios, T.D. and Georgantas, D. (2003), Kinetic analysis for the removal of a reactive dye from aqueous solution onto hydrotalcite by adsorption. *Water Research*, **37** (12), 3023-3033.

Full Text: [W\Wat Res37, 3023.pdf](W/Wat%20Res37,%203023.pdf)

Abstract: The removal of a reactive color, Cibacron Yellow LS-R, from aqueous solutions by adsorption onto hydrotalcite particles is investigated using batch rate experiments. Measurements are performed at various initial color concentrations, solid loads, pH values and ionic backgrounds (dissolved NaCl). The speed of agitation and the temperature inside the batch adsorber are also varied within a practical range of values. It is shown that the sorption capacity is relatively high for most experimental conditions so hydrotalcite may be considered as a suitable sorbent for this application. The probable mechanism of the process is investigated by a number of homogeneous and heterogeneous reaction kinetic models as well as diffusion kinetic models. It is found that no single kinetic model can fully describe the sorption process at all times. At least three independent rate-controlling mechanisms appear to compete each other and dominate the different stages of sorption.

Keywords: Adsorption, Diffusion, Hydrotalcite, Kinetics, Mass Transfer, Reactive Dye, Sorption, Decomposition, Effluents, Anions

Notes: highly cited

Chiron, N., Guilet, R. and Deydier, E. (2003), Adsorption of Cu(II) and Pb(II) onto a grafted silica: Isotherms and kinetic models. *Water Research*, **37** (13), 3079-3086.

Full Text: [W\Wat Res37, 3079.pdf](W/Wat%20Res37,%203079.pdf)

Abstract: The isotherms and kinetics of adsorption of lead(II) and copper(II) onto a grafted silica are studied at 20°C. A commercial silica is grafted with an ethylediamine derivative, *N*-[3-(trimethoxysilyl)propyl]-ethylenediamine. From the Langmuir isotherms, maximum adsorption capacities of the grafted silica towards Pb(II) and Cu(II) are determined (0.184 mmol Pb(II) g-1 and 0.261 mmol Cu(II) g-1) and compared to those of non-modified silica (respectively, 0.019 and 0.036 mmol g-1). Four kinetic models, i.e., pseudo-first order, pseudo-second order, Langmuir and double-exponential are applied to fit the experimental kinetic data. The kinetic parameters are determined which allow to calculate the theoretical metal uptake as a function of time. The results are discussed and indicate the best fit is obtained with the double-exponential model. A discussion on the adsorption mechanism with respect to the double-exponential model leads to two possible interpretations: the metal uptake may follow a diffusion-controlled mechanism or a two-site adsorption process.

Keywords: Adsorption Mechanism, Langmuir Isotherms, Kinetics, Grafted Silica, Heavy Metals

Rivera-Utrilla, J. and Sánchez-Polo, M. (2003), Adsorption of Cr(III) on ozonised activated carbon. Importance of Cπ––cation interactions. *Water Research*, **37** (14), 3335-3340.

Full Text: [W\Wat Res37, 3335.pdf](W/Wat%20Res37,%203335.pdf)

Abstract: The adsorption of Cr(III) in aqueous solution was investigated on a series of ozonised activated carbons, analysing the effect of oxygenated surface groups on the adsorption process. A study was carried out to determine the adsorption isotherms and the influence of the pH on the adsorption of this metal. The adsorption capacity and affinity of the adsorbent for Cr(III) increased with the increase in oxygenated acid groups on the surface of the activated carbon. These findings imply that electrostatic-type interactions predominate in the adsorption process, although the adsorption of Cr(III) on the original (basic) carbon indicates that other forces also participate in the adsorption process. Thus, the ionic exchange of protons in the –Cπ–H3O+ interaction for Cr(III) accounts for the adsorption of cationic species in basic carbons with positive charge density. Study of the influence of pH on the adsorption of Cr(III) showed that, in each system, the maximum adsorption occurred when the charge of the carbon surface was opposite that of the species of Cr(III) present at the pH of the experiment. These results confirmed that electrostatic interactions predominate in the adsorption process.

Keywords: Adsorption, Oxygenated Surface Groups, Heavy Metals, Activated Carbon, Ozone

Saeed, A. and Iqbal, M. (2003), Bioremoval of cadmium from aqueous solution by black gram husk (*Cicer arientinum*). *Water Research*, **37** (14), 3472-3480.

Full Text: [W\Wat Res37, 3472.pdf](W/Wat%20Res37,%203472.pdf)

Abstract: Husk of black gram (*Cicer arientinum*), a waste of no commercial value, was investigated as a new biosorbent of cadmium from low concentration aqueous solutions. With 99.99% sorption efficiency from 10 mg l-1 cadmium solution, the biomass required at saturation was 0.8 g mg-1 cadmium. Biosorption was rapid and equilibrium was achieved in 30 min. Among the various desorbing agents tested, 99.89% cadmium recovery was achieved with 0.1 M HCl. Sorption efficiency of cadmium during six biosorption–desorption cycles in batch operations declined, which was traceable to 39.0% black gram husk (bgh) weight loss. This decline was only 9.71% when compensated for biomass loss, which is comparable to 10.45% decline during six cycles in fixed bed column bioreactor in which biomass loss was only 5.98%. On plotting breakthrough curves it was noted that bgh in the fixed bed column was capable of bringing down cadmium concentration from 10 to 0.1 mg l-1 in 35.5 l volume. Biosorption of cadmium was not effected in the presence of other cations. Comprehensive characterization of parameters indicate bgh to be an excellent material for biosorption of cadmium to treat wastewaters containing low concentration of the metal. As an agrowaste, the advantage of application of this material as a metal biosorbent in a fixed bed column bioreactor system, in comparison with those based on immobilized algae or biomass of algal, fungal and bacterial origin, is considered.

Keywords: Biosorption, Agrowaste, *Cicer arientinum*, Metal Desorption, Wastewater Treatment, Cadmium Biosorption, Black Gram Husk

Garcinuño, R.M., Fernández-Hernando, P. and Cámara, C. (2003), Evaluation of pesticide uptake by Lupinus seeds. *Water Research*, **37** (14), 3481-3489.

Full Text: [W\Wat Res37, 3481.pdf](W/Wat%20Res37,%203481.pdf)

Abstract: Pesticide uptake by seeds depends on the properties of the chemical, such as structure, stability, log *k*ow and diffusion rate, type of water, pH, temperature, content of organic matter and composition, and on seed characteristics such as permeability of the seed coat. The efficiency with which *Lupinus angustifolius* seeds retain different herbicides (simazine, atrazine, isoproturon, linuron,) and insecticides (carbaryl, fenamiphos, permethrin) was evaluated using both a batch and a continuous system. Factors which affect pesticide uptake by seeds, such as flow rate, seed biomass, pesticide concentration, contact time, pH, seed saturation and also the speed of the retention process for 17 days, were tested. *L. angustifolius* showed a high retention capacity for the above mentioned pesticides.

The extraction of pesticides from seeds using different organic solvents, such as methanol, acetonitrile, ethyl acetate and *n*-hexane was evaluated and no pesticide residues were detected in any of the solvents tested. This could be attributed to the capacity of the seed to degrade the pesticides. From the results obtained, *L. angustifolius* seems to be a promising seed to be applied for phytoremediation of industrial effluents or contaminated water.

Keywords: Pesticides, *Lupinus angustifolius* Seeds, Phytoremediation

Arican, B. and Yetis, U. (2003), Nickel sorption by acclimatized activated sludge culture. *Water Research*, **37** (14), 3508-3516.

Full Text: [W\Wat Res37, 3508.pdf](W/Wat%20Res37,%203508.pdf)

Abstract: The sorption of Ni2+ by acclimatized activated sludge treating Ni2+ bearing wastewater was investigated using a once-through completely mixed tank reactor. The culture developed from sewage was acclimatized to 85.2 μmole/L Ni2+ influent concentration by stepwise increases, at a low dilution rate 0.11/h. Acclimation was found to enhance the sorptive capacity of the activated sludge. In fact, at all of the intermediate concentrations, percentage Ni2+ adsorbed by the biomass and also the sorptive capacity of the activated sludge drastically increased with an increase in the influent Ni2+ concentration. All influent Ni2+ concentrations were found to significantly stimulate the observed biomass yield of the culture over that observed in the base line. Experimental findings obtained at two other dilution rates; namely, 0.25/h and 0.45/h revealed that dilution rate is a significant operational parameter affecting the Ni2+ sorption characteristics of acclimatized activated sludge microorganisms. Considerable complexation of nickel and organic and inorganic ligands in the wastewater appeared to be responsible for a relatively lower Ni2+ sorption capacity.

Keywords: Activated Sludge, Heavy Metal Removal, Nickel, Sorption

Kim, M.S., Hong, K.M. and Chung, J.G. (2003), Removal of Cu(II) from aqueous solutions by adsorption process with anatase-type titanium dioxide. *Water Research*, **37** (14), 3524-3529.

Full Text: [W\Wat Res37, 3524.pdf](W/Wat%20Res37,%203524.pdf)

Abstract: The experiment was performed in the reactor with suspended anatase-type titanium dioxide particles. The adsorption amount increased rapidly with an increasing pH value from pH 2 to 5 and remained constant over pH 5. The adsorption amount of Cu2+ increased with temperature from 15°C to 40°C. The adsorption equilibrium constant (*K*ads) was 0.854 and adsorption isotherm of Cu2+ adsorption on titanium dioxide was more suitable in Langmuir adsorption isotherm than in Freundlich isotherm. The adsorption rate was rapid with an increasing number of UV lamps of 254 nm.

Keywords: Copper(II), Adsorption, Anatase-Type Titanium Dioxide, UV Radiation, Aqueous Solutions

? Yoon, Y.M., Westerhoff, P., Snyder, S.A. and Esparza, M. (2003), HPLC-fluorescence detection and adsorption of bisphenol A, 17β-estradiol, and 17α-ethynyl estradiol on powdered activated carbon. *Water Research*, **37** (14), 3530-3537.

Full Text: [2003\Wat Res37, 3530.pdf](2003/Wat%20Res37,%203530.pdf)

Abstract: The adsorption of three estrogenic compounds (bisphenol A (BPA), 17beta-estradiol (E2), and 17alpha-ethynyl estradiol (EE2)) on several powdered activated carbons (PAC) was investigated. Without preconcentration, method detection limits (MDL) using high-performance liquid chromatography (HPLC) with fluorescence detection at an excitation wavelength of 280nm and an emission wavelength of 310nm were 0.88, 1.15, and 0.96nM for BPA, E2, and EE2, respectively. Compound recoveries were >90% in raw drinking water matrices. PAC screening studies (six PAC brands) indicated all three compounds were removed by PAC, but the percentage removal ranged from 31% to >99% based upon PAC type/dosage and presence/absence of natural organic matter. The order of removal (E2>EE2>BPA) corresponded with log K-ow values for the compounds (3.1-4.0, 3.7-3.9, 3.3, respectively). Kinetic and PAC dose-response experiments were conducted with the two best performing PACs. Increasing contact time and PAC dose improved compound removal. Freundlich isotherm parameters were fit to the experimental data. This study confirms that PAC treatment is feasible for >99% removal of three estrogenic compounds from raw drinking waters that may be at risk for containing such compounds, at least at initial concentration of 500ng/L and higher. (C) 2003 Elsevier Science Ltd. All rights reserved.

Keywords: 17 Alpha-Ethynyl Estradiol, 17 Beta-Estradiol, Activated Carbon, Activated Carbons, Adsorption, Aquatic Environment, Assay, Bisphenol A, Carbons, Dose-Response, Drinking Water, Drinking-Water, Estradiol, Estrogenic Hormones, Hplc-Fluorescence, Isotherm, Kinetic, Natural, Natural Organic Material, Natural Organic Matter, Pac, Performance Liquid-Chromatography, Powdered Activated Carbon, Removal, Risk, Science, Screening, Sorption, Surface-Water, Treatment, Waste-Water, Water Treatment Plants

? Ying, G.G., Kookana, R.S. and Dillon, P. (2003), Sorption and degradation of selected five endocrine disrupting chemicals in aquifer material. *Water Research*, **37** (15), 3785-3791.

Full Text: [2003\Wat Res37, 3785.pdf](2003/Wat%20Res37,%203785.pdf)

Abstract: Sorption and degradation of the five selected endocrine disrupting chemicals (EDCs) including bisphenol A (BPA), 17beta-estradiol (E2), 17alpha-ethynylestradiol (EE2), 4-tert-octylphenol (4-t-OP) and 4-n-nonylphenol (4-n-NP) have been investigated in the laboratory using sediment and groundwater from an aquifer in Bolivar, South Australia. The sorption coefficients measured on the sediment were in the following order: 4-n-NP > 4-t-OP > EE2 > E2 > BPA. The sorption coefficients (K-f values) for the five EDCs were 3.89, 21.8, 24.2, 90.9 and 195, respectively. The alkylphenols 4-t-OP and 4-n-NP had strong binding on the sediment while BPA had a weak affinity. Degradation experiments of the five EDCs showed that E2 and 4-n-NP degraded quickly under aerobic conditions with a half-life of 2 and 7 days, respectively. EE2 degraded slowly with an estimated half-life of 81 days in the aquifer material under aerobic conditions while the other two chemicals (BPA and 4-t-OP) remained almost unchanged. Little or no degradation of the five EDCs except slow degradation for E2 was observed within 70 days under anaerobic conditions in native groundwater. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Endocrine Disrupting Chemical, Aquifer, Sorption, Biodegradation, Aquifer Storage And Recovery, Bisphenol-A, Waste-Water, Alkylphenol Polyethoxylates, Environmental Fate, Phenolic-Compounds, Treatment Plants, English Rivers, Estrogens, Nonylphenol, Behavior

Tomei, M.C., Annesini, M.C., Luberti, R., Cento, G. and Senia, A. (2003), Kinetics of 4-nitrophenol biodegradation in a sequencing batch reactor. *Water Research*, **37** (16), 3803-3814.

Full Text: [W\Wat Res37, 3803.pdf](W/Wat%20Res37,%203803.pdf)

Abstract: In this paper, the biodegradation process of 4-nitrophenol (4NP) in a sequencing batch reactor has been investigated. Kinetic tests have been carried out on biomass grown on mixed substrate (4NP plus biogenic substrate) both in the presence of a biogenic substrate fraction in the feed and with 4NP as the sole carbon source. Removal kinetics for all tests is well described by the typical substrate inhibition pattern as predicted by the Haldane equation. In both sets, estimated kinetic parameters are very similar: no beneficial effect of the biogenic fraction is observed on the 4NP removal while increasing trend of 4NP maximum removal rate with the 4NP/CODTOT ratio in the feed has been observed. This finding has been modelled by estimating the fraction of the total biomass involved in 4NP biodegradation as a function of 4NP concentration in the feed.

High removal rates, short acclimation times and good settling characteristics of produced sludge (observed during the whole working period) confirm the suitability of periodic systems in enhancing the bacterial potentialities for biodegradation of xenobiotic compounds.

Keywords: 4-Nitrophenol Biodegradation, Xenobiotics, Sequencing Batch Reactor, Kinetic Parameters, Haldane Equation

López, F.A., Martín, M.I., Pérez, C., López-Delgado, A. and Alguacil, F.J. (2003), Removal of copper ions from aqueous solutions by a steel-making by-product. *Water Research*, **37** (16), 3883-3890.

Full Text: [W\Wat Res37, 3883.pdf](W/Wat%20Res37,%203883.pdf)

Abstract: A study is made of the use of a steel-making by-product (rolling mill scale) as a material for removing Cu2+ ions from aqueous solutions. The influence of contact time, initial copper ion concentration and temperature on removal capability is considered. The removal of Cu2+ ions from an aqueous solution involves two processes: on the one hand, the adsorption of Cu2+ ions on the surface of mill scale due to the iron oxides present in the latter; and on the other hand, the cementation of Cu2+ onto metallic iron contained in the mill scale. Rolling mill scale is seen to be an effective material for the removal of copper ions from aqueous solutions.

Keywords: Copper, Steel-Making By-Product, Rolling Mill Scale, Cementation, Adsorption

Zhan, X.M. and Zhao, X. (2003), Mechanism of lead adsorption from aqueous solutions using an adsorbent synthesized from natural condensed tannin. *Water Research*, **37** (16), 3905-3912.

Full Text: [W\Wat Res37, 3905.pdf](W/Wat%20Res37,%203905.pdf)

Abstract: Adsorption is a method for removing lead from wastewater. The adsorption of lead on a new adsorbent synthesized from natural condensed tannin has been investigated using a series of batch adsorption experiments. The study on the adsorption mechanism indicates that the adsorbent performed in aqueous solutions as an ionic exchanger whose end group was sodium ion (Na+). One lead(II) ion (Pb2+) was adsorbed onto the adsorbent by taking the place of two Na+ ions. The maximum exchangeable Na+ present on the adsorbent was measured with the proton titration experiments and it was up to 1.0 mmol Na+ g-1 dry adsorbent. To a significant extent, pH influenced the extraction of lead from aqueous solutions. The lead removal efficiency was up to 71%, 87% and 91% with initial solution pH at 3.0, 3.6 and 4.2, respectively. The Langmuir equation fitted the adsorption isotherm data well. The maximum adsorption capacity of lead calculated was 57.5, 76.9 and 114.9 mg lead g-1 dry adsorbent at initial solution pH of 3.0, 3.6 and 4.2, respectively. Therefore, the adsorbent does offer favorable characteristics in lead removal from acidic wastewater.

Keywords: Adsorption, Adsorption Mechanism, Condensed Tannin, Ion Exchange, Lead Removal

? Wang, H., Appan, A. and Gulliver, J.S. (2003), Modeling of phosphorus dynamics in aquatic sediments: I - model development. *Water Research*, **37** (16), 3928-3938.

Full Text: [2003\Wat Res37, 3928.pdf](2003/Wat%20Res37,%203928.pdf)

Abstract: A model is developed to study the phosphorus dynamics in aquatic sediments and to conduct dynamic predictions of phosphorus release across a sediment-water interface. The model focuses on the sediment active layer below the sediment-water interface and is based on primary mechanisms regulating phosphorus behavior in sediments, including effective diffusion, bioturbation mixing and burial processes (transport), organic decomposition, sorption kinetic processes and non-linear partitioning (mobilization). The effects of environmental factors such as dissolved oxygen and temperature are taken into account. The model is solved by numerical integration. The primary difference from models in the literature is that the model directly describes the dynamic behavior of dissolved, particulate exchangeable ortho-phosphorus and organic phosphorus in sediments, and incorporates dynamic sorption and non-linear partitioning processes. These improve model mechanisms and allow regulation of phosphorus flux through the sediment reservoir that acts as both a source and sink of phosphorus. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Behavior, Development, Diffusion, Dynamic Model, Environmental, Exchange, Kinetic, Kinetics, Lakes, Literature, Model, Modeling, Netherlands, Numerical Computation, Phosphorus, Primary, Release Flux, Sediment, Sediments, Sorption

Bhattacharjee, S., Chakrabarty, S., Maity, S., Kar, S., Thakur, P. and Bhattacharyya, G. (2003), Removal of lead from contaminated water bodies using sea nodule as an adsorbent. *Water Research*, **37** (16), 3954-3966.

Full Text: [W\Wat Res37, 3954.pdf](W/Wat%20Res37,%203954.pdf)

Anbstract: Adsorption of water soluble lead on polymetallic sea nodule has been studied in detail. Complete decontamination of lead is possible by appropriate sea nodule dosing. Adsorption is also dependent on pH and best adsorption is achieved at pH 6. Beyond pH 6, the desorption of lead from sea nodule surface is practically zero. Residual metal concentrations in the filtrate after adsorption is negligible. Both Freundlich and Langmuir isotherms may reasonably explain adsorption of lead on sea nodule. Chemically bound moisture plays a very crucial role in lead adsorption. Lead adsorptive capability of sea nodule is practically destroyed when calcined at a temperature of 900°C. Lead loading capacity of sea nodule has been estimated at 440 mg of lead per gram of sea nodule. The performance of sea nodule as a lead adsorbent has been successfully tested over six simulated lead contaminated water systems. Lead loading capacity of sea nodule compares favorably with other adsorbents like activated carbon, ion exchange resin, anionic clay, granulated blast furnace slag and natural and treated zeolites.

Keywords: Adsorption, Lead, Sea Nodule, Chemically Bound Moisture, pHzpc

Ma, W. and Tobin, J.M. (2003), Development of multimetal binding model and application to binary metal biosorption onto peat biomass. *Water Research*, **37** (16), 3967-3977.

Full Text: [W\Wat Res37, 3967.pdf](W/Wat%20Res37,%203967.pdf)

Abstract: Biosorption of Cr3+, Cu2+ and Cd2+ from binary metal solutions onto peat in the batch systems was investigated at pH 4. The order of maximum uptake was Cr≥Cu>Cd and maximum uptake levels of ca. 0.4 mmol/g were observed for chromium and copper while cadmium was taken up to a maximum of ca. 0.2 mmol/g. Co-ion competition resulted in up to 70 percent decrease of primary metal uptake.

A novel approach to multicomponent sorption modelling involving regression to the total metal taken up was adopted. Two extended Langmuir-type models were found to exhibit good fit to the experimental data. Using the simpler model of these, three-dimensional sorption surfaces were generated which describe the metal uptake as a function of equilibrium concentrations of both metals. These methods allow prediction of metal uptakes over a continuum of concentrations of both metals in binary systems.

Keywords: Peat, Biosorption, Modelling, Wastewater Treatment, Metals, pH Effects

Reddad, Z., Gérente, C., Andrès, Y., Thibault, J.F. and Le Cloirec, P. (2003), Cadmium and lead adsorption by a natural polysaccharide in MF membrane reactor: experimental analysis and modelling. *Water Research*, **37** (16), 3983-3991.

Full Text: [W\Wat Res37, 3983.pdf](W/Wat%20Res37,%203983.pdf)

Abstract: In the present work, Pb2+ and Cd2+ adsorption onto a natural polysaccharide has been studied in membrane reactors. The process involves a stirred semi-batch reactor for the adsorption step and a microfiltration (MF) process in order to confine the particles. Due to their lower affinity for the biosorbent, Cd2+ ions were found to breakthrough the process faster than Pb2+ cations. The experimental results showed the technical feasibility of the pilot. A mass balance model based on the Langmuir equilibrium isotherm was used to describe the adsorption process. This relation is able to predict experimental data under different operating conditions: the adsorbent and metal concentrations, and the permeate flow rate. Based on these results, it is demonstrated that the biosorbent studied represents an interesting low-cost solution for the treatment of metal ions polluted waters.

Keywords: Metal Ions, Polysaccharides, Adsorption, Microfiltration, Modelling

Notes: highly cited

Gupta, V.K., Jain, C.K., Ali, I., Sharma, M. and Saini, V.K. (2003), Removal of cadmium and nickel from wastewater using bagasse fly ash: A sugar industry waste. *Water Research*, **37** (16), 4038-4044.

Full Text: [W\Wat Res37, 4038.pdf](W/Wat%20Res37,%204038.pdf)

Abstract: The bagasse fly ash, an industrial solid waste of sugar industry, was used for the removal of cadmium and nickel from wastewater. As much as 90% removal of cadmium and nickel is possible in about 60 and 80 min, respectively, under the batch test conditions. Effect of various operating variables, viz., solution pH, adsorbent dose, adsorbate concentration, temperature, particle size, etc., on the removal of cadmium and nickel has been studied. Maximum adsorption of cadmium and nickel occurred at a concentration of 14 and 12 mg l-1 and at a pH value of 6.0 and 6.5, respectively. A dose of 10 g l-1 of adsorbent was sufficient for the optimum removal of both the metal ions. The material exhibits good adsorption capacity and the adsorption data follow the Langmuir model better then the Freundlich model. The adsorption of both the metal ions increased with increasing temperature indicating endothermic nature of the adsorption process. Isotherms have been used to determine thermodynamic parameters of the process, viz., free energy change, enthalpy change and entropy change.

Keywords: Adsorption, Sugar Industry, Bagasse Fly Ash, Cadmium, Nickel

Notes: highly cited

? Simeonov, V., Stratis, J.A., Samara, C., Zachariadis, G., Voutsa, D., Anthemidis, A., Sofoniou, M. and Kouimtzis, T. (2003), Assessment of the surface water quality in Northern Greece. *Water Research*, **37** (17), 4119-4124.

Full Text: [2003\Wat Res37, 4119.pdf](2003/Wat%20Res37,%204119.pdf)

Abstract: The application of different multivariate statistical approaches for the interpretation of a large and complex data matrix obtained during a monitoring program of surface waters in Northern Greece is presented in this study. The dataset consists of analytical results from a 3-yr survey conducted in the major river systems (Aliakmon, Axios, Gallikos, Loudias and Strymon) as well as streams, tributaries and ditches. Twenty-seven parameters have been monitored on 25 key sampling sites on monthly basis (total of 22,350 observations). The dataset was treated using cluster analysis (CA), principal component analysis and multiple regression analysis on principal components. CA showed four different groups of similarity between the sampling sites reflecting the different physicochemical characteristics and pollution levels of the studied water systems. Six latent factors were identified as responsible for the data structure explaining 90% of the total variance of the dataset and are conditionally named organic, nutrient, physicochemical, weathering, soil-leaching and toxic-anthropogenic factors. A multivariate receptor model was also applied for source apportionment estimating the contribution of identified sources to the concentration of the physicochemical parameters. This study presents the necessity and usefulness of multivariate statistical assessment of large and complex databases in order to get better information about the quality of surface water, the design of sampling and analytical protocols and the effective pollution control/management of the surface waters. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Water Quality, River Water, Statistical Analysis, Nutrients, Heavy Metals, Chemical-Parameters, Fecal Pollution, Aliakmon River

Jeon, B.H., Dempsey, B.A., Burgos, W.D. and Royer, R.A. (2003), Sorption kinetics of Fe(II), Zn(II), Co(II), Ni(II), Cd(II), and Fe(II)/Me(II) onto hematite. *Water Research*, **37** (17), 4135-4142.

Full Text: [W\Wat Res37, 4135.pdf](W/Wat%20Res37,%204135.pdf)

Abstract: The reactions of Fe(II) and other divalent metal ions including Zn, Co, Ni, and Cd on hematite were studied in single and competitive binary systems with high sorbate/sorbent ratios in 10 mM PIPES (pH 6.8) solution under strict anoxic conditions. Adsorbed Me(II) was defined as extractable by 0.5 N HCl within 20 h, and fixed Me(II) was defined as the additional amount that was extracted by 3.0 N HCl within 7 days. Binary systems contained Fe(II) plus a second metal ion. The extent of uptake of divalent metal ions by hematite was in order of Fe greater than or equal to Zn > Co greater than or equal to Ni > Cd. For all metals tested, there was an instantaneous adsorption followed by a relatively slow stage that continued for the next 1-5 days. This sequence occurred in both single and binary systems, and could have been due to a variety of sorption site types or due to slow conversion from outer- to inner-sphere surface complexes due to increasing surface charge. Sorption competition was observed between Fe(II) and the other metal ions. The displacement of Fe(II) by Me(II) was in order of Ni similar to Zn > Cd, and the displacement of Me(II) by Fe(II) was in order of Cd > Zn similar to Ni > Co. Fixed Fe(II) was in order of Fe + Co (20%) > Fe + Cd (6%) > Fe - Zn (4%) > Fe similar to Ni (4%) after 30 days. There was no fixation for the other metals in single or binary systems. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Divalent Metal Ions, Hematite, Slow Sorption Kinetics, Sorption Competition, Hydrous Ferric-Oxide, Metal-Ions, Water Interface, Ferrous Iron, Adsorption, Reduction, Goethite, Cu, Surface, Copper

Notes: highly cited

Davis, T.A., Volesky, B. and Mucci, A. (2003), A review of the biochemistry of heavy metal biosorption by brown algae. *Water Research*, **37** (18), 4311-4330.

Full Text: [W\Wat Res37, 4311.pdf](W/Wat%20Res37,%204311.pdf)

Abstract: The passive removal of toxic heavy metals such as Cd2+, Cu2+, Zn2+, Pb2+, Cr3+, and Hg2+ by inexpensive biomaterials, termed biosorption, requires that the substrate displays high metal uptake and selectivity, as well as suitable mechanical properties for applied remediation scenarios. In recent years, many low-cost sorbents have been investigated, but the brown algae have since proven to be the most effective and promising substrates. It is their basic biochemical constitution that is responsible for this enhanced performance among biomaterials. More specifically, it is the properties of cell wall constituents, such as alginate and fucoidan, which are chiefly responsible for heavy metal chelation. In this comprehensive review, the emphasis is on outlining the biochemical properties of the brown algae that set them apart from other algal biosorbents. A detailed description of the macromolecular conformation of the alginate biopolymer is offered in order to explain the heavy metal selectivity displayed by the brown algae. The role of cellular structure, storage polysaccharides, cell wall and extracellular polysaccharides is evaluated in terms of their potential for metal sequestration. Binding mechanisms are discussed, including the key functional groups involved and the ion-exchange process. Quantification of metal–biomass interactions is fundamental to the evaluation of potential implementation strategies, hence sorption isotherms, ion-exchange constants, as well as models used to characterize algal biosorption are reviewed. The sorption behavior (i.e., capacity, affinity) of brown algae with various heavy metals is summarized and their relative performance is evaluated.

Keywords: Alginate, Alginic Acid, Biosorbents, Biosorption, Brown Algae, Capacity, Circular-Dichroism, Cr3+, Crystalline-Structure, Cu2+, Divalent Metals, Elsevier, Evaluation, Groups, Heavy Metal, Heavy Metals, Ion Exchange, Ion-Exchange Properties, Isotherms, L-Guluronic Acid, Mechanisms, Metal, Metals, Models, Pb2+, Polysaccharides, Remediation, Removal, Review, Sargassum, Sargassum Fluitans, Science, Sorption, Storage, Structural Components, Uronic Acid Sequence, X-Ray-Diffraction, Zn2+

Zeng, L. (2003), A method for preparing silica-containing iron(III) oxide adsorbents for arsenic removal. *Water Research*, **37** (18), 4351-4358.

Full Text: [W\Wat Res37, 4351.pdf](W/Wat%20Res37,%204351.pdf)

Abstract: A method for preparing iron(III)-based binary oxide adsorbents in a granulated form for arsenic removal was studied. The key step in the method was the simultaneous generation of hydrous ferric oxide (FeOOH) sol and silica sol in situ in one reactor. This eventually led to the formation of Fe-Si complexes. The addition of silica enhanced the granulated adsorbent strength but reduced the arsenic adsorption capacity. An optimum Si/Fe molar ratio in the balance of adsorbent strength and arsenic adsorption capacity was found to be approximately 0.33. The effects of aging time, drying temperature and process pH on adsorbents were also evaluated in the study. X-ray diffraction analysis confirmed that the iron(III) oxide in the Fe-Si binary oxide adsorbents was amorphous, largely due to the retardation of the iron oxide crystallization by the presence of silicate species. The surface area of the Fe-Si adsorbents and the particle size of Fe-Si complexed suspensions were determined as well. The batch strength testing procedure introduced in this study can provide a simple and quick evaluation of granulate strength in a wet status. Generally, this developed method can prepare granulated Fe-Si binary oxide adsorbents for column adsorption of arsenic from water. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Arsenic Removal, Ferric Oxide, Silica, Adsorbent, Granulate, Adsorption Properties, Drinking-Water, Ferrihydrite, Goethite, Surface, Health

Notes: highly cited

Yan, G. and Viraraghavan, T. (2003), Heavy-metal removal from aqueous solution by fungus *Mucor rouxii*. *Water Research*, **37** (18), 4486-4496.

Full Text: [W\Wat Res37, 4486.pdf](W/Wat%20Res37,%204486.pdf)

Abstract: Biosorption of lead, cadmium, nickel and zinc by live and dead *Mucor rouxii* biomass treated with NaOH was studied over a range of pH. In the case of dead biomass, low pH resulted in a decrease in the biosorption capacity. At pH 3.0 or less, the inhibition of biosorption of metal ions took place. At pH 4.0 or higher, the biosorption of metal ions increased sharply. Ho’s pseudo-second-order model described the biosorption kinetics better than the Lagergren model. Live biomass had high biosorption capacity, i.e. 35.69, 11.09, 8.46 and 7.75 mg/g at pH 5.0 for Pb2+, Ni2+, Cd2+ and Zn2+, respectively. The dead biomass adsorbed metal ions in the order of Pb2+, Zn2+, Cd2+ and Ni2+, with the biosorption capability of 25.22, 16.62, 8.36 and 6.34 mg/g at pH 5.0, respectively. At pH 6.0, the capacity of the dead biomass increased to 53.75, 53.85, 20.31 and 20.49 mg/g, respectively. For bi- or multi-metal ion adsorption, biosorption capacity of individual metal ion was reduced in the presence of other metal ions, but the total biosorption capacity increased, indicating the capability of *M. rouxii* biomass in adsorbing multi-metal ions. In addition, *M. rouxii* biomasses cultured with different media exhibited the same level of capacity to bind metal ions. Metal ions adsorbed by the biomass could be eluted effectively with HNO3, while distilled water demonstrated negligible metal elution capability. Regeneration of the biomass with NaOH regained or enhanced the biosorption capacity even after five cycles of adsorption–elution–regeneration.

Keywords: Fungal Biomass, *Mucor Rouxii*, Heavy-Metal Ions, Adsorption Kinetics, Adsorption Isotherms

? Hu, C.Y., Lo, S.L. and Kuan, W.H. (2003), Effects of co-existing anions on fluoride removal in electrocoagulation (EC) process using aluminum electrodes. *Water Research*, **37** (18), 4513-4523.

Full Text: [2003\Wat Res37, 4513.pdf](2003/Wat%20Res37,%204513.pdf)

Abstract: Batch experiments with bipolar aluminum electrodes and potentiodynamic polarization tests with monopolar systems were conducted to investigate the effects of the type and concentration of co-existing anions on defluoridation in electrocoagulation (EC) process. The results demonstrate that the type of the dominant anion directs the EC defluoridation reaction. The defluoridation efficiency was almost 100% and most of the fluoride removal reaction occurred on the surface of the anode in the solution without the co-existing anions, due to the electro-condensation effect. In the solutions with co-existing anions, most of the defluoridation took place in bulk solution. The residual fluoride concentration is a function of the total mass of Al(III) liberation from anodes and the types of the functions in the solutions with and without co-existing anions are different. The existence of sulfate ions inhibits the localized corrosion of aluminum electrodes, leading to lower defluoridation efficiency because of lower current efficiency. The presence of chloride or nitrate ions prevented the inhibition of sulfate ions, and the chloride ions were more efficient. Different corrosion types occurred in different anion-containing solutions and the form of corrosion affected the kinetic over-potential. The bypass flow causes the decrease of current efficiency and the proportion of the bypass flow of current increased due to a rise of the kinetic over potential and the conductivity of the solution. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aluminum, Bipolar Electrodes, Chloride, Co-Existing Anion, Corrosion, Corrosion, Current Efficiency, Defluoridation, Dissolution, Electrocoagulation (EC), Fluoride, Gibbsite, Goethite, Growth, Ions, Kinetic, Nitrate, Potentiodynamic Polarization Test, Removal, Waste-Waters

Loukidou, M.X., Matis, K.A., Zouboulis, A.I. and Liakopoulou-Kyriakidou, M. (2003), Removal of As(V) from wastewaters by chemically modified fungal biomass. *Water Research*, **37** (18), 4544-4552.

Full Text: [W\Wat Res37, 4544.pdf](W/Wat%20Res37,%204544.pdf)

Abstract: Biosorption has been demonstrated to be a useful alternative to conventional treatment systems for the removal of toxic metals from dilute aqueous solution. The objective of this paper was to examine the main aspects of a possible strategy for the removal of arsenates, employing *P. chrysogenum* biomass. The pretreatment of biomass with common surfactants (as hexadecyl-trimethylammonium bromide and dodecylamine) and a cationic polyelectrolyte was found to improve the biosorption efficiency. The initial biomass showed a relative low affinity for metallic anions, whereas with the application of modified samples a significant uptake of arsenic was observed. Sorption data were well described by typical Langmuir and Freundlich adsorption isotherms. Promising results were obtained in laboratory experiments and effective As(V) removals were observed.

Keywords: Biosorption, Biomass, Modification, Arsenates, Metal Anions Removal

Jeon, C. and Höll, W.H. (2003), Chemical modification of chitosan and equilibrium study for mercury ion removal. *Water Research*, **37** (19), 4770-4780.

Full Text: [W\Wat Res37, 4770.pdf](W/Wat%20Res37,%204770.pdf)

Abstract: To increase the uptake capacity of mercury ions, several chemical modifications of chitosan beads which are cross-linked with glutaraldehyde were performed. Among them, aminated chitosan bead prepared through chemical reaction with ethylenediamine had a high uptake capacity of about 2.3 mmol g-1 dry mass at pH 7. The increased number of amine groups was confirmed by IR analysis and measuring the saturation capacities for adsorption of HCl. The surface condition and existence of mercury ions on the beads was confirmed by the environmental scanning electron microscope and energy dispersive X-ray spectroscopy instrumental analyses. The beads showed the characteristic of competitive sorption between mercury and hydrogen ions and it was successfully modelled by an equilibrium model.

Keywords: Chitosan, Heavy Metals, Metal Removal, Adsorption, Modification, Polysaccharides

Rivas, F.J., Beltrán, F., Gimeno, O., Acedo, B. and Carvalho, F. (2003), Stabilized leachates: Ozone-activated carbon treatment and kinetics. *Water Research*, **37** (20), 4823-4834.

Full Text: [W\Wat Res37, 4823.pdf](W/Wat%20Res37,%204823.pdf)

Abstract: Ozone has been used as a pre-oxidation step for the treatment of stabilized leachates. Given the refractory nature of this type of effluents, the conversion of some wastewater quality parameters has been moderate after 1 h of ozonation (i.e. 30% chemical oxygen demand (COD) depletion). Ozone uptake was calculated in the interval 1.3–1.5 g of ozone per gram of COD degraded. An optimum dose of ozone has been experienced in terms of biodegradability of the processed effluent (60 min of treatment, 1×10-3 molL-1 ozone inlet feeding concentration and 50 Lh-1 gas flow-rate). pH and other typical hydroxyl radical generator systems exerted no influence on the efficiency of the process, suggesting the negligible role played by the indirect route of oxidation (generation of hydroxyl radicals). The ozonated effluent was thereafter treated in a second adsorption stage by using a commercial activated carbon. Removal levels up to 90% of COD in approximately 120 h were experienced for adsorbent dosages of 30 gL-1. Both steps, the single ozonation and the adsorption stage have been modelled by using different pseudoempirical models.

Keywords: Leachate, Landfill, Ozone, Activated Carbon, Wastewater

Álvarez-Ayuso, E., García-Sánchez, A. and Querol, X. (2003), Purification of metal electroplating waste waters using zeolites. *Water Research*, **37** (20), 4855-4862.

Full Text: [W\Wat Res37, 4855.pdf](W/Wat%20Res37,%204855.pdf)

Abstract: The sorption behaviour of natural (clinoptilolite) and synthetic (NaP1) zeolites has been studied with respect to Cr(Ill), Ni(II), Zn(II), Cu(II) and Cd(II) in order to consider its application to purify metal finishing waste waters. The batch method has been employed using metal concentrations in solution ranged from 10 to 200 mg/l and solid/liquid ratios ranged from 2.5 to 10 g/1. The Langmuir model was found to describe well all sorption processes, allowing to establish metal sorption sequences from which the main retention mechanism involved for each metal has been inferred. Synthetic zeolite exhibited about 10 times greater sorption capacities (b(Cr) = 0.838 mmol/g, b(Ni) = 0.342 mmol/g, b(Zn) = 0.499 mmol/g, b(Cu) = 0.795 mmol/g, b(Cd) = 0.452 mmol/g) than natural zeolite (b(Cr) = 0.079 mmol/g, b(Ni) = 0.034 mmol/g, b(Zn) = 0.053 mmol/g, b(Cu) = 0.093 mmol/g, b(Cd) = 0.041 mmol/g), appearing, therefore, as most suitable to perform metal waste water purification processes. This mineral showed the same high sorption capacity values when used in the purification of metal electroplating waste waters. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Waste Waters, Purification, Zeolites, Heavy Metals, Sorption, Ion-Exchange, Fly-Ash, Natural Clinoptilolite, Cadmium, Adsorption, Solvation, Binary, Cu2+, Fe3+, Pb2+

Vegliò, F., Beolchini, F. and Prisciandaro, M. (2003), Sorption of copper by olive mill residues. *Water Research*, **37** (20), 4895-4903.

Full Text: [W\Wat Res37, 4895.pdf](W/Wat%20Res37,%204895.pdf)

Abstract: A study on olive mill residues (OMR) as copper adsorbing material is reported in this work. A rough characterization of this waste material has been performed, by microanalysis and SEM pictures. Sorption tests with suspended OMR evidenced copper removal from solution, of about 60% in the investigated experimental conditions. The COD release in solution was also monitored during biosorption. Considering that it was significant, OMR washings with water were performed before biosorption. In this case the COD release in solution was reduced to less than 600 mg/L after two washings, while the OMR metal sorption properties did not change. Regenerated residues by acid solutions gave a copper removal of about 40%, in the same experimental conditions of the first adsorption test: regeneration with EDTA at different concentrations suggested that it presents a damage of adsorption active sites. On the other hand, the use of HCl and CaCl2 led to completely regenerate the biosorbent material. Tests were also performed with a column filled with 80 g of OMR and the breakpoint was demonstrated to take place after that about 1 L solution was treated in the investigated experimental conditions. Regeneration tests permitted to demonstrate that a concentration factor of about 2 can be obtained in no-optimized conditions, highlighting the possibility of using OMR for the treatment of metal bearing effluents. The main advantage of the process would be the ‘low cost’ biosorbing material, considering that it represents a waste in the olive oil production.

Keywords: Olive Mill Residues, Adsorption, Copper, Kinetic, Equilibrium, Regeneration

Sublet, R., Simonnot, M.O., Boireau, A. and Sardin, M. (2003), Selection of an adsorbent for lead removal from drinking water by a point-of-use treatment device. *Water Research*, **37** (20), 4904-4912.

Full Text: [W\Wat Res37, 4904.pdf](W/Wat%20Res37,%204904.pdf)

Abstract: The removal of lead from drinking water was investigated to develop a point-of-use water filter that could meet the regulation imposed by the new European Directive 98-83 lowering lead concentration in drinking water below 10 μg L-1. The objective of this research was to assess the potential of different adsorbents (zeolites, resins, activated carbon, manganese oxides, cellulose powder) to remove lead from tap water with a very short contact time. To begin, the repartition of the lead species in a tap water and a mineral water was computed with the computer model CHESS. It showed that in bicarbonated waters lead is mainly under lead carbonate form, either in the aqueous or in the mineral phase. Batch experiments were then conducted to measure the equilibrium adsorption isotherms of the adsorbents. Then, for five of them, dynamic experiments in micro-columns were carried out to assess the outlet lead concentration level. Three adsorbents gave rise to a leakage concentration lower than 10 μg L-1 and were then selected for prototypes experiments: chabasite, an activated carbon coated with a synthetic zeolite and a natural manganese oxide. The proposed method clearly showed that the measurement of equilibrium isotherms is not sufficient to predict the effectiveness of an adsorbent, and must be coupled with dynamic experiments. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Lead Removal, Drinking Water, Adsorption Isotherm, Adsorption Kinetics, Column Experiments, Point-of-Use Filter, Aqueous-Solution, Ion-Exchange, Cadmium, Metals

Horsfall, Jr., M. and Abia, A.A. (2003), Sorption of cadmium(II) and zinc(II) ions from aqueous solutions by cassava waste biomass (*Manihot sculenta* Cranz). *Water Research*, **37** (20), 4913-4923.

Full Text: [W\Wat Res37, 4913.pdf](W/Wat%20Res37,%204913.pdf)

Abstract: The sorption of two divalent metal ions, Cd(II) and Zn(II), onto untreated and differentially acid-treated cassava waste biomass over a wide range of reaction conditions was studied at 30°C. The metal ion removal from the spent biomass was also measured. The batch experiments show that pH 4.5–5.5 was the best range for the sorption of the metal ions for untreated and acid-treated biomass. Time-dependent experiments for the metal ions showed that for the two metals examined, binding to the cassava waste biomass was rapid and occurred within 30 min and completed within 1 h. High sorption capacities were observed for the two metals. The binding capacity experiments revealed the following amounts of metal ions bound per gram of biomass: 86.68 mg/g Cd, 55.82 mg/g Zn and 647.48 mg/g Cd, 559.74 mg/g Zn for untreated and acid-treated biomass, respectively. It was further found that the rate of sorption was particle-diffusion controlled, and the sorption rate coefficients were determined to be 2.30×10-1 min-1 (Cd2+), 4.0×10-3 min-1 (Zn2+) and 1.09×10-1 min-1 (Cd2+), 3.67×10-2 min-1 (Zn2+) for 0.5 and 1.00 M differential acid treatment, respectively. Desorption studies showed that acid treatment inhibited effective recovery of metal ions already bound to the biomass as a result of stronger sulfhydryl-metal bonds formed. Less than 25% of both metals were desorbed as concentration of acid treating reagent increases. However, over 60% Cd and 40% Zn were recovered from untreated biomass during the desorption study. The results from these studies indicated that both untreated and acid-treated cassava waste biomass could be employed in the removal of toxic and valuable metals from industrial effluents.

Keywords: Heavy Metal Binding, Cassava Waste, Wastewater Treatment, Thiolation, *Manihot Sculenta* Cranz

Fan, X., Parker, D.J. and Smith, M.D. (2003), Adsorption kinetics of fluoride on low cost materials. *Water Research*, **37** (20), 4929-4937.

Full Text: [W\Wat Res37, 4929.pdf](W/Wat%20Res37,%204929.pdf)

Abstract: Adsorption is one important technique in fluoride removal from aqueous solutions. The viability of adsorption techniques is greatly dependent on the development of adsorptive materials. A large number of materials have been tested at a fluoride concentration greater than 2 mg/l, and the lowest limit for fluoride reduction by them is about 2 mg/l. Decreasing the fluoride concentration to less than 2 mg/l, most of the tested materials displayed a very low capacity of fluoride removal.

This paper has concentrated on investigating the adsorption kinetics and adsorption capacity of low cost materials at a low initial fluoride concentration. The experiments were carried out at a natural pH, and radioisotope 18F rather than 19F was used since 18F can be rapidly measured by measuring the radioactivity with a resolution of 1×10-13 mg or 0.01 μCi. The tested materials are hydroxyapatite, fluorspar, calcite, quartz and quartz activated by ferric ions. Their adsorption capacities follow the order:

Hydroxyapatite>Fluorspar>Quartz activated using ferric ions>Calcite>Quartz

The uptake of fluoride on hydroxyapatite is an ion-exchange procedure and follows the pseudo-first- and second-order equations, while the uptake of fluoride on the others is a surface adsorption and follows the pseudo-second-order equation. Calcite has been seen as a good adsorbent in fluoride removal and has been patented. However, our data suggested that its adsorption capacity is only better than quartz.

The external mass transfer is a very slow and rate-determining step during fluoride removal from the aqueous solution. Under static conditions, there was no relative movement between adsorbents and solutions, the fluoride uptake was at a very slow rate and the adsorbent properties did not significantly affect the fluoride uptake. Under shaken conditions, the adsorption of fluoride was controlled by the adsorbent structure and chemical properties.

Keywords: Fluoride, Adsorption Kinetics, Hydroxyapatite, Fluorspar, Calcite, Quartz

Notes: highly cited

Janoš, P., Buchtová, H. and Rýznarová, M. (2003), Sorption of dyes from aqueous solutions onto fly ash. *Water Research*, **37** (20), 4938-4944.

Full Text: [W\Wat Res37, 4938.pdf](W/Wat%20Res37,%204938.pdf)

Abstract: Brown coal fly ashes were tested as potentially low-cost sorbents for the removal of synthetic dyes from waters. It was shown that both basic (cationic) as well as acid (anionic) dyes can be sorbed onto the fly ash. The adsorption can be described by the multi-site Langmuir isotherm. The sorption capacities were in the range of 10-1–10-3 mmol/g and did not differ significantly for basic and acid dyes. The dye sorption decreased in the presence of organic solvents (methanol, acetone). The presence of oppositely charged surfactants exhibited a pronounced effect on the dye sorption––low concentrations of the surfactant enhanced sorption, whereas high concentrations solubilized the dyes and kept them in solution. Inorganic salts exhibited only a minor effect on the dye sorption. The sorption of basic dyes increased at high pH values, whereas the opposite was true for acid dyes.

Keywords: Acid Dyes, Basic Dyes, Sorption, Fly Ash, Wastewater Treatment

Ghimire, K.N., Inoue, K., Yamaguchi, H., Makino, K. and Miyajima, T. (2003), Adsorptive separation of arsenate and arsenite anions from aqueous medium by using orange waste. *Water Research*, **37** (20), 4945-4953.

Full Text: [W\Wat Res37, 4945.pdf](W/Wat%20Res37,%204945.pdf)

Abstract: Cellulose and orange waste were chemically modified by means of phosphorylation. The chemically modified gels were further loaded with iron(III) in order to create a suitable chelating environment for arsenate and arsenite removal. The loading capacity for iron(III) on the gel prepared from orange waste (POW) was 1.21 mmol g-1 compared with 0.96 mmol g-1 for the gel prepared from cellulose (PC). Removal tests of arsenic with the iron(III)-loaded gel were carried out batchwise and by using a column. Arsenite removal was favored under alkaline condition for both PC and POW gels, however, the POW gel showed some removal capability even at neutral pH. On contrary, arsenate removal took place under acidic conditions at pH=2–3 and 2–6 for the PC and POW gels, respectively. Since iron(III) loading is higher on the POW gel than on the PC gel greater arsenic removal has been achieved by the POW gel compared with the PC gel. It can be concluded that the POW gel can be used for the removal and recovery of both arsenite and arsenate from arsenic contaminated wastewater.

Keywords: Adsorption, Arsenite, Arsenate, Phosphorylated Cellulose, Phosphorylated Orange Waste, Ion Exchange

Palma, G., Freer, J. and Baeza, J. (2003), Removal of metal ions by modified *Pinus radiata* bark and tannins from water solutions. *Water Research*, **37** (20), 4974-4980.

Full Text: [W\Wat Res37, 4974.pdf](W/Wat%20Res37,%204974.pdf)

Abstract: *Pinus radiata* bark and tannins, chemically modified with an acidified formaldehyde solution were used for removing metal ions from aqueous solutions and copper mine acidic residual waters. The adsorption ability to different metal ions [V(V), Re(VII), Mo(VI), Ge(IV), As(V), Cd(II), Hg(II), Al(III), Pb(II), Fe(II), Fe(III), Cu(II)] and the factors affecting their removal from solutions were investigated. Effect of pH on the adsorption, desorption, maximum adsorption capacity of the adsorbents, and selectivity experiments with metal ion solutions and waste waters from copper mine were carried out. The adsorbents considerably varied in the adsorption ability to each metal ion. The adsorption depends largely upon the pH of the solution. Modified tannins showed lower adsorption values than the modified bark. For the same adsorbent, the maximum capacity at pH 3 for the different ions were very different, ranging for modified bark from 6.8 meqg-1 for V to 0.93 meqg-1 for Hg. Waste waters were extracted with modified bark as adsorbent and at pH 2. The ions Cu(II) (35.2 mgL-1), Fe(III) (198 mgL-1), Al(III) (83.5 mgL-1) and Cd(II) (0.15 mgL-1) were removed in 15.6%, 46.9%, 83.7% and 3.3%, respectively, by using 1 g of adsorbent/10 mL of waste water. In general, a continuous adsorption on a packed column gave higher adsorbed values than those observed in the batchwise experiment.

Keywords: Adsorbents, Adsorption, Bark, Binding, Cellulosic Materials, Coniferous Wood Bark, Copper, Copper Ions, Effluents, Heavy-Metals, Metal Ions, Peanut Shells, Recovery, Scavengers, Tannins, Uranium Uptake, Waste, Waste Water, Wastewaters

Min, B., Evans, P.J., Chu, A.K. and Logan, B.E. (2004), Perchlorate removal in sand and plastic media bioreactors. *Water Research*, **38** (1), 47-60.

Full Text: [W\Wat Res38, 47.pdf](W/Wat%20Res38,%2047.pdf)

Abstract: The treatment of perchlorate-contaminated groundwater was examined using two side-by-side pilot-scale fixed-bed bioreactors packed with sand or plastic media, and bioaugmented with the perchlorate-degrading bacterium Dechlorosoma sp. KJ. Groundwater containing perchlorate (77 μg/L), nitrate (4 mg-NO3/L), and dissolved oxygen (7.5 mg/L) was amended with a carbon source (acetic acid) and nutrients (ammonium phosphate). Perchlorate was completely removed (<4 μg/L) in the sand medium bioreactor at flow rates of 0.063–0.126 L/s (1–2 gpm or hydraulic loading rate of 0.34–0.68 L/m2 s) and in the plastic medium reactor at flow rates of <0.063 L/s. Acetate in the sand reactor was removed from 43±8 to 13±8 mg/L (after day 100), and nitrate was completely removed in the reactor (except day 159). A regular (weekly) backwashing cycle was necessary to achieve consistent reactor performance and avoid short-circuiting in the reactors. For example, the sand reactor detention time was 18 min (hydraulic loading rate of 0.68 L/m2 s) immediately after backwashing, but it decreased to only 10 min 1 week later. In the plastic medium bioreactor, the relative changes in detention time due to backwashing were smaller, typically changing from 60 min before backwashing to 70 min after backwashing. We found that detention times necessary for complete perchlorate removal were more typical of those expected for mixed cultures (10–18 min) than those for the pure culture (<1 min) reported in our previous laboratory studies. Analysis of intra-column perchlorate profiles revealed that there was simultaneous removal of dissolved oxygen, nitrate, and perchlorate, and that oxygen and nitrate removal was always complete prior to complete perchlorate removal. This study demonstrated for the first time in a pilot-scale system, that with regular backwashing cycles, fixed-bed bioreactors could be used to remove perchlorate in groundwater to a suitable level for drinking water.

Keywords: Backwashing, Bioaugmentation, Bioreactor, Chlorate, Drinking Water, Fixed-Bed Reactor, Groundwater, Perchlorate, Sand

Netpradit, S., Thiravetyan, P. and Towprayoon, S. (2004), Evaluation of metal hydroxide sludge for reactive dye adsorption in a fixed-bed column system. *Water Research*, **38** (1), 71-78.

Full Text: [W\Wat Res38, 71.pdf](W/Wat%20Res38,%2071.pdf)

Abstract: The capacity and performance of small-scale column, containing coarse particles of metal hydroxide sludge, were evaluated using 30 mg l−1 dye solutions of C.I. Reactive Red 141. The studied bed depths were 2.5–20 cm and the studied flow rates were 1.1, 2.2 and 3.3 ml min−1 cm−2. At the breakthrough point of 0.1 Ct/C0, the breakthrough volume was increased with increasing bed depth or decreasing flow rate, due to an increase in empty bed contact time (EBCT). The data followed the bed depth service time model, and the adsorption capacity was 24–26 mg cm−3 or 27–29 mg dyes g−1 adsorbent. The minimum bed depths should be higher 1.02, 2.04 and 2.59 cm with flow rates of 1.1, 2.2 and 3.3 ml min−1 cm−2, respectively, while the ratio of bed depth to diameter should not be higher than 6. With EBCT above 5 min, the usage rate of metal hydroxide sludge was 1.3 g l−1. Using the bed depth of 5 cm and the flow rate of 0.55 ml min−1 cm−2, 87% of dominant colour, 78% of COD, and 99% of SS could be removed from the textile wastewater, and the leachate of toxic heavy metals was under the standard limitations.

Keywords: Adsorbent, Adsorption, Breakthrough, Color Removal, Dye, Dye Adsorption, Dyes, Fixed Bed, Fixed-Bed Column, Flow Rate, Heavy Metals, Metal Hydroxide, Particles, Reactive Dye, Reactive Dyes, Waste-Water, Wastewater

Antizar-Ladislao, B. and Galil, N.I. (2004), Biosorption of phenol and chlorophenols by acclimated residential biomass under bioremediation conditions in a sandy aquifer. *Water Research*, **38** (2), 267-276.

Full Text: [W\Wat Res38, 267.pdf](W/Wat%20Res38,%20267.pdf)

Abstract: Phenol and chlorophenols are common environmental contaminants. The fate and transport of these chemicals must be sufficiently understood to predict detrimental environmental impacts and to develop technically and economically appropriate remedial action to minimise environmental degradation. in order to gain a better understanding of the many mechanisms influencing the fate of phenol and chlorophenols in a sandy aquifer, we conducted biosorption experiments with biomass collected from a simulated aquifer polluted by consecutive accidental spills of phenol, 2-monochlorophenol, 2,4,6-trichlorophenol and pentachlorophenol under continuous bioremediation conditions following a closed-loop configuration during 180 days. A comparative study of the biosorption capacity of phenol and chlorophenols characterised by different physicochemical properties, at different pHs in the range of 6.0±0.1 to 9.0±0.1 showed the following: (i) the biosorption of phenol and chlorophenols on resident biomass was rapid (equilibrium reached in less than 2 h); (ii) the experimental data followed the Freundlich isotherm; (iii) changes in pH from 6.0±0.1 to 9.0±0.1 resulted in a decrease in the equilibrium biosorption capacity (q(eq)); (iv) both Freundlich parameters (K-F, n) should be used together as predictive parameters in mathematical models to simulate the fate of phenol and chlorophenols in the aquifer; (v) q(eq) of phenol and chlorophenols investigated in this study were satisfactorily correlated to their hydrophobicity (K-ow) with a correlation factor 0.98. In addition, available data from other reported studies fell in the same correlation curve. The results of the present study should be introduced in mathematical models developed to predict the effect of biomass fate and transport of contaminants in aquifers during bioremediation conditions. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Bioremediation, Biosorption, Fate of Chlorophenols, Freundlich Isotherm, Hydrophobicity, Activated-Sludge, Chlorinated Phenols, Organic Pollutants, Sorption, Soil, Pentachlorophenol, Biodegradation, Desorption, Adsorption, Transport

Kim, E., Benedetti, M.F. and Boulègue, J. (2004), Removal of dissolved rhenium by sorption onto organic polymers: Study of rhenium as an analogue of radioactive technetium. *Water Research*, **38** (2), 448-454.

Full Text: [W\Wat Res38, 448.pdf](W/Wat%20Res38,%20448.pdf)

Abstract: Technetium (Tc-99) is one of the main components of nuclear wastes. Tc characteristics can be predicted by studying rhenium. (Re-75), one of its chemical analogue, thus avoiding the use of a radioactive element at high concentrations. The objectives of this experimental study was to understand the sorption behavior of Re with natural organic materials in order to define the possible condition of Tc uptake in case where Tc may be transferred into surface or ground waters. As the well-defined organic sorbents we chose chitosan which contains amine -NH2 groups; poly-galacturonic acid (PGA) and poly-styrene sulfonates (PSS) which contain respectively carboxyl -COOH and sulfonate -SO3H groups. Concerning the reaction of Re with PGA or with PSS, no interaction between Re and carboxyl or sulfonate groups was found within the detection limit of this study. Re sorption on chitosan was found to be dependent on ionic strength and pH. We propose that non-specific sorption of perrhenate ion ReO4- via electrostatic interaction takes place at the protonated amine groups NH3+. The polymer-solution interface can be described by the electric diffuse double layer model combined with the Langmuir-Freundlich model. The calculation is in good agreement with our experimental results. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Rhenium, Technetium, Sorption, Organic Polymers, Chitosan, Nuclear Wastes, Metal-Ions, Chitosan, Adsorption, Pertechnetate, Binding

Martins, R.J.E., Pardo, R. and Boaventura, R.A.R. (2004), Cadmium(II) and zinc(II) adsorption by the aquatic moss *Fontinalis antipyretica*: Effect of temperature, pH and water hardness. *Water Research*, **38** (4), 693-699.

Full Text: [W\Wat Res38, 693.pdf](W/Wat%20Res38,%20693.pdf)

Abstract: The biosorption of cadmium(II) and zinc(II) ions onto dried *Fontinalis antipyretica*, a widely spread aquatic moss, was studied under different values of temperature, initial pH and water hardness. The equilibrium was well described by Langmuir adsorption isotherms. Maximum biosorption capacity of cadmium was independent on temperature and averaged 28.0 mg g-1 moss, whereas for zinc, capacity increased with temperature, from 11.5 mg g-1 moss at 5°C to 14.7 mg g-1 moss at 30°C. Optimum adsorption pH value was determined as 5.0 for both metal ions. Cadmium uptake was unaffected by the presence of calcium ions, but zinc sorption was improved when water hardness increased from 101.1 to 116.3 mg CaCO3 l-1. Inversely, as hardness increases, the competition with calcium ions strongly reduces the affinity of the biosorbent for zinc.

Keywords: Aquatic Moss, Zinc, Cadmium, Sorption, Heavy Metals, *Fontinalis Antipyretica*

? Temmink, H. and Klapwijk, B. (2004), Fate of linear alkylbenzene sulfonate (LAS) in activated sludge plants. *Water Research*, **38** (4), 903-912.

Full Text: [2004\Wat Res38, 903.pdf](2004/Wat%20Res38,%20903.pdf)

Abstract: Monitoring data were collected in a pilot-scale municipal activated sludge plant to assess the fate of the C-12-homologue of linear alkyl benzene sulfonate (LAS-C-12). The pilot-plant was operated at influent LAS-C-12 concentrations between 2 and 12 mg l(-1) and at sludge retention times of 10 and 27 days. Effluent and waste sludge concentrations varied between 5 and 10 mug l(-1) and between 37 and 69 mug g(-1) VSS, respectively. In the sludge samples only 2-8% was present as dissolved LAS-C-12, whereas the remaining 92-98% was found to be adsorbed to the sludge. In spite of this high degree of sorption, more than 99% of the LAS-C-12 load was removed by biodegradation, showing that not only the soluble fraction but also the adsorbed fraction of LAS-C-12 is readily available for biodegradation. Sorption and biodegradation of LAS-C-12 were also investigated separately. Sorption was an extremely fast and reversible process and could be described by a linear isotherm with a partition coefficient of 3.21 g(-1) volatile suspended solids. From the results of biodegradation kinetic tests it was concluded that primary biodegradation of LAS-C-12 cannot be described by a (growth) Monod model, but a secondary utilisation model should be used instead. The apparent affinity of the sludge to biodegrade LAS-C-12 increased when the sludge was loaded with higher influent concentrations of LAS-C-12. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Activated Sludge, Behavior, Biodegradation, Biodegradation Kinetics, Chemicals, Culture, Environment, Isotherm, Linear Alkylbenzene Sulfonate (LAS), Model, Monitoring, Organic Trace Compounds, Plant, Plants, Primary, Removal, Retention, Sewage, Sorption, Surfactant Monitoring Program, Utilisation, Waste-Water Treatment

? Doll, T.E. and Frimmel, F.H. (2004), Kinetic study of photocatalytic degradation of carbamazepine, clofibric acid, iomeprol and iopromide assisted by different TiO2 materials: Determination of intermediates and reaction pathways. *Water Research*, **38** (4), 955-964.

Full Text: [2004\Wat Res38, 955.pdf](2004/Wat%20Res38,%20955.pdf)

Abstract: The light-induced degradation of clofibric acid, carbamazepine, iomeprol and iopromide under simulated solar irradiation has been investigated in aqueous solutions suspended with different TiO2 materials (P25 and Hombikat UV100). Kinetic studies showed that P25 had a better photocatalytic activity for clofibric acid and carbamazepine than Hombikat UV100. For photocatalytic degradation of iomeprol Hombikat UV100 was more suitable than P25. The results can be explained by the higher adsorption capacity of Hombikat UV100 for iomeprol.

The study also focuses on the identification and quantification of possible degradation products. The degradation process was monitored by determination of sum parameters and inorganic ions. In case of clofibric acid various aromatic and aliphatic degradation products have been identified and quantified. A possible multi-step degradation scheme for clofibric acid is proposed. This study proves the high potential of the photocatalytic oxidation process to transform and mineralize environmentally relevant pharmaceuticals and contrast media in water. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: Anatase/Rutile (P25), Anatase (Hombikat UV100), Degradation Products, Aqueous Suspensions, Pharmaceuticals, Contrast Media, Drinking-Water Treatment, Ray Contrast-Media, Aquatic Environment, Pharmaceuticals, Drugs, Ozonation, Oxidation, Removal, Samples, Agents

Villaescusa, I., Fiol, N., Martínez, M., Miralles, N., Poch, J. and Serarols, J. (2004), Removal of copper and nickel ions from aqueous solutions by grape stalks wastes. *Water Research*, **38** (4), 992-1002.

Full Text: [W\Wat Res38, 992.pdf](W/Wat%20Res38,%20992.pdf)

Abstract: In the present work, the usefulness of grape stalks wastes generated in the wine production process has been investigated for the removal of copper and nickel ions from aqueous solutions. The sorption process was relatively fast and equilibrium was reached after about 60 min of contact. The influence of pH, sodium chloride and metal concentration on metal removal has been studied. Uptake showed a pH-dependent profile. Maximum sorption for both metals was found to occur at around pH 5.5–6.0. An increase of sodium chloride concentration caused a decrease in metal removal. Langmuir isotherms, at pH 6.0, for each metal were used to describe sorption equilibrium data. Maximum uptake obtained was 1.59×10-4 mol of copper and 1.81×10-4 mol of nickel per gram of dry sorbent.

Sorption of copper and nickel on grape stalks released an equivalent amount of alkaline and alkaline earth metals (K+, Mg2+, Ca2+) and protons, indicating that ionic exchange is predominantly responsible for metal ion uptake. Fourier transform infrared (FTIR) spectrometry analysis indicated that lignin C–O bond might be involved in metal uptake.

Equilibrium batch sorption studies were also performed using a two metal system containing (Cu(II)+Ni(II)). In the evaluation of the two metal sorption system performance, single isotherm curves had to be replaced by three-dimensional sorption isotherm surface. In order to describe the isotherm surface mathematically, the extended-Langmuir model was used. Nickel was found to be much more sensitive to the presence of copper than copper is to the presence of nickel.

Keywords: Grape Stalks Wastes, Copper, Nickel, Metal Removal, Sorption Isotherms

Pagnanelli, F., Beolchini, F., Di Biase, A. and Vegliò, F. (2004), Biosorption of binary heavy metal systems onto *Sphaerotilus natans* cells confined in an UF/MF membrane reactor: Dynamic simulations by different Langmuir-type competitive models. *Water Research*, **38** (4), 1055-1061.

Full Text: [W\Wat Res38, 1055.pdf](W/Wat%20Res38,%201055.pdf)

Abstract: Continuous heavy metal biosorption in membrane reactor apparatus using binary metal solutions was here considered. A dynamic model was developed to simulate biosorption performances on the base of metal mass balances in the system considering biosorption as an equilibrium process. The effect of three Langmuir-type competitive models on dynamic simulations of biosorption was then studied by using predictive equilibrium models (whose adjustable parameters were determined only by single metal system biosorption data) and not predictive equilibrium models (adjustable parameters directly by binary biosorption data). Predictive competitive models can give simulation profiles that are different from those obtained using non-predictive models. This detachment is due to the non-ideal competition among metals in solution which cannot be predicted only on the base of biosorption data in single metal systems. The dynamic model for multi-component biosorption here proposed was compared with experimental results reported in the literature and obtained using a biomass in a similar membrane reactor apparatus with ternary metal systems. The simulated profiles (obtained by using predictive equilibrium models) can reproduce qualitatively the specific adsorbent selectivity and the overshoot regions in the permeate concentrations of the metals with the minor affinity.

Keywords: Heavy Metals, Biosorption, Membrane Reactor, Langmuir-Type Models, Dynamic Modelling

Ahmedna, M., Marshall, W.E., Husseiny, A.A., Rao, R.M. and Goktepe, I. (2004), The use of nutshell carbons in drinking water filters for removal of trace metals. *Water Research*, **38** (4), 1062-1068.

Full Text: [W\Wat Res38, 1062.pdf](W/Wat%20Res38,%201062.pdf)

Abstract: Filtration of drinking water by point-of-use (POU) or point-of-entry (POE) systems is becoming increasingly popular in the United States. Drinking water is filtered to remove both organic and inorganic contaminants. The objective of this study was to evaluate the use of granular activated carbon from nutshells (almond, English walnut, pecan) in a POU water filtration system to determine its effectiveness in removing select, potentially toxic metal ions, namely, copper (Cu2+), lead (Pb2+) or zinc (Zn2+) found in drinking water. The nutshell-based carbon system was designated ‘Envirofilter’ and was compared to four commercial POU systems with brand names of BRITA, Omni Filter, PŪR and Teledyne Water Pik. Eight prototype ‘Envirofilters’, consisting of individual or binary mixtures of carbons made from acid-activated almond or pecan shells and steam-activated pecan or walnut shells were constructed and evaluated for adsorption of the three metal ions. The results indicated that a binary mixture of carbons from acid-activated almond and either steam-activated pecan or walnut shells were the most effective in removing these metals from drinking water of all the POU systems evaluated. Binary mixtures of acid-activated almond shell-based carbon with either steam-activated pecan shell- or walnut shell-based carbon removed nearly 100% of lead ion, 90–95% of copper ion and 80–90% of zinc ion. Overall the performance data on the ‘Envirofilters’ suggest that these prototypes require less carbon than commercial filters to achieve the same metal adsorption efficiency and may also be a less expensive product.

Keywords: Granular Activated Carbon, Drinking Water Filtration; Point-of-Use Water Filter, Pecan Shell, Almond Shell, English Walnut Shell, Copper, Lead, Zinc

Notes: highly cited

? Cho, M., Chung, H., Choi, W. and Yoon, J. (2004), Linear correlation between inactivation of *E. coli* and OH radical concentration in TiO2 photocatalytic disinfection. *Water Research*, **38** (4), 1069-1077.

Full Text: [2004\Wat Res38, 1069.pdf](2004/Wat%20Res38,%201069.pdf)

Abstract: The biocidal action of the TiO2 photocatalyst has been now well recognized from massive experimental evidences, which demonstrates that the photocatalytic disinfection process could be technically feasible. However, the understanding on the photochemical mechanism of the biocidal action largely remains unclear. In particular, the identity of main acting photooxidants and their roles in the mechanism of killing microorganisms is under active investigation. It is generally accepted that reactive oxygen species (ROS) and OH radicals play the role. The aim of this study is to deter-mine how the OH radical, acting either independently or in collaboration with other ROS, is quantitatively related to the inactivation of E coli. The steady-state concentrations of OH radicals ([.OH](ss)) in UV-illuminated TiO2 suspensions could be quantified from the measured photocatalytic degradation rates of p-chlorobenzoic acid (a probe compound) and its literature bimolecular rate constant with OH radicals. The results demonstrated an excellent linear correlation between [.OH](ss) and the rates of E coli inactivation, which indicates that the OH radical is the primary oxidant species responsible for inactivating E coli in the UV/TiO2 process. The CT value of OH radical for achieving 2 log E coli inactivation was initially found to be 0.8 x 10(-5) mg min/l, as predicted by the delayed Chick-Watson model. Although the primary role of OH radicals in photocatalytic disinfection processes has been frequently assumed, this is the first quantitative demonstration that the concentration of OH radicals and the biocidal activity is linearly correlated. (C) 2003 Elsevier Ltd. All rights reserved.

Keywords: TiO2, E. coli, Photocatalysis, OH Radical, ROS (reactive oxygen species), Bactericidal Activity, Aqueous Suspensions, Water, Kinetics, Degradation, Ozone

Jensen-Spaulding, A., Shuler, M.L. and Lion, L.W. (2004), Mobilization of adsorbed copper and lead from naturally aged soil by bacterial extracellular polymers. *Water Research*, **38** (5), 1121-1128.

Full Text: [W\Wat Res38, 1121.pdf](W/Wat%20Res38,%201121.pdf)

Abstract: Sorption of pollutants is a dominant phase transfer process affecting the fate and transport of metals through the subsurface. The movement of contaminants is retarded by sorption to the stationary subsurface porous media and can seriously hinder remediation efforts. Research has shown that the binding of adsorbed metals becomes more pronounced the longer the contaminant is in the subsurface and the release rates of aged metal contaminants have not received the research attention given to freshly added metals in laboratory studies. Metal release rates are also influenced by the presence of dissolved ligands that compete with mineral soil surfaces by providing binding sites. Dissolved organic matter such as bacterial extracellular polymers are common in natural soil solutions and the metal binding properties of bacterial polymers are well established. Therefore, binding of metals to dissolved biopolymers may result in mobilization of an adsorbed metal. This is important for cases where the metals are assumed to be relatively immobile such as in the case of land applied biosolids. In addition, naturally occurring adherent bacteria commonly produce extracellular polymers and thus may modify the bioavailability of meal contaminants at the point of their attachment. In this study samples from three sites, one a land applied sludge test site, were used to investigate the ability of bacterial extracellular polymers to release metals from soils with long-term exposures. The presence of ≅ 200 mg/L bacterial extracellular polymer was found to increase the short-term (less than 350 h) release of Cu and Pb by a factor of 2–4-fold.

Keywords: Adsorption, Bacteria, Copper, Extracellular Polymer, Lead, Sludge

Balci, S. (2004), Nature of ammonium ion adsorption by sepiolite: Analysis of equilibrium data with several isotherms. *Water Research*, **38** (5), 1129-1138.

Full Text: [W\Wat Res38, 1129.pdf](W/Wat%20Res38,%201129.pdf)

Abstract: Adsorption isotherms for an ammonium ion–sepiolite system have been established for initial ammonium ion solution concentrations in the range of 8.32–388.06 mmol NH4+/L (150–7000 ppm). The change of the ‘g sepiolite/mL solution’ ratios from 1/10 to 1/70 caused an increase in the adsorption from 1.82 to 3.70 mmol NH4+/g for the average particle size of 2.8 mm. The equilibrium data were fitted to ‘general-purpose isotherms’ and ‘first-order adsorption model’, and the adjustable parameters of the isotherms were estimated by nonlinear least-squares analysis. Langmuir and Freundlich models were found insufficient to explain the adsorption equilibrium, while Langmuir–Freundlich and Tooth isotherms explained the data well. Goodness of fit increased with the increased sepiolite quantity in the treated suspension.

Keywords: Ammonium Removal, Sepiolite, Adsorption Isotherm

Meng Chun, S. Chugchun, Guo Y.H., Shi, X.A., Cheng, J.F. and Yan, F. (2004), Study on characteristics of biocometabolic removal of omethoate by the *Aspergillus* spp. *Water Research*, **38** (5), 1139-1146.

Full Text: [W\Wat Res38, 1139.pdf](W/Wat%20Res38,%201139.pdf)

Abstract: A strain *Aspergillus* spp. F1 which could effectively metabolized omethoate was screened out in this study. F1 tended to form granula with diameter 4–5 mm after 5 days culture in shaker. The pH range from 4.5 to 6.5 was the suitable pH range for growth and metabolism of *Aspergillus* spp. F1. The maximum omethoate removal rate was about 3.0 mg/(h L), and the removal fraction of omethoate reached 90% after 8 days culture when initial concentrations of omethoate were not more than 2000 mg/L in medium. There was no obvious relativity between cell growth and cometabolism of omethoate. Starch was the best carbon source for omethoate removal and the result after 3 days reached 56.6% removal. F1 could use omethoate to metabolize as single nitrogen or phosphate source. The residual fragments in medium after treatment with the *Aspergillus* spp. F1 were determined by gas chromatography–mass spectrometry. The analysis results showed that only fragment o, o, s, -trimethyl phosphorothioate (TEP) containing phosphorus was available and the fragment containing nitrogen was consumed by F1 thoroughly in culture process. But no accumulations of TEP were observed in the omethoate bioremediation process. F1 could effectively remove omethoate in complex nutritional environment safely.

Keywords: *Aspergillus* spp*.* F1, Omethoate, Biocometabolic Removal, Phosphorus Source, Nitrogen Source, Nontoxic Fragments

Min, S.H., Han, J.S., Shin, E.W. and Park, J.K. (2004), Improvement of cadmium ion removal by base treatment of juniper fiber. *Water Research*, **38** (5), 1289-1295.

Full Text: [W\Wat Res38, 1289.pdf](W/Wat%20Res38,%201289.pdf)

Abstract: Juniper is a small-diameter underutilized lignocellulosic material. We evaluated the efficacy of base-treated juniper fiber (BTJF) for cadmium (Cd2+) sorption and the viability of juniper fiber as a sorbent for removing Cd2+ from water. Fourier transform infrared spectroscopy analysis indicated that carboxylate ion is a major functional group responsible for Cd2+ sorption. The apparent ideal sodium hydroxide concentration for base treatment is approximately 0.5 M. A batch sorption isotherm test showed that equilibrium sorption data were better represented by the Langmuir model than the Freundlich model. After base treatment, the maximum Cd2+ sorption loading, *Q*max, was greatly improved (9.18–29.54 mg/g), despite a decrease in specific surface area. A pseudo-second-order kinetic model fitted well for the sorption of Cd2+ onto BTJF. Initial metal ion concentration and treatment alkalinity were found to be major parameters influencing the kinetics of the sorption reaction. As a result of its strong ability to bind cadmium and its faster kinetics in low concentration, BTJF could be an inexpensive and efficient sorbent for removing heavy metals from stormwater runoff.

Keywords: Cadmium, Juniper, Saponification, Fourier Transform Infrared (FTIR) Spectroscopy, Isotherm, Kinetics

Zeng, L., Li, X.M. and Liu, J.D. (2004), Adsorptive removal of phosphate from aqueous solutions using iron oxide tailings. *Water Research*, **38** (5), 1318-1326.

Full Text: [W\Wat Res38, 1318.pdf](W/Wat%20Res38,%201318.pdf)

Abstract: This study explored the feasibility of utilizing industrial waste iron oxide tailings for phosphate removal in laboratory experiments. The experimental work emphasized on the evaluation of phosphate adsorption and desorption characteristics of the tailing material. The adsorption isotherm, kinetics, pH effect and desorption were examined in batch experiments. Five isotherm models were used for data fitting. The three-parameter equations (Redlich–Peterson and Langmuir–Freundlich) showed more applicability than the two-parameter equations (Freundlich, Langmuir and Temkin). A modified equation for calculation of the separation factor using the Langmuir–Freundlich equation constants was developed. The initial phosphate adsorption on the tailings was rapid. The adsorption kinetics can be best described by either the simple Elovich or power function equation. The phosphate adsorption on the tailings tended to decrease with an increase of pH. A phosphate desorbability of approximately 13–14% was observed, and this low desorbability likely resulted from a strong bonding between the adsorbed PO43- and iron oxides in the tailings. Column flow-through tests using both synthetic phosphate solution and liquid hog manure confirmed the phosphate removal ability of the tailings. Due to their low cost and high capability, this type of iron oxide tailings has the potential to be utilized for cost-effective removal of phosphate from wastewater.

Keywords: Phosphate Removal, Iron Oxide Tailings, Adsorption, Isotherm, Kinetics

Kristian Stevik, T., Aa, K., Ausland, G. and Hanssen, J.F. (2004), Retention and removal of pathogenic bacteria in wastewater percolating through porous media: A review. *Water Research*, **38** (6), 1355-1367.

Full Text: [W\Wat Res38, 1355.pdf](W/Wat%20Res38,%201355.pdf)

Abstract: Properly designed biological filters or infiltration systems have the capacity to significantly reduce effluent concentrations of pathogenic microorganisms in wastewater. The retention and elimination of microbial cells in biological wastewater filter systems is influenced by several factors. In this review, these factors are discussed. Immobilization of microbial cells moving through a porous media is influenced by mechanisms such as physical straining as well as adsorption to porous media. The grain size of porous media and bacterial cell size are important factors affecting the straining of bacteria, as are the hydraulic loading rate or the extent of clogging layer development in the filter. Adsorption of cells to the porous media is influenced by the content of organic matter, degree of biofilm development, and electrostatic attraction due to ion strength of the solution or electrostatic charges of cell- and particle surfaces. The rate of inactivation of pathogenic microorganisms, in adsorbed or liquid phases, has been shown to be affected by abiotic and biotic factors such as moisture content, pH, temperature, organic matter, bacterial species, predation, and antagonistic symbiosis between microorganisms in the system. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Contaminated Sandy Aquifer, Escherichia-Coli, Facilitated Transport, Fecal Streptococci, Filtration Theory, Growth-Conditions, Infiltration, Pathogenic Bacteria, Porous Media, Pseudomonas-Fluorescens, Purification, Solid-Surfaces, Surface Characteristics, Unsaturated Soil Columns, Wastewater

? Maine, M.A., Sune, N.L. and Lagger, S.C. (2004), Chromium bioaccumulation: comparison of the capacity of two floating aquatic macrophytes. *Water Research*, **38** (6), 1494-1501.

Full Text: [2004\Wat Res38, 1494.pdf](2004/Wat%20Res38,%201494.pdf)

Abstract: The capacity of Salvinia herzogii and *Pistia stratiotes* to remove Cr(III) from water and their behaviour at different Cr(III) concentrations were studied in outdoor experiments. Cr distribution in aerial parts and roots with time and the possible mechanisms of Cr uptake were analyzed. Both macrophytes efficiently removed Cr from water at concentrations of 1, 2, 4 and 6 mg Cr L-1. S. herzogii was the best adapted species. At a greater initial concentration, greater bioaccumulation rates were observed. Root Cr uptake was a rapid process that was completed within the first 24 h. Cr uptake through direct contact between the leaves and the solution is the main cause of the increase of Cr in the aerial parts, Cr being poorly translocated from the roots to the aerial parts. Both mechanisms were fast processes. The Cr uptake mechanism involves two components: a fast component and a slow one. The former occurs mainly due to the roots and leaves adsorption and is similar for both species. The slow component is different for each species probably because in P. stratiotes a Cr precipitation occurs induced by the roots. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Accumulation, Adsorption, Azolla-Filiculoides, Cadmium Uptake, Chromate, Chromium Bioaccumulation, Floating Aquatic Macrophytes, Heavy-Metals, Hyacinth, *Pistia Stratiotes*, Plants, Reduction, Salvinia Herzogii, Uptake Mechanism, Waste-Water Treatment, Water Pollution, Wetlands

Solbrå, S., Allison, N., Skei, J., Waite, S. and Mikhalovsky, S. (2004), Deploying a metal adsorbent in situ: A technique for indicating bioavailable Cd(II) in marine waters. *Water Research*, **38** (6), 1586-1594.

Full Text: [W\Wat Res38, 1586.pdf](W/Wat%20Res38,%201586.pdf)

Abstract: This paper reports a study into the deployment of a metal adsorbent in situ to estimate bioavailable Cd(II) in marine waters. Eight adsorbents were screened in the laboratory to test their ability to accumulate Cd(II) from deionised water and artificial seawater, and an oxidised activated carbon was selected for further investigation. The adsorption isotherm at Cd(II) concentrations 0.16–38 μg l-1 and at salinity 15 followed the Freundlich equation. The adsorbent was contained in nylon bags (pore size 35 μm) and dialysis tubes (membrane pore size 2 nm) to produce deployable devices and to investigate the effect of housing material on Cd(II) accumulation. The devices were tested in the laboratory and deployed at four field sites for up to 3 weeks. The adsorbent in the nylon bags reached equilibrium towards the end of this period and the measured contents were in good agreement with expected contents predicted from known seawater Cd(II) concentrations and the adsorption isotherm. The dialysis tubes accumulated significantly lower amounts of Cd(II) than the nylon bags, probably due to an initial lag as Cd(II) diffused into the dialysis bag and due to biofouling which reduced diffusion. The relationship between concentrations of Cd(II) accumulated by the mussels (indicating the bioavailable Cd(II) fraction) and the devices at different field sites could be described by the Freundlich model. The goodness of fit of this relationship was better for the dialysis tubes than the nylon bags. The adsorbent in the nylon bags may have collected small particles from seawater which affected the Cd(II) analysis. Both devices demonstrate potential as indicators of the relative bioavailable fraction of Cd(II) to *Mytilus edulis* in marine waters.

Keywords: Bioaccumulation, Cd(II), Carbon, *Mytilus Edulis*, Adsorbent

Nakagawa, K., Namba, A., Mukai, S.R., Tamon, H., Ariyadejwanich, P. and Tanthapanichakoon, W. (2004), Adsorption of phenol and reactive dye from aqueous solution on activated carbons derived from solid wastes. *Water Research*, **38** (7), 1791-1798.

Full Text: [W\Wat Res38, 1791.pdf](W/Wat%20Res38,%201791.pdf)

Abstract: Activated carbons were produced from several solid wastes, namely, waste PET, waste tires, refuse derived fuel and wastes generated during lactic acid fermentation from garbage. Activated carbons having various pore size distributions were obtained by the conventional steam-activation method and via the pre-treatment method (i.e., mixture of raw materials with a metal salt, carbonization and acid treatment prior to steam-activation) that was proposed by the authors. The liquid-phase adsorption characteristics of organic compounds from aqueous solution on the activated carbons were determined to confirm the applicability of these carbons, where phenol and a reactive dye, Black5, were employed as representative adsorbates. The hydrophobic surface of the carbons prepared was also confirmed by water vapor adsorption. The characteristics of a typical commercial activated carbon were also measured and compared. It was found that the activated carbons with plentiful mesopores prepared from PET and waste tires had quite high adsorption capacity for large molecules. Therefore they are useful for wastewater treatment, especially, for removal of bulky adsorbates.

Keywords: Adsorption, Activated Carbon, Activation, Mesopores, Pore Size Distribution, Solid Wastes, Liquid-Phase Adsorption

Perić, J., Trgo, M. and Vukojević Medvidović, N. (2004), Removal of zinc, copper and lead by natural zeolite: A comparison of adsorption isotherms. *Water Research*, **38** (7), 1893-1899.

Full Text: [W\Wat Res38, 1893.pdf](W/Wat%20Res38,%201893.pdf)

Abstract: An uptake of zinc (Zn), copper (Cu), and lead (Pb) from aqueous solutions by ion exchange on natural zeolitic tuff has been studied. The Croatian zeolite clinoptilolite from the Donje Jesenje deposit has been used as a natural ion exchanger. The efficiency of removal is higher for Pb and Cu than for Zn ions. Measured concentrations of Si in the liquid phase identify the detachment of the aluminosilicate structure during ion exchange in the presence of H+ and OH- ions. The adsorption isotherm equations; Langmuir–Freundlich, Redlich–Petersen, Toth, Dubinin–Radushkevich, modified Dubinin–Radushkevich, and Lineweawer–Burk were derived from the basic empirical equations, and used for calculation of ion exchange parameters. The best fitting of experimental results to the proposed isotherms was observed in models that assume that ionic species bind first at energetically most favorable sites, with multi-layer adsorption taking place subsequently.

Keywords: Zinc, Copper, Lead, Natural Zeolite, Adsorption Models

? Werker, A.G. and Hall, E.R. (2004), Development and application of a quasi-static Langmuir isotherm for modelling selected resin acid fate in pulp mill wastewater treatment. *Water Research*, **38** (8), 1995-2008.

Full Text: [W\Wat Res38, 1995.pdf](W/Wat%20Res38,%201995.pdf)

Abstract: Resin acids are pulp mill effluent contaminants that exhibit significant solubility, diffusivity, and surfactancy changes with pH within the range typically used for biological treatment. Such physical-chemical property changes which can influence removal during biological wastewater treatment, can be characterized by dynamic surface tension measurements. Dynamic surface tension measurements were made by the maximum bubble pressure method during batch treatment of selected resin acids in pulp mill effluent. Interpretation of dynamic surface tension data was made through the framework of a quasi-static Langmuir isotherm model that was derived as part of this investigation. The results suggested that under acidic conditions, resin acids form associations with other dissolved organic matter contained in pulp mill effluent, while under alkaline conditions, they behave as relatively soluble surfactants. A resin acid residuum, or threshold concentration, has been found to increase under acidic growth conditions. This residuum increase corresponded to an inferred reduction in resin acid bioavailability that was suggested from the isotherm modelling. The development of quasi-static isotherm adsorption models has application in computer simulation for design of adsorption based unit processes, and could potentially be utilized as an informative treatment process monitor. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Adsorption Kinetics, Langmuir Isotherm, Contaminant Fate, Dynamic Surface Tension, Maximum Bubble Pressure, Wastewater Treatment, Dynamic Surface-Tension, Bubble Pressure Method, Biological Treatment, Dehydroabietic Acid, Effluent, Detoxification, Mechanisms, Parameters, Kinetics, Removal

Faria, P.C.C., Órfão, J.J.M. and Pereira, M.F.R. (2004), Adsorption of anionic and cationic dyes on activated carbons with different surface chemistries. *Water Research*, **38** (8), 2043-2052.

Full Text: [W\Wat Res38, 2043.pdf](W/Wat%20Res38,%202043.pdf)

Abstract: The influence of the surface chemical groups of an activated carbon on the removal of different classes of dyes is evaluated. Starting from the same material (NORIT GAC 1240 PLUS), the following treatments were carried out in order to produce a series of samples with different surface chemical properties but with no major differences in their textural properties: oxidation in the liquid phase with 6 M HNO3 and 10 M H2O2 (acid materials) and heat treatment at 700°C in H2 or N2 flow (basic materials). The specific micropores volume and mesopores surface area of the materials were obtained from N2 adsorption equilibrium isotherms at 77 K. The surface chemistry was characterised by temperature programmed desorption, by the determination of the point of zero charge (pHpzc) and by the evaluation of the acidity/basicity of the samples. Elemental and proximate analyses were also carried out.

Equilibrium isotherms of selected dyes (an acid, a basic and a reactive dye) on the mentioned samples were obtained and the results discussed in relation to their surface chemistry. In general, the Langmuir model provided the best fit for the adsorption data.

It is shown that the surface chemistry of the activated carbon plays a key role in dye adsorption performance. The basic sample obtained by thermal treatment under H2 flow at 700°C is the best material for the adsorption of all the tested dyes.

Keywords: Activated Carbon, Surface Chemistry, Wastewater, Decolourisation, Dyes, Adsorption

Ladeira, A.C.Q. and Ciminelli, V.S.T. (2004), Adsorption and desorption of arsenic on an oxisol and its constituents. *Water Research*, **38** (8), 2087-2094.

Full Text: [W\Wat Res38, 2087.pdf](W/Wat%20Res38,%202087.pdf)

Abstract: The present work investigates the adsorption and mobility (desorption) of As(III) and As(V) on an oxisol, and its main mineral constituents, as part of a broader project aimed at selecting a soil liner to be used in tailings dams at a sulfidic gold ore plant. Emphasis was given to a quantitative comparison of As mobility––here assessed by the amount of As leached from the loaded samples––under different experimental conditions. From among the soil constituents, goethite was the most efficient adsorbent with regard to arsenic adsorption, 12.4 mg g-1 for As(V) and 7.5 mg g-1 for As(III), respectively. Gibbsite also presented a relevant adsorption capacity (4.6 mg g-1 for As(V) and 3.3 mg g-1 for As(III)); adsorption on kaolinite was negligible (<0.23 mg g-1 for As(V) and As(III)). Desorption of the arsenic was shown to vary largely with the arsenic oxidation state, the adsorbents and the leaching solutions. While only 1–2% max. of As(V) was released from the loaded samples, leaching the A(III) reached 32%, the highest values corresponding to the solutions containing sulfate ions. Oxisol and goethite were superior to gibbsite with respect to As immobilization. Adsorption and mobility were also discussed with the help of electrophoretic mobility and isoelectric points (IEP) determined prior and following arsenic adsorption on goethite and gibbsite. The results indicated that As(V) is mainly adsorbed as an inner sphere complex. As(III) may be adsorbed as an inner or an outer neutral complex.

Keywords: Arsenic Mobility, Oxisol, Adsorption, Desorp

Basar, C.A., Karagunduz, A., Cakici, A. and Keskinler, B. (2004), Removal of surfactants by powdered activated carbon and microfiltration. *Water Research*, **38** (8), 2117-2124.

Full Text: [W\Wat Res38, 2117.pdf](W/Wat%20Res38,%202117.pdf)

Abstract: Direct and indirect releases of large quantities of surfactants to the environment may result in serious health and environmental problems. Therefore, surfactants should be removed from water before release to the environment or delivery for public use. Using powdered activated carbon (PAC) as adsorbent and separating particles with a membrane may be an effective technique to remove surfactants. In this study, the removal of surfactants by microfiltration and PAC was investigated and the influences of the operating parameters on the effectiveness on microfiltration were determined. An anionic (LABS) and a cationic surfactant (CTAB) were selected for the experiments. A series of batch experiments were performed to determine the sorption isotherms of surfactants to PAC. Then microfiltration experiments were carried out. The results showed that formation of secondary membrane on the surface and, within the pores of the membrane, increased the retention of surfactants significantly. Increase in transmembrane pressure and pore size of the membrane decreased the rejection rates, but increase in cross-flow velocity increased the rejection rate. Temperature had no apparent affect on the efficiency of surfactant removal. Presence of electrolyte had different effects on CTAB and LABS. The rejection rates of CTAB significantly increased when the concentration of NaCl increased; however, a slight decrease was observed in the rejection rate of LABS at the same conditions.

Keywords: Powdered Activated Carbon, Surfactant, Membrane, Microfiltration

Hanzlík, J., Jehlička, J., Šebek, O. Weishauptová, Z. and Machovič, V. (2004), Multi-component adsorption of Ag(I), Cd(II) and Cu(II) by natural carbonaceous materials. *Water Research*, **38** (8), 2178-2184.

Full Text: [W\Wat Res38, 2178.pdf](W/Wat%20Res38,%202178.pdf)

Abstract: Adsorption of silver, cadmium and copper from aqueous solutions by natural carbonaceous materials was investigated. The studied series of natural materials (spruce wood, pine bark, cork, peat, fusinite, lignite, oxidised lignite, bituminous coal and anthracite) was extended to include industrial carbon-rich materials: coke, activated carbon F-400 and Multisorb™100. Adsorption was tested on a single-component system and on the binary and ternary mixtures. All the materials used differ in their ability to adsorb selected metals. The adsorption of metals is significantly affected by the presence of other ions in solution. Total metal uptake was considerably higher in a mixture than single-ion adsorption. Chemical reactions, such as precipitation and reduction of metallic silver, play a role in metal uptake by bituminous coal, coke and activated carbon.

Keywords: Activated Carbon, Adsorption, Aqueous-Solution, Cadmium, Cadmium, Coal, Competitive Adsorption, Copper, Copper, Equilibrium, Ions, Lignite, Metal-Cations, Natural Materials, Peat, Removal, Silver, Sorption, Wood

? Jensen-Spaulding, A., Cabral, K., Shuler, M.L. and Lion, L.W. (2004), Predicting the rate and extent of cadmium and copper desorption from soils in the presence of bacterial extracellular polymer. *Water Research*, **38** (9), 2231-2240.

Full Text: [2004\Wat Res38, 2231.pdf](2004/Wat%20Res38,%202231.pdf)

Abstract: The movement of cationic transition metals through the subsurface is strongly retarded by sorption to the porous media. However, dissolved organic ligands can compete with soil surfaces by providing binding sites for metals in solution. An extracellular polymer produced by a bacterium isolated from soil was used in this study to observe and model the influence of a naturally occurring ligand on the release of adsorbed metals from two test soils. Experimental results show that the presence of dissolved extracellular polymer enhanced the rate and extent of desorptive release of soil-bound cadmium and copper. A kinetic model that uses a gamma distribution of rate constants to account for the physical and chemical heterogeneity of the soil matrix was employed to describe the release of cadmium and copper in batch experiments. Model parameters describing soil, metal and extracellular polymer interactions were obtained through separate experiments. With these parameters the model successfully predicted the influence of dissolved polymer on the rate and extent of release of cadmium and copper from soil in independent batch experiments. These results suggest that the presence of natural metal-binding ligands such as bacterial extracellular polymers can act to increase the driving force for desorption by lowering the aqueous concentration of free unbound metals in solution. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Aquifer Material, Bacteria, Cadmium, Contaminated Soils, Copper, Desorption, Desorption Kinetics, Dissolved Organic-Matter, Driving, Extracellular Polymer, Gamma Distribution, Heavy-Metals, Lead, Metal, Metals, Microbial Polymers, Model, Movement, Natural, Phenanthrene, Porous-Media, Soil, Sorption, Transport, Water

Zheng, S.K., Yang, Z.F., Jo, D.H. and Park, Y.H. (2004), Removal of chlorophenols from groundwater by chitosan sorption. *Water Research*, **38** (9), 2314-2321.

Full Text: [W\Wat Res38, 2314.pdf](W/Wat%20Res38,%202314.pdf)

Abstract: The equilibrium and kinetics of chlorophenol (CP) sorption by chitosan, poly D-glucosamine, were studied under simulated groundwater conditions. Lower temperature, from 25°C to 15°C and then 5°C, markedly decreased the adsorption rates by a factor of 30–53% and 7–22%. Comparison between two types of chitosan, flakes and highly swollen beads, demonstrated that the maximum pentachlorophenol (PCP) uptake capacities in Langmuir and Freundlich models depend on the specific surface area of the particle. Low temperature (5°C) significantly increased the PCP uptake capacity in comparison to higher temperatures (15°C and 25°C). PCP uptake capacity was halved at pH levels higher than 6.5, and NaCl concentrations greater than 1% blocked PCP sorption almost completely. Of five kinds of chlorophenols, i.e. 2,4,6-trichlorophenol (2,4,6-TCP), 3,4-dichlorophenol (3,4-DCP), 2,3-dichlorophenol (2,3-DCP), 2,6-dichlorophenol (2,6-DCP), 3-monochlorophenol (3-MCP), TCP had the maximum sorption efficiency on flake-type chitosan, followed by DCPs, and finally MCP (the three kinds of DCP, with the same elemental compositions, achieved similar sorption performances).

Keywords: Chlorophenol, Chitosan, Sorption, Groundwater, Salinity, Low–Temperature

Deng, S.B. and Bai, R.B. (2004), Removal of trivalent and hexavalent chromium with aminated polyacrylonitrile fibers: Performance and mechanisms. *Water Research*, **38** (9), 2423-2431.

Full Text: [W\Wat Res38, 2423.pdf](W/Wat%20Res38,%202423.pdf)

Abstract: Aminated polyacrylonitrile fibers (APANFs) were prepared and used as an adsorbent in a series of batch adsorption experiments for the removal of Cr(III) and Cr(VI) species from aqueous solutions of different pH values. The results show that significant amounts of Cr(III) or Cr(VI) species can be adsorbed by the APANFs, although the adsorption performances was greatly dependent upon the solution pH values. In general, the amounts of adsorption for Cr(III) species increased whereas that for Cr(VI) decreased with the increase of the solution pH values, which suggests that different adsorption mechanisms dominated the removal of Cr(III) or Cr(VI) species on the APANFs. X-ray photoelectron spectroscopy and Fourier transform infrared spectroscopy revealed that the adsorption of Cr(III) species on the APANFs was largely attributed to the formation of surface complexes between the nitrogen atoms on the APANFs and the Cr(III) species adsorbed, but the adsorption of Cr(VI) species on the APANFs was more likely effected through the formation of hydrogen bonds at high solution pH values or through both electrostatic attraction and surface complexation at low solution pH values. It was found that the Cr(VI)-adsorbed APANFs can be effectively regenerated in a basic solution and be reused almost without any loss of the adsorption capacity, while the Cr(III)-adsorbed APANFs needed to be regenerated in an acidic solution and the regeneration appeared to be less effective.

Keywords: Aminated Polyacrylonitrile Fibers (APANFs), Chromium Adsorption, FTIR and XPS Analyses, Adsorption Mechanisms, Surface Interactions

? Jeon, B.H., Dempsey, B.A., Burgos, W.D., Royer, R.A. and Roden, E.E. (2004), Modeling the sorption kinetics of divalent metal ions to hematite. *Water Research*, **38** (10), 2499-2504.

Full Text: [W\Wat Res38, 2499.pdf](W/Wat%20Res38,%202499.pdf)

Abstract: The sorption kinetics of the divalent metals Zn, Co, Ni, and Cd to hematite were studied in single sorbate systems with high sorbate/sorbent ratios (from 1.67 to 3.33 mol sorbate/mol sorption sites) in 10 mM Na-piperazine N,N’-bis 2-ethane sulfonic acid (Na-PIPES) solution at pH 6.8. The experimental data showed a rapid initial sorption (half-time about 1 min) followed by slower sorption that continued for 1–5 days. The sequence of fast to slow sorption kinetics was modeled by slow inner-sphere (IS) complexation in equilibrium with outer-sphere (OS) complexes. Although the OS reaction was fast and considered to be in equilibrium, the extent of OS complexation changed over time due to increased surface potential from the IS complexes. For example, the model showed that the dimensionless OS complexation function, Kos, decreased from 0.014 initially to 0.0016 at steady state due to sorption of 4×10−5 M Zn(II) to 2 g L−1 hematite. Sorption rate constants, kads, for the various divalent metals ranged from 6.1 to 82.5 M−1 s−1. Desorption rate constants, kdes, ranged from 5.2×10−7 to 6.7×10−5 s−1. This study suggests that the conversion from OS to IS complex was the rate-determining step for the sorption of divalent metals on crystalline adsorbents.

Keywords: Divalent Metal Ions, Hematite; Slow Sorption Kinetics, Modeling

? Huang, Y.H. and Zhang, T.C. (2004), Effects of low pH on nitrate reduction by iron powder. *Water Research*, **38** (11), 2631-2642.

Full Text: [2004\Wat Res38, 2631.pdf](2004/Wat%20Res38,%202631.pdf)

Abstract: The effect of low pH (2-4.5) on nitrate reduction in an iron/nitrate/water system was investigated through batch experiments conducted in a pH-stat. The results showed that nitrate could be rapidly reduced to ammonium at pH 24.5. A black coating, consisted of both Fe(II) and Fe(III), was formed on the surface of iron grains as an iron corrosion product. X-ray diffractometry indicated that the black coating was poorly crystalline, and its spectrum could not be matched with commonly known iron oxides/hydroxides/oxide hydroxides or green rust I/II. The black coating does not inhibit the reactivity of Fe-0 (at least at pH < 3). The black coating was unstable and evolved with time into other oxides under certain conditions. A kinetic model incorporating the effects of pH on nitrate reduction and Langrymuir adsorption of nitrate was proposed, and the parameters were estimated by nonlinear curve fitting. Based on this model, the two major effects of pH on the kinetics of nitrate reduction are that: (a) H+ ions directly participate in the redox reaction of nitrate reduction following first-order kinetics; and (b) H+ ions affect the nitrate adsorption onto reactive sites. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Corrosion, I, II, Ions, Iron, Iron Corrosion, Iron Oxides, Kinetics, Kinetics, Metal, Model, Nitrate, Oxide, pH, Redox, Water, Zero-Valent Iron, Zerovalent Iron

Zhou, D., Zhang, L.N., Zhou, J.P. and Guo, S.L. (2004), Cellulose/chitin beads for adsorption of heavy metals in aqueous solution. *Water Research*, **38** (11), 2643-2650.

Full Text: [W\Wat Res38, 2643.pdf](W/Wat%20Res38,%202643.pdf)

Abstract: We successfully prepared the biodegradable cellulose/chitin beads by coagulating a blend of cellulose and chitin in 6 wt% NaOH/5 wt% thiourea aqueous solution with 5 % H2SO4 as coagulant, and investigated the adsorption of heavy metals (Pb2+, Cd2+, Cu2+) from an aqueous solution on the beads by atomic absorption spectrophotometer. Batch adsorption experiments were carried out as a function of ion concentrations, initial pH, ionic strength, temperature, 21 adsorption time and desorption time. The results revealed that the cellulose/chitin beads could adsorb effectively Pb Cd2+ and Cu2+ ions, and the uptakes of Pb2+ Cd2+ and ions on cellulose/chitin beads were 0.33 mmol/g at pH(0) 4 0.32 mmol/g at pH(0) 5 and 0.30 mmol/g at pH(0) 4, respectively. Experimental results also showed that the adsorption of these heavy metals was selective to be in the order of Pb2+ > Cd2+ > Cu2+ in a low ion concentration solution. The adsorption equilibrium time of these heavy metals on beads was 4-5 h, but the desorption time was 5-15 min. Moreover, these beads could be regenerated up to about 98% by treating with 1 mol/L HCl aqueous solution. The mechanisms for the removal of free heavy metal ions by cellulose/chitin beads was based on mainly complexation adsorption model, as well as a affinity of hydroxyl groups of the materials on metals. Therefore, we developed new environment-friendly beads prepared by a simple produce process for removal and recovery of heavy metals. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Cellulose/Chitin Bead, Adsorption, Heavy Metal, Removal, Chitin, Biosorption, Ions, Chitosan, Biomass, Lead, Equilibrium, Copper(II), Membrane

Nakajima, A. and Baba, Y. (2004), Mechanism of hexavalent chromium adsorption by persimmon tannin gel. *Water Research*, **38** (12), 2859-2864.

Full Text: [W\Wat Res38, 2859.pdf](W/Wat%20Res38,%202859.pdf)

Abstract: Mechanism of chromium adsorption by the persimmon tannin (PT) gel was examined. The PT gel can adsorb Cr highly effectively from aqueous solutions containing Cr(VI), while it adsorbed far smaller amounts of Cr from the solution containing Cr(III). The maximum Cr adsorption from the Cr(VI) solution occurred at pH 3. The Cr adsorption from the Cr(VI) solution by the PT gel was rapid, was faster than VO2+ and Fe3+ adsorptions, and was obeyed the Langmuir adsorption isotherm (Qe = 5.27 mmol g-1 I and K = 16.2 mM). The gel adsorbed Cr from the Cr(VI) solution (pH I and 3) showed no ESR signal of Cr(III), while the ESR signal of Cr(III) was observed in the residual solution at pH 1. Hexavalent chromium was, therefore, adsorbed on the PT gel through the esterification of chromate with catechol group. In other words, Cr(VI) should combine with catechol as a hard acid, CrO22+ cation. Through the treatment of a Cr(VI) solution with the PT gel, chromium should be recovered as a Cr(IV)-tannin complex at pH 3 or a Cr(III) solution at pH I or lower pH region. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Chromium Adsorption, Persimmon Tannin, Hexavalent Chromium Ion, ESR, Aqueous-Solution, Removal, Biosorption, Cr(VI), Ions

Notes: highly cited

? Carballa, M., Omil, F., Lema, J.M., Llompart, M., García-Jares, C., Rodríguez, I., Gómez, M. and Ternes, T. (2004), Behavior of pharmaceuticals, cosmetics and hormones in a sewage treatment plant. *Water Research*, **38** (12), 2918-2926.

Full Text: [2004\Wat Res38, 2918.pdf](2004/Wat%20Res38,%202918.pdf)

Abstract: Two cosmetic ingredients (galaxolide, tonalide), eight pharmaceuticals (carbamazepine, diazepam, diclofenac, ibuprofen, naproxen, roxithromycin, sulfamethoxazole and iopromide) and three hormones (estrone, 17β-estradiol and 17α-ethinylestradiol) have been surveyed along the different units of a municipal Sewage Treatment Plant (STP) in Galicia, NW Spain. Among all the substances considered, significant concentrations in the influent were only found for the two musks (galaxolide and tonalide), two anti-inflammatories (ibuprofen and naproxen), two natural estrogens (estrone, 17β-estradiol), one antibiotic (sulfamethoxazole) and the X-ray contrast medium (iopromide), where the other compounds studied were below the limit of quantification. In the primary treatment, only the fragrances (30–50%) and 17β-estradiol (20%) were partially removed. On the other hand, the aerobic treatment (activated sludges) caused an important reduction in all compounds detected, between 35% and 75%, with the exception of iopromide, which remained in the aqueous phase. The overall removal efficiencies within the STP ranged between 70–90% for the fragrances, 40–65% for the anti-inflammatories, around 65% for 17β-estradiol and 60% for sulfamethoxazole. However, the concentration of estrone increased along the treatment due to the partial oxidation of 17β-estradiol in the aeration tank.

Keywords: Activated-Sludge, Adsorption, Anti-Inflammatories, Antibiotics, Antibiotics, Aquatic Environment, Aqueous, Chromatography-Mass Spectrometry, Contaminants, Cosmetics, Elimination, Elsevier, Estrogens, Hormones, Influent, Musk Compounds, Pharmaceuticals, PPCP, Primary, Ray Contrast-Media, Removal, Sewage, Sewage Treatment Plant, Sludge Treatment Works, Solid-Phase Microextraction, Spain, Treatment, Waste-Water, Wastewaters

? Daus, B., Wennrich, R. and Weiss, H. (2004), Sorption materials for arsenic removal from water: A comparative study. *Water Research*, **38** (12), 2948-2954.

Full Text: [2004\Wat Res38, 2948.pdf](2004/Wat%20Res38,%202948.pdf)

Abstract: Five different sorption materials were tested in parallel for the removal of arsenic from water: activated carbon (AC), zirconium-loaded activated carbon (Zr-AC), a sorption medium with the trade name ‘Absorptionsmittel 3’ (AM3), zero-valent iron (Fe-0), and iron hydroxide granulates (GIH). Batch and column tests were carried out and the behavior of the two inorganic species (arsenite and arsenate) was investigated separately. The sorption kinetics of arsenate onto the materials followed the sequence Zr-ACmuch greater thanGIH=AM3>Fe(0)AC. A different sequence was obtained for arsenite (ACmuch greater thanZr-AC = AM3 = GIH = Fe-0). AC was found to enhance the oxidation reaction of arsenite in anaerobic batch experiments. The linear constants of the sorption isotherms were determined to be 377, 89 and 87 for Zr-AC, AM3 and GIH, respectively. The uptake capacities yielded from the batch experiment were about 7 g l-1 for Zr-Ac and 5 g l-1 for AM3.

Column tests indicated that arsenite was completely removed. The best results were obtained with GIH, with the arsenate not eluting before 13 100 pore volumes (inflow concentration I mg l-1 As) which corresponds to a uptake capacity of 2.3 mg g-1 or 3.7 g l-1. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Arsenic, Sorption, Iron Hydroxides, Water Cleaning, Activated Carbon, Kinetics, Samples, Iron, Equilibrium, Adsorption, Adsorbent

Ho, Y.S. (2004), Comment on ‘Cadmium removal from aqueous solutions by chitin: Kinetic and equilibrium studies’. *Water Research*, **38** (12), 2962-2964.

Full Text: [W\Wat Res38, 2962.pdf](W/Wat%20Res38,%202962.pdf) [W\Wat Res-Ho1.pdf](W/Wat%20Res-Ho1.pdf)

Keywords: Fungus Aspergillus-Niger, Industry Waste-Water, Sphagnum Moss Peat, Sorption Kinetics, Batch System, Metal-Ions, Dye, Lead, Biosorption, Biosorbent

Benaissa, H. (2004), Author’s reply. *Water Research*, **38** (12), 2965.

Full Text: [W\Wat Res38, 2965.pdf](W/Wat%20Res38,%202965.pdf)

El Zawahry, M.M. and Kamel, M.M. (2004), Removal of azo and anthraquinone dyes from aqueous solutions by *Eichhornia Crassipes*. *Water Research*, **38** (12), 2967-2972.

Full Text: [W\Wat Res38, 2967.pdf](W/Wat%20Res38,%202967.pdf)

Abstract: The rate of adsorption of two azo and four anthraquinone anionic dyes on Eichhornia Crassipes (E.C.) has been studied. Raw E.C. and three aminated derivatives of E.C. with different nitrogen percent were used as dye adsorbents. The parameters studied include the amount of substrate, shaking time, chemical structure, concentration of dyestuff and pH of dyeing bath. Simple kinetic adsorption models of dynamics and adsorption parameters for the Langmuir and Freundlich isotherms were determined. A higher nitrogen percent of aminated E.C. showed a higher adsorption capacity than other derivatives. The kinetic adsorption models indicate that the decolourization was complete in a relatively short time (10 min) and the reaction taking place is of the first order. The equilibrium data fit well with the Freundlich model of adsorption for the six dyes. Only dye IV (C.I.A Acid Blue 25) conform both Freundlich and Langmuir adsorption isotherms.

Keywords: Azo Dyes, Anthraquinone Dyes, Eichhornia Crassipes and Its Aminated Derivatives, Dye Adsorbents, Decolourization Freundlich and Langmuir’s Model

Munavalli, G.R. and Mohan Kumar, M.S. (2004), Modified Lagrangian method for modeling water quality in distribution systems. *Water Research*, **38** (12), 2973-2988.

Full Text: [W\Wat Res38, 2973.pdf](W/Wat%20Res38,%202973.pdf)

Abstract: Previous work has shown that Lagrangian methods are more efficient for modeling the transport of chemicals in a water distribution system. Two such methods, the Lagrangian Time-Driven Method (TDM) and Event-Driven Method (EDM) are compared for varying concentration tolerance and computational water quality time step. A new hybrid method (EDMNET) is developed which improves the accuracy of the Lagrangian methods. All the above methods are incorporated in an existing hydraulic simulation model. The integrated model is run for different network problems under varying conditions. The TDM-generated solutions are affected by both concentration tolerance and water quality time step, whereas EDM solutions are dependent on concentration tolerance. The EDMNET solutions are less sensitive to variations in these parameters. The threshold solutions are determined for all the methods and compared. The hybrid method simulates the nodal concentrations accurately with least maximum segmentation of network and reasonable computational effort as compared to the other Lagrangian methods.

Keywords: Bulk Decay, Distribution System, Dynamic Modeling, Quality Time Step, Concentration Tolerance, Wall Decay, Water Quality

Notes: highly cited

? Sakthivel, S., Shankar, M.V., Palanichamy, M., Arabindoo, B., Bahnemann, D.W. and Murugesan, V. (2004), Enhancement of photocatalytic activity by metal deposition: characterisation and photonic efficiency of Pt, Au and Pd deposited on TiO2 catalyst. *Water Research*, **38** (13), 3001-3008.

Full Text: [2004\Wat Res38, 3001.pdf](2004/Wat%20Res38,%203001.pdf)

Abstract: Pt, An and Pd deposited TiO(2) have been prepared and characterised by surface analytical methods such as surface area, XRD, and scanning electron micrograph and photophysical characterisation by diffuse reflectance spectroscopy. The photocatalytic activity of the doped catalysts was ascertained by the photo-oxidation of leather dye, acid green 16 in aqueous solution illuminated with low-pressure mercury lamp (similar to254nm). The effect of metal contents on the photocatalytic activity was investigated. The highest photonic efficiency was observed with metal deposition level of less than 1 wt%. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Photocatalysis, Photo-Oxidation, Photonic Efficiency, Metal-Doped TiO2, Acid Green 16, Acid Green 16, Heterogeneous Photocatalysis, Leather Dye, Semiconductor Photocatalysis, Water, Photodegradation, Photooxidation, Decomposition, Degradation, Particles

Karapinar, N., Hoffmann, E. and Hahn, H.H. (2004), Magnetite seeded precipitation of phosphate. *Water Research*, **38** (13), 3059-3066.

Full Text: [W\Wat Res38, 3059.pdf](W/Wat%20Res38,%203059.pdf)

Abstract: Seeded precipitation of Ca phosphate on magnetite mineral (Fe3O4) surfaces was investigated using a Jar Test system in supersaturated solutions at 20degreesC and ionic strength 0.01 mol l-1 with relative super saturation, 12.0-20.0 for HAP. pH of the solution, initial phosphorus concentration and molar Ca/P ratio were investigated as the main parameters, which effect the seeded precipitation of Ca phosphate. Results showed that there is no pronounced effect of magnetite seed, neither positive nor negative on the amount of calcium phosphate precipitation. pH was found to be the main parameter that determines the phosphate precipitated onto the seed surface. Increasing of the pH of precipitation reaction was resulted in the decrease in percentage amount of phosphate precipitated onto seed surfaces to total precipitation (magnetite seeded precipitation efficiency). It was concluded that the pH dependence of magnetite-seeded precipitation should be considered in the light of its effect on the supersaturated conditions of solution. Saturation index (SI) of solution with respect to the precipitate phase was considered the driving force for the precipitation. A simulation programme PHREEQC (Version 2) was employed to calculate the Saturation-index with respect to hydroxyapatite (HAP) of the chemically defined precipitation system. It was found a good relationship between SI of solution with respect to HAP and the magnetite seeded precipitation efficiency, a second order polynomial function. Results showed that more favorable solution conditions for precipitation (higher SI values of solution) causes homogenous nucleation whereas heterogeneous nucleation led to a higher magnetite seeded precipitation efficiency. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Phosphate Removal, Precipitation, Magnetite, Seeding, Water-Pollution Control, Calcium Phosphates, Crystal-Growth, Separation

Merrifield, J.D., Davids, W.G., MacRae, J.D. and Amirbahman, A. (2004), Uptake of mercury by thiol-grafted chitosan gel beads. *Water Research*, **38** (13), 3132-3138.

Full Text: [W\Wat Res38, 3132.pdf](W/Wat%20Res38,%203132.pdf)

Abstract: This study describes the synthesis and characterization of thiol-grafted chitosan beads for use as mercury (Hg) adsorbents. Chitosan flakes were dissolved and formed into spherical beads using a phase inversion technique, then crosslinked to improve their porosity and chemical stability. Cysteine was grafted onto the beads in order to improve the adsorption affinity of Hg to the beads. The beads possessed an average diameter of 3.2 mm, porosity of 0.9, specific surface area of similar to 100 m2/g, average pore size of similar to 120 Angstrom, and specific gravity of 2.0. Equilibrium and kinetic uptake experiments were conducted to study the uptake of Hg by the beads. The adsorption capacity was approximately 8.0 mmol-Hg/g-dry beads at pH 7, and decreased with decreasing pH. Hg adsorption kinetics was modeled as radial pore diffusion into a spherical bead with nonlinear adsorption. Use of the nonlinear Freundlich-isotherm in the diffusion equation allowed modeling of the uptake kinetics with a single tortuosity factor of 1.5±0.3 as the fitting parameter for all initial Hg concentrations, chitosan loadings, and agitation rates. At agitation rates of 50 and 75 rpm, where uptake rate was reduced significantly due to the boundary layer effect, the mass transfer coefficient at the outside boundary was also used as a fitting parameter to model the kinetic data. At agitation rates higher than 150 rpm, pore diffusion was the rate-limiting step. The beads exhibited a high initial uptake rate followed by a slower uptake rate suggesting pore diffusion as the rate-determining step especially at high agitation rates. Higher uptake rates observed in this study compared to those in a previous study of chitosan-based crab shells indicate that dissolution and gel formation increase the porosity and pore accessibility of chitosan. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Chitosan, Hg Removal, Heavy Metals, Sorption, Mass Transfer, Intraparticle Diffusion, Cross-Linking, Heavy-Metals, Sorption, Adsorption, Kinetics, Removal, Equilibrium, Ions, Sorbents, Water

? Barlow, K., Nash, D. and Grayson, R. (2004), Investigating phosphorus interactions with bed sediments in a fluvial environment using a recirculating flume and intact soil cores. *Water Research*, **38** (14-15), 3420-3430.

Full Text: [2004\Wat Res38, 3420.pdf](2004/Wat%20Res38,%203420.pdf)

Abstract: Phosphorus uptake by bed sediments in surface drains can reduce phosphorus exports from irrigated land. This paper reports on an investigation into the effects of velocity and water depth on phosphorus uptake by bed sediments, which consisted of eight sequential flow events conducted in a recirculating flume as well as a concurrent experiment using sediment cores. For the heavy clay bed sediment discussed in this paper, velocity and depth of water column had no significant effect on net phosphorus uptake and the rates of phosphorus uptake in either the cores or the recirculating flume. The most significant factor affecting phosphorus uptake was the experiment number which represented the sequential nature of experiments within the flume and increasing phosphorus saturation of the surface sediments. Of the kinetic equations used to describe phosphorus uptake (Elovich, boundary layer and diffusion) the Elovich equation provided the best representation of the results, both in terms of the adj-R-2 values and the absence of systematic errors in the residuals. Results suggest that intact soil cores may be used to parameterise rate equations such as the Elovich equation for use in process-based mathematical models of phosphorus transport in fluvial systems. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Clay, Column, Depth, Diffusion, Dynamics, Elovich Equation, Environment, Inorganic Phosphorus, Kinetic Equations, Kinetics, Phosphorus, Phosphorus Sorption, Rate Equations, Release, Retention, Sediment, Sediments, Soil, Sorption, Stream, Systematic, Transport, Uptake, Uptake Length, Velocity

Rodríguez, J., Castrillón, L., Marañón, E., Sastre, H. and Fernández, E. (2004), Removal of non-biodegradable organic matter from landfill leachates by adsorption. *Water Research*, **38** (14-15), 3297-3303.

Full Text: [W\Wat Res38, 3297.pdf](W/Wat%20Res38,%203297.pdf)

Abstract Leachates produced at the La Zoreda landfill in Asturias, Spain, were recirculated through a simulated landfill pilot plant. Prior to recirculation, three loads of different amounts of Municipal Solid Waste (MSW) were added to the plant, forming in this way consecutive layers. When anaerobic digestion was almost completed, the leachates from the landfill were recirculated. After recirculation, a new load of MSW was added and two new recirculations were carried out. The organic load of the three landfill leachates recirculated through the anaerobic pilot plant decreased from initial values of 5108, 3782 and 2560 mg/l to values of between 1500 and 1600 mg/l. Despite achieving reductions in the organic load of the leachate, a residual organic load still remained that was composed of non-biodegradable organic constituents such as humic substances. Similar values of the chemical oxygen demand (COD) were obtained when the landfill leachate was treated by a pressurised anoxic–aerobic process followed by ultrafiltration. After recirculation through the pilot plant, physico-chemical treatment was carried out to reduce the COD of the leachate. The pH of the leachate was decreased to a value of 1.5 to precipitate the humic fraction, obtaining a reduction in COD of about 13.5%. The supernatant liquid was treated with activated carbon and different resins, XAD-8, XAD-4 and IR-120. Activated carbon presented the highest adsorption capacities, obtaining COD values for the treated leachate in the order of 200 mg/l. Similar results were obtained when treating with activated carbon, the leachate from the biological treatment plant at the La Zoreda landfill; in this case without decreasing the pH.

Keywords: Municipal Solid Waste (MSW), Landfill, Leachates, Recirculation, Refractory Organic Matter, Adsorption

Genz, A., Kornmüller, A. and Jekel, M. (2004), Advanced phosphorus removal from membrane filtrates by adsorption on activated aluminium oxide and granulated ferric hydroxide. *Water Research*, **38** (16), 3523-3530.

Full Text: [W\Wat Res38, 3523.pdf](W/Wat%20Res38,%203523.pdf)

Abstract: The advanced phosphorus (P) removal by adsorption was studied for its suitability as a post-treatment step for membrane bioreactor (MBR) effluents low in P concentration and particle content. Two commercial adsorbents, granulated ferric hydroxide (GFH) and activated aluminium oxide (AA), were studied in batch tests and lab-scale filter tests for P adsorption in MBR filtrates. GFH showed a higher maximum capacity for phosphate and a higher affinity at low P concentrations compared to AA. Competition by inorganic ions was negligible for both adsorbents at the original pH (8.2). When equilibrium P concentrations exceeded 2 mg L−1 in the spiked MBR filtrates, a precipitation of calcium phosphates occurred additionally to adsorption. During column studies the effluent criteria of 50 μg L−1 P was reached after a throughput of 8000 bed volumes for GFH and 4000 for AA. Dissolved organic carbon appears to be the strongest competitor for adsorption sites. A partial regeneration and reloading of both adsorbents could be achieved by the use of sodium hydroxide.

Keywords: Granulated Ferric Hydroxide, Activated Alumina, Aluminium Oxide, Isotherms, Fixed-Bed Adsorption Filters, Phosphorus Removal

Oliveira, L.C.A., Petkowicz, D.I., Smaniotto, A. and Pergher, S.B.C. (2004), Magnetic zeolites: A new adsorbent for removal of metallic contaminants from water. *Water Research*, **38** (17), 3699-3704.

Full Text: [W\Wat Res38, 3699.pdf](W/Wat%20Res38,%203699.pdf)

Abstract: In this work the adsorption features of NaY zeolite with the magnetic properties of iron oxides have been combined in a composite to produce a magnetic adsorbent. These magnetic composites can be used as an adsorbent for metallic contaminants in water and subsequently removed from the medium by a simple magnetic process. The zeolites: iron oxide magnetic composites, were prepared by using NaY with weight ratio of 3: 1 and were characterized by powder X-ray diffraction (XRD), magnetization measurements, chemical analyses, N2 adsorption isotherms and Mössbauer spectroscopy. Nitrogen adsorption isotherms showed that the surface area decreased from 505 m2 g−1 for the pure NaY to 353 m2 g−1 for the NaY: Fe oxide 3: 1 composite. The adsorption isotherms of metal ions Cr3+, Cu2+ and Zn2+ from aqueous solution onto the composites also showed that the presence of iron oxide does not affect the adsorption capacity.

Keywords: Zeolite, Magnetic Adsorbents, Metallic Contaminants, Magnetic Zeolites

Kundu, S., Kavalakatt, S.S., Pal, A., Ghosh, S.K., Mandal, M. and Pal, T. (2004), Removal of arsenic using hardened paste of Portland cement: Batch adsorption and column study. *Water Research*, **38** (17), 3780-3790.

Full Text: [W\Wat Res38, 3780.pdf](W/Wat%20Res38,%203780.pdf)

Abstract: Hardened paste of Portland cement (HPPC) has been used as a low-cost adsorbent for the removal of arsenic from water environment. Results from the batch experiments, conducted at an initial concentration of 0.2 ppm of arsenate, suggest arsenate removal up to 95%. Kinetic profiles were developed for various conditions. Effects of adsorbent dose, common ions such as Ca2+, Mg2+, Fe3+, Fe2+, Cl−, SO42−, NO3−, PO43− and of pH were studied in detail. Adsorption isotherm studies revealed that the Freundlich isotherm was followed with a better correlation than the Langmuir isotherm. Arsenite could also be removed up to 88% using the same material, HPPC. Finally, column studies were undertaken involving the new HPPC to check the suitability of the material for the removal of total arsenic content from water body. Kinetic experiments for the removal of arsenic by column studies revealed a film diffusion mechanism.

Keywords: Portland Cement, Adsorption, Arsenate Removal, Adsorbent, Column Study

Li, Z.K. and Wrenn, B.A. (2004), Effects of ferric hydroxide on the anaerobic biodegradation kinetics and toxicity of vegetable oil in freshwater sediments. *Water Research*, **38** (18), 3859-3868.

Full Text: [W\Wat Res38, 3859.pdf](W/Wat%20Res38,%203859.pdf)

Abstract: Biodegradation of vegetable oil in freshwater sediments exhibits self-inhibitory characteristics when it occurs under methanogenic conditions but not under iron-reducing conditions. The basis of the protective effect of iron was investigated by comparing its effects on oil biodegradation rate and the toxicity of oil-amended sediments to those of clay and calcium, which reduce the toxicity of oil-derived long-chain fatty acids by adsorption and precipitation, respectively. Kinetic parameters for an integrated mixed-second-order model were estimated by nonlinear regression using cumulative methane production as the response variable and used to compare the effects of the three treatment factors on the rate of oil biodegradation. Ferric hydroxide was the only factor that significantly (*P*<0.05) increased the rate of methane production from canola oil, whereas calcium significantly reduced the oil biodegradation rate. Measurement of sediment toxicity using the Microtox Solid-Phase Test showed that inhibitory products formed within 5 days of oil addition, but the sediment toxicity decreased over time as the extent of oil mineralization increased. None of the other amendments significantly reduced the toxicity of oil-containing sediments. Since ferric hydroxide stimulated the rate of oil biodegradation without affecting the toxicity of oiled sediments, it must operate through a mechanism that is different from those previously described for clay and calcium.

Keywords: Vegetable Oil, Anaerobic Biodegradation, Kinetics, Freshwater Sediments

? Park, J.H., Feng, Y.C., Cho, S.Y., Voice, T.C. and Boyd, S.A. (2004), Sorbed atrazine shifts into non-desorbable sites of soil organic matter during aging. *Water Research*, **38** (18), 3881-3892.

Full Text: [2004\Wat Res38, 3881.pdf](2004/Wat%20Res38,%203881.pdf)

Abstract: Soil-chemical contact time (aging) is an important determinant of the sorption and desorption characteristics of the organic contaminants and pesticides in the environment. The effects of aging on mechanism-specific sorption and desorption of atrazine were studied in soil and clay slurries. Sorption isotherm and desorption kinetic experiments were performed, and soil-water distribution coefficients and desorption rate parameters were evaluated using linear and nonlinear sorption equations and a three-site desorption model, respectively. Aging time for sorption of atrazine in sterilized soil and clay slurries ranged from 2 days to 8 months. Atrazine sorption isotherms were nearly linear (r(2)>0.97) and sorption coefficients were strongly correlated to soil organic carbon content. Sorption distribution coefficients (K-d) increased with increase in age in all five soils studied, but not for K-montmorillonite. Sorption non-linearity did not increase with increase in age except for the Houghton muck soil. Desorption profiles were well described by the three-site desorption model. The equilibrium site fraction (f(eq)) decreased and the non-desorbable site fraction (f(nd)) increased as a function of aging time in all soils. For K-montmorillonite, f(nd) approximate to 0 regardless of aging, showing that aging phenomena are sorbent/mechanism specific. In all soils, it was found that when normalized to soil organic matter content, the concentration of atrazine in desorbable sites was relatively constant, whereas that in non-desorbable site increased. This, and the lack of aging effects on desorption from montmorillonite, suggests that sorption into nondesorbable sites of soil organic matter is primary source of increased atrazine sorption in soils during aging. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Adsorption-Desorption, Aging, Atrazine, Clay, Desorption, Desorption-Kinetics, Diffusion-Model, Distributed Reactivity Model, Distribution Coefficients, Environment, Equilibrium, Isotherm, Isotherms, Kinetics, Model, Montmorillonite, Natural Sediments, Phase-Distribution, Polychlorinated-Biphenyls, Primary, Slow Desorption, Soil, Sorption, Sorption, Sorption Isotherm, Time

Notes: highly cited

? Singh, K.P., Malik, A., Mohan, D. and Sinha, S. (2004), Multivariate statistical techniques for the evaluation of spatial and temporal variations in water quality of Gomti River (India) - a case study. *Water Research*, **38** (18), 3980-3992.

Full Text: [2004\Wat Res38, 3980.pdf](2004/Wat%20Res38,%203980.pdf)

Abstract: This case study reports different multivariate statistical techniques applied for evaluation of temporal/spatial variations and interpretation of a large complex water-quality data set obtained during monitoring of Gomti River in Northern part of India. Water quality of the Gomti River, a major tributary of the Ganga River was monitored at eight different sites selected in relatively low, moderate and high pollution regions, regularly over a period of 5 years (1994-1998) for 24 parameters. The complex data matrix (17,790 observations) was treated with different multivariate techniques such as cluster analysis, factor analysis/principal component analysis (FA/PCA) and discriminant analysis (DA). Cluster analysis (CA) showed good results rendering three different groups of similarity between the sampling sites reflecting the different water-quality parameters of the river system. FA/PCA identified six factors, which are responsible for the data structure explaining 71% of the total variance of the data set and allowed to group the selected parameters according to common features as well as to evaluate the incidence of each group on the overall variation in water quality. However, significant data reduction was not achieved, as it needed 14 parameters to explain 71% of both the temporal and spatial changes in water quality. Discriminant analysis showed the best results for data reduction and pattern recognition during both temporal and spatial analysis. Discriminant analysis showed five parameters (pH, temperature, conductivity, total alkalinity and magnesium) affording more than 88% right assignations in temporal analysis, while nine parameters (pH, temperature, alkalinity, Ca-hardness, DO, BOD, chloride, sulfate and TKN) to afford 91% right assignations in spatial analysis of three different regions in the basin. Thus, DA allowed reduction in dimensionality of the large data set, delineating a few indicator parameters responsible for large variations in water quality. This study presents necessity and usefulness of multivariate statistical techniques for evaluation and interpretation of large complex data sets with a view to get better information about the water quality and design of monitoring network for effective management of water resources. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Gomti River, Water Quality, Multivariate Techniques, Cluster Analysis, Factor Analysis, Principal Component, Discriminant Analysis, Principal Component Analysis, Fecal Pollution, Phosphorus, Nitrogen

Badruzzaman, M., Westerhoff, P. and Knappe, D.R.U. (2004), Intraparticle diffusion and adsorption of arsenate onto granular ferric hydroxide (GFH). *Water Research*, **38** (18), 4002-4012.

Full Text: [W\Wat Res38, 4002.pdf](W/Wat%20Res38,%204002.pdf)

Abstract: Porous iron oxides are being evaluated and selected for arsenic removal in potable water systems. Granular ferric hydroxide, a typical porous iron adsorbent, is commercially available and frequently considered in evaluation of arsenic removal methods. GFH is a highly porous (micropore volume 0.0394±0.0056 cm3 g−1, mesopore volume 0.0995±0.0096 cm3 g−1) adsorbent with a BET surface area of 235±8 m2 g−1. The purpose of this paper is to quantify arsenate adsorption kinetics on GFH and to determine if intraparticle diffusion is a rate-limiting step for arsenic removal in packed-bed treatment systems. Data from bottle-point isotherm and differential column batch reactor (DCBR) experiments were used to estimate Freundlich isotherm parameters (*K* and 1/*n*) as well as kinetic parameters describing mass transfer resistances due to film diffusion (*k*f) and intraparticle surface diffusion (*D*s). The pseudo-equilibrium (18 days of contact time) arsenate adsorption density at pH 7 was 8 μg As/mg dry GFH at a liquid phase arsenate concentration of 10 μg As/L. The homogeneous surface diffusion model (HSDM) was used to describe the DCBR data. A non-linear relationship (*D*S=3.0−9×*R*p1.4) was observed between *D*s and GFH particle radius (*R*P) with *D*s values ranging from 2.98×10−12 cm2 s−1 for the smallest GFH mesh size (100×140) to 64×10−11 cm2 s−1 for the largest GFH mesh size (10×30). The rate-limiting process of intraparticle surface diffusion for arsenate adsorption by porous iron oxides appears analogous to organic compound adsorption by activated carbon despite differences in adsorption mechanisms (inner-sphere complexes for As versus hydrophobic interactions for organic contaminants). The findings are discussed in the context of intraparticle surface diffusion affecting packed-bed treatment system design and application of rapid small-scale column tests (RSSCTs) to simulate the performance of pilot- or full-scale systems at the bench-scale.

Keywords: Arsenic, Iron, Adsorption, Surface Diffusion, Water Treatment

Yang, J., Jia, J.P., Liao, J. and Wang, Y.L. (2004), Removal of fulvic acid from water electrochemically using active carbon fiber electrode. *Water Research*, **38** (19), 4353-4360.

Full Text: [W\Wat Res38, 4353.pdf](W/Wat%20Res38,%204353.pdf)

Abstract: Humic acids (HA) are a group of widely existing natural organic compounds and potential contaminants to underground water reservoirs. Fulvic acid (FA) is a typical humic acid of relatively low molecular weight. Electrochemical removal of FA from water by active carbon fiber (ACF) electrodes was studied by using light scattering photometer (LSP), fluorescence spectroscopy and total organic carbon analyzer (TOC). The experiments showed that FA molecules aggregated and that the average particle diameter in FA solution increased from below 10 nm to hundreds of nanometers during the treatment process. When iron was added to the anode, the FA could be coagulated efficiently at the early stage of the treatment. The proposed mechanism of the removal process is: adsorption of FA on ACF surface→aggregation of FA→desorption of FA aggregates from ACF→coagulation of FA aggregates by nFe(OH)2.mFe(OH)3 dissolved from anode. Experiments were also repeated using graphite and stainless-steel electrodes, and the results were compared with that of ACF electrodes. FA aggregation was not observed in these experiments and most FA was not removed from the solution. At the end of this paper, FA samples from Huai River sediment were successfully treated using the ACF electrode.

Keywords: Active Carbon Fiber, Fulvic Acid, Electro-Chemistry, Light Scattering Photometer, Wastewater, Fluorescence Spectroscopy

? Quan, M., Liu, X.T., Bo, L.L., Chen, S., Zhao, Y.Z. and Cui, X.Y. (2004), Regeneration of acid orange 7-exhausted granular activated carbons with microwave irradiation. *Water Research*, **38** (20), 4484-4490.

Full Text: [2004\Wat Res38, 4484.pdf](2004/Wat%20Res38,%204484.pdf)

Abstract: An investigation was performed for the regeneration of three granular activated carbons (GACs) exhausted with acid orange 7 (AO7). The three GACs were made from different materials, i.e. coconut shells, almond nucleus and coal. The AO7 adsorption process was carried out in a continuous-flow adsorption column. After adsorption, the AO7-saturated GAC was dried at 120degreesC, then regenerated in a quartz reactor by 2450MHz microwave (MW) irradiation at 850W for 5 min. The efficacy of this procedure was analyzed by determining the rates and amounts of AO7 adsorbed in successive adsorption-MW regeneration cycles. Effects of this regeneration on the structural properties, surface chemistry and the AO7 adsorption capacities of GAC samples were examined. It was found that after several adsorption-MW regeneration cycles, the adsorption rates and capacities of GACs could maintain relatively high levels, even higher than those of virgin GACs, as indicated by AO7 breakthrough curves and adsorption isotherms. The improvement of GAC adsorption properties resulted from the modification of pore size distribution and surface chemistry by MW irradiation. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Acid Orange 7, Activated Carbon, Adsorption, Adsorption, Adsorption Isotherms, Breakthrough Curves, Decomposition, Dye, High-Pressure, Liquid Water, Microwave Irradiation, Regeneration, Temperature

Egirani, D. (2005), Comments on: Removal of copper ions from aqueous solution by tree ferns. *Water Research*, **38** (20), 4535.

Full Text: [W\Wat Res38, 4535.pdf](W/Wat%20Res38,%204535.pdf)

Ho, Y.S. (2005), Erratum to ‘Removal of copper ions from aqueous solution by tree fern’: [Water Res. 37 (2003) 2323–2330]. *Water Research*, **38** (20), 4536-4537.

Full Text: [W\Wat Res38, 4536.pdf](W/Wat%20Res38,%204536.pdf), [W\Wat Res-Ho2.pdf](W/Wat%20Res-Ho2.pdf)

Notes: highly cited

? Clara, M., Kreuzinger, N., Strenn, B., Gans, O. and Kroiss, H. (2005), The solids retention time - a suitable design parameter to evaluate the capacity of wastewater treatment plants to remove micropollutants. *Water Research*, **39** (1), 97-106.

Full Text: [2005\Wat Res39, 97.pdf](2005/Wat%20Res39,%2097.pdf)

Abstract: Micropollutants as endocrine disrupting compounds (EDC) or pharmaceuticals are of increased interest in water pollution control. Wastewater treatment plant (WWTP) effluents are relevant point sources for residues of these compounds in the aquatic environment. The solids retention time (SRT) is one important parameter for the design of WWTPs, relating to growth rate of microorganisms and to effluent concentrations. If a specific substance is degraded in dependency on the SRT, a critical value for the sludge age can be determined. In WWTPs operating SRTs below this critical value, effluent concentrations in the range of influent concentrations or a distribution according to the adsorption equilibrium have to be expected, whereas in WWTPs operating at SRTs higher than the critical value degradation will occur. Critical SRTs were determined for different micropollutants, indicating that the design criteria based on the sludge age allows an estimation of emissions. Different treatment technologies as conventional activated sludge systems and a membrane bioreactor were considered and no significant differences in the treatment efficiency were detected when operated at comparable SRT. The results of the investigations lead to the conclusion that low effluent concentrations can be achieved in WWTPs operating SRTs higher than 10 days (referred to a temperature of 10degreesC). This corresponds to the requirements for WWTPs situated in sensitive areas according to the urban wastewater directive of the European Community (91/271/EEC) in moderate climatic zones. (C) 2004 Elsevier Ltd. All rights reserved.

Keywords: Wastewater Treatment, Plant Design, Solids Retention Time, Removal Potential, Endocrine Disrupting Compounds, Pharmaceuticals, Hazardous Substances, Sewage-Treatment Plants, Municipal Sewage, Activated-Sludge, Bisphenol-A, Pharmaceutical Residues, Estrogens, Fate, Environment, Behavior

Wang, S.B., Boyjoo, Y., Choueib, A. and Zhu, Z.H. (2005), Removal of dyes from aqueous solution using fly ash and red mud. *Water Research*, **39** (1), 129-138.

Full Text: [W\Wat Res39, 129.pdf](W/Wat%20Res39,%20129.pdf)

Abstract: Fly ash and red mud have been employed as adsorbents for the removal of a typical basic dye, Methylene blue, from aqueous solution. Heat treatment and chemical treatment have also been applied to the as-received fly ash and red mud samples. It is found that fly ash generally shows higher adsorption capacity than red mud. The raw fly ash and red mud show adsorption capacity at 1.4×10−5 and 7.8×10−6 mol/g, respectively. Heat treatment reduces the adsorption capacity for both fly ash and red mud but acid treatment by HNO3 induces a different effect on fly ash and red mud. Nitric acid treatment results in an increase in adsorption capacity of fly ash (2.4×10−5 mol/g) while it decreases the adsorption capacity for red mud (3.2×10−6 mol/g). The adsorption data have been analysed using Langmuir, Freundlich and Redlich–Peterson isotherms. The results indicate that the Redlich–Peterson model provides the best correlation of the experimental data. Isotherms have also been used to obtain the thermodynamic parameters such as free energy, enthalpy and entropy of adsorption. For fly ash and red mud, adsorption of Methylene blue is endothermic reaction with Δ*H*0 at 76.1 and 10.8 kJ/mol, respectively.

Keywords: Fly Ash, Red Mud, Basic Dyes, Wastewater, Adsorption

Diniz, V. and Volesky, B. (2005), Biosorption of La, Eu and Yb using *Sargassum* biomass. *Water Research*, **39** (1), 239-247.

Full Text: [W\Wat Res39, 239.pdf](W/Wat%20Res39,%20239.pdf)

Abstract: Biosorption of the lanthanides: Lanthanum (La3+), Europium (Eu3+) and Ytterbium (Yb3+) from single-component and multi-component batch systems using *Sargassum polycystum* Ca-loaded biomass was studied. The ion exchange sorption mechanism was confirmed by the release of calcium ions from the biomass that matched the total number of metal and protons removed from the solution. The metal binding increased with pH due to the decrease of proton concentration in the system, as they also compete for the binding sites. The maximum metal uptake capacity for pH 3, 4 and 5 ranged approximately between (0.8–0.9) mmol g−1 for La (0.8–0.9) mmol g−1 for Eu, and (0.7–0.9) mmol g−1 for Yb. Biosorption from multi-component mixtures was examined at pH 4 using equimolar initial concentrations of the metals. The metal affinity sequence established was Eu>La>Yb, and the maximum metal uptake obtained was 0.29, 0.41, 0.28 mmol g−1 for La, Eu and Yb, respectively.

Keywords: Biosorption, Ion Exchange, Lanthanum, Europium, Ytterbium, *Sargassum*

Zheng, S.K., Yang, Z.F., Jo, D.H., Park, Y.H. and Ho, Y.S. (2005), Comment on ‘Removal of chlorophenols from groundwater by chitosan sorption’. *Water Research*, **39** (1), 264-268.

Full Text: [W\Wat Res39, 264.pdf](W/Wat%20Res39,%20264.pdf), [W\Wat Res-Ho3.pdf](W/Wat%20Res-Ho3.pdf)

Keywords: Fungus Aspergillus-Niger, Sugarcane Bagasse Pith, Heavy-Metal Adsorption, Activated Date Pits, Sphagnum Moss Peat, Aqueous-Solution, Kinetic-Models, Tree Fern, Dye Sorption, Cadmium Ion

Zheng, S.K. and Yang, Z.F. (2005), Reply to comment on originality of kinetic models by Y.-S. Ho. *Water Research*, **39** (1), 269.

Full Text: [W\Wat Res39, 269.pdf](W/Wat%20Res39,%20269.pdf)

Zhang, F.S., Nriagu, J.O. and Itoh, H. (2005), Mercury removal from water using activated carbons derived from organic sewage sludge. *Water Research*, **39** (2-3), 389-395.

Full Text: [W\Wat Res39, 389.pdf](W/Wat%20Res39,%20389.pdf)

Abstract: Various types of activated carbons were developed from organic sewage sludge (SS) using H2SO4, H3PO4 and ZnCl2 as chemical activation reagents, and the removal of Hg(II) from aqueous solution by these carbons was effectively demonstrated. The quality of the activated carbons was dramatically improved owing to chemical activation. ZnCl2 activated carbon had the highest capability for Hg(II) adsorption, followed by H3PO4 and H2SO4 activated carbons. The adsorption was greatly affected by Hg(II) concentration, solution pH and carbon dosage, and followed Lagergren first order rate equation and Freundlich isotherm model. Desorption results indicated that around 60% to 80% of the adsorbed Hg(II) could be recovered from the carbons to 0.1 M HNO3 solution by sonication treatment. Accordingly, it is believed that the activated carbons developed in this study are effective and practical for utilization in industrial wastewater treatment for mercury removal.

Keywords: Mercury, Activated carbon, Sewage sludge, Adsorption, Wastewater, Desorption

Benkli, Y.E., Can, M.F., Turan, M. and Çelik, M.S. (2005), Modification of organo-zeolite surface for the removal of reactive azo dyes in fixed-bed reactors. *Water Research*, **39** (2-3), 487-493.

Full Text: [W\Wat Res39, 487.pdf](W/Wat%20Res39,%20487.pdf)

Abstract: Modification of zeolite (clinoptilolite) surface with a quaternary amine, hexadecyl trimethyl ammonium bromide (HTAB), to improve the removal efficiency of reactive azo dyes in a zeolite fixed bed was investigated. A series of adsorption tests were conducted to find out the uptake of three types of reactive dyes, i.e. CI Reactive Black 5, Red 239 and Yellow 176. Each run consisted of modifying zeolite with HTAB in the column followed by removal of color from the modified zeolite bed. The breakthrough curves for modification process were constructed under different conditions by plotting the normalized effluent concentration (C/C0) versus time or bed volumes (BV). Optimization studies show that 3 g/l of HTAB dosage at a flowrate of 0.025 l/min showed the best performance. Examination of the dye removal under the optimum modification conditions reveals that the black dye gives the highest breakthrough point among the three dyes tested. This is ascribed to the hydrophobic/hydrophilic match of the zeolite surface with the dye molecule, which depends upon the way zeolite is modified with HTAB. Calculations of the HTAB coverage on zeolite surface indicate that a bilayer formation is the most viable packing that enables maximum removal of the dye.

Keywords: Activated Carbon, Adsorption, Adsorption, Ammonia Removal, Behavior, Breakthrough Curves, Clinoptilolite, Clinoptilolite, Color Removal, Decolorization, Drinking-Water, Dye, Dyes, Fixed Bed, HTAB, Reactive Dyes, Removal, Textile Effluents

Park, D., Yun, Y.S., Jo, J.H. and Park, J.M. (2005), Mechanism of hexavalent chromium removal by dead fungal biomass of *Aspergillus niger*. *Water Research*, **39** (4), 533-540.

Full Text: [W\Wat Res39, 533.pdf](W/Wat%20Res39,%20533.pdf)

Abstract: When synthetic wastewater containing Cr(VI) was placed in contact with the dead fungal biomass of *Aspergillus niger*, the Cr(VI) was completely removed from aqueous solution, whereas Cr(III), which was not initially present, appeared in aqueous solution. Desorption and X-ray photoelectron spectroscopy (XPS) studies showed that most of the Cr bound on the biomass was in trivalent form. These results indicated that the main mechanism of Cr(VI) removal was a redox reaction between Cr(VI) and the dead fungal biomass, which is quite different from previously reported mechanisms. The influences of contact time, pH, Cr(VI) concentration, biomass concentration and temperature on Cr(VI) removal were also evaluated. The Cr(VI) removal rate increased with a decrease in pH and with increases in Cr(VI) concentration, biomass concentration and temperature. Although removal kinetics was dependent on the experimental conditions, Cr(VI) was completely removed in the aqueous solution. In conclusion, a new mechanism of Cr(VI) removal by the dead fungal biomass has been proposed. From a practical viewpoint, this abundant and inexpensive dead fungal biomass has potential application in the conversion of toxic Cr(VI) into less toxic or nontoxic Cr(III).

Keywords: Biosorption, Hexavalent Chromium, Fungi, Reduction, Detoxification

James, G., Sabatini, D.A., Chiou, C.T., Rutherford, D., Scott, A.C. and Karapanagioti, H.K. (2005), Evaluating phenanthrene sorption on various wood chars. *Water Research*, **39** (4), 549-558.

Full Text: [W\Wat Res39, 549.pdf](W/Wat%20Res39,%20549.pdf)

Abstract: A certain amount of wood char or soot in a soil or sediment sample may cause the sorption of organic compounds to deviate significantly from the linear partitioning commonly observed with soil organic matter (SOM). Laboratory produced and field wood chars have been obtained and analyzed for their sorption isotherms of a model solute (phenanthrene) from water solution. The uptake capacities and nonlinear sorption effects with the laboratory wood chars are similar to those with the field wood chars. For phenanthrene aqueous concentrations of 1 μgl−1, the organic carbon-normalized sorption coefficients (log Koc) ranging from 5.0 to 6.4 for field chars and 5.4–7.3 for laboratory wood chars, which is consistent with literature values (5.6–7.1). Data with artificial chars suggest that the variation in sorption potential can be attributed to heating temperature and starting material, and both the quantity and heterogeneity of surface-area impacts the sorption capacity. These results thus help to corroborate and explain the range of log Koc values reported in previous research for aquifer materials containing wood chars.

Keywords: Wood Char, Sorption, Koc, Phenanthrene, Nonlinear Isotherms, Surface Area

Li, Y.H., Di, Z.C., Ding, J., Wu, D.H., Luan, Z.K. and Zhu, Y.Q. (2005), Adsorption thermodynamic, kinetic and desorption studies of Pb2+ on carbon nanotubes. *Water Research*, **39** (4), 605-609.

Full Text: [W\Wat Res39, 605.pdf](W/Wat%20Res39,%20605.pdf)

Abstract: Adsorption thermodynamics of Pb2+ on carbon nanotubes has been studied at various temperatures of 280, 298 and 321 K and the thermodynamic parameters, such as equilibrium constant (K0), standard free energy changes (ΔG°), standard enthalpy change (ΔH°) and standard entropy change (ΔS°), have been obtained. A pseudo-second-order rate model has been employed to describe the kinetic adsorption processes. Desorption studies reveal that Pb2+ can be easily removed from carbon nanotubes by altering the pH values of the solution using both HCl and HNO3, indicating that carbon nanotubes are a promising absorbent for wastewater treatment.

Keywords: Adsorption, Carbon Nanotubes, Desorption, Kinetics, Lead, Thermodynamics

Wu, R.C., Qu, J.H. and Chen, Y.S. (2005), Magnetic powder MnO–Fe2O3 composite: A novel material for the removal of azo-dye from water. *Water Research*, **39** (4), 630-638.

Full Text: [W\Wat Res39, 630.pdf](W/Wat%20Res39,%20630.pdf)

Abstract: Fine powder adsorbents or catalysts often show better adsorptive or catalytic properties, but they encounter the difficulties of separation and recovery in application. In this study, four inexpensive magnetic powder MnO–Fe2O3 composites used as adsorbent–catalyst materials were prepared and characterized. These materials could be recovered efficiently by a magnetic separation method. Their adsorptive properties for the removal of an azo-dye, acid red B (ARB), from water and the regeneration of adsorbents containing ARB by catalytic combustion was studied. These powder adsorbents showed excellent adsorption towards ARB under acidic conditions. A very fast adsorption rate was observed and could be well described by a pseudo-second-order kinetics model. The adsorption capacity increased with increasing Fe content and surface area of the adsorbent, and the highest adsorption capacity of 105.3 mg/g was obtained at pH 3.5. The adsorption was not affected by the presence of Cl−, but was significantly affected by SO42−. The adsorbent containing ARB can be regenerated by catalytic combustion of adsorbed ARB at 400 °C in air. Laboratory experiments demonstrated that this material is reusable.

Keywords: MnO–Fe2O3 Composite, Adsorption, Catalytic Combustion, Acid Red B

Yan, W.L. and Bai, R. (2005), Adsorption of lead and humic acid on chitosan hydrogel beads. *Water Research*, **39** (4), 688-698.

Full Text: [W\Wat Res39, 688.pdf](W/Wat%20Res39,%20688.pdf)

Abstract: Chitosan hydrogel beads were studied for the adsorption of lead ions and humic acid from aqueous solutions to examine the adsorption behaviors and mechanisms. The experiments were carried out at room temperature with solution pH ranging from 5 to 7.5 (in near neutral pH range). Three types of batch adsorption experiments, including single species adsorption, sequential adsorption of one species after another and co-adsorption of both species, were investigated. The results show that: (1) adsorption of either species mainly results from the complexations between adsorbate and functional groups at the surface of the hydrogel beads; (2) previously adsorbed species can either act as additional binding sites for, or occupy the same binding sites as the subsequent species to be adsorbed, resulting in enhanced or retarded adsorption of the subsequent species; and (3) for co-adsorption, metal-organic interactions play a very important role in determining the extent of adsorption. It is concluded that multi-species adsorption can be significantly affected by adsorbate interactions and the understanding of these interactions needs great attention in adsorption study in the future.

Keywords: Chitosan Hydrogel Beads, Adsorption, Lead, Humic Acid, Interactions

Petrus, R. and Warchoł, J.K. (2005), Heavy metal removal by clinoptilolite. An equilibrium study in multi-component systems. *Water Research*, **39** (5), 819-830.

Full Text: [W\Wat Res39, 819.pdf](W/Wat%20Res39,%20819.pdf)

Abstract: Ternary and quaternary ion-exchange equilibria have been studied between heavy metal solution (Pb2+, Cd2+, Cu2+) and Na-form of clinoptilolite. The value of the ion-exchange equilibrium constant was estimated using the Langmuir, Competitive Langmuir, and thermodynamic sorption models. For each isotherm, calculations were done taking into account the concentration of ions in both phases. Additionally, for the thermodynamic isotherm, two other cases were considered: activity of ions in the liquid phase and concentration in the solid phase; activity of ions in both phases. The activity coefficients of ions in the liquid phase were determined using Pitzer’s model; activity coefficients in the solid phase were estimated by Wilson’s model. It was found that the exchange capacity for a given M2+ is not constant and differs in one- or multi-component systems. The results show that the equilibrium model based on the law of mass action, which considers nonideal behavior of both phases, allows one to achieve the best approach to the real multi-component equilibrium data in all studied systems.

Keywords: Clinoptilolite, Ion-Exchange, Heavy Metals Removal, Equilibrium Models, Sorption

Zhang, S.J., Yu, H.Q. and Zhao, Y. (2005), Kinetic modeling of the radiolytic degradation of Acid Orange 7 in aqueous solutions. *Water Research*, **39** (5), 839-846.

Full Text: [W\Wat Res39, 839.pdf](W/Wat%20Res39,%20839.pdf)

Abstract: The degradation of Acid Orange 7 (AO7) in aqueous solutions induced by γ-ray irradiation was investigated in terms of both the disappearance of parent molecule (decoloration) and the degree of mineralization. The disappearance of AO7 followed pseudo first-order kinetics, whereas its mineralization could be described by zero-order kinetics. The pseudo first-order degradation rate constants were found to be proportional to irradiation dose rates and the reciprocals of initial AO7 concentrations. Based on the experimental results and a reaction analysis on the steady-state radiolysis of aerated aqueous solutions, a kinetic model was developed for describing the radiolytic degradation of AO7. Moreover, with this kinetic model, the reaction rate constants of *e*aq− and H· with AO7 were estimated as 3.0×109 and 8.4×109×L mol−1 s−1, respectively. Taking the relative contributions of oxidative and reductive species to AO7 degradation into account, oxidative radiolysis proved to be a better approach for the degradation of AO7.

Keywords: AO7, Degradation, Radiolysis, Kinetic, Modeling

Khraisheh, M.A.M., Al-Ghouti, M.A., Allen, S.J. and Ahmad, M.N. (2005), Effect of OH and silanol groups in the removal of dyes from aqueous solution using diatomite. *Water Research*, **39** (5), 922-932.

Full Text: [W\Wat Res39, 922.pdf](W/Wat%20Res39,%20922.pdf)

Abstract: The removal of methylene blue, reactive black (C-NN), and reactive yellow (MI-2RN) from aqueous solution by calcined and raw diatomite at 980 °C was studied. These studies demonstrated the importance of the various functional groups on the mechanism of adsorption. The role of pore size distribution in the dye adsorption studies was also investigated. The adsorption isotherms were pH dependent. Henry and Freundlich adsorption isotherms were used to model the adsorption behavior and experimental results for all dyes used exhibited heterogeneous surface binding. The removal of the ionisable functional groups increased the pHZPC value from 5.4 to 7.7, while FTIR, SEM and XRD analysis showed a remarkable decrease of the characteristic Si–OH peaks after calcinations at 980 °C. The removal of hydroxyl groups from the surface of diatomite lead to a decrease in the adsorption. It was evident from pH and infrared spectra results that mechanisms of methylene blue and reactive yellow adsorption differed from that of reactive black. Accordingly, adsorption on the external surface by *n*–*π* interaction between the π system of the RB and the electron lone pairs of the oxygen atoms of siloxane group and columbic attraction between the dye and the surface of calcined diatomite was proposed as a possible adsorption mechanism.

Keywords: Diatomite, Calcined Diatomite, Adsorption, Reactive and Basic Dyes, Methylene Blue, Textile Wastewater

Amiri, F., Börnick, H. and Worch, E. (2005), Sorption of phenols onto sandy aquifer material: the effect of dissolved organic matter (DOM). *Water Research*, **39** (5), 933-941.

Full Text: [W\Wat Res39, 933.pdf](W/Wat%20Res39,%20933.pdf)

Abstract: The influence of dissolved organic matter (DOM) on the sorption of four phenols, 2,4,6-trichlorophenol (2,4,6-TCP), pentachlorophenol (PCP), 2,4-dinitrophenol (2,4-DNP) and 2-methyl-4,6-dinitrophenol (2-M-4,6-DNP), onto sandy aquifer material at different pH values was investigated using flow through column experiments.

The pH-dependent sorption of the chlorinated phenols 2,4,6-TCP and PCP was not significantly affected by DOM (measured as dissolved organic carbon, DOC), whereas in the case of nitrophenols a significant lower retardation was found, depending on the DOC concentration and pH value of the aqueous solution. Sorption decreases with increasing DOC concentration, which indicates a binding of these compounds by DOM. The degree of sorption reduction depends on the pH value and increases with increasing fraction of neutral species. The different behaviour of nitrophenols in comparison to the chlorophenols is assumed to be a result of specific charge-transfer interactions.

A combined sorption and complex formation model was used to describe the effect of pH and DOC concentration on the sorption of nitrophenols onto aquifer material and to estimate binding coefficients of neutral nitrophenols on DOM.

Keywords: Sorption, Hydrophobic Ionic Organic Compounds (HIOCs), pH effEct, Dissolved Organic Matter (DOM), DOC, Complex Formation

? Logan, B.E., Murano, C., Scott, K., Gray, N.D. and Head, I.M. (2005), Electricity generation from cysteine in a microbial fuel cell. *Water Research*, **39** (5), 942-952.

Full Text: [2005\Wat Res39, 942.pdf](2005/Wat%20Res39,%20942.pdf)

Abstract: In a microbial fuel cell (MFC), power can be generated from the oxidation of organic matter by bacteria at the anode, with reduction of oxygen at the cathode. Proton exchange membranes used in MFCs are permeable to oxygen, resulting in the diffusion of oxygen into the anode chamber. This could either lower power generation by obligate anaerobes or result in the loss in electron donor from aerobic respiration by facultative or other aerobic bacteria. In order to maintain anaerobic conditions in conventional anaerobic laboratory cultures, chemical oxygen scavengers such as cysteine are commonly used. It is shown here that cysteine can serve as a substrate for electricity generation by bacteria in a MFC. A two-chamber MFC containing a proton exchange membrane was inoculated with an anaerobic marine sediment. Over a period of a few weeks, electricity generation gradually increased to a maximum power density of 19 mW/m2 (700 or 100Ω resistor; 385 mg/L of cysteine). Power output increased to 39 mW/m2 when cysteine concentrations were increased up to 770 mg/L (493Ω resistor). The use of a more active cathode with Pt- or Pt–Ru, increased the maximum power from 19 to 33 mW/m2 demonstrating that cathode efficiency limited power generation. Power was always immediately generated upon addition of fresh medium, but initial power levels consistently increased by ca. 30% during the first 24 h. Electron recovery as electricity was 14% based on complete cysteine oxidation, with an additional 14% (28% total) potentially lost to oxygen diffusion through the proton exchange membrane. 16S rRNA-based analysis of the biofilm on the anode of the MFC indicated that the predominant organisms were Shewanella spp. closely related to Shewanella affinis (37% of 16S rRNA gene sequences recovered in clone libraries).

Keywords: Bacteria, Biofuel Cell, Microbial Fuel Cell, Electricity, Power Output, Shewanella, Fuel Cell

Vaughan, Jr., R.L. and Reed, B.E. (2005), Modeling As(V) removal by a iron oxide impregnated activated carbon using the surface complexation approach. **39** (6), 1005-1014.

Full Text: [W\Wat Res39, 1005.pdf](W/Wat%20Res39,%201005.pdf)

Abstract: The objective of this research was to model As(V) removal onto a iron oxide impregnated activated carbon (FeAC) using the surface complexation model (SCM) approach. As(V) removal by FeAC was due to the impregnated Fe oxide, not the base carbon material and was a strong function of pH. The two-monoprotic site-triple layer model adequately described As(V) removal using 2 fitting parameters compared with the 3 parameters needed for the diprotic site model. This, along with a better representation of the recognized As(V) removal mechanism (ligand exchange with −OH) as well as the acid–base behavior makes the two-monoprotic approach the better model for As(V) removal by the impregnated iron oxide although the diprotic model was able to describe the pH dependent removal of As(V). Both models were also able to predict As(V) removal at different adsorbent/adsorbate ratios using *K*As determined from a single FeAC adsorption experiment. Thus, fewer adsorption experiments are required in order to model As(V) removal in equilibrium and column systems. The results described in this work will be used as a foundation in developing a dynamic model to predict As(V) adsorption in a fixed-bed adsorber.

Keywords: Arsenic, Modeling, Iron Oxide, Impregnated Carbon

Faghihian, H. and Bowman, R.S. (2005), Adsorption of chromate by clinoptilolite exchanged with various metal cations. *Water Research*, **39** (6), 1099-1104.

Full Text: [W\Wat Res39, 1099.pdf](W/Wat%20Res39,%201099.pdf)

Abstract: Unmodified zeolite surfaces show no affinity for anions, due to the fact that zeolites are negatively charged. Thus, adsorption of anions by zeolites has not been given much attention. In this work, after modification of clinoptilolite by different cations, the mineral was found to adsorb a considerable amount of the divalent anion chromate. Chromate adsorption was proportional to the *K*sp of the chromate precipitate and the amount of the exchangeable cation. The amount of chromate adsorbed was maximized when the Pb-exchanged form was used. Chromate desorption in deionized water indicated that between 2.50% and 18.60% of the adsorbed chromate was released depending upon the exchangeable cation. Some of the exchanged forms are candidate materials for adsorption and immobilization of chromate.

Keywords: Zeolites, Adsorption, Chromate

Lu, C., Chung, Y.L. and Chang, K.F. (2005), Adsorption of trihalomethanes from water with carbon nanotubes. *Water Research*, **39** (6), 1183-1189.

Full Text: [W\Wat Res39, 1183.pdf](W/Wat%20Res39,%201183.pdf)

Abstract: Commercial carbon nanotubes (CNTs) were purified by acid solution and were employed as adsorbents to study adsorption of trihalomethanes (THMs) from water. The properties of CNTs such as purity, structure and nature of the surface were greatly improved after acid treatment which made CNTs become more hydrophilic and suitable for adsorption of low molecular weight and relatively polar THM molecules. The adsorption of THMs onto CNTs fluctuates very little in the pH range 3–7, but decreases with pH value as pH exceeds 7. A comparative study between CNTs and powdered activated carbon (PAC) for adsorption of THMs from water was also conducted. The short time needed to reach equilibrium as well as the high adsorption capacity of CHCl3, which accounts for a significant portion of THMs in the chlorinated drinking water, suggests that CNTs possess highly potential applications for THMs removal from water.

Keywords: Carbon Nanotubes, Adsorption, Trihalomethanes, pH Effect, Powdered Activated Carbon

? Zhou, A.M., Tang, H.X. and Wang, D.S. (2005), Phosphorus adsorption on natural sediments: Modeling and effects of pH and sediment composition. *Water Research*, **39** (7), 1245-1254.

Full Text: [W\Wat Res39, 1245.pdf](W/Wat%20Res39,%201245.pdf)

Abstract: The classic Langmuir isotherm equation was modified to describe phosphorus (P) adsorption on P-polluted sediments. The P adsorption characteristics of six sediment samples from Chinese Taihu Lake were studied by short-term isotherm batch experiments and related to sediment composition. The maximum P adsorption capacities (PAC) and P-binding energy constant (k) were obtained by nonlinearly fitting sorption data using the modified Langmuir isotherm model. Native adsorbed exchangeable phosphorus (NAP), the zero equilibrium P concentration value (EPC0), and partitioning coefficients (Kp) were subsequently calculated by corresponding formulae. Kp and PAC were linearly related to the contents of active Fe and Al in sediments by least squares regression analyses (R2≈0.9 for both).

The effect of pH in a wide range on adsorption process was investigated and H2PO4− was presumed to be the preferential sorption species in overall sorption process. The fact that the amount of P sorbed and zeta potential of sediment particles have no necessary relationship reveals that a strong contribution to the P binding still comes from a ligand-exchange process on the Me–OH2+ and Me–OH sites rather than electrostatic attraction. In addition, the influence of oxidation–reduction potential (ORP) was investigated and discussed and the dual nature of sediments as a pool or source of P in natural waters was evaluated in site T1–T4.

Keywords: Adsorption, Model, Sediment, NAP, Preferential Sorption Species, Taihu Lake

? Kim, Y.H. and Nakano, Y. (2005), Adsorption mechanism of palladium by redox within condensed-tannin gel. *Water Research*, **39** (7), 1324-1330.

Full Text: [W\Wat Res39, 1324.pdf](W/Wat%20Res39,%201324.pdf)

Abstract: Condensed-tannin gel particles with polyhydroxyphenyl groups were synthesized as the adsorbent for the new recovery system of palladium (Pd), which was simple and generated little secondary waste in comparison with the conventional recovery processes. The properties of condensed-tannin gel particles for the Pd adsorption were examined in PdCl2 aqueous solution and it was found that Pd(II) was adsorbed onto the tannin gel particles as a reduced metallic Pd through redox reaction mechanism: chloropalladium(II) species were reduced to Pd(0), while hydroxyl groups of condensed-tannin gel were oxidized during the adsorption. Additionally, it was observed that Pd(II) species containing fewer Cl, such as PdCl2(H2O)2 and PdCl(H2O)3+, were more favorable for the adsorption than PdCl3(H2O)− and PdCl42−. By utilizing such characteristics of tannin gel particles, it is expected that they can be applied to recover Pd efficiently and simply with low cost.

Keywords: Tannin, Gel, Palladium, Chloropalladium(II), Recovery, Redox

? Chen, J.S., Zhang, J.D., Xian, Y.Z., Ying, X.Y., Liu, M.C. and Jin, L.T. (2005), Preparation and application of TiO2 photocatalytic sensor for chemical oxygen demand determination in water research. *Water Research*, **39** (7), 1340-1346.

Full Text: [W\Wat Res39, 1340.pdf](W/Wat%20Res39,%201340.pdf)

Abstract: In this work, a TiO2 photocatalytic sensor was prepared and utilized into flow injection analysis (FIA) for chemical oxygen demand (COD) determination. With a positive bias potential of 0.4 V (vs. Ag/AgCl) applied to the sensor and a 12-W quartz UV lamp illuminating it, photocurrent, due to the charge transfer at the interface of TiO2 sensor and the passing solution, was recorded and its change (ΔIPhoto) caused by the detected sample was calculated to characterize the COD value of the sample. Under the optimizing conditions, the sensor responded linearly to the COD of d-glucose solution in the range of 0.5–235 mg/L, with a linear correlation coefficient of 0.9998. Its application in artificial wastewater analysis has achieved results in good agreement with those from the conventional dichromate method; meanwhile, the process requires no hypertoxic reagents and less analysis time, suggesting that it would be another appropriate method for COD determination in water assessment.

Keywords: Photocatalytic Sensor, Chemical Oxygen Demand (COD), Titanium Dioxide (TiO2), Flow Injection Analysis (FIA)

? Tanthapanichakoon, W., Ariyadejwanich, P., Japthong, P., Nakagawa, K., Mukai, S.R. and Tamon, H. (2005), Adsorption–desorption characteristics of phenol and reactive dyes from aqueous solution on mesoporous activated carbon prepared from waste tires. *Water Research*, **39** (7), 1347-1353.

Full Text: [W\Wat Res39, 1347.pdf](W/Wat%20Res39,%201347.pdf)

Abstract: Liquid-phase adsorption–desorption characteristics and ethanol regeneration efficiency of an activated carbon prepared from waste tires and a commercial activated carbon were investigated. Water vapor adsorption experiments reveal that both activated carbons showed hydrophobic surface characteristics. Adsorption experiments reveal that the prepared activated carbon possessed comparable phenol adsorption capacity as the commercial one but clearly larger adsorption capacity of two reactive dyes, Black 5 and Red 31. It was ascertained that the prepared activated carbon exhibited less irreversible adsorption of phenol and the two dyes than its commercial counterpart. Moreover, ethanol regeneration efficiency of the prepared AC saturated with either dye was higher than that of the commercial AC. Because of its superior liquid-phase adsorption–desorption characteristics as well as higher ethanol regeneration efficiency, the prepared activated carbon is more suitable for wastewater treatment, especially for adsorbing similarly bulky adsorbates.

Keywords: Activated Carbon, Waste Tires, Adsorption, Desorption, Ethanol Regeneration, Porosity

? Athanasiadis, K. and Helmreich, B. (2005), Influence of chemical conditioning on the ion exchange capacity and on kinetic of zinc uptake by clinoptilolite. *Water Research*, **39** (8), 1527-1532.

Full Text: [2005\Wat Res39, 1527.pdf](2005/Wat%20Res39,%201527.pdf)

Abstract: Aim of this study was to evaluate the feasibility of the use of clinoptilolite as a barrier material to eliminate heavy metals from roof runoff. The effect of chemical conditioning with 1 M NaCl solution upon the ion exchange capacity and on kinetic of zinc uptake by clinoptilolite has been investigated. According to the batch experiments the modified clinoptilolite has up to 100% higher sorption capacity, regarding Zn than the natural material. The pre-treatment of clinoptilolite results in an acceleration of the ion exchange process up to 40% regarding zinc. In order to define the reasons of this behaviour, both materials, modified and natural, were analysed for: (i) chemical composition, (ii) density, (iii) pore size distribution and (iv) zeta potential. The clogging of the pores, the charge of the grain surface, the pH of the initial metal solution and the ion metal concentration are the factors which are mainly affecting the ion exchange capacity and the rate of zinc uptake by clinoptilolite. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Capacity, Clinoptilolite, Feasibility, Heavy Metals, Ion Exchange, Ion Exchange Capacity, Lead, Metal, Metals, Modified, Natural, pH, Pore Size Distribution, Removal, Roof Runoff, Runoff, Sorption, Uptake, Zeolites, Zeta Potential

? Pagnanelli, F., Mainelli, S., De Angelis, S. and Toro, L. (2005), Biosorption of protons and heavy metals onto olive pomace: Modelling of competition effects. *Water Research*, **39** (8), 1639-1651.

Full Text: [W\Wat Res39, 1639.pdf](W/Wat%20Res39,%201639.pdf)

Abstract: Heavy metal biosorption onto solid wastes from olive oil production plants, olive pomace, has been investigated. Acid–base properties of the active sites of olive pomace were determined by potentiometric titrations and represented by a continuous model accounting for two main kinds of active sites. Competition among protons and heavy metals in solution was considered by performing biosorption tests at different equilibrium pH with single (Cu and Cd) and binary metal systems (Cu–Cd). Both Langmuir extensions and non-ideal competitive adsorption models (NICA models) can be used to represent experimental data of Cu and Cd biosorption in single metal systems at different equilibrium pH. Nevertheless only NICA models, accounting for site heterogeneity and non-ideal adsorption of the different species simultaneously present in solution, can adequately simulate the competition among Cu and Cd in binary metal systems by using the parameters fitted to single system data.

Keywords: Biosorption, Heavy Metals, Olive Pomace, Equilibrium Modeling, Binary Systems

? Quinlivan, P.A., Li, L. and Knappe, D.R.U. (2005), Effects of activated carbon characteristics on the simultaneous adsorption of aqueous organic micropollutants and natural organic matter. *Water Research*, **39** (8), 1663-1673.

Full Text: [W\Wat Res39, 1663.pdf](W/Wat%20Res39,%201663.pdf)

Abstract: The overall objective of this research was to determine the effects of physical and chemical activated carbon characteristics on the simultaneous adsorption of trace organic contaminants and natural organic matter (NOM). A matrix of 12 activated carbon fibers (ACFs) with three activation levels and four surface chemistry levels (acid-washed, oxidized, hydrogen-treated, and ammonia-treated) was studied to systematically evaluate pore structure and surface chemistry phenomena. Also, three commercially available granular activated carbons (GACs) were tested. The relatively hydrophilic fuel additive methyl tertiary-butyl ether (MTBE) and the relatively hydrophobic solvent trichloroethene (TCE) served as micropollutant probes. A comparison of adsorption isotherm data collected in the presence and absence of NOM showed that percent reductions of single-solute TCE and MTBE adsorption capacities that resulted from the presence of co-adsorbing NOM were not strongly affected by the chemical characteristics of activated carbons. However, hydrophobic carbons were more effective adsorbents for both TCE and MTBE than hydrophilic carbons because enhanced water adsorption on the latter interfered with the adsorption of micropollutants from solutions containing NOM. With respect to pore structure, activated carbons should exhibit a large volume of micropores with widths that are about 1.5 times the kinetic diameter of the target adsorbate. Furthermore, an effective adsorbent should possess a micropore size distribution that extends to widths that are approximately twice the kinetic diameter of the target adsorbate to prevent pore blockage/constriction as a result of NOM adsorption.

Keywords: Activated Carbon, Adsorption, Drinking Water Treatment, Methyl Tertiary-Butyl Ether (MTBE), Natural Organic Matter, Trichloroethylene (TCE)

? Kostura, B., Kulveitová, H. and Leško, J. (2005), Blast furnace slags as sorbents of phosphate from water solutions. *Water Research*, **39** (9), 1795-1802.

Full Text: [W\Wat Res39, 1795.pdf](W/Wat%20Res39,%201795.pdf)

Abstract: The paper is focused on the sorption of phosphorus from aqueous solutions by crystalline and amorphous blast furnace slags. Slag sorption kinetics were measured, adsorption tests were carried out and the effect of acidification on the sorption properties of slags was studied. The kinetic measurements confirmed that the sorption of phosphorus on crystalline as well as amorphous slags can be described by a model involving pseudo-second-order reactions. For all slag types, phosphorus sorption follows the Langmuir adsorption isotherm. The acid neutralizing capacities of crystalline and amorphous slags were determined. In the case of the crystalline slags, buffering intervals were found to exist during which the slag minerals dissolve in the sequence bredigite–gehlenite–diaspor. There is a high correlation (R2=0.9989) between ANC3.8 and the saturation capacities of crystalline and amorphous slags.

Keywords: Phosphate Sorption, Blast Furnace Slag, Sorption Kinetics, Acid Neutralizing Capacity

? Suzuki, Y., Kametani, T. and Maruyama, T. (2005), Removal of heavy metals from aqueous solution by nonliving *Ulva* seaweed as biosorbent. *Water Research*, **39** (9), 1803-1808.

Full Text: [W\Wat Res39, 1803.pdf](W/Wat%20Res39,%201803.pdf)

Abstract: The growth of dense green seaweed mats of *Ulva* spp. is an increasing problem in estuaries and coasts worldwide. The enormous amount of *Ulva* biomass thus becomes a troublesome waste disposal problem. On the other hand, it has been revealed that nonliving seaweed biomass, particularly brown seaweeds, has a high capacity for assimilating heavy metals. In this study, the possibility of using *Ulva* seaweed biomass as a biosorbent for the removal of heavy metals was examined. After processing, the biomass material was very easy to separate from the aqueous solution using a mesh. The sorption capacity of Cd on *Ulva* biomass increased upon pretreatment with alkali solution. The outstanding function of the biosorbent was demonstrated at around pH 8. On the basis of the Langmuir isotherms of Cd, Zn and Cu using the alkali-pretreated biomass, the parameters *q*m and *b* were determined to be within the narrow range of 60–90 mg/g and 0.03–0.04 L/mg, respectively, for each metal. Given the *q*m and *b* values, *Ulva* seaweed is a good biosorbent material for removing heavy metals. In an experiment using artificial wastewater containing Cd, Zn, Cu, Cr and Ni, it was possible to remove each metal simultaneously using *Ulva* biomass. Adsorption by *Ulva* biomass is effective for the removal of heavy metals from wastewater.

Keywords: *Ulva* Biomass, Biosorbent, Pretreatment, Heavy Metals, Acidic Wastewater

? González-Pradas, E., Socías-Viciana, M., Ureña-Amate, M.D., Cantos-Molina, A. and Villafranca-Sánchez, M. (2005), Adsorption of chloridazon from aqueous solution on heat and acid treated sepiolites. *Water Research*, **39** (9), 1849-1857.

Full Text: [W\Wat Res39, 1849.pdf](W/Wat%20Res39,%201849.pdf)

Abstract: The adsorption of chloridazon on heat treated sepiolite samples at 110 °C (S-110), 200 °C (S-200), 400 °C (S-400), 600 °C (S-600) and acid treated samples with H2SO4 solutions of two different concentrations (0.25 and 1.0 M) (S-0.25 and S-1.0, respectively) from pure water at 25 °C has been studied by using batch experiments. In addition, column experiments were carried out with the natural (S-110) and 600 °C (S-600) heat treated samples, using a 10.30 mg l−1 aqueous solution of chloridazon. The adsorption experimental data points have been fitted to the Freundlich equation in order to calculate the adsorption capacities (*K*f) of the samples; *K*f values range from 2.89 mg kg−1 for the S-1.0 sample up to 164 mg kg−1 for the S-600 sample; so, the heat treatment given to the sepiolite greatly increases its adsorption capacity for the herbicide chloridazon whereas the acid treatment produces a clear decrease in the amount of chloridazon adsorbed. The removal efficiency (*R*) has also been calculated; *R* values ranging from 5.08% for S-1.0 up to 60.9% for S-600. The batch experiments showed that the strongest heat treatment is more effective than the natural and acid treated sepiolite in relation to adsorption of chloridazon. The column experiments also showed that 600 °C heat treated sepiolite might be reasonably used in removing chloridazon from water. Thus, as this type of clay is relatively plentiful, these activated samples might be reasonably used in order to remove chloridazon from water.

Keywords: Chloridazon, Removal, Sepiolite, Adsorption

? Lee, Y., Yoon, J. and von Gunten, U. (2005), Spectrophotometric determination of ferrate (Fe(Vl)) in water by ABTS. *Water Research*, **39** (10), 1946-1953.

Full Text: [W\Wat Res39, 1964.pdf](W/Wat%20Res39,%201964.pdf)

Abstract: A new method for the determination of low concentrations (0.03-35 μM) of the aqueous ferrate (Fe(VI)) was developed. The method is based on the reaction of Fe(VI) with 2,2’-azino-bis(3-ethylbenzothiazoline-6-sulfonate) (ABTS) which forms a green radical cation (ABTS center dot(+)) that can be measured spectrophotometrically at 415 nm (ABTS method). The reaction of Fe(VI) with ABTS has a stoichiometry of 1:1 in excess of ABTS (73 μM). The increase in absorbance at 415 nm for ABTS center dot(+) generation was linear with respect to Fe(VI) added (0.03-35 μM) in buffered solutions (acetate/phosphate buffer at pH = 4.3) and was (3.40±0.05)×104 M-1 cm-1. The reaction of Fe(VI) with ABTS was very rapid with a half-life time below 0.01 s at pH 4.3 and 73 μM of ABTS. This enables the ABTS method to measure Fe(VI) selectively. The residual absorbance of ABTS center dot(+) was found to be stable in several water matrices (synthetic buffer solution and natural waters) and concentrations of Fe(VI) spiked in natural waters could be determined with high accuracy. The ABTS method can also be used as a tool to determine rate constants of reactions of Fe(VI). The second-order rate constant for the reaction of phenol with Fe(VI) was determined to be 90 M-1 s-1 at pH 7. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Ferrate, 2,2’-Azino-Bis(3-Ethylbenzothiazoline-6-Sulfonate), ABTS, Analysis, Oxidation, Kinetics, Premix Pulse-Radiolysis, Photometric-Determination, POTASSIUM Ferrate(VI), Hydrogen-Peroxide, Stopped-Flow, Oxidation, Removal, Coagulation, Oxidant, Acids

? Deng, S.B. and Ting, Y.P. (2005), Characterization of PEI-modified biomass and biosorption of Cu(II), Pb(II) and Ni(II). *Water Research*, **39** (10), 2167-2177.

Full Text: [W\Wat Res39, 2167.pdf](W/Wat%20Res39,%202167.pdf)

Abstract: The objective of this work is to develop a surface-modified biosorbent with enhanced sorption capacity for heavy metal ions. The biomass of *Penicillium chrysogenum* was modified with polyethylenimine (PEI) and then crosslinked with glutaraldehyde. The crosslingked PEI was chemically bonded on the biomass surface through the amine and carboxylate groups on the pristine biomass. The presence of the amine group was confirmed by X-ray photon spectroscopy (XPS) and Fourier transform infrared (FTIR) analysis, and the concentration of the amine groups on the biomass surface was found to be 2 mmol/g through potentiometric titration. The rugged morphology of the biomass surface after the modification was observed by scanning electron microscope (SEM). Compared with the pristine biomass, the modified biomass with amine groups showed a significant increase in sorption capacity for three metal ions, namely, copper, lead and nickel. The sorption isotherms of the biomass for three metals were well described by Langmuir equation, with a maximum sorption at 92 mg copper, 204 mg lead and 55 mg nickel per g biomass. The binding sites for the three metals attributed to the amine groups on the biomass surface were verified by FTIR analysis.

Keywords: PEI-Modified Biomass, *Penicillium Chrysogenum*, Crosslinking, Adsorption Performance, Heavy Metals, FTIR and XPS Spectra

Notes: highly cited

? Lindqvist, N., Tuhkanen, T. and Kronberg, L. (2005), Occurrence of acidic pharmaceuticals in raw and treated sewages and in receiving waters. *Water Research*, **39** (11), 2219-2228.

Full Text: [2005\Wat Res39, 2219.pdf](2005/Wat%20Res39,%202219.pdf)

Abstract: The occurrence of five acidic pharmaceuticals, ibuprofen, naproxen, ketoprofen, diclofenac and bezafibrate, in seven different sewage treatment plants (STP) and three receiving waters were determined. The analytical procedure included solid phase extraction, liquid chromatographic separation and detection by a triple-quadrupole mass spectrometer. The studied pharmaceuticals were found in all the STPs. The pattern of the occurrence of individual compounds was the same in every STP and matched the consumption figures reported in the literature. Ibuprofen is the most used pharmaceutical in Finland and was accordingly found to be the most abundant compound in the raw sewage. In the treatment processes, the highest removal rate was observed for ibuprofen and the lowest for diclofenac, 92% +/- 8% and 26% +/- 17%, respectively. Due to the incomplete removal in the STPs, the pharmaceuticals were found in rivers at the discharge points of the STP effluents. Downstream from the discharge points, the concentrations decreased significantly mainly due to dilution in the river water. The risk to the aquatic environment was estimated by a ratio of measured environmental concentration (MEC) and predicted no-effect concentration (PNEC). At the concentrations the compounds were found in the surface waters, they should not pose risk for the aquatic environment. However, at dry seasons and/or during malfunctions of STPs, ibuprofen could be associated with a risk in small river systems. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Pharmaceuticals, Sewage Treatment Plant Influent And Effluent, Discharge To Rivers, Environmental Risk, Clofibric Acid, Surface Waters, Ibuprofen, Residues, Drugs, Carbamazepine, Wastewaters, Environment, Diclofenac, Fate

? Diniz, V. and Volesky, B. (2005), Effect of counterions on lanthanum biosorption by *Sargassum polycystum*. *Water Research*, **39** (11), 2229-2236.

Full Text: [W\Wat Res39, 2229.pdf](W/Wat%20Res39,%202229.pdf)

Abstract: The effect of the presence of different anions on the biosorption of La3+ (Lanthanum) using *Sargassum polycystum* Ca-loaded biomass was studied in this work. Different types of metal salts were used, such as nitrate, sulphate and chloride. The presence of the anion sulphate decreased the metal uptake for tested pH values of 3–5 when compared to the nitrate and chloride systems. The presence of chloride ions did not seem to interfere with the lanthanum removal. The speciation of lanthanum in solution could explain the differences obtained for the different systems and the Mineql+ program was used for the calculations. A monovalent complex with sulphate and lanthanum was formed that had lower apparent affinity towards the biomass compared to the free trivalent metal ion. The La uptake varied from 0.6 to 1.0 mmol g−1. The Langmuir model was used to describe quantitatively the sorption isotherms. The addition of sulphuric acid for pH adjustment decreased the metal uptake from lanthanum sulphate solutions when compared to the nitric acid addition. The effect was more pronounced with sulphuric acid due to the formation of complexes.

Keywords: Biosorption, Anions, Lanthanum, *Sargassum*, Speciation

? Saiano, F., Ciofalo, M., Cacciola, S.O. and Ramirez, S. (2005), Metal ion adsorption by *Phomopsis* sp. biomaterial in laboratory experiments and real wastewater treatments. *Water Research*, **39** (11), 2273-2280.

Full Text: [W\Wat Res39, 2273.pdf](W/Wat%20Res39,%202273.pdf)

Abstract: An insoluble material of polysaccharidic nature has been obtained by thermal alkali treatment of the filamentous fungus *Phomopsis* sp. FT-IR spectrum of the resulting material as well as its nitrogen content suggest that chitosan and glucans are the main components of the biomaterial. Information on Lewis base sites has also been obtained and used as a guideline in the evaluation of the complexing ability against a number of metal ions in aqueous media at pH in the range 4–6. Results indicate that after 24 h contact time, up to 870 μmol/g of lead, 390 μmol/g of copper, 230 μmol/g of cadmium, 150 μmol/g of zinc and 110 μmol/g of nickel ions are adsorbed into the material. After approximately 10 min, about 70% of the overall adsorption process has already been completed. Adsorbed metal ions can be recovered by washing with dilute acid. Experiments have been extended to a real wastewater effluent confirming the potential of this biomaterial as a depolluting agent.

Keywords: Fungal Biomaterial, Chitin, Chitosan, Adsorption Isotherm, Heavy Metal, Wastewater

? Cheng, W., Dastgheib, S.A. and Karanfil, T. (2005), Adsorption of dissolved natural organic matter by modified activated carbons. *Water Research*, **39** (11), 2281-2290.

Full Text: [W\Wat Res39, 2281.pdf](W/Wat%20Res39,%202281.pdf)

Abstract: Adsorption of dissolved natural organic matter (DOM) by virgin and modified granular activated carbons (GACs) was studied. DOM samples were obtained from two water treatment plants before (i.e., raw water) and after coagulation/flocculation/sedimentation processes (i.e., treated water). A granular activated carbon (GAC) was modified by high temperature helium or ammonia treatment, or iron impregnation followed by high temperature ammonia treatment. Two activated carbon fibers (ACFs) were also used, with no modification, to examine the effect of carbon porosity on DOM adsorption. Size exclusion chromatography (SEC) and specific ultraviolet absorbance (SUVA254) were employed to characterize the DOMs before and after adsorption.

Iron-impregnated (HDFe) and ammonia-treated (HDN) activated carbons showed significantly higher DOM uptakes than the virgin GAC. The enhanced DOM uptake by HDFe was due to the presence of iron species on the carbon surface. The higher uptake of HDN was attributed to the enlarged carbon pores and basic surface created during ammonia treatment. The SEC and SUVA254 results showed no specific selectivity in the removal of different DOM components as a result of carbon modification.

The removal of DOM from both raw and treated waters was negligible by ACF10, having 96% of its surface area in pores smaller than 1 nm. Small molecular weight (MW) DOM components were preferentially removed by ACF20H, having 33% of its surface area in 1–3 nm pores. DOM components with MWs larger than 1600, 2000, and 2700 Da of Charleston raw, Charleston-treated, and Spartanburg-treated waters, respectively, were excluded from the pores of ACF20H. In contrast to carbon fibers, DOM components from entire MW range were removed from waters by virgin and modified GACs.

Keywords: Activated Carbon, Dissolved Natural Organic Matter (DOM), Surface Chemistry, Surface Modification, Size Exclusion Chromatography (SEC), Specific Ultraviolet Absorbance (SUVA254)

? Zhu, X.P. and Jyo, A. (2005), Column-mode phosphate removal by a novel highly selective adsorbent. *Water Research*, **39** (11), 2301-2308.

Full Text: [W\Wat Res39, 2301.pdf](W/Wat%20Res39,%202301.pdf)

Abstract: A phosphoric acid resin RGP was immobilized with zirconium(IV) (Zr(IV)) to investigate its applicability in phosphate removal. When loaded with Zr(IV), RGP was changed into an effective ligand exchanger with phosphate sorption capacity of 0.345 mmol/ml. Little metal leakage was observed. Breakthrough of phosphate sorption depended on solution acidity and phosphate concentration. An increase of solution pH greatly suppressed phosphate removal, but even at pH 8.21, about 56% of the added phosphate (2.8 mM) in the feed solution could still be sorbed. Electrolytes in the aqueous solution did not interfere with phosphate sorption; on the contrary, an enhancement effect was observed. Due to the high sorption capacity of Zr(IV)-loaded RGP, low concentration of phosphate can be removed at high flow rate (100 h−1 in space velocity). The sorbed phosphate on the Zr(IV)-loaded RGP could be quantitatively eluted with 0.5 M sodium hydroxide solution. The Zr(IV)-loaded RGP is a promising ligand exchanger for treating wastewater containing trace amounts of inorganic phosphate.

Keywords: Phosphate Removal, Ligand Exchange, Water Treatment, Phosphoric Acid Resin

? Pena, M.E., Korfiatis, G.P., Patel, M., Lippincott, L. and Meng, X.G. (2005), Adsorption of As(V) and As(III) by nanocrystalline titanium dioxide. *Water Research*, **39** (11), 2327-2337.

Full Text: [W\Wat Res39, 2327.pdf](W/Wat%20Res39,%202327.pdf)

Abstract: This study evaluated the effectiveness of nanocrystalline titanium dioxide (TiO2) in removing arsenate [As(V)] and arsenite [As(III)] and in photocatalytic oxidation of As(III). Batch adsorption and oxidation experiments were conducted with TiO2 suspensions prepared in a 0.04 M NaCl solution and in a challenge water containing the competing anions phosphate, silicate, and carbonate. The removal of As(V) and As(III) reached equilibrium within 4 h and the adsorption kinetics were described by a pseudo-second-order equation. The TiO2 was effective for As(V) removal at pH<8 and showed a maximum removal for As(III) at pH of about 7.5 in the challenge water. The adsorption capacity of the TiO2 for As(V) and As(III) was much higher than fumed TiO2 (Degussa P25) and granular ferric oxide. More than 0.5 mmol/g of As(V) and As(III) was adsorbed by the TiO2 at an equilibrium arsenic concentration of 0.6 mM. The presence of the competing anions had a moderate effect on the adsorption capacities of the TiO2 for As(III) and As(V) in a neutral pH range. In the presence of sunlight and dissolved oxygen, As(III) (26.7 μM or 2 mg/L) was completely converted to As(V) in a 0.2 g/L TiO2 suspension through photocatalytic oxidation within 25 min. The nanocrystalline TiO2 is an effective adsorbent for As(V) and As(III) and an efficient photocatalyst.

Keywords: Adsorption, Challenge Water, TiO2, Photocatalytic Oxidation, Arsenic Speciation

? Jarvie, M.E., Hand, D.W., Bhuvendralingam, S., Crittenden, J.C. and Hokanson, D.R. (2005), Simulating the performance of fixed-bed granular activated carbon adsorbers: Removal of synthetic organic chemicals in the presence of background organic matter. *Water Research*, **39** (11), 2407-2421.

Full Text: [W\Wat Res39, 2407.pdf](W/Wat%20Res39,%202407.pdf)

Abstract: Granular activated carbon (GAC) adsorption is an effective treatment technology for the removal of synthetic organic chemicals (SOCs) from drinking water supplies. This treatment process can be expensive if not properly designed. Application of mathematical models is an attractive method to evaluate the impact of process variables on process design and performance. Practical guidelines were developed to select an appropriate model framework and to estimate site-specific model parameters to predict GAC adsorber performance. Pilot plant and field-scale data from 11 different studies were utilized to investigate the effectiveness of this approach in predicting adsorber performance in the presence of background organic batter (BOM). These data represent surface and ground water sources from four different countries. The modeling approach was able to adequately describe fixed-bed adsorber performance for the purpose of determining the carbon usage rate and process design variables. This approach is more accurate at predicting bed life in the presence of BOM than the current methods commonly used by practicing engineers.

Keywords: Organic Matter, Activated Carbon, Modeling, Fouling, Synthetic Organic Chemicals

? Walker, G.M., Hanna, J.A. and Allen, S.J. (2005), Treatment of hazardous shipyard wastewater using dolomitic sorbents. *Water Research*, **39** (11), 2422-2428.

Full Text: [W\Wat Res39, 2422.pdf](W/Wat%20Res39,%202422.pdf)

Abstract: Hazardous shipyard wastewater is a worldwide problem, arising from ship repair. In this study an experimental programme was undertaken to establish the suitability of dolomite and dolomitic sorbent materials to remove contaminants from wastewater arising from a commercial shipyard. Experimental data indicate that dolomite and dolomitic sorbents have the ability to significantly reduce the COD concentration of the shipyard effluent (98% reduction). The data gained from trials at a shipyard indicated that the dolomite treatment process could be undertaken in a 8000 L pilot scale reaction vessel. Analysis of the wastewater using ICP-MS during the pilot trial indicated that the dolomite significantly reduced the concentrations of metallic impurities. The concentration of Sn ions, which is indicative of organo-tin complexes commonly found in shipyard wastewater, was reduced by 80% from its initial concentration in the pilot trial. The mechanism for the removal process using dolomite has been ascribed to a metal complexation/sorption process.

Keywords: Sorption, Hazardous Shipyard Wastewater, Dolomitic Sorbents

? Ahmad, A.L., Sumathi, S. and Hameed, B.H. (2005), Adsorption of residue oil from palm oil mill effluent using powder and flake chitosan: Equilibrium and kinetic studies. *Water Research*, **39** (12), 2483-2494.

Full Text: [W\Wat Res39, 2483.pdf](W/Wat%20Res39,%202483.pdf)

Abstract: The adsorption of residue oil from palm oil mill effluent (POME) using chitosan powder and flake has been investigated. POME contains about 2 g/l of residue oil, which has to be treated efficiently before it can be discharged. Experiments were carried out as a function of different initial concentrations of residue oil, weight dosage, contact time and pH of chitosan in powder and flake form to obtain the optimum conditions for the adsorption of residue oil from POME. The powder form of chitosan exhibited a greater rate compared to the flake type. The results obtained showed that chitosan powder, at a dosage of 0.5 g/l, 15 min of contact time and a pH value of 5.0, presented the most suitable conditions for the adsorption of residue oil from POME. The adsorption process performed almost 99% of residue oil removal from POME. Equilibrium studies have been carried out to determine the capacity of chitosan for the adsorption of residue oil from POME using the optimum conditions from the flocculation at different initial concentrations of residue oil. Langmuir and Freundlich adsorption models were applied to describe the experimental isotherms and isotherm constants. Equilibrium data fitted very well with the Freundlich model. The pseudo first- and second-order kinetic models and intraparticle diffusion model were used to describe the kinetic data and the rate constants were evaluated. The experimental data fitted well with the second-order kinetic model, which indicates that the chemical sorption is the rate-limiting step, i.e. chemisorption between residue oil and chitosan. The significant uptake of residue oil on chitosan was further proved by BET surface area analysis and SEM micrographs.

Keywords: Chitosan, Residue Oil, Pome, Adsorption Equilibrium, Adsorption Rate

? Shon, H.K., Vigneswaran, S., Ngo, H.H. and Kim, J.H. (2005), Chemical coupling of photocatalysis with flocculation and adsorption in the removal of organic matter. *Water Research*, **39** (12), 2549-2558.

Full Text: [W\Wat Res39, 2549.pdf](W/Wat%20Res39,%202549.pdf)

Abstract: An experimental investigation was made to study the effects of chemical coupling of flocculation and adsorption with photocatalysis in treating persistent organic pollutants in wastewater. The photocatalysis alone showed initial reverse reaction when titanium oxide (TiO2) was used in catalysis. The effect of the pretreatment of adsorption with powdered activated carbon (PAC) on photocatalysis was studied. The results showed that PAC adsorption followed by photocatalysis was not effective in alleviating reverse reaction. On the other hand, when PAC and TiO2 were added simultaneously, the reverse reaction was eliminated. Further, the organic removal was also improved by simultaneous PAC and TiO2 additions. When flocculation with ferric chloride (FeCl3) was used as pretreatment, the organic removal efficiency was superior. The initial reverse reaction was also eliminated/minimized. However, inadequate doses of FeCl3 (less than 30 mg l−1) resulted in initial reverse reaction and inferior DOC removal.

Keywords: Activated Carbon, Chemical Coupling, FeCl3 Flocculation, Molecular Weight Distribution, Organic Matter, Photocatalysis, Reverse Reaction, Wastewater

? Maity, S., Chakravarty, S., Bhattacharjee, S. and Roy, B.C. (2005), A study on arsenic adsorption on polymetallic sea nodule in aqueous medium. *Water Research*, **39** (12), 2579-2590.

Full Text: [W\Wat Res39, 2579.pdf](W/Wat%20Res39,%202579.pdf)

Abstract: A detailed study on As(III) and As(V) adsorption on polymetallic sea nodule in aqueous medium has been reported. Elemental composition of sea nodule comprises primarily, iron, manganese and silicon with trace quantities of aluminium, copper, cobalt and nickel. As(V) adsorption on sea nodule is dependent on pH while As(III) is insensitive to it. Adsorption data broadly follow Langmuir isotherm. Kinetic data follow a pseudo-second-order model for both As(III) and As(V). Arsenic loading on sea nodule is dependent on initial arsenic concentration. Optimum As(III) loading is 0.74 mg/g at 0.34 mg/L and for As(V) it is 0.74 mg/g at 0.78 mg/L. As(III) adsorption is broadly independent of ionic environment. Except for PO43−, As(III) adsorption is not influenced by anions but cations influence it significantly. As(V) adsorption, on the other hand, is influenced by anions and not by cations. Experimental evidence indicates an inner sphere complex for As(III) and partial inner and partial outer sphere complex for As(V). Both As(III) and As(V) adsorptions are marked with very little desorption in the pH range of 2–10. Sea nodule can speciate As(III) and As(V) in groundwater at or above pH 6. Sea nodule was successfully tested as an adsorbent for the removal of arsenic from six contaminated groundwater samples of West Bengal, India, containing arsenic in the range 0.04–0.18 mg/L.

Keywords: Adsorption, As(III), As(V), Sea Nodule, Aqueous Medium

? Ju, D. and Young, T.M. (2005), The influence of the rigidity of geosorbent organic matter on non-ideal sorption behaviors of chlorinated benzenes. *Water Research*, **39** (12), 2599-2610.

Full Text: [W\Wat Res39, 2599.pdf](W/Wat%20Res39,%202599.pdf)

Abstract: This study focused on evaluating the influence of the rigidity of natural organic matter (NOM) associated with four natural geosorbents in controlling the non-ideal sorption behaviors of five chlorinated benzenes. Single solute sorption isotherms for each sorbate/sorbent combination were modeled and interpreted by the Freundlich sorption isotherm and the adsorption-partitioning model based on Polanyi–Manes theory (PM model). ‘Rigid’ organic matter was operationally quantified as the fraction of carbon resistant to wet chemical oxidation (hard carbon) or thermal oxidation (soot carbon); atomic H/O ratios indicated a close correlation between the degree of reduction of the NOM and its rigidity. Sorbents with larger rigid carbon fractions had more non-linear sorption isotherms and higher organic carbon (OC) normalized sorption affinities. The size of the PM hole filling domain for a given sorbent was closely correlated with the extent to which the sorbent’s affinity for chlorobenzenes exceeded predictions from a linear free energy relationship. Loss of some portions of the rigid character of the NOM domain due to the penetration of sorbate molecules (plasticization) was discussed as a possible contributor to the non-ideal sorption behaviors observed in this study. The existence of a permanently rigid NOM domain, not subject to plasticization under environmental conditions, was postulated as an additional factor determining the observed sorption behavior.

Keywords: Isotherm Model, Equilibrium, Hard Carbon, Soot Carbon, Non-Linear Sorption

? Mysore, D., Viraraghavan, T. and Jin, Y.C. (2005), Treatment of oily waters using vermiculite. *Water Research*, **39** (12), 2643-2653.

Full Text: [2005\Wat Res39, 2643.pdf](2005/Wat%20Res39,%202643.pdf)

Abstract: The main objective of this study was to examine the removal of oil from water by expanded and hydrophobized vermiculite. A pH of 9 showed a higher removal efficiency of oil by vermiculite. Oil removal efficiencies at pH 9 were found to be 79%, 93%, 90%, 57% for standard mineral oil (SMO), Canola oil (CO), Kutwell oil (KUT45), refinery effluent (RE), respectively, in the case of expanded vermiculite, and 56%, 58%, 47%, 43% for SMO, CO, KUT45 and RE, respectively, for hydrophobized vermiculite. Kinetic data satisfied both the Lagergren and Ho models. Equilibrium studies showed that the Langmuir isotherm was the best-fit isotherm for oil removal by both expanded and hydrophobized vermiculite. The data showed a higher adsorptive capacity by the expanded vermiculite compared to the hydrophobized vermiculite. Desorption studies showed that the expanded vermiculite did not desorb oil to the same extent compared to hydrophobized vermiculite. The Freundlich isotherm was the best-fit model for desorption. Expanded vermiculite showed better retention than hydrophobic vermiculite. The results showed that the expanded vermiculite had a greater affinity for oil than hydrophobized vermiculite. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Expanded Vermiculite, Hydrophobized Vermiculite, Sorption, Desorption, Isotherms, Oil Retention, Oil-In-Water Emulsions, Adsorption, Removal, Bentonite, Pore

? McCullagh, C. and Saunders, G.C. (2005), Enhanced adsorption of Cd(II) on a hydrous Al(III) floc in the presence of a modified form of polyethylenimine. *Water Research*, **39** (13), 2799-2806.

Full Text: [W\Wat Res39, 2799.pdf](W/Wat%20Res39,%202799.pdf)

Abstract: A polymer modified with succinic anhydride has been investigated for the adsorption of cadmium(II) on a freshly precipitated aluminium(III) hydroxide floc. The proportion of chelate attached to the polymer is varied to determine the relationship between carboxyl and amino groups on the polyelectrolyte, in terms of enhanced adsorption of cadmium(II) on a hydrous aluminium floc. The presence of polyelectrolyte enhanced the adsorption of 3.3 ppm Cd(II) on a 333 ppm Al(III) floc at every concentration of polyelectrolyte investigated. The proportion of succinic anhydride attached to the polymer had an impact on the increased adsorption of Cd(II) on an Al(III) floc observed. A decreasing proportion of succinic anhydride to polymer resulted in a decrease in the amount of cadmium adsorbed on the floc. Above pH 8, a decrease in the % Cd(II) adsorbed on the floc and % Al(III) retained within the floc decreases with the presence of polyelectrolyte as a result of the formation of soluble Cd–Polyethylenimine-succinic acid (PEISA) complexes. When the Al–PEISA combination was applied to a complex matrix where Cd(II), Cu(II) and Ni(II) ions competed for adsorption, enhanced adsorption was observed for Cd(II) and Ni(II). At pH 7, dissolution of the floc observed with the addition of discrete chelates was not observed with the addition of polyelectrolytes.

Keywords: Waste Water Treatment, Polyelectrolytes, Flocs, Cadmium, Chelates

? Kamala, C.T., Chu, K.H., Chary, N.S., Pandey, P.K., Ramesh, S.L., Sastry, A.R.K.and Sekhar, K.C. (2005), Removal of arsenic(III) from aqueous solutions using fresh and immobilized plant biomass. *Water Research*, **39** (13), 2815-2826.

Full Text: [W\Wat Res39, 2815.pdf](W/Wat%20Res39,%202815.pdf)

Abstract: The ability of *Garcinia cambogia*, an indigenous plant found in many parts of India, to remove trivalent arsenic from solution was assessed. Batch experiments were carried out to characterize the As(III) removal capability of fresh and immobilized biomass of *G. cambogia*. It was found that the kinetic property and uptake capacity of fresh biomass were significantly enhanced by the immobilization procedure. The uptake of As(III) by fresh and immobilized biomass was not greatly affected by solution pH with optimal biosorption occurring at around pH 6–8. The presence of common ions such as Ca and Mg at concentrations up to 100 mg/l had no effect on As(III) removal. However, the presence of Fe(III) at 100 mg/l caused a noticeable drop in the extent of As(III) removal but the effect was minimal when Fe(III) was present at 10 mg/l. The adsorption isotherms quantitatively predicted the extent of As(III) removal in groundwater samples collected from an arsenic-contaminated site in India. Immobilized biomass loaded with As(III) was amenable to efficient regeneration with NaOH solution. Column studies showed that immobilized biomass could be reused over five cycles of loading and elution. The excellent As(III) sequestering capability of fresh and immobilized *G. cambogia* biomass could lead to the development of a viable and cost-effective technology for arsenic removal in groundwater.

Keywords: Adsorption, Arsenic, Biosorption, Column, Immobilization, Plant Biomass

? Gibert, O., de Pablo, J., Cortina, J.L. and Ayora, C. (2005), Sorption studies of Zn(II) and Cu(II) onto vegetal compost used on reactive mixtures for in situ treatment of acid mine drainage. *Water Research*, **39** (13), 2827-2838.

Full Text: [W\Wat Res39, 2827.pdf](W/Wat%20Res39,%202827.pdf)

Abstract: The efficiency of the sulphate reducing bacteria-based in situ treatment of acid mine drainage is often limited by the low degradability of the current carbon sources, typically complex plant-derived materials. In such non-sulphate-reducing conditions, field and laboratory experiences have shown that mechanisms other than sulphide precipitation should be considered in the metal removal, i.e. metal (oxy)hydroxides precipitation, co-precipitation with these precipitates, and sorption onto the organic matter.

The focus of the present paper was to present some laboratory data highlighting the Zn and Cu sorption on vegetal compost and to develop a general and simple model for the prediction of their distribution in organic-based passive remediation systems. The model considers two kinds of sorption sites (>SO2H2) and the existence of monodentate and bidentate metal-binding reactions, and it assumes that only free M2+ species can sorb onto the compost surface. The acid–base properties of the compost were studied by means of potentiometric titrations in order to identify the nature of the involved surface functional groups and their density. The distribution coefficient (*K*D) for both Zn and Cu were determined from batch experiments as a function of pH and metal concentration. The model yielded the predominant surface complexes at the experimental conditions, being >SO2Zn for Zn and >SO2HCu+ and (>SO2H)2Cu for Cu, with log *K*M values of −2.10, 3.36 and 4.65, respectively. The results presented in this study have demonstrated that the proposed model provides a good description of the sorption process of Zn and Cu onto the vegetal compost used in these experiments.

Keywords: Metal Sorption, Zn(II) and Cu(II), Acid Mine Drainage, Natural Organic Compost, Passive Remediation, Surface Complexation

? Hellerich, L.A. and Nikolaidis, N.P. (2005), Studies of hexavalent chromium attenuation in redox variable soils obtained from a sandy to sub-wetland groundwater environment. *Water Research*, **39** (13), 2851-2868.

Full Text: [2005\Wat Res39, 2851.pdf](2005/Wat%20Res39,%202851.pdf)

Abstract: Laboratory experiments were conducted to characterize and quantify the capacity and kinetics of the combined effects of natural attenuation processes, such as adsorption, reduction, and precipitation, for hexavalent chromium [Cr(VI)] in a variable geochemical (i.e. fraction of organic carbon [foc], redox) environment of glaciated soils. Equilibrium attenuation terms: linear sorption (K-d), estimated capacity, and non-linear Langmuir (K-L, Q) sorption parameters; varied over several orders of magnitude. The pseudo-first-order rate of disappearance of Cr(VI) from aqueous:soil slurries ranged from similar to 10(-5) to similar to 10(-1)/min. An operationally defined kinetic attenuation term, attenuation capacity (AC), describing the quantity of Cr(VI) disappearing from the slurries, ranged from 1.1 to similar to 12 mu g Cr(VI)/g soil/7 days. The linear K-d’s and estimated attenuation capacities were indirectly and directly related to increasing soil pH and foc, respectively. The AC values decreased and increased as a function of increasing soil pH and foc, respectively. The parameters determined in this work were used to evaluate the kinetics, capacity, and stability of chromium attenuation in the sub-wetland saturated soils in Hellerich (2004. A field, laboratory, and modeling study of natural attenuation processes affecting the fate and transport of hexavalent chromium in a redox variable groundwater environment. Ph.D. Dissertation, Department of Civil and Environmental Engineering, University of Connecticut-Storrs) using a statistical simulation framework. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aquifer Solids, Attenuation, Behavior, Capacity, Chromium, Cr(VI), Environment, Equilibrium, Groundwater, Hexavalent, Hexavalent Chromium, Iron, Kinetics, Mobility, Modeling, Natural, Oxidation, pH, Precipitation, Pseudo-First-Order, Redox, Reduction, Sorption, Statistical, System, University

? Wartelle, L.H. and Marshall, W.E. (2005), Chromate ion adsorption by agricultural by-products modified with dimethyloldihydroxyethylene urea and choline chloride. *Water Research*, **39** (13), 2869-2876.

Full Text: [W\Wat Res39, 2869.pdf](W/Wat%20Res39,%202869.pdf)

Abstract: The use of cellulose-containing agricultural by-products modified with the cross-linking reagent dimethyloldihydroxyethylene urea (DMDHEU) and the quaternary amine, choline chloride, as anion exchange resins, has not been reported. The objective of the present study was to convert the readily available by-products, soybean hulls, sugarcane bagasse and corn stover to functional anion exchange resins using DMDHEU and choline chloride. Optimization of the modification method was achieved using soybean hulls as a substrate. The optimized method was additionally used to modify sugarcane bagasse and corn stover. Adsorption efficiency results with chromate ion showed that modification with both DMDHEU and choline chloride was required for the highest efficiencies. Adsorption capacities of the modified by-products were determined using chromate ion and found to be 1.97, 1.61 and 1.12 mmol/g for sugarcane bagasse, corn stover and soybean hulls, respectively. Competitive adsorption studies were conducted at 10 and 50 times US Environmental Protection Agency (US EPA) limits for arsenic, chromium and selenium in a simulated wastewater at pH 7. The results showed preferential adsorption of chromate ion over arsenate or selenate ion. Estimated product costs for the three resins ranged from $0.88/kg to $0.99/kg, which was considerably lower than the market costs for the two commercial anion exchange resins QA-52 and IRA-400 also used in this study. DMDHEU/choline chloride modification of the three by-products produced an anion exchange resin with a high capacity to adsorb chromate ion singly or competitively in the presence of other anions from aqueous solutions.

Keywords: Soybean Hulls, Sugarcane Bagasse, Corn Stover, Anion Exchange Resins, DMDHEU, Choline Chloride, Chromium, Arsenic, Selenium

? Genç-Fuhrman, H., Bregnhøj, H. and McConchie, D. (2005), Arsenate removal from water using sand–red mud columns. *Water Research*, **39** (13), 2944-2954.

Full Text: [W\Wat Res39, 2944.pdf](W/Wat%20Res39,%202944.pdf)

Abstract: This study describes experiments in which sorption filters, filled with chemically modified red mud (Bauxsol) or activated Bauxsol (AB) coated sand, are used to remove As(V) (arsenate) from water. Bauxsol-coated sand (BCS) and AB-coated sand (ABCS) are prepared by mixing Bauxsol or AB with wet sand and drying. Samples of the BCS and ABCS are also used in batch experiments to obtain isotherm data. The observed adsorption data fit the Langmuir model well, with adsorption maxima of 3.32 and 1.64 mg g−1 at pH values of 4.5 and 7.1, respectively for BCS; and of 2.14 mg g−1 for ABCS at a pH of 7.1. Test results show that higher arsenate adsorption capacities can be achieved for both BCS and ABCS when using the columns compared to results for batch experiments; the difference is greater for BCS. Additional batch tests, carried out for 21 days using BCS to explain the observed discrepancy, show that the equilibrium time previously used in batch experiments was too short because adsorption continued for at least 21 days and reached 87% after 21 days compared to only 35% obtained after 4 h. Fixed bed column tests, used to investigate the effects of flow rate and initial arsenate concentration indicate that the process is sensitive to both parameters, with lower flow rates (longer effective residence times in the columns) and initial arsenate concentrations providing better column performance. An examination of the combined effect of potential competing anions (i.e. silicate, phosphate, sulphate and bicarbonate) on the column performance showed that the presence of these anions in tap water slightly decreases arsenate removal. Each breakthrough curve is compared to the Thomas model, and it is found that the model may be applied to estimate the arsenate sorption capacity in columns filled with BCS and ABCS. The data obtained from both batch and column studies indicate that BCS and ABCS filtration could be effectively used to remove arsenate from water, with the latter being more efficient.

Keywords: Activated Bauxsol Coated Sand, Arsenate Removal, Batch Tests, Bauxsol Coated Sand, Column Tests, Thomas Model

Notes: highly cited

? Joss, A., Keller, E., Alder, A.C., Göbel, A., McArdell, C.S., Ternes, T. and Siegrist, H. (2005), Removal of pharmaceuticals and fragrances in biological wastewater treatment. *Water Research*, **39** (14), 3139-3152.

Full Text: [2005\Wat Res39, 3139.pdf](2005/Wat%20Res39,%203139.pdf)

Abstract: The removal of seven pharmaceuticals and two fragrances in the biological units of various full-scale municipal wastewater treatment plants was studied. The observed removal of pharmaceuticals was mainly due to biological transformation and varied from insignificant (<10%, carbamazepine) to>90% (ibuprofen). However, no quantitative relationship between structure and activity can be set up for the biological transformation. Overall, it can be concluded that for compounds showing a sorption coefficient (Kd) of below 300 L kg−1, sorption onto secondary sludge is not relevant and their transformation can consequently be assessed simply by comparing influent and effluent concentrations. The two fragrances (HHCB, AHTN) studied were mainly removed by sorption onto sludge. For the compounds studied, comparable transformation and sorption was seen for different reactor types (conventional activated sludge, membrane bioreactor and fixed bed reactor) as well as for sludge ages between 10 and 60–80 days and temperatures between 12 °C and 21 °C. However, some significant variations in the observed removal currently lack an explanation. The observed incoming daily load of iopromide and roxithromycin in medium-sized municipal wastewater treatment plants (up to 80,000 population equivalents) is generated by only a small number of patients: the consequences for representative 24 h composite sampling are discussed. Generally, the paper presents a method for setting up mass balances for micropollutants over entire wastewater treatment plants, including an estimation of the accuracy of the quantified fate (i.e. removal by sorption and biological transformation).

Keywords: Degradation, Sorption, Municipal Wastewater, Membrane Bioreactor, Pharmaceuticals, Musk Fragrances

? Herrero, R., Lodeiro, P., Rey-Castro, C., Vilariño T. and Sastre de Vicente, M.E. (2005), Removal of inorganic mercury from aqueous solutions by biomass of the marine macroalga *Cystoseira baccata*. *Water Research*, **39** (14), 3199-3210.

Full Text: [2005\Wat Res39, 3199.pdf](2005/Wat%20Res39,%203199.pdf)

Abstract: The ability of *Cystoseira baccata* algal biomass to remove Hg(II) from aqueous solutions is investigated. The mercury biosorption process is studied through batch experiments at 25 °C with regard to the influence of contact time, initial mercury concentration, solution pH, salinity and presence of several divalent cations. The acid–base properties of the alga are also studied, since they are related to the affinity for heavy metals. The studies of the pH effect on the metal uptake evidence a sharp increasing sorption up to a pH value around 7.0, which can be ascribed to changes both in the inorganic Hg(II) speciation and in the dissociation state of the acid algal sites. The sorption isotherms at constant pH show uptake values as high as 178 mg g−1 (at pH 4.5) and 329 mg g−1 (at pH 6.0). The studies of the salinity influence on the Hg(II) sorption capacity of the alga exhibit two opposite effects depending on the electrolyte added; an increase in concentration of nitrate salts (NaNO3, KNO3) slightly enhances the metal uptake, on the contrary, the addition of NaCl salt leads to a drop in the sorption. The addition of different divalent cations to the mercury solution, namely Ca2+, Mg2+, Zn2+, Cd2+, Pb2+ and Cu2+, reveals that their effect on the uptake process is negligible. Finally, the equilibrium sorption results are compared with predictions obtained from the application of a simple competitive chemical model, which involves a discrete proton binding constant and three additional constants for the binding of the main neutral inorganic Hg(II) complexes, Hg(Cl)2, HgOHCl and Hg(OH)2, to the algal surface sites.

Keywords: *Cystoseira Baccata*, Mercury, Adsorption, Marine Macroalga

? Rodgers, M., Healy, M.G. and Mulqueen, J. (2005), Organic carbon removal and nitrification of high strength wastewaters using stratified sand filters. *Water Research*, **39** (14), 3279-3286.

Full Text: [2005\Wat Res39, 3279.pdf](2005/Wat%20Res39,%203279.pdf)

Abstract: The current practice of spray irrigation of dairy parlour wastewaters is laborious and time consuming. Intermittent sand filtration systems may offer an alternative to spray irrigation when designed to remove organic carbon, nitrogen, phosphorus, coliforms and viruses from such wastewaters to allow discharge of the final effluent directly into receiving waters without damage to the environment. In this study two instrumented stratified sand filter columns (0.425 and 0.9 m deep, and both 0.3 m in diameter) were intermittently loaded for 439 days with synthetic dairy parlour washings at a number of hydraulic and organic loading rates. At a biochemical oxygen demand (BOD) loading of 22 g m−2 d−1, over 92% of the BOD and suspended solids in the wastewater was removed in the two filters and nitrification was complete. The 0.9 m column had a sustained ability to adsorb the influent phosphorus during the study period; however, the phosphorus adsorption capacity of the 0.425 m column began to decrease after approximately 30 days. Biomass, comprising hydrated extracellular polymers (exopolymers) and living and dead cells, accumulated in the 0.9 m column; it was assessed by sodium bromide tracer studies and by variations in the sand volumetric water contents using time domain reflectometry (TDR). The biomass growth increased the retention time of the wastewater in the filter media, and occurred mainly at the top of the first sand layer. Intermittent stratified sand filters appear to offer an effective and sustainable treatment process for the removal of BOD from high-strength wastewaters, and for the complete nitrification of ammonium.

Keywords: Intermittent Sand Filtration, Organic Loading Rate, Volumetric Water Content, Adsorption Isotherm Test

? Wingenfelder, U., Nowack, B., Furrer, G. and Schulin, R. (2005), Adsorption of Pb and Cd by amine-modified zeolite. *Water Research*, **39** (14), 3287-3297.

Full Text: [2005\Wat Res39, 3287.pdf](2005/Wat%20Res39,%203287.pdf)

Abstract: Natural zeolites, known for their excellent sorption properties towards metal cations, are widely used for the purification of wastewaters. The selectivity of clinoptilolite, a common zeolite mineral, for Pb is known to be particularly high, whereas its selectivity for Cd is often lower. Extraordinarily high sorption capacities for soft metal cations were observed in the case of thiol-functionalized silica gels and clays. In order to enhance the zeolites’ sorption capacity for Cd, we treated natural heteroionic and Na-clinoptilolite in aqueous suspensions with cysteamine and propylamine solutions and investigated the sorption of Cd and Pb to amine-modified zeolite by a series of batch experiments. Stability constants for amine sorption on all zeolite samples at room temperature and 50 °C were obtained. Partial dimerization of cysteamine explains the enhanced sorption of this compound.

In contrast, amine treatment did not enhance the adsorption capacity or selectivity of the clinoptilolite towards Cd and Pb. Instead, the amounts of adsorbed heavy metals decreased stoichometrically with increasing sorption of cysteamine and propylamine. This reduction can be explained by the blockage of channels by amine molecules and revealed that the modification of zeolites with mercaptoamines does not enhance the sorption capacity of zeolite for Cd and Pb.

Keywords: Zeolite, Sorption, Mercaptoamines, Heavy Metals, Dimerization

? Zhou, D., Zhang, L.N. and Guo, S.L. (2005), Mechanisms of lead biosorption on cellulose/chitin beads. *Water Research*, **39** (16), 3755-3762.

Full Text: [2005\Wat Res39, 3755.pdf](2005/Wat%20Res39,%203755.pdf)

Abstract: Environment-friendly cellulose/chitin beads being prepared by coagulating a blend of cellulose and chitin in 6 wt% NaOH/5 wt% thiourea aqueous solution with 5% H2SO4 possessed higher heavy metals uptake capacity than pure chitin flakes. The mechanisms of Pb2+ adsorption on cellulose/chitin beads at pH0=5 were investigated at the molecular levels by scanning electron micrographs (SEM), transmission electron micrographs (TEM), X-ray photoelectron spectroscopy (XPS), Fourier transform infrared spectroscopy (FTIR) and powder X-ray diffraction (XRD). The result revealed that mechanisms for the adsorption of Pb2+ on the cellulose/chitin beads could be described as complexation between Pb2+ and N atom in the chitin, and further adsorption of Pb2+ nearby the complexed Pb2+ and precipitation of the hydrolysis product of the Pb2+ complex on the beads as the crystalline state. Furthermore, structural factors such as larger surface area of the beads resulted from microporous-network structure, low crystallinity of cellulose/chitin beads and high hydrophilicity induced by hydrophilic skeleton of cellulose played an important role in increasing adsorption ability.

Keywords: Cellulose, Chitin, Beads, Heavy Metal, Adsorption, Mechanism

? Jeon, C. and Park, K.H. (2005), Adsorption and desorption characteristics of mercury(II) ions using aminated chitosan bead. *Water Research*, **39** (16), 3938-3944.

Full Text: [2005\Wat Res39, 3938.pdf](2005/Wat%20Res39,%203938.pdf)

Abstract: Adsorption and desorption characteristics for mercury ions using aminated chitosan bead which showed very high affinity to mercury ions were studied. The adsorption of mercury ions using aminated chitosan bead was an exothermic process since binding strength each other increased as the temperature decreased. And the adsorption of mercury ions was almost completed in 100 min at 150 rpm. In case that adsorbent dose increased, mercury uptake capacity decreased, while, removal efficiency increased. The beads were not greatly affected by the ionic strength, organic material and alkaline-earth metal ions. Mercury ions adsorbed on aminated chitosan bead were desorbed effectively about 95% by EDTA and the adsorption capacity of the recycled beads can still be maintained at 90% level at the 5th cycle.

Keywords: Chitosan, Mercury Ions, Biosorption, Polysaccharides, Adsorption, Desorption

? Zhang, Y.P. and Zhou, J.L. (2005), Removal of estrone and 17*β*-estradiol from water by adsorption. *Water Research*, **39** (16), 3991-4003.

Full Text: [2005\Wat Res39, 3991.pdf](2005/Wat%20Res39,%203991.pdf)

Abstract: Endocrine disrupting chemicals (EDCs) are the focus of current environment concern, as they can cause adverse health effects in an intact organism, or its progeny, subsequent to endocrine function. The paper reports on the removal of estrone (E1) and 17*β*-estradiol (E2) from water through the use of various adsorbents including granular activated carbon (GAC), chitin, chitosan, ion exchange resin and a carbonaceous adsorbent prepared from industrial waste. The results show that the kinetics of adsorption were adsorbent and compound-dependent, with equilibration being reached within 2 h for a waste-derived carbonaceous adsorbent to 71 h for an ion-exchange resin for E1, and within 7 h for the waste-derived carbonaceous adsorbent to 125 h for GAC for E2. Of all the adsorbents tested, the carbonaceous adsorbent showed the highest adsorption capacity, with a maximum adsorption constant of 87500 ml/g for E1 and 116000 ml/g for E2. The GAC also had a very high adsorption capacity for the two compounds, with a maximum adsorption constant of 9290 ml/g for E1 and 12200 ml/g for E2. The effects of some fundamental environmental parameters including adsorbent concentration, pH, salinity and the presence of humic acid and surfactant on adsorption were studied. The results show that adsorption capacity of activated carbon was decreased with an increase in adsorbent concentration and by the presence of surfactant and humic acid. The results have demonstrated excellent performance of a waste derived adsorbent in removing E1 and E2 from water, and indicated the potential of converting certain solid waste into useful adsorbents for pollution-control purposes.

Keywords: Endocrine Disrupting Chemicals, Adsorption, Activated Carbon, Carbonaceous Adsorbent, Wastewater

? Parette, R. and Cannon, F.S. (2005), The removal of perchlorate from groundwater by activated carbon tailored with cationic surfactants. *Water Research*, **39** (16), 4020-4028.

Full Text: [2005\Wat Res39, 4020.pdf](2005/Wat%20Res39,%204020.pdf)

Abstract: In rapid small-scale column tests, cationic surfactant-tailored activated carbons (ACs) effectively removed perchlorate to below detection levels for up to 30 times longer than virgin AC. By pre-loading bituminous AC with dicocodimethylammonium chloride, tallowtrimethylammonium chloride, cetyltrimethylammonium chloride, or cetylpyridinium chloride, 75 ppb perchlorate was removed for 27,000–35,000 bed volumes before the effluent perchlorate rose above 1 ppb. These tests employed a natural groundwater that also contained 30 mg/L sulfate, 26 mg/L nitrate (as NO3−), and other ions. By the time of 25 ppb perchlorate breakthrough, 7.3–10.1% of quaternary ammonium sites had perchlorate associated with them. Although some of the surfactants leached out of the tailored carbon beds (0.6–21.2% of the amount loaded), the leached surfactant could be removed to below detectable limits with a virgin AC polishing bed that chased the tailored bed.

Keywords: Perchlorate, Granular Activated Carbon (GAC), Cationic surfactant; Rapid Small-Scale Column Test (RSSCT)

? Lau, S.L. and Stenstrom, M.K. (2005), Metals and PAHs adsorbed to street particles. *Water Research*, **39** (17), 4083-4092.

Full Text: [2005\Wat Res39, 4083.pdf](2005/Wat%20Res39,%204083.pdf)

Abstract: Particles were collected from 18 different city streets adjacent to five different landuses in the City of Santa Monica, California. Landuses were classified as industrial, roads, multifamily residential, commercial and single family residential. Particles were collected using a vacuum cleaner with a 0.1-μm filter and a rotating brush head. Particles were first sized into six fractions from 43–2200 μm using two sets of sieves. Representative samples of the four size fractions smaller than 841 μm from each landuse were separately digested to extract metals and polynuclear aromatic hydrocarbons (PAHs). Smaller particles had higher solid-phase concentrations, but not as high as the ratios of their specific surface areas, assuming spherical shape. Relative PAHs concentrations were higher on small particles than were metal concentrations. Single-family residential areas were the lowest in metals and PAHs, with only a few exceptions. The greatest mass of pollutants was associated with the particles in the 100–250 μm range.

Keywords: Stormwater, Heavy Metals, PAHs, Street, Particles

? Figueiredo, S.A., Loureiro, J.M. and Boaventura, R.A. (2005), Natural waste materials containing chitin as adsorbents for textile dyestuffs: Batch and continuous studies. *Water Research*, **39** (17), 4142-4152.

Full Text: [2005\Wat Res39, 4142.pdf](2005/Wat%20Res39,%204142.pdf)

Abstract: In this work three natural waste materials containing chitin were used as adsorbents for textile dyestuffs, namely the Anodonta (*Anodonta cygnea*) shell, the Sepia (*Sepia officinalis*) and the Squid (*Loligo vulgaris*) pens. The selected dyestuffs were the Cibacron green T3G-E (CI reactive green 12), and the Solophenyl green BLE 155% (CI direct green 26), both from CIBA, commonly used in cellulosic fibres dyeing, the most used fibres in the textile industry.

Batch equilibrium studies showed that the materials’ adsorption capacities increase after a simple and inexpensive chemical treatment, which increases their porosity and chitin relative content. Kinetic studies suggested the existence of a high internal resistance in both systems. Fixed bed column experiments performed showed an improvement in adsorbents’ behaviour after chemical treatment. However, in the column experiments, the biodegradation was the main mechanism of dyestuff removal, allowing the materials’ bioregeneration. The adsorption was strongly reduced by the pore clogging effect of the biomass.

The deproteinised Squid pen (grain size 0.500–1.41 mm) is the adsorbent with highest adsorption capacity (0.27 and 0.037 g/g, respectively, for the reactive and direct dyestuffs, at 20 °C), followed by the demineralised Sepia pen and Anodonta shell, behaving like pure chitin in all experiments, but showing inferior performances than the granular activated carbon tested in the column experiments.

Keywords: Acid Dye, Activated Carbon, Adsorption, Adsorption, Basic-Dyes, Carbon, Chitin, Chitosan Fibers, Color, Dye Removal, Dyestuffs, Epichlorohydrin-Cellulose Polymer, Low-Cost Adsorbents, Removal, Textile Wastewaters

? Rangsivek, R.and Jekel, M.R. (2005), Removal of dissolved metals by zero-valent iron (ZVI): Kinetics, equilibria, processes and implications for stormwater runoff treatment. *Water Research*, **39** (17), 4153-4163.

Full Text: [2005\Wat Res39, 4153.pdf](2005/Wat%20Res39,%204153.pdf)

Abstract: Infiltration of stormwater runoff contaminated with metals is often questionable in several cases due to its long-term potential to cause deterioration of groundwater quality. To ensure the quality of filtrate, a pre-treatment of contaminated runoff is required. This study investigates the processes of copper and zinc ion removal from stormwater runoff using zero-valent iron (ZVI, Fe0). Kinetic and equilibrium tests were performed with laboratory-prepared and in situ stormwater runoff samples collected from roof, street and highway catchments. Based on the results, a substantial portion of Cu2+ is reduced and transformed to insoluble forms of Cu0 and Cu2O. Unlike copper, the adsorption and co-precipitation associated with freshly precipitated iron oxides play important roles for the removal of Zn2+. Investigations under various water quality conditions demonstrated a relatively minor impact on Cu2+ uptake rates. However, the different conditions apparently altered the removal stoichiometry and phases of the copper deposits. The removal rates of Zn2+ increase with higher dissolved oxygen (DO), ionic strength (IS), temperature (*T*) and pH. Dissolved organic carbon (DOC) in runoff samples forms complexes with metals and Fe2+, thereby kinetically decreasing the metal uptake rates. Furthermore, depending on its composition, a larger molecular weight organic fraction was found to preferentially compete for the adsorption sites. The study demonstrates that ZVI is a promising medium for achieving comparable capacity to a commercial adsorbent like granular ferric hydroxide (GFH). Long-term performance of ZVI, however, may be limited and governed by the formation of non-conductive layers of iron and cuprous oxides.

Keywords: Adsorption, Cementation, Heavy Metals, Iron Corrosion, Runoff Pollutants, Zero-Valent Iron (ZVI)

? Bi, E., Haderlein, S.B. and Schmidt, T.C. (2005), Sorption of methyl *tert*-butyl ether (MTBE) and *tert*-butyl alcohol (TBA) to synthetic resins. *Water Research*, **39** (17), 4164-4176.

Full Text: [2005\Wat Res39, 4164.pdf](2005/Wat%20Res39,%204164.pdf)

Abstract: Methyl *tert*-butyl ether (MTBE) is a widely used gasoline oxygenate. Contamination of MTBE and its major degradation product *tert*-butyl alcohol (TBA) in groundwater and surface water has received great attention. However, sorption affinity and sorption mechanisms of MTBE and TBA to synthetic resins, which can be potentially used in removal of these contaminants from water, in passive sampling, or in enrichment of bacteria, have not been studied systemically. In this study, kinetic and equilibrium sorption experiments (single solute and binary mixtures) on four synthetic resins were conducted. The sorption affinity of the investigated sorbents for MTBE and TBA decreases in the order Ambersorb 563>Optipore L493>Amberlite XAD4>Amberlite XAD7, and all show higher sorption affinity for MTBE than for TBA. Binary experiments with *o*-xylene, a major compound of gasoline as co-contaminant, imply that all resins preferentially sorb *o*-xylene over MTBE or TBA, i.e., there is sorption competition. In the equilibrium aqueous concentration (*C*eq) range (0.1–139.0 mg/L for MTBE, and 0.01–48.4 mg/L for TBA), experimental and modeling results as well as sorbent characteristics indicate that micropore filling and/or some other type of adsorption process (e.g., adsorption to specific sites of high sorption potential at low concentrations) rather than partitioning were the dominant sorption mechanisms. Optipore L493 has favourable sorption and desorption characteristics, and is a suitable sorbent, e.g., in bacteria enrichment or passive sampling for moderately polar compounds. However, for highly polar compounds such as TBA, Ambersorb 563 might be a better choice, especially in water treatment.

Keywords: MTBE, TBA, Synthetic Resins, Adsorption, Optipore L493, Sorption Kinetics

? Ogata, T. and Nakano, Y. (2005), Mechanisms of gold recovery from aqueous solutions using a novel tannin gel adsorbent synthesized from natural condensed tannin. *Water Research*, **39** (18), 4281-4286.

Full Text: [2005\Wat Res39, 4281.pdf](2005/Wat%20Res39,%204281.pdf)

Abstract: We report a novel recovery system for gold (Au), which is one of the precious metals contained in electronic scrap, utilizing tannin gel particles. Tannin gel particles were prepared by a process of cross-linking of condensed tannin (wattle tannin), which is a ubiquitous and inexpensive natural material having many hydroxyl groups. The adsorption mechanism of gold onto tannin gel particles was elucidated: the adsorption of gold takes place through the reduction of trivalent gold ions to metallic gold on the surface of tannin gel particles, which is accompanied by the simultaneous oxidization of the hydroxyl groups of tannin gel. Additionally, the adsorption capacity of gold was found to be extremely high, 8000 mg-Au/g-dry gel. The outstanding characteristics of tannin gel particles for gold offers the possibility of efficient recovery of other precious metals. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Tannin, Gel, Recovery, Gold, Redox, Biosorption, Hexavalent Chromium, Solvent-Extraction, Gold(III), Accumulation, Temperature, Biosorption, Reduction, Removal, Au(III), Resins

? Dunne, E.J., Culleton, N., O’Donovan, G., Harrington, R. and Daly, K. (2005), Phosphorus retention and sorption by constructed wetland soils in Southeast Ireland. *Water Research*, **39** (18), 4355-4362.

Full Text: [2005\Wat Res39, 4355.pdf](2005/Wat%20Res39,%204355.pdf)

Abstract: It may be necessary to use constructed wetlands as a land use practice to mitigate phosphorus (P) loss from agriculture in Ireland. The objectives of this study were to determine the ability of two constructed wetland site soils to retain and sorb P. Intact soil/water column studies were used to determine P release/retention rates during a 30-day incubation period. Soil columns flooded with distilled water released P during the first 2 days; however, soluble reactive P (SRP) concentrations in overlying floodwaters decreased thereafter. Soils with overlying floodwaters spiked at 5 and 15 mg SRP L-1 retained highest amounts of P (p < 0.05) with retention at these concentrations controlled by SRP in overlying waters. Retention rates by soils ranged between 0.3 and 60.9 mg P m-2 d-1. Maximum P sorption capacity (S-max) was higher for wetland soils at Dunhill, Waterford (1464 mg P kg-1) in comparison to soils at Johnstown Castle, Wexford (618 mg P kg-1). Equilibrium P concentrations (EPC0) were low (in the μg SRP L-1 range), indicating a high capacity of these soils to sorb P. Phosphorus sorption parameters were significantly related to ammonium oxalate extractable aluminium (Al) and iron (Fe) content of soils. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Phosphorus, Constructed Wetlands, Agriculture, Retention, Sorption, Column Study, Fresh-Water Wetlands, Phosphate Sorption, Waste-Water, Sediments, Streams, Capacity, Dynamics, Disposal, Nitrogen, Surface

? Lazaridis, N.K. and Charalambous, C. (2005), Sorptive removal of trivalent and hexavalent chromium from binary aqueous solutions by composite alginate-goethite beads. *Water Research*, **39** (18), 4385-4396.

Full Text: [2005\Wat Res39, 4385.pdf](2005/Wat%20Res39,%204385.pdf)

Abstract: In this study, the removal of hexavalent and trivalent chromium ions from binary aqueous solutions by composite alginate-goethite beads was investigated in a batch mode. Equilibrium sorption experiments were carried out at different temperatures and pH values. The data were correlated with Langmuir and Freundlich equations. The thermodynamic parameters calculated were: change in free energy, in enthalpy, in entropy and the heat of adsorption. The influence of mixing rate, sorbent concentration and sorbent particle size was studied at kinetic runs. The effective diffusion coefficients were evaluated by employing the homogeneous diffusion model and the shrinking core model for hexavalent and trivalent chromium, respectively. Desorption experiments were conducted by employing various eluants showed that the loaded material could be regenerated satisfactorily. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Biosorbent, Biosorption, Chromate, Chromium, Desorption, Diffusion, Energy, Equilibrium, Groundwater, Hexavalent Chromium, Homogeneous Kinetic Model, Ions, Isotherms, Kinetics, Kinetics, Mg-Al-CO3 Hydrotalcite, Model, pH, Removal, Shrinking Core Model, Sorbent, Sorption, Thermodynamic Parameters, Trivalent Chromium, Waste-Water

? Hu, J., Chen, G.H. and Lo, I.M.C. (2005), Removal and recovery of Cr(VI) from wastewater by maghemite nanoparticles. *Water Research*, **39** (18), 4528-4536.

Full Text: [2005\Wat Res39, 4528.pdf](2005/Wat%20Res39,%204528.pdf)

Abstract: Hexavalent chromium existing in the effluent is a major concern for the metal-processing plant. In this study, a new method combining nanoparticle adsorption and magnetic separation was developed for the removal and recovery of Cr(VI) from wastewater. The nanoscale maghemite was synthesized, characterized, and evaluated as adsorbents of Cr(VI). Various factors influencing the adsorption of Cr(VI), e.g., pH, temperature, initial concentration, and coexisting common ions were studied. Adsorption reached equilibrium within 15 min and was independent of initial Cr concentration. The maximum adsorption occurred at pH 2.5. The adsorption data were analyzed and fitted well by Freundlich isotherm. Cr(VI) adsorption capacity of maghemite nanoparticles was compared favorably with other adsorbents like activated carbon and clay. Competition from common coexisting ions such as Na+, Ca2+, Mg2+, Cu2+, Ni2+, NO3−, and Cl− was ignorable, which illustrated the selective adsorption of Cr(VI) from wastewater. Regeneration studies verified that the maghemite nanoparticles, which underwent six successive adsorption–desorption processes, still retained the original metal removal capacity. In addition, the adsorption mechanisms were investigated using X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), and Raman spectroscopic techniques.

Keywords: Adsorption, Chromium, Common Ion Effect, Desorption, Freundlich Isotherm

? Lagarde, F., Tusseau-Vuillemin, M.H., Lessard, P., Héduit, A., Dutrop, F. and Mouchel, J.M. (2005), Variability estimation of urban wastewater biodegradable fractions by respirometry. *Water Research*, **39** (19), 4768-4778.

Full Text: [2005\Wat Res39, 4768.pdf](2005/Wat%20Res39,%204768.pdf)

Abstract: This paper presents a methodology for assessing the variability of biodegradable chemical oxygen demand (COD) fractions in urban wastewaters. Thirteen raw wastewater samples from combined and separate sewers feeding the same plant were characterised, and two optimisation procedures were applied in order to evaluate the variability in biodegradable fractions and related kinetic parameters. Through an overall optimisation on all the samples. a unique kinetic parameter set was obtained with a three-substrate model including an adsorption stage, This method required powerful numerical treatment, but improved the identifiability problem compared to the usual sample-to-sample optimisation. The results showed that the fractionation of samples collected in the combined sewer was much more variable (standard deviation of 70% of the mean values) than the fractionation of the separate sewer samples. and the slowly biodegradable COD fraction was the most significant fraction (45% of the total COD on average), Because these samples were collected under various rain conditions, the standard deviations obtained here on the combined sewer biodegradable fractions could be used as a first estimation of the variability of this type of sewer system, (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Activated-Sludge, Adsorption, Biodegradability, Biomass, Cod, Cod Fractions, France, Methodology, Model, Oxygen, Parameters, Plant, Respirometry, Seine River, Treatment, Urban, Variability, Wastewater, Wastewaters

Notes: highly cited

? Clara, M., Strenn, B., Gans, O., Martinez, E., Kreuzinger, N. and Kroiss, H. (2005), Removal of selected pharmaceuticals, fragrances and endocrine disrupting compounds in a membrane bioreactor and conventional wastewater treatment plants. *Water Research*, **39** (19), 4797-4807.

Full Text: [2005\Wat Res39, 4797.pdf](2005/Wat%20Res39,%204797.pdf)

Abstract: Eight pharmaceuticals, two polycyclic musk fragrances and nine endocrine disrupting chemicals were analysed in several waste water treatment plants (WWTPs). A membrane bioreactor in pilot scale was operated at different solid retention times (SRTs) and the results obtained are compared to conventional activated sludge plants (CASP) operated at different SRTs. The SRT is an important design parameter and its impact on achievable treatment efficiencies was evaluated. Different behaviours were observed for the different investigated compounds. Some compounds as the antiepileptic drug carbamazepine were not removed in any of the sampled treatment facilities and effluent concentrations in the range of influent concentrations were measured. Other compounds as bisphenol-A. the analgesic ibuprofen or the lipid regulator bezafibrate were nearly completely removed (removal rates >90%). The operation of WWTPs with SRTs suitable for nitrogen removal (SRT > 10 days at 10 degrees C) also increases the removal potential regarding selected micropollutants. No differences in treatment efficiencies were detected between the two treatment techniques. As in conventional WWTP also the removal potential of MBRs depends on the SRT. Ultrafiltration membranes do not allow any additional detention of the investigated substances due to size exclusion. However, MBRs achieve a high SRT within a compact reactor. Nonylphenolpolyehtoxylates were removed in higher extend in very low-loaded conventional WWTPs, due to variations of redox conditions, necessary for the degradation of those compounds. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Wastewater Treatment, Endocrine Disrupting Chemicals, Pharmaceuticals, Musk Fragrances, Membrane Bioreactor, Removal Efficiency, Aquatic Environment, Sewage-Treatment, Bisphenol-A, Fate, Behavior, Sludge, Parameter, Macrolide, Residues

Notes: highly cited

? Min, B., Kim, J.R., Oh, S.E., Regan, J.M. and Logan, B.E. (2005), Electricity generation from swine wastewater using microbial fuel cells. *Water Research*, **39** (20), 4961-4968.

Full Text: [2005\Wat Res39, 4961.pdf](2005/Wat%20Res39,%204961.pdf)

Abstract: Microbial fuel cells (MFCs) represent a new method for treating animal wastewaters and simultaneously producing electricity. Preliminary tests using a two-chambered MFC with an aqueous cathode indicated that electricity could be generated from swine wastewater containing 8320 +/- 190 mg/L of soluble chemical oxygen demand (SCOD) (maximum power density of 45 mW/m(2)). More extensive tests with a single-chambered air cathode MFC produced a maximum power density with the animal wastewater of 261 mW/m(2) (200 Omega resistor), which was 79% larger than that previously obtained with the same system using domestic wastewater (146 +/- 8 mW/m(2)) due to the higher concentration of organic matter in the swine wastewater. Power generation as a function of substrate concentration was modeled according to saturation kinetics, with a maximum power density of P-max = 225 mW/m(2) (fixed 1000 Omega resistor) and half-saturation concentration of K-s = 1512 mg/L (total COD). Ammonia was removed from 198 +/- 1 to 34 +/- 1 mg/L (83% removal). In order to try to increase power output and overall treatment efficiency, diluted (1:10) wastewater was sonicated and autoclaved. This pretreated wastewater generated 16% more power after treatment (110 +/- 4 mW/m(2)) than before treatment (96 +/- 4 mW/m(2)). SCOD removal was increased from 88% to 92% by stirring diluted wastewater, although power output slightly decreased. These results demonstrate that animal wastewaters such as this swine wastewater can be used for power generation in MFCs while at the same time achieving wastewater treatment. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Microbial Fuel Cell, Electricity, Swine Wastewater, Animal Wastewater, Power Generation, Intermittent Aeration, Hydrogen-Production, Removal, Manure, Reactor, Energy, Power, Denitrification, Phosphorus, Nitrogen

? Deschamps, E., Ciminelli, V.S.T. and Höll, W.H. (2005), Removal of As(III) and As(V) from water using a natural Fe and Mn enriched sample. *Water Research*, **39** (20), 5212-5220.

Full Text: [2005\Wat Res39, 5212.pdf](2005/Wat%20Res39,%205212.pdf)

Abstract: The arsenic removal capacity of a natural oxide sample consisting basically of Mn-minerals (birnessite, cryptomelane, todorokite), and Fe-oxides (goethite, hematite), collected in the Iron Quadrangle mineral province in Minas Gerais, Brazil, has been investigated. As-spiked tap water and an As-rich mining effluent with As-concentrations from 100 μg L−1 to 100 mg L−1 were used for the experiments. Sorbent fractions of different particle sizes (<38 μm to 0.5 mm), including spherical material (diameter 2 mm), have been used. Batch and column experiments (pH values of 3.0, 5.5, and 8.5 for batch, and about pH 7.0 for column) demonstrated the high adsorption capacity of the material, with the sorption of As(III) being higher than that of As(V). At pH 3.0, the maximum uptake for As(V) and for As(III)-treated materials were 8.5 and 14.7 mg g−1, respectively. The Mn-minerals promoted the oxidation of As(III) to As(V), for both sorbed and dissolved As-species. Column experiments with the cFeMn-c sample for an initial As-concentration of 100 μg L−1 demonstrated a very efficient elimination of As(III), since the drinking water limit of 10 g L−1 was exceeded only after 7400 BV total throughput. The As-release from the loaded samples was below the limit established by the toxicity characteristic leaching procedure, thus making the spent material suitable for discharge in landfill deposits.

Keywords: Arsenic, Arsenic Removal, Arsenic Sorption, Iron–Manganese Sorbent

? Shilton, A.N., Elmetri, I., Drizo, A., Pratt, S., Haverkamp, R.G. and Bilby, S.C. (2006), Phosphorus removal by an ‘active’ slag filter-a decade of full scale experience. *Water Research*, **40** (1), 113-118.

Full Text: [2006\Wat Res40, 113.pdf](2006/Wat%20Res40,%20113.pdf)

Research on active filters for P removal using steel slag material has been conducted in laboratories across the world, however, field experiments have been limited and long-term data is practically non-existent. This paper presents a decade of experience on P removal by active slag filters at a full-scale treatment plant. During 1993-1994 the filter removed 77% of the total phosphorus (TP), and over the first 5 years of the filter’s operation it reduced the mean effluent TP concentration to 2.3 mg l(-1). However during the sixth year of operation P removal was significantly reduced. Over the 11 years of monitoring, 22.4 tonnes of TP was removed by the filter, 19.7 tonnes of this in the first 5-year period. It was determined that the slag material maintained its maximum removal potential until reaching a P-retention ratio of 1.23kg TP per tonne of slag. This paper provides the first long-term field data for slag filters, and shows that they can provide P removal for a half a decade before filter replacement/rejuvenation is required. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Active Filter, Adsorption, Blast-Furnace Slag, Constructed Reed Beds, Media, Monitoring, Phosphorus, Phosphorus Removal, Plant, Ponds, Ratio, Research, Retention Capacity, Sands, Slag, Steel Slag, Systems, Treatment, Treatment Wetlands, Waste-Water, Wastewater, Wastewater Treatment

? Ho, Y.S. (2006), Second-order kinetic model for the sorption of cadmium onto tree fern: A comparison of linear and non-linear methods. *Water Research*, **40** (1), 119-125.

Full Text: [2006\Wat Res40, 119.pdf](2006/Wat%20Res40,%20119.pdf); [2005\Wat Res-Ho1.pdf](2005/Wat%20Res-Ho1.pdf); [2005\Wat Res-Ho.pdf](2005/Wat%20Res-Ho.pdf)

Abstract: A comparison was made of the linear least-squares method and a trial-and-error non-linear method of the widely used pseudo-second-order kinetic model for the sorption of cadmium onto ground-up tree fern. Four pseudo-second-order kinetic linear equations are discussed. Kinetic parameters obtained from the four kinetic linear equations using the linear method differed but they were the same when using the non-linear method. A type 1 pseudo-second-order linear kinetic model has the highest coefficient of determination. Results show that the non-linear method may be a better way to obtain the desired parameters.

Keywords: Biosorption, Kinetics, Pseudo-Second-Order, Tree Fern, Metal

? Beolchini, F., Pagnanelli, F., Toro, L. and Vegliò, F. (2006), Ionic strength effect on copper biosorption by *Sphaerotilus natans*: Equilibrium study and dynamic modelling in membrane reactor. *Water Research*, **40** (1), 144-152.

Full Text: [2006\Wat Res40, 144.pdf](2006/Wat%20Res40,%20144.pdf)

Abstract: Biosorption of copper by *Sphaerotilus natans* in different conditions of ionic strength and pH was studied by performing sorption tests in batch and membrane reactors. Equilibrium batch tests evidenced the negative effect of ionic strength and the positive effect of pH on biosorption performances: the highest determined value for copper specific uptake, *q*, was about 60 mg/g at pH 6 and about 15 mg/g at pH 4. A competitive equilibrium model was successfully fitted to experimental data at different ionic strength levels to account for copper–sodium competition. In membrane reactor tests, experimental profiles of copper concentration in the permeate vs. time did not evidence a significant effect of ionic strength at low pH values (4 and 5). On the other hand a more remarkable effect of ionic strength on copper concentration in the permeate was observed at pH 6. Experimental profiles of continuous biosorption in the membrane reactors were successfully simulated by developing a dynamic model accounting for Cu–Na competition and for binding ability of cells fragments.

Keywords: Copper, Biosorption, Membrane, Equilibrium, Kinetics, Modelling

? Vilar, V.J.P., Botelho, C.M.S. and Boaventura, R.A.R. (2006), Equilibrium and kinetic modelling of Cd(II) biosorption by algae Gelidium and agar extraction algal waste. *Water Research*, **40** (2), 291-302.

Full Text: [2006\Wat Res40, 291.pdf](2006/Wat%20Res40,%20291.pdf)

Abstract: In this study an industrial algal waste from agar extraction has been used as an inexpensive and effective biosorbent for cadmium(II) removal from aqueous solutions. This biosorbent was compared with the algae Gelidium itself, which is the raw material for agar extraction. Equilibrium data follow both Langmuir and Redlich–Peterson models. The parameters of Langmuir equilibrium model are qmax = 18.0 mg g−1, b = 0.19 mg l−1, and qmax = 9.7 mg g−1, b = 0.16 mg l−1, respectively for Gelidium and the algal waste. Kinetic experiments were conducted at initial Cd(II) concentrations in the range 6–91 mg l−1. Data were fitted to pseudo-first- and second-order Lagergren models. For an initial Cd(II) concentration of 91 mg l−1 the parameters of the pseudo-first-order Lagergren model are k1,ads = 0.17 and 0.87 min−1; qeq = 16.3 and 8.7 mg g−1, respectively, for Gelidium and algal waste. Kinetic constants vary with the initial metal concentration. The adsorptive behaviour of biosorbent particles was modelled using a batch reactor mass transfer kinetic model. The model successfully predicts Cd(II) concentration profiles and provides significant insights on the biosorbents performance. The homogeneous diffusivity, Dh, is in the range 0.5–2.2×10−8 and 2.1–10.4×10−8 cm2 s−1, respectively, for Gelidium and algal waste.

Keywords: Biosorption, Cadmium(II), Gelidium, Agar Extraction Waste, Mass Transfer Modelling

? Seredyńska-Sobecka, B., Tomaszewska, M., Janus, M. and Morawski, A.W. (2006), Biological activation of carbon filters. *Water Research*, **40** (2), 355-363.

Full Text: [2006\Wat Res40, 355.pdf](2006/Wat%20Res40,%20355.pdf)

Abstract: To prepare biological activated carbon (BAC), raw surface water was circulated through granular activated carbon (GAC) beds. Biological activity of carbon filters was initiated after about 6 months of filter operation and was confirmed by two methods: measurement of the amount of biomass attached to the carbon and by the fluorescein diacetate (FDA) test. The effect of carbon prewashing on WG-12 carbon properties was also studied. For this purpose, the nitrogen adsorption isotherms at 77K and Fourier transform-infrared (FT-IR) spectra analyses were performed. Moreover, iodine number, decolorizing power and adsorption properties of carbon in relation to phenol were studied. Analysis of the results revealed that after WG-12 carbon prewashing its BET surface increased a little, the pH value of the carbon water extract decreased from 11.0 to 9.4, decolorizing power remained at the same level, and the iodine number and phenol adsorption rate increased. in preliminary studies of the ozonation-biofiltration process, a model phenol solution with concentration of approximately 10mg/l was applied. During the ozonation process a dose of 1.64 mgO3/mgTOC (total organic carbon) was employed and the contact time was 5 min. Four empty bed contact times (EBCTs) in the range of 2.4-24.0 min were used in the biofiltration experiment. The effectiveness of purification was measured by the following parameters: chemical oxygen demand (CODMn), TOC, phenol concentration and UV254-absorbance. The parameters were found to decrease with EBCT. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Agricultural By-Products, Biological Activated Carbon, Bioregeneration, Kinetics, Microbial Activity, Ozonation, Performance, Sorption, Water

? Song, Z., Edwards, S.R. and Burns, R.G. (2006), Treatment of naphthalene-2-sulfonic acid from tannery wastewater by a granular activated carbon fixed bed inoculated with bacterial isolates *Arthrobacter globiformis* and *Comamonas testosteroni*. *Water Research*, **40** (3), 495-506.

Full Text: [2006\Wat Res40, 495.pdf](2006/Wat%20Res40,%20495.pdf)

Abstract: The kinetics of naphthalene-2-sulfonic acid (2-NSA) adsorption by granular activated carbon (GAC) were measured and the relationships between adsorption, desorption, bioavailability and biodegradation assessed. The conventional Langmuir model fitted the experimental sorption isotherm data and introduced 2-NSA degrading bacteria, established on the surface of the GAC, did not interfere with adsorption. The potential value of GAC as a microbial support in the aerobic degradation of 2-NSA by Arthrobacter globiformis and Comamonas testosteroni was investigated. Using both virgin and microbially colonised GAC, adsorption removed 2-NSA from the liquid phase up to its saturation capacity of 140 mg/g GAC within 48 h. However, between 83.2% and 93.3% of the adsorbed 2-NSA was bioavailable to both bacterial species as a source of carbon for growth. In comparison to the non-inoculated GAC, the combination of rapid adsorption and biodegradation increased the amount (by 70–93%) of 2-NSA removal from the influent phase as well as the bed-life of the GAC (from 40 to >120 d). A microbially conditioned GAC fixed-bed reactor containing 15 g GAC removed 100% 2-NSA (100 mg/l) from tannery wastewater at an empty bed contact time of 22 min for a minimum of 120 d without the need for GAC reconditioning or replacement. This suggests that small volume GAC bioreactors could be used for tannery wastewater recycling.

Keywords: Tannery Wastewater, Naphthalene-2-Sulfonic Acid, Biodegradation, Sorption, Bioavailability, GAC, *Arthrobacter*, *Comamonas*, Desulphurisation

? Pokhrel, D. and Viraraghavan, T. (2006), Arsenic removal from an aqueous solution by a modified fungal biomass. *Water Research*, **40** (3), 549-552.

Full Text: [2006\Wat Res40, 549.pdf](2006/Wat%20Res40,%20549.pdf)

Abstract: Non-viable fungal biomass of Aspergillus niger, coated with iron oxide was investigated for its potential to remove arsenic from an aqueous solution. A. niger biomass coated with iron oxide showed maximum removal (approximately 95% of As(V) and 75% of As(III)) at a pH of 6. No strong relationship was observed between the surface charge of the biomass and arsenic removal.

Keywords: Arsenic Removal, Fungal Biomass, Aspergillus Niger, Iron Oxide Coating

? Lo, I.M.C., Lam, C.S.C. and Lai, K.C.K. (2006), Hardness and carbonate effects on the reactivity of zero-valent iron for Cr(VI) removal. *Water Research*, **40** (3), 595-605.

Full Text: [2006\Wat Res40, 595.pdf](2006/Wat%20Res40,%20595.pdf)

Abstract: Zero-valent iron (Fe0) was used to remove hexavalent chromium, Cr(VI), in groundwater via a coupled reduction-oxidation reaction. Nine columns were set up under various groundwater geochemistry to investigate the effects of hardness and carbonate on Cr(VI) removal. The Cr(VI) removal capacity of Fe0 was found to be about 4 mg Cr/g Fe0 in the control column (i.e., column 1). A slight decrease in the Cr(VI) removal capacity was found in the presence of calcium hardness. However, there was a 17% drop in the Cr(VI) removal capacity when magnesium hardness was present at low to moderately hard level. Results also revealed that carbonate changed the morphology of the Fe0 by formation of pale green precipitates on the iron filings. Furthermore, there was a 33% decrease in the Cr(VI) removal capacity of Fe0 when both carbonate and hardness ions were present. In general, the presence of hardness ions and carbonate in groundwater have great impact on the Fe0 by formation of passivated precipitates, such as CaCO3, on the Fe0 surface resulting in a diminished lifespan of the Fe0 by blocking electron transfer.

Keywords: Carbonate, Chromium, Hardness, Reactivity, Zero-Valent Iron

? Oladoja, N.A. and Ademoroti, C.M.A. (2006), The use of fortified soil-clay as on-site system for domestic wastewater purification. *Water Research*, **40** (3), 613-620.

Full Text: [2006\Wat Res40, 613.pdf](2006/Wat%20Res40,%20613.pdf)

Abstract: The quest for simple, low-cost and high-performance decentralized wastewater treatment system for domestic application in developing nations necessitated this study. Clay samples collected from different deposits in Nigeria were characterized by studying the mineralogical and geochemical composition using X-ray diffraction (XRD) and atomic absorption spectroscopy (AAS), respectively. Three major clay minerals of kaolinite, illite and smectite were identified. The geochemical studies showed the abundance of SiO2, Al2O3 and H2O+ in each of the clay samples. Performance efficiency studies were conducted to determine the best combination ratio of pebbles/soil-clay. Soil-clay fortified by pebbles in combination ratios of 1:3 (i.e. pebbles:soil-clay=1:3 (w/w) showed the optimum water purification, while the combination 3:1 gave the least. The flow rate studies showed that the wastewater had a longer residence time in non-fortified soil-clay than in fortified soil-clay. Two modes of treatment methods were employed—single and double column treatment methods (SCT and DCT). The two methods gave effluents of good quality characteristics, but those from the DCT were of better quality. The quality of effluents also varies from one clay type to another. The quality of effluents from media containing smectite clay mineral was better than those from other columns. Repeated usage of the fortified clay column showed a decrease of pH, TS and DO, and an increase of COD when monitored over a period of 10 days.

Keywords: Fortified Soil-Clay, Wastewater Treatment, Percolator, Single Column, Double Column

? Ambonguilat, S., Gallard, H., Garron, A., Epron, F. and Croué, J.P. (2006), Evaluation of the catalytic reduction of nitrate for the determination of dissolved organic nitrogen in natural waters. *Water Research*, **40** (4), 675-682.

Full Text: [2006\Wat Res40, 675.pdf](2006/Wat%20Res40,%20675.pdf)

Abstract: The catalytic reduction of nitrate ions into nitrogen gas was tested to partly remove dissolved inorganic nitrogen (DIN) before the determination of dissolved organic nitrogen (DON). Experiments were conducted on nitrate solutions enriched with natural organic matter (NOM) isolates previously extracted from surface waters. Three catalysts Pd-In/Al2O3, Pd-Sn/Al2O3 and Pd/SnO2 were tested. Their noble metal (palladium) and promoter metal (indium or tin) contents are 5 and 1.75wt%, respectively. Preliminary experiments performed on a solution containing 17 amino acids showed that most compounds were removed by less than 15%, probably due to sorption onto the catalysts, Reduction of nitrate in absence of NOM was complete after 20 min of reaction time and the removal of DIN was about 80% (about 19% formation of ammonium). In the presence of NOM (DOC 20mgC/L, DON 0.67mg N/L), the kinetic of nitrate reduction was slower and the reduction in DIN content was limited to 15% i.e. selectivity toward ammonium reached 85%. Adsorption tests showed a similar removal of both DOC and DON of about 70% and 30% onto Pd-Sn/Al2O3 and Pd/SnO2 catalysts, respectively, which confirmed that NOM probably compete with nitrate for active catalytic sites. In conclusion, catalytic reduction of nitrate before DON determination cannot be used because of DON sorption and low DIN removal. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Catalytic Reduction, Copper, Dissolved Organic Nitrogen, Drinking-Water, Evaluation, Ions, Natural Organic Matter, Nitrate, Nitrite, Nitrogen, Palladium, Platinum, Reduction, Removal, Sorption, Surface

Notes: highly cited

? Rosenberger, S., Laabs, C., Lesjean, B., Gnirss, R., Amy, G., Jekel, M. and Schrotter, J.C. (2006), Impact of colloidal and soluble organic material on membrane performance in membrane bioreactors for municipal wastewater treatment. *Water Research*, **40** (4), 710-720.

Full Text: [2006\Wat Res40, 710.pdf](2006/Wat%20Res40,%20710.pdf)

Abstract: Two parallel membrane bioreactors (2 m(3) each) were operated over a period of 2 years. Both pilots were optimised for nitrification, denitrification, and enhanced biological phosphorous elimination, treating identical municipal wastewater under comparable operating conditions. The only constructional difference between the pilots was the position of the denitrification zone (pre-denitrification in pilot 1 and post-denitrification in pilot 2). Despite identical modules and conditions, the two MBRs showed different permeabilities and fouling rates. The differences were not related to the denitrification scheme. In order to find an explanation for the different membrane performances, a one-year investigation was initiated and the membrane performance as well as the operating regime and characteristics of the activated sludge were closely studied. MLSS concentrations, solid retention time, loading rates, and filtration flux were found not to be responsible for the different performance of the submerged modules. These parameters were kept identical in the two pilot plants. Instead, the non-settable fraction of the sludges (soluble and colloidal material, i.e. polysaccharides, proteins and organic colloids) was found to impact fouling and to cause the difference in membrane performance between the two MBR. This fraction was analysed by spectrophotometric and size exclusion chromatography (SEC) methods. In a second step, the origin of these substances was investigated. The results point to microbiologically produced substances such as extracellular polymeric substances (EPS) or soluble microbial products (SMP). (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Membrane Bioreactor, Fouling, Organic Substances, Solutes, Sec, Polysaccharides, Extracellular Polymeric Substances, Activated-Sludge, Microbial Products, Filtration Characteristics, Permeate Flux, System

? Lv, L.A., He, J., Wei, M., Evans, D.G. and Duan, X. (2006), Uptake of chloride ion from aqueous solution by calcined layered double hydroxides: Equilibrium and kinetic studies. *Water Research*, **40** (4), 735-743.

Full Text: [2006\Wat Res40,735.pdf](2006/Wat%20Res40,735.pdf)

Abstract: Layered double hydroxides (LDH) calcined within a certain temperature range (denoted as CLDH) have been shown to recover their original layered structure in the presence of appropriate anions. in the light of this so-called ‘memory effect’, uptake of chloride ion from aqueous solution by calcined MgAl-CO3 LDH was investigated in batch mode. The equilibrium isotherm showed that the uptake of chloride ion by CLDH was consistent with the Langmuir and Freundlich equations and that the Langmuir model gave a better fit to the experimental data than the Freundlich model. The maximum uptake capacity of CLDH for chloride ion was 149.5 mg/g, close to the stoichiometric uptake (168 mg/g). The influence of varying pH of solution, initial chloride concentration, adsorbent quantity, and temperature on the kinetics of chloride removal has also been explored. Four kinetic models were used to fit the experimental data, and it was found that the pseudo - second-order kinetics model could be used to describe the uptake process satisfactorily. The calculated value of E. was found to be 56.8kJ/mol, which suggests that the process of uptake of chloride ion is controlled by the rate of reaction of chloride ion with the CLDH rather than diffusion. A mechanism for removal of chloride ion has been confirmed by X-ray diffraction, FT-IR spectroscopy and TG-MS measurements. (c) 2005 Elsevier Ltd. All rights reserved.

Keywords: Chloride, Kinetics, Layered Double Hydroxides, Hydrotalcite, Memory Effect, Isotherm, Magnesium-Aluminum Oxide, Waste-Water, Activated Carbon, Diffusion-Model, Sodium-Chloride, Basic Dye, Adsorption, Sorption, Removal, Hydrotalcite

? Zhang, Y. and Banks, C. (2006), A comparison of the properties of polyurethane immobilised *Sphagnum* moss, seaweed, sunflower waste and maize for the biosorption of Cu, Pb, Zn and Ni in continuous flow packed columns. *Water Research*, **40** (4), 788-798.

Full Text: [2006\Wat Res40, 788.pdf](2006/Wat%20Res40,%20788.pdf)

Abstract: The biosorption of Cu, Pb, Zn and Ni from a mixed solution of the metals was investigated in continuous flow packed columns containing polyurethane immobilised biomass. The characteristics and biosorption properties of Sphagnum moss, the brown seaweed Ascophyllum nodosum, waste biomass from the preparation of sunflower oil, and whole plant maize were compared.

All the biomass types showed a preference for the sequestration of Pb followed by Cu, with Ni and Zn having roughly equal affinity. With continuous metal loading to the column there was an initial binding of all metals and then a displacement of the lower affinity metals by those with a high affinity. This led to a chromatographic effect in the column with breakthrough concentrations for low-affinity metals higher than the concentration in the feed. A similar phenomenon was found on desorption using acidic solutions where low-affinity metals were desorbed preferentially. The results also indicated that despite competitive displacement of one metal species by another the biomass appeared to succeed in retaining some low-affinity metal species indicating that there may be selective sites present with different affinity characteristics.

When using a multi-metal solution with Cu, Pb, Zn and Ni at equal 10 mg g−1 concentrations as column influent, the total quantities of metal sequestered were: seaweed, 117.3 mg g−1; sunflower waste, 33.2 mg g−1; Sphagnum moss, 32.5 mg g−1; and maize, 2.3 mg g−1. The use of an acid base potentiometric titration showed a relationship between the number of acid functional groups and biosorption capacity, although this was not proportional for the biomass types studied. It can, however, be used in conjunction with a simple classification of metals into high and low-affinity bands to make a preliminary assessment of a biosorption system.

Keywords: Biosorption, Multi-Metal, Biosorption Capacity, Biosorption Affinity

? Tang, Z.J., Hong, S., Xiao, W.Z. and Taylor, J. (2006), Impacts of blending ground, surface, and saline waters on lead release in drinking water distribution systems. *Water Research*, **40** (5), 943-950.

Full Text: [2006\Wat Res40, 943.pdf](2006/Wat%20Res40,%20943.pdf)

Abstract: The impacts of distribution water quality changes caused by blending different source waters on lead release from corrosion loops containing small lead coupons were investigated in a pilot distribution study. The 1-year pilot study demonstrated that lead release to drinking water increased as chlorides increased and sulfates decreased. Silica and calcium inhibited lead release to a lesser degree than sulfates. An additional 3-month field study isolated and verified the effects of chlorides and sulfates on lead release. Lead release decreased with increasing pH and increasing alkalinity during the 1-year pilot study; however, the effects of pH and alkalinity on lead release, were not clearly elucidated due to confounding effects. A statistical model was developed using nonlinear regression, which showed that lead release increased with increasing chlorides, alkalinity and temperature, and decreased with increasing pH and sulfates. The model indicated that primary treatment processes such as enhanced coagulation and RO (reverse osmosis membrane) were related to lead release by water quality Chlorides are high in RO-finished water and increase lead release, while sulfates are high following enhanced coagulation and decrease lead release. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Lead Corrosion, Water Blending, Water Quality, Statistical Regression, Pipe Distribution Systems, Solubility, Carbonate

? Zhang, Y. and Banks, C. (2006), Adsorption of Cu(II) to schwertmannite and goethite in presence of dissolved organic matter. *Water Research*, **40** (5), 969-974.

Full Text: [2006\Wat Res40, 969.pdf](2006/Wat%20Res40,%20969.pdf)

Abstract: Sorption processes involving secondary iron minerals may significantly contribute to immobilisation of metals in soils and surface waters. In the present work the effect of dissolved organic matter (DOM) from a concentrated bog-water on the adsorption of Cu(II) onto schwertmannite (Fe8O8(OH)6SO4) and goethite (α-FeOOH) has been studied. The acid/base behaviour of DOM up to pH 6 was explained by assuming a diprotic acid with a density of carboxylate groups of 6.90 μeq (mg C)−1. The resulting acidity constants, recalculated to zero ionic strength were Click to view the MathML sourceand Click to view the MathML source.

The uptake of DOM to schwertmannite and goethite was highest at low pH although adsorption was significant also under mildly alkaline conditions. Adsorption to the two minerals was similar although at high pH more DOM was adsorbed to schwertmannite than to goethite.

DOM enhanced the adsorption of Cu(II) at moderately low pH in the goethite system but there was no effect of DOM in the case of schwertmannite. The presence of Cu(II) resulted in a decreased adsorption of DOM to goethite at weakly acidic pH and increased adsorption at high pH. In the case of schwertmannite, Cu(II) did not affect DOM uptake.

Keywords: Adsorption, Schwertmannite, Goethite, Dissolved Organic Matter, Metal Attenuation, Acid Mine Drainage

? Saleh, M.M. (2006), On the removal of cationic surfactants from dilute streams by granular charcoal. *Water Research*, **40** (5), 1052-1060.

Full Text: [2006\Wat Res40, 1052.pdf](2006/Wat%20Res40,%201052.pdf)

Abstract: Adsorption of a cationic surfactant; cetylpyridinium chloride (CPyCl) on granular charcoal (GC) was used to remove the surfactant from dilute solutions. The removal process was performed using both batch and continuous processes. In the batch process, the effects of different operating parameters on the removal efficiency were studied. The GC was found to be efficient and removal efficiencies up to not, vert, similar98% were obtained at certain conditions. The removal efficiency was found to increase with the amount of charcoal, shaking speed and temperature. It increased with the surfactant concentration and reaches quickly to maximum constant ranges but it decreases at higher concentrations near the cmc of the surfactant. The resistance for further decreases in the removal efficiency was dependent of the operating conditions. Adsorption of CPyCl on the GC was found to follow the kinetics of a first-order reaction. Activation energy of adsorption and SEM images suggested that diffusion inside the porous matrix could be a controlling step. Modified Frumkin isotherm was applied to the collected data at different temperatures. The results of removal of CPyCl using packed bed of GC at flowing conditions were also discussed. Higher values of the conversion efficiency, Ψ were obtained at low flow rates and thicker beds. The results were discussed on the light of a dimensionless conversion factor, Φ=υr2/2DLθ, which includes important structural and hydrodynamic parameters. The experimental data showed a satisfactory agreement with the theoretical trends.

Keywords: Cetylpyridinium, Charcoal, Granular, Removal, Porous

? Lemić, J., Kovačević, D., Tomašević-Čanović, M., Kovačević, D., Stanić, T. and Pfend, R. (2006), Removal of atrazine, lindane and diazinone from water by organo-zeolites. *Water Research*, **40** (5), 1079-1085.

Full Text: [2006\Wat Res40, 1079.pdf](2006/Wat%20Res40,%201079.pdf)

Abstract: Systematic adsorption tests were carried out to determine the efficiency of organo-zeolite (OZ) for removal of atrazine, lindane and diazinone from water. The hydrophobic character of OZ-pesticide interactions was confirmed by measuring the amount of pesticides sorbed on zeolite samples modified with 25, 50, 75 and 150 mmol of stearyldimethylbenzylammoniumchloride (SDBAC)/kg of zeolite. The effects of adsorbent particle size, solid content in the suspension and the initial pesticide concentration in the solutions were also investigated. For effective adsorption of diazinone onto an OZ, it is necessary for the SDBAC/diazinon ratio to be higher than 25. The adsorption capacities, calculated by fitting the experimental data to the Langmuir–Freundlich equation, were 2.0 μmol/g (atrazine), 4.4 μmol/g (diazinone) and 3.4 μmol/g (lindan). At lower initial concentrations of pesticide solution, a linear dependence existed between the amount adsorbed and the equilibrium concentration of pesticide. Column experiments showed that at volumetric flow of 6 cm3/min, the breakthrough points (at C/C0 = 0.1) were 560 bed volume (BV) for lindane and 620 for diazinone.

Keywords: Pesticide, Adsorption, Organo-Zeolite

? Li, Y.J., Li, X.D., Li, J.W. and Yin, J. (2006), Photocatalytic degradation of methyl orange by TiO2-coated activated carbon and kinetic study. *Water Research*, **40** (6), 1119-1126.

Full Text: [2006\Wat Res40, 1119.pdf](2006/Wat%20Res40,%201119.pdf)

Abstract: TiO2-coated activated carbon (AC) grain (TiO2/AC) was prepared through hydrolytic precipitation of TiO2 from Tetrabutylorthotitanate and following heat treatment. The TiO2/AC was characterized by BET, SEM, XRD and optical absorption spectroscopy. The samples were employed as catalysts for methyl orange photocatalytic oxidation degradation in aqueous suspension, used as probe reaction. The kinetics of methyl orange photo degradation was analyzed. The results indicate that BET surface area of TiO2-coated ACs decreased drastically in comparison with the original AC with increasing TiO2 coatings by more than 1 doped cycle. Nano-TiO2 particles were dispersed on the AC with the size of 20-40 nm, Crystalline TiO2 doped onto AC was from anatase to rutile with increase of heat-treatment temperature. The TiO2/AC was shown high photoactivity for the photodegradation of methyl orange (MO) dyestuff in aqueous solution under UV irradiation. The kinetics of photocatalytic MO dyestuff degradation was found to follow a pseudo-first-order rate law. It was observed that the presence of the AC enhanced the photoefficiency of the titanium dioxide catalyst. Different amount of TiO2 coatings induced different increases in the apparent first-order rate constant of the process. The kinetic behavior could be described in terms of a modified Langmuir-Hinshelwood model. The values of the adsorption equilibrium constants for the organic molecules, K-C, and for the rate constants, k(c), were certainly dependent on TiO2 content. At 47 wt% TiO2 coatings with the highest rate constant, the K-C and k(c) was 0.11161 mmol(-1) and 0.1872 mmol(-1) min(-1), respectively. The mechanism of methyl orange degradation was discussed in terms of the titanium dioxide photosensitization by the AC. (c) 2006 Published by Elsevier Ltd.

Keywords: Activated Carbon, Adsorption, Anatase-Type TiO2, Behavior, Equilibrium, Heterogeneous Photocatalysis, Induced, Kinetics, Mechanism, Methyl Orange Degradation, Model, Modified, Oxidation, Photocatalyst, Precipitation, Pseudo-First-Order, Quantum Yields, Rate Constant, Relative Photonic Efficiencies, Technical Report, Terminology, Titania, Titanium Dioxide, Treatment, Water, XRD

? Pekakis, P.A., Xekoukoulotakis, N.P. and Mantzavinos, D. (2006), Treatment of textile dyehouse wastewater by TiO2 photocatalysis. *Water Research*, **40** (6), 1276-1286.

Full Text: [2006\Wat Res40, 1276.pdf](2006/Wat%20Res40,%201276.pdf)

Abstract: The oxidative degradation of an actual textile dyehouse wastewater was investigated by means of photocatalysis in the presence of TiO2. The UV-A-induced photocatalytic oxidation over TiO2 suspensions was capable of decolorizing the effluent completely, as well as reducing chemical oxygen demand (COD) sufficiently (COD reduction generally varied between about 40% and 90% depending on the operating conditions) after 4 h of treatment. Two crystalline forms of TiO2, viz. anatase and rutile, were tested for their photocatalytic activity and anatase was found to be more active than rutile. The extent of photocatalytic degradation was found to increase with increasing TiO2 concentration up to 0.5 g/L TiO2, above which degradation remained practically constant, reaching a plateau. Furthermore, textile effluent degradation was enhanced at acidic conditions (i.e. pH = 3) and in the presence of hydrogen peroxide. To assess catalyst activity on repeated use, experiments were performed where the catalyst was recovered and reused; after three successive uses, TiO2 had sufficiently retained its photocatalytic activity. Finally, the luminescent marine bacteria Vibrio fischeri was used to assess the acute ecotoxicity of samples prior to and after the photocatalytic treatment and it was found that ecotoxicity was fully eliminated following photocatalytic oxidation.

Keywords: Textile wastewater, Photocatalysis, TiO2, Catalyst reuse, Ecotoxicity

? Fatin-Rouge, N., Dupont, A., Vidonne, A., Dejeu, J., Fievet, P. and Foissy, A. (2006), Removal of some divalent cations from water by membrane-filtration assisted with alginate. *Water Research*, **40** (6), 1303-1309.

Full Text: [2006\Wat Res40, 1303.pdf](2006/Wat%20Res40,%201303.pdf)

Abstract: The removal of divalent metal ions from hard waters or galvanic wastewater by polymer-assisted membrane filtration using alginate was investigated. The ability of this natural polymer to form aggregates and gels in presence of metal ions was studied, in order to carry out metal removal by ultra or micro-filtration. Alginate titrations have shown the presence of amine groups in addition to carboxylates onto the polymer backbone. The binding properties of alginate with divalent cations have been studied, showing an increasing affinity for Ca2+ over Mg2+ as polymer concentration increases, and the relative affinity Pb2+ ≥ Cu2+ > Zn2+ > Ni2+. The softening of hard natural waters was achieved successfully and easily, but needs an optimal alginate concentration ~4×10−2 M. The alginate powder can be directly added to hard waters. Except for Ni2+, metal-removal was efficient. Polymer regeneration has shown that Cu2+-complexes are labiles.

Keywords: Ultrafiltration Complexation, Polymer-Assisted Filtration, Wastewater Treatment, Water Softening, Metal Removal, Alginate

? Oporto, C., Arce, O., Van den Broeck, E., Van der Bruggen, B. and Vandecasteele, C. (2006), Experimental study and modelling of Cr (VI) removal from wastewater using *Lemna minor*. *Water Research*, **40** (7), 1458-1464.

Full Text: [2006\Wat Res40, 1458.pdf](2006/Wat%20Res40,%201458.pdf)

Abstract: The removal of Cr(VI) from wastewater by *Lemna minor* was studied both at laboratory and pilot scale. Laboratory tests were conducted under different conditions of initial Cr(VI) concentration (0.5 and 2.0 mg/l) and temperature (285 and 291 K). Batch experiments were carried out during 16 days in which the chromium concentrations, both in the biomass and in wastewater were measured. Data were used to characterize the biouptake capacity of the biomass; results showed that it increases with the temperature and when the initial Cr concentration decreases. The biouptake process could be fitted by an equation, with a correlation coefficient of 0.98. The removal process was assessed using the data of the variation of chromium concentration in the wastewater with respect to time; this allowed obtaining constant parameters which were applied in a mathematical model for the assessment of duckweed systems in a pilot scale plant.

Keywords: *Lemna minor*, Cr(VI), Biouptake, Removal, Wastewater, Mathematical Model, Pilot Scale Plant, Duckweed

? Drizo, A., Forget, C., Chapuis, R.P. and Comeau, Y. (2006), Phosphorus removal by electric arc furnace steel slag and serpentinite. *Water Research*, **40** (8), 1547-1554.

Full Text: [2006\Wat Res40, 1547.pdf](2006/Wat%20Res40,%201547.pdf)

Abstract: Electric arc furnace (EAF) steel slag and serpentinite were tested in columns either alone or mixed with limestone to determine their capacity to remove phosphorus (P) from a solution containing initially 20 mg P/L (for 114 days) than 400 mg P/L (for 21 days). EAF steel slag was nearly 100% efficient due to specific P adsorption onto metal hydroxides and precipitation of hydroxyapatite. Serpentinite also showed a good performance that decreased with time, adsorption appearing to be the dominant mechanism for P removal. Mixing limestone with these two materials did not improve their performance and in the case of serpentinite, it actually even decreased it. In 114 days of experimentation, serpentinite alone and the mixture of serpentinite and limestone removed 1.0 mg P/g while in 180 days of experimentation, EAF steel slag and the mixture of slag and limestone removed an average of 2.2 mg P/g, without attaining their maximum P removal potential. The void hydraulic retention time (HRTv) was a key factor for growing hydroxyapatite crystals and had a significant effect on P removal efficiency by EAF steel slag. A temporary increase in HRTv caused by clogging resulted in an increase in EAF steel slag efficiency (from 80% to almost 100%) towards the end of investigation. Results from this study indicate that the use of EAF steel slag in constructed wetlands or filter beds is a promising solution for P removal via adsorption and precipitation mechanisms. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Adsorption, Calcium, Constructed Wetland Systems, Hydroxyapatite, Magnesium, Mechanism, Phosphate Removal, Phosphorus, Phosphorus Removal, Phosphorus Retention, Precipitation, Precipitation, Retention, Saturation, Slag, Soils, Sorption, Steel Slag, Waste-Water, Wetlands

? Ruotolo, L.A.M., Santos-Junior, D.S. and Gubulin, J.C. (2006), Electrochemical treatment of effluents containing Cr(VI). Influence of pH and current on the kinetic. *Water Research*, **40** (8), 1555-1560.

Full Text: [2006\Wat Res40, 1555.pdf](2006/Wat%20Res40,%201555.pdf)

Abstract: Compounds of Cr(VI) are very toxic and their reduction to Cr(III) is necessary to allow their further precipitation or adsorption. Chemical methods for Cr(VI) reduction are usually used for this purpose. As an alternative, electrochemical methods using three-dimensional electrodes, such as reticulated vitreous carbon (RVC) and polyaniline-modified RVC, have been used successfully Since the pH affects reaction of Cr(VI) reduction, in this work its effect on the reaction rate was studied using electrodes of RVC and RVC/PANI. While a maximum in reaction rate was found for a pH 1.5 using the RVC, the RVC/PANI showed no differences in reaction rates in the range of pH between 0 and 1. Practically, no reaction was observed for any pH greater than 3. The effect of different current densities using optimized pH was also evaluated and the RVC/PANI electrode showed the best reaction rates, current efficiencies and energy consumption as a result of the polyaniline electrocatalytic effect. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aqueous-Solutions, Carbon Electrodes, Chromium(VI), Conducting Polymer-Films, Cr(VI), Current Efficiency, Energy, Hexavalent Chromium, pH, Polyaniline, Polyaniline, Polypyrrole, Precipitation, Reaction Rates, Reactor, Reduction, Reticulated Vitreous Carbon, Stability, Treatment

? Joss, A., Zabczynski, S., Gobel, A., Hoffmann, B., Loffler, D., McArdell, C.S., Ternes, T.A., Thomsen, A. and Siegrist, H. (2006), Biological degradation of pharmaceuticals in municipal wastewater treatment: Proposing a classification scheme. *Water Research*, **40** (8), 1686-1696.

Full Text: [2006\Wat Res40, 1686.pdf](2006/Wat%20Res40,%201686.pdf)

Abstract: A simple classification scheme is suggested to characterize the biological degradation of micropollutants such as pharmaceuticals, musk fragrances and estrogens during wastewater treatment. The scheme should be a basis for the discussion about potential removal efficiencies. Hence, the biological degradation of 25 pharmaceuticals, hormones and fragrances was studied in batch experiments at typical concentration levels using activated sewage sludge originating from nutrient-eliminating municipal wastewater treatment plants.

Since pseudo first-order degradation kinetics was observed for all compounds down to ngL(-1) levels, the removal rates can be predicted for various reactor configurations. Therefore dilution of wastewater (e.g. by extraneous water) is expected to reduce the degree of biological removal. Wastewater segregation and treatment at the source are therefore to be favoured for elimination of persistent micropollutants over centralized end-of-pipe treatment. For reactor configurations typical for nutrient removal in municipal wastewater, the derived formula for predicting removal allows the identification of three groups of micropollutants according to their degradation constant k(biol): compounds with k(biol)<0.1Lg(ss)(-1)d(-1) are not removed to a significant extent (<20%), compounds with k(biol)>10Lg(ss)(-1)d(-1) transformed by >90% and in-between moderate removal is expected. Based on the degradation of a heterogeneous group of 35 compounds (including literature data), state of the art biological treatment schemes for municipal wastewater are not efficient in degrading pharmaceuticals: only 4 out of 35 compounds are degraded by more than 90% while 17 compounds are removed by less than 50%.

Keywords: Municipal Wastewater, Micropollutants, Pharmaceuticals, Hormones, Activated Sludge, Membrane Bioreactor, Tandem Mass-Spectrometry, Sewage-Treatment Plants, Surface Waters, Drinking-Water, Aquatic Environment, Musk Fragrances, Estrogenic Chemicals, Contrast-Media, STW Effluent, Sludge

? Vieira, R.S. and Beppu, M.M. (2006), Dynamic and static adsorption and desorption of Hg(II) ions on chitosan membranes and spheres. *Water Research*, **40** (8), 1726-1734.

Full Text: [2006\Wat Res40, 1726.pdf](2006/Wat%20Res40,%201726.pdf)

Abstract: The adsorption and desorption of Hg(II) ions was studied using static and dynamic methods, employing membranes and spheres of chitosan as the adsorbent. The quantity of adsorption was influenced by chitosan crosslinking and by the adsorbent shape. The Langmuir model was applied to fit the experimental equilibrium data. Glutaraldehyde-crosslinked membranes presented a lower desorption capacity, when compared to natural membranes, but could be regenerated for use in successive cycles. Dynamic adsorption experiments suggested that the adsorption capacity depended mainly on adsorbent geometry, due to differences between surface area to mass ratio and initial concentration of Hg(II) ions. The adsorption capacity determined by the dynamic method was 65% and 77% for membranes and spheres, respectively of the value obtained static method results. A process combining dynamic adsorption and static desorption can be used to concentrate the Hg(II) ions by a factor of nearly seven (7×), when compared to the initially treated volume.

Keywords: Chitosan, Heavy Metal, Mercury, Adsorption

? Ngomsik, A.F., Bee, A., Siaugue, J.M., Cabuil, V. and Cote, G. (2006), Nickel adsorption by magnetic alginate microcapsules containing an extractant. *Water Research*, **40** (9), 1848-1856.

Full Text: [2006\Wat Res40, 1848.pdf](2006/Wat%20Res40,%201848.pdf)

Abstract: The adsorption of heavy metals on biomaterials was investigated by studying the potential of alginate microcapsules containing an extractant (Cyanex 272) and magnetic nanoparticles (*γ*-Fe2O3) for the adsorption of nickel(II) from aqueous solutions. A two-stage kinetics behaviour was observed with 70% of the maximum sorption capacity achieved within 8 h. An increase in nickel removal with increase in pH occurred, the maximum uptake capacity being around 0.42 mmol g–1 at pH 8. The adsorption isotherm (pH about 5.3) was obtained in a wide range of initial nickel concentrations; the experimental data were fitted by a Langmuir model and the *q*max value was estimated to be 0.52 mmol g–1. Moreover, including magnetic particles in the microcapsules allowed easy isolation of the beads from the aqueous solutions after the sorption process. Magnetic microcapsules are then suitable for the development of efficient biosorbents for removal and recovery of heavy metals from wastewater using magnetic separation.

Keywords: Magnetic Nanoparticles, Alginate, Cyanex 272, Microcapsule, Metal Removal

? Li, A.M. and Dai, J.Y. (2006), Effects of fulvic fractions on the pH-dependent sorption of Cu(II) to kaolinite. *Water Research*, **40** (10), 1951-1956.

Full Text: [2006\Wat Res40, 1951.pdf](2006/Wat%20Res40,%201951.pdf)

Abstract: Sorption of copper on kaolinite in the absence and presence of four fulvic acid (FA) fractions fractionated using XAD-8 resin, including F4.8, F7.0, F11.0 and Feth fractions (eluted by pH4.8 buffer, pH7.0 buffer, pH11.0 buffer, and ethanol (95%), respectively, was investigated by batch experiments. Results showed that the binding of Cu(II) by pure kaolinite increased with an increase in pH values. The presence of each FA fraction significantly affects the sorption of Cu(II) to kaolinite. Below pH 6.3, Cu(II) sorption was pronouncedly promoted after adding FA fraction to binary systems, compared to that in pure kaolinite suspensions. Magnitude in enhancement of Cu(II) sorption to solid phase, which was caused by FA fractions, followed an order of F4.8>F7.0>11.0>Feth. Above pH 6.3, nearly all the Cu(II) were removed from solution in pure koalinte system, while a portion of Cu(II) left in aqueous phase via formation of dissolved Cu–FA complexes, was observed in systems in the presence of FA fractions. The largest Cu(II) distribution coefficients (*K*d) between solid phase and aqueous solution at pH 3.15–5.7, are obtained from the ternary system with F4.8 fraction. The smallest *K*d are from system in the presence of Feth fraction. Conversely, over a pH range from 5.7 to 7.0, the highest *K*d values are from system with Feth fraction.

Overall, F4.8 fraction exhibited the greatest effect on Cu(II) pH-dependent sorption to kaolinite, and Feth fraction had the least. Functional groups such as carboxyl, phenolic moieties of FA played the vital role in Cu(II) sorption to kaolinite at lower pH conditions, and solubility under neutral conditions.

Keywords: Kaolinite, FA Fractions, Copper, Adsorption

? Nowack, B. and Stone, A.T. (2006), Competitive adsorption of phosphate and phosphonates onto goethite. *Water Research*, **40** (11), 2201-2209.

Full Text: [2006\Wat Res40, 2201.pdf](2006/Wat%20Res40,%202201.pdf)

Abstract: Phosphate and phosphonates are both strongly adsorbed onto mineral surfaces and their removal during wastewater treatment is mainly due to adsorptive processes. We have conducted experiments to study the mutual influence of phosphate and six different phosphonates on each other in buffered medium at pH 7.2. We have used phosphonates having one to five phosphonic acid groups (HMP, IDMP, HEDP, NTMP, EDTMP and DTPMP). The presence of phosphonates suppressed the adsorption of phosphate. The monophosphonate HMP had the smallest and the polyphosphonates the largest effect on phosphate adsorption. The presence of phosphate lowered phosphonate adsorption. The competition in the multicomponent system can reasonably well be predicted using a surface complexation model developed for single component systems. The competitive model only failed in systems containing the polyphosphonate DTPMP. With this approach we can predict the behavior of both compounds during wastewater treatment. The calculations show that phosphonates have a small effect on phosphate adsorption at the actual concentrations in observed wastewater. Adsorption of low concentrations of phosphonates was calculated to be significantly reduced by phosphate concentrations as observed in wastewater.

Keywords: Phosphate, Phosphonates, Competition, Adsorption, Iron Oxides, Water, Water Treatment

? Smičiklas, I., Dimović, S., Plećaš, I. and Mitrić, M. (2006), Removal of Co2+ from aqueous solutions by hydroxyapatite. *Water Research*, **40** (12), 2267-2274.

Full Text: [2006\Wat Res40, 2267.pdf](2006/Wat%20Res40,%202267.pdf)

Abstract: A study on the removal of cobalt ions from aqueous solutions by synthetic hydroxyapatite was conducted in batch conditions. The influence of different sorption parameters, such as: initial metal concentration, equilibration time, solution pH and presence of EDTA on the amount of Co2+ sorbed was studied and discussed. The sorption process followed pseudo-second-order kinetics with necessary time of 24 h to reach equilibrium. Cobalt uptake was quantitatively evaluated using the Langmuir and Dubinin–Kaganer–Radushkevich (DKR) model. The Langmuir adsorption isotherm constant corresponding to adsorption capacity, Xm, was found to be 20.92 mg/g. Sorption of Co2+ is constant in the initial pH range 4–8, because HAP surface buffers these solutions to the constant final pH value of 5.1. In the presence of EDTA, sorption of Co2+ decreases due to formation of complex with lower sorption affinities. Cobalt desorption depends on the composition of the extracting solution. The desorbed amount of cobalt decreased continuously with increasing pH, and increased with increasing Ca2+ concentration in leaching solution.

Keywords: Hydroxyapatite, Cobalt Removal, Equilibrium Isotherm, Kinetics, pH, Desorption

? Southichak, B., Nakano, K., Nomura, M., Chiba, N. and Nishimura, O. (2006), *Phragmites australis*: A novel biosorbent for the removal of heavy metals from aqueous solution. *Water Research*, **40** (12), 2295-2302.

Full Text: [2006\Wat Res40, 2295.pdf](2006/Wat%20Res40,%202295.pdf)

Abstract: Reed (*Phragmites australis*), a commonly used macrophyte in the wetlands constructed for water purification, was investigated as a new biosorbent for the removal of Cu2+, Cd2+, Ni2+, Pb2+ and Zn2+ from aqueous solution. The metal adsorption capacity of reed biomass was improved significantly by water-wash, base- and acid-treatment. The maximum sorption of NaOH-pretreated reed biomass was observed near neutral pH for Cu2+, Cd2+, Ni2+ and Zn2+, while that for Pb2+ was from an acidic range of pH 4.0 or higher. The maximum metal adsorption capacity on a molar basis assumed by Langmuir model was in the order of Cu2+>Ni2+>Cd2+>Zn2+>Pb2+. Reed biosorbent showed a very high adsorption affinity value, which helps predict its high ability to adsorb heavy metals at low concentration. Desorption of heavy metals and regeneration of the biosorbent was attained simultaneously by acid elution. Even after three cycles of adsorption-elution, the adsorption capacity was regained completely and the desorption efficiency of metal was maintained at around 90%.

Keywords: Biosorption, Heavy Metals, *Phragmites Australis*, Reed Biomass, Wetlands

? Tyrovola, K., Nikolaidis, N.P., Veranis, N., Kallithrakas-Kontos, N. and Koulouridakis, P.E. (2006), Arsenic removal from geothermal waters with zero-valent iron—Effect of temperature, phosphate and nitrate. *Water Research*, **40** (12), 2375-2386.

Full Text: [2006\Wat Res40, 2375.pdf](2006/Wat%20Res40,%202375.pdf)

Abstract: Field column studies and laboratory batch experiments were conducted in order to assess the performance of zero-valent iron in removing arsenic from geothermal waters in agricultural regions where phosphates and nitrates were present. A field pilot study demonstrated that iron filings could remove arsenic, phosphate and nitrate from water. In addition, batch studies were performed to evaluate the effect of temperature, phosphate and nitrate on As(III) and As(V) removal rates. All batch experiments were conducted at three temperatures (20, 30 and 40 °C). Pseudo-first-order reaction rate constants were calculated for As(III), As(V), phosphate, nitrate and ammonia for all temperatures. As(V) exhibited greater removal rates than As(III). The presence of phosphate and nitrate decreased the rates of arsenic removal. The temperature of the water played a dominant role on the kinetics of arsenic, phosphate and nitrate removal. Nitrate reduction resulted in the formation of nitrite and ammonia. In addition, the activation energy, *E*act, and the constant temperature coefficient, *θ* were determined for each removal process.

Keywords: Geothermal, Zero-valent iron, Arsenic, Phosphate, Nitrate

? Marshall, W.E. and Wartelle, L.H. (2006), Chromate (CrO42−) and copper (Cu2+) adsorption by dual-functional ion exchange resins made from agricultural by-products. *Water Research*, **40** (13), 2541-2548.

Full Text: [2006\Wat Res40, 2541.pdf](2006/Wat%20Res40,%202541.pdf)

Abstract: Ion exchange resins commonly have a single functionality for either cations or anions. Resins that have a dual functionality for both cations and anions are uncommon. The objective of this study was to create dual-functional ion exchange resins derived from soybean hulls, sugarcane bagasse and corn stover. Dual-functional resins were prepared by two separate two-step processes. In the first two-step process, by-products were reacted with a solution of citric acid in order to impart additional negative charge, and then reacted with the cross-linking reagent dimethyloldihydroxyethylene urea (DMDHEU) and a quaternary amine (choline chloride) to add positive charge to the lignocellulosic material. In the second two-step process, the order of reaction was reversed, with positive charge added first, followed by the addition of negative charge. These combined reactions added both cationic and anionic character to the by-products as evidenced by the increased removal from solution of copper (Cu2+) cation and the chromate (CrO42−) anion compared to unmodified by-products. The order of reaction appeared to slightly favor the functionality that was added last. That is, if negative charge was added last, the resulting resin sequestered more copper ion than a comparable resin where the negative charge was added first and vice-versa. Cu2+ and CrO42− were used as marker ions in a solution that contained both competing cations and anions. The dual-functional resins adsorbed as much as or more of the marker ions compared to commercial cation or anion exchange resins used for comparison. None of the commercial resins exhibited dual-functional properties to the same extent as the by-product-based resins.

Keywords: Chromate Ion Adsorption, Copper Ion Adsorption, Dual-Functional Ion Exchange Resin, Agricultural By-Product

? Al-Degs, Y.S., El-Barghouthi, M.I., Issa, A.A., Khraisheh, M.A. and Walker, G.M. (2006), Sorption of Zn(II), Pb(II), and Co(II) using natural sorbents: Equilibrium and kinetic studies. *Water Research*, **40** (14), 2645-2658.

Full Text: [2006\Wat Res40, 2635.pdf](2006/Wat%20Res40,%202635.pdf)

Abstract: Natural Jordanian sorbent (consisting of primary minerals, i.e., quartz and aluminosilicates and secondary minerals, i.e., calcite and dolomite) was shown to be effective for removing Zn(II), Pb(II) and Co(II) from aqueous solution. The major mineral constitutions of the sorbent are calcite and quartz. Dolomite was present as minor mineral and palygorskite was present as trace mineral. The sorbent has microporous structure with a modest surface area of 14.4 m2 g−1. pHzpc (pH of zero point charge) of the sorbent was estimated by alkaline–titration methods and a value of 9.5 was obtained. The sorption capacities of the metals were: 2.860, 0.320, 0.076 mmol cation g−1 for Zn(II), Pb(II) and Co(II) at pH 6.5, 4.5 and 7.0, respectively. The shape of the experimental isotherm of Zn(II) was of a ‘L2’ type, while that of Pb(II) and Co(II) was of a ‘L1’ type according to Giles classification for isotherms. Sorption data of metals were described by Langmuir and Freundlich models over the entire concentration range. It was found that the mechanism of metal sorption was mainly due to precipitation of metal carbonate complexes. The overall sorption capacity decreased after acid treatment, as this decreased the extent of precipitation on calcite and dolomite. The effect of Zn(II) ions concentration on sorption kinetics was investigated. Kinetic data were accurately fitted to pseudo-first order and external diffusion models which indicated that sorption of Zn(II) occurred on the exterior surface of the sorbent and the contribution of internal diffusion mechanism was insignificant. Furthermore, the sorption rate of Zn(II) was found to be slow, where only 10–20% of the maximum capacity was utilized in the first 30 min of interaction.

Keywords: Adsorption, Adsorption, Aqueous, Bentonite, Bone Char, Cadmium Ions, Calcite, Calcium-Carbonate Surfaces, Capacity, Classification, Clay Minerals, Contribution, Diffusion, Dolomite, Elsevier, Equilibrium, External Diffusion, Freundlich, Heavy Metals, Heavy-Metals, Interaction, Isotherm, Isotherms, Kaolinite, Kinetic, Kinetics, Langmuir, Mechanism, Metal, Metals, Methods, Models, Natural Adsorbent, Pb(II), pH, Precipitation, Primary, Pseudo-First Order, Removal, Single-Component, Sorption, Sorption Kinetics, Surface Area, Treatment, Zinc, Zn(II)

? Jang, J.H., Dempsey, B.A. and Burgos, W.D. (2006), Solubility of schoepite: Comparison and selection of complexation constants for U(VI). *Water Research*, **40** (14), 2738-2746.

Full Text: [2006\Wat Res40, 2738.pdf](2006/Wat%20Res40,%202738.pdf)

Abstract: Solubility of UO3.nH(2)O and sorption of U(VI) onto ferric (hydr)oxides were measured at pH 5.9, 6.8, and 7.8 at 10(-3.5) atm CO2 using reaction times up to 48 days. Precipitation was fastest in the presence of hydrous ferric oxide and slower with hematite or without an initial solid phase. Solubility after 48 days was statistically similar for low to intermediate initial supersaturation conditions and increased for the highest initial supers aturation. Schoepite was identified for low-to-intermediate initial conditions of supersaturation and was not found for the highest initial supersaturation. Predicted concentrations of monomeric and polymeric species differed considerably with the different suites of complexation constants, resulting in significant differences in predicted oxidation-reduction potential and mobility of U(VI) in groundwater. Solubilities for low to intermediate initial supersaturation were best represented using complexation constants from Langmuir, D. [1978. Uranium solution-mineral equilibria at low temperatures with applications to sedimentary ore deposits. Geochim. Cosmochim. Acta 42, 547-569] and Iog\*K-SP = 5.39 for schoepite, while solubilities for very high initial supersaturation were consistent with amorphous UO3 - nH(2)O. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Chemical Speciation, CO2, Coprecipitation, Dioxouranium(VI), Equilibria, Goethite, Groundwater, Hydrolysis Constant, Kinetic Phosphorimetry, Minerals, pH, Solubility, Sorption, Surface Precipitation, Uranium, Uranium(VI) Adsorption, Uranyl, Uranyl

Notes: highly cited

? Nakada, N., Tanishima, T., Shinohara, H., Kiri, K. and Takada, H. (2006), Pharmaceutical chemicals and endocrine disrupters in municipal wastewater in Tokyo and their removal during activated sludge treatment. *Water Research*, **40** (17), 3297-3303.

Full Text: [2006\Wat Res40, 3297.pdf](2006/Wat%20Res40,%203297.pdf)

Abstract: We measured six acidic analgesics or anti-inflammatories (aspirin, ibuprofen, naproxen, ketoprofen, fenoprofen, mefenamic acid), two phenolic antiseptics (thymol, triclosan), four amide pharmaceuticals (propyphenazone, crotamiton, carbamazepine, diethyltoluamide), three phenolic endocrine disrupting chemicals (nonylphenol, octylphenol, bisphenol A), and three natural estrogens (17 beta-estradiol, estrone, estriol) in 24-h composite samples of influents and secondary effluents collected seasonally from five municipal sewage treatment plants in Tokyo. Aspirin was most abundant in the influent, with an average concentration of 7300 ng/L (n = 16), followed by crotamiton (921 ng/L), ibuprofen (669 ng/L), triclosan (511 ng/L), and diethyltoluamide (503 ng/L). These concentrations were 1 order of magnitude lower than those reported in the USA and Europe. This can be ascribed to lower consumption of the pharmaceuticals in Japan. Aspirin, ibuprofen, and thymol were removed efficiently during primary+secondary treatment (> 90% efficiency). On the other hand, amide-type pharmaceuticals, ketoprofen, and naproxen showed poor removal (< 50% efficiency), which is probably due to their lower hydrophobicity (logK(ow)< 3). Because of the persistence of crotamiton during secondary treatment, crotamiton was most abundant among the target pharmaceuticals in the effluent. This is the first paper to report ubiquitous occurrence of crotamiton, a scabicide, in sewage. Because crotamiton is used worldwide and it is persistent during secondary treatment, it is a promising molecular marker of sewage and secondary effluent. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Pharmaceuticals, Crotamiton, Sewage Treatment Plant, Activated Sludge Treatment, Endocrine Disrupting Chemicals, Removal Efficiency, Sewage-Treatment Plants, Estrogenic Compounds, Aquatic Environment, Behavior, Triclosan, Drugs, River, Fate, Micropollutants, Carbamazepine

? Gaspard, S., Altenor, S., Passe-Coutrin, N., Ouensanga, A. and Brouers, F. (2006), Parameters from a new kinetic equation to evaluate activated carbons efficiency for water treatment. *Water Research*, **40** (18), 3467-3477.

Full Text: [2006\Wat Res40, 3467.pdf](2006/Wat%20Res40,%203467.pdf)

Abstract: The fractal dimension of some commercial activated carbon (AC) was determined in the micro-, meso- and macropore range using mercury porosimetry and N2 adsorption data. We studied the kinetic of adsorption of phenol, tannic acid and melanoidin on those ACs. The typical concentration-time profiles obtained here could be very well fitted by a general fractal kinetics equation q(n,alpha)(t) = q(e)[1 -(1+ (n - 1)(t/tau(n,alpha))(alpha))(-1/(n-1))] deduced from recently new methods of analysis of reaction kinetics and relaxation. The parameter n is the reaction order, a is a fractional time index, qe measures the maximal quantity of solute adsorbed, and a ‘half-reaction time’, tau(1/2), can be calculated, which is the time necessary to reach half of the equilibrium. The adsorption process on AC is clearly a heterogeneous process, taking place at the liquid-solid boundary, and the diffusion process occurs in a complex matrix with a fractal architecture as demonstrated here. In fact, these systems belong to what has been called ‘complex systems’ and the fractal kinetic, which has been extensively applied to biophysics, can be a useful theoretical tool for study adsorption processes. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Fractal Kinetic, Activated Carbon, Adsorption, Fractal Dimension, Fractal Dimension, Noninteger Dimensions, Universal Relaxation, Adsorption-Isotherms, Surface-Diffusion, Porous Materials, Complex-Systems, Heterogeneity, Molecules, Solids

? Maliyekkal, S.M., Sharma, A.K. and Philip, L. (2006), Manganese-oxide-coated alumina: A promising sorbent for defluoridation of water. *Water Research*, **40** (19), 3497-3506.

Full Text: [2006\Wat Res40, 3497.pdf](2006/Wat%20Res40,%203497.pdf)

Abstract: In this study, adsorption potential of a new sorbent manganese-oxide-coated alumina (MOCA) was investigated for defluoridation of drinking water using batch and continuous mode experiments. The effects of different parameters such as pH, initial fluoride concentration and co-existing ions (usually present in groundwater sample) were studied to understand the adsorption behavior of the sorbent under various conditions. Optimum removal of fluoride ions occurred in a pH range of 4-7. Results of the present study indicate that fluoride adsorption rate and adsorption capacity of MOCA are far superior to that of activated alumina (AA), which was used as the base material for MOCA preparation. The MOCA can be effectively regenerated using 2.5% NaOH as eluent. The Langmuir equilibrium model was found to be suitable for describing the fluoride sorption on AA and MOCA. The maximum fluoride uptake capacity for MOCA and AA was found to be 2.85 and 1.08 mg g-1, respectively. The kinetic results showed that the fluoride sorption to MOCA followed pseudo-second-order kinetics with a correlation coefficient greater than 0.98. The fluoride sorption capacity at breakthrough point for both the adsorbents was greatly influenced by bed depth. A bed depth service time (BDST) approach was adopted to describe the continuous flow system. The batch and column studies demonstrated the superiority of MOCA over AA in removing fluoride from the drinking water system. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Fluoride, Adsorption, Manganese-Oxide-Coated Alumina, Activated Alumina, Drinking Water, Fluoride Removal, Activated Alumina, Adsorption, Equilibrium, Sorption, Breakthrough, Diffusion, Earth, Mn, Fe

Notes: highly cited

? Adams, L.K., Lyon, D.Y. and Alvarez, P.J.J. (2006), Comparative eco-toxicity of nanoscale TiO2, SiO2, and ZnO water suspensions. *Water Research*, **40** (19), 3527-3532.

Full Text: [2006\Wat Res40, 3527.pdf](2006/Wat%20Res40,%203527.pdf)

Abstract: The potential eco-toxicity of nanosized titanium dioxide (TiO2), silicon dioxide (SiO2), and zinc oxide (ZnO) water suspensions was investigated using Gram-positive Bacillus subtilis and Gram-negative Escherichia coli as test organisms. These three photosensitive nanomaterials were harmful to varying degrees, with antibacterial activity increasing with particle concentration. Antibacterial activity generally increased from SiO2 to TiO2 to ZnO, and B. subtilis was most susceptible to their effects. Advertised nanoparticle size did not correspond to true particle size. Apparently, aggregation produced similarly sized particles that had similar antibacterial activity at a given concentration. The presence of light was a significant factor under most conditions tested, presumably due to its role in promoting generation of reactive oxygen species (ROS). However, bacterial growth inhibition was also observed under dark conditions, indicating that undetermined mechanisms additional to photocatalytic ROS production were responsible for toxicity. These results highlight the need for caution during the use and disposal of such manufactured nanomaterials to prevent unintended environmental impacts, as well as the importance of further research on the mechanisms and factors that increase toxicity to enhance risk management. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Antibacterial, Bacillus Subtilis, Escherichia Coli, Eco-Toxicity, Nanomaterials, Nanolitter, Photocatalysis, Titanium-Dioxide Particles, Escherichia-Coli, Photocatalytic Disinfection, Bactericidal Activity, Solar

? Qi, S.Y., Schideman, L., Marinas, B.J., Snoeyink, V.L. and Campos, C. (2007), Simplification of the IAST for activated carbon adsorption of trace organic compounds from natural water. *Water Research*, **41** (2), 440-448.

Full Text: [2007\Wat Res41, 440.pdf](2007/Wat%20Res41,%20440.pdf)

Abstract: Recent studies have shown that the ideal adsorbed solution theory (IAST) coupled with the concept of equivalent background compound (EBC) can be simplified for describing trace organic compound adsorption from natural water, provided that the adsorbent surface loading is dominated by competing natural organic matter. The resulting simplified IAST has been used to reduce the complexity of kinetic models for various dynamic adsorption processes. In order to be correctly applied, however, the simplified IAST requires some additional clarification and a quantitative evaluation of the deviation caused by the simplifying assumption. In this study, we derive a simple equation that relates the relative deviation of the simplified IAST directly to the molar ratio of EBC and trace organic compound surface loadings and their Freundlich isotherm exponents. We then verify the simplified IAST using the original IAST and experimental isotherm data from the literature for trace organic compounds at various initial concentrations in natural water. By further assuming that the adsorbed amount of the EBC is substantially greater than what remains in solution, a new pseudo single-solute isotherm equation is derived and a simple relation is subsequently established between the carbon dose and the remaining trace compound concentration. The results show that the adsorption capacity and relative removal of a trace organic compound at any carbon dose can be estimated directly with the simple equations developed here and data from a single isotherm experiment for the target compound conducted in the natural water of interest. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorption, Capacity, Chemicals, Competitive Adsorption, Competitive Adsorption, Contaminants, Evaluation, IAST, Interest, Isotherm, Kinetic Models, Literature, Matter, Model, Natural Organic Matter, Natural Water, Organic Compound, PAC, Prediction, Quantitative, Ratio, Removal, Theory, Verification

? Feo, J.C., Ordonez, E., Letek, M., Castro, M.A., Munoz, M.I., Gil, J.A., Mateos, L.M. and Aller, A.J. (2007), Retention of inorganic arsenic by coryneform mutant strains. *Water Research*, **41** (3), 531-542.

Full Text: [2007\Wat Res41, 531.pdf](2007/Wat%20Res41,%20531.pdf)

Abstract: The natural resistance mechanisms of corynebacteria to respond to the environments containing high levels of arsenic were successfully adopted to develop inexpensive and selective extractants for submicrogram amounts of arsenic. Kinetic and equilibrium characteristics were evaluated, and a preliminary exploration of the capability of these strains to be used for arsenic speciation was also made in this work. Three kinetics models were used to fit the experimental data. It was found that the pseudo-first-order kinetics model was not quite adequate to describe the retention process, while the intraparticle diffusion and the pseudo-second-order kinetics models provide the best fits. The equilibrium isotherm showed that the retention of arsenic was consistent with the Langmuir equation and that the Freundlich and Dubinin-Radushkevich models provided poorer fits to the experimental data. The maximum effective retention capacity for arsenic was about 15.4ng As/mg biomass. The amount of arsenic retained was directly measured in the biomass by forward planning a slurry electrothermal atomic absorption spectrometric procedure. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Absorption, Adsorption, Antimonite, Arsenate, Arsenic, Arsenite, Bacterial-Cells, Biomass, Capacity, Corynebacteria, Diffusion, Electrothermal Atomic Absorption, Equilibrium, Escherichia-Coli, Exploration, Freundlich, Inorganic, Isotherm, Kinetics, Kinetics, Kinetics Model, Langmuir, Langmuir Equation, Levels, Made, Mechanisms, Mercury, Model, Models, Mutant Strains, Natural, Planning, Resistance, Retention, Retention Capacity, Selective, Slurry, Slurry Sampling, Sorption, Speciation, Spectrometry, Toxicity

? Murphy, V., Hughes, H. and McLoughlin, P. (2007), Cu(II) binding by dried biomass of red, green and brown macroalgae. *Water Research*, **41** (4), 731-740.

Full Text: [2007\Wat Res41, 731.pdf](2007/Wat%20Res41,%20731.pdf)

Abstract: Dried biomass of the marine macroalgae Fucus spiralis and Fucus uesiculosus (brown), Ulva spp. (comprising Ulva linza, Ulva compressa and Ulva intestinalis) and Ulva lactuca (green), Palmaria palmata and Polysiphonia lanosa (red) were studied in terms of their Cu(II) biosorption performance. This is the first study of its kind to compare Cu(II) uptake by these seaweeds in the South-East of Ireland. Potentiometric and conductimetric titrations revealed a variety of functionalities on the seaweed surface including carboxyl and amino groups, which are capable of metal binding. it was also found that, of the seaweeds investigated, F. vesiculosus contained the greatest number of acidic surface binding sites while Palmaria palmata contained the least. The metal uptake capacities of the seaweeds increased with increasing pH and kinetic behaviour followed a similar pattern for all seaweeds: a rapid initial sorption period followed by a longer equilibrium period. P. palmata reached equilibrium within 10min of exposure while F. vesiculosus required 60min. Correlation was found between the total number of acidic binding sites and the time taken to reach equilibrium. Fourier transform infra-red (FTIR) analysis of the seaweeds revealed the interaction of carboxyl, amino, sulphonate and hydroxyl groups on the seaweed surface with Cu2+, ions while time course studies established the relative contribution of each of these groups in metal binding. (c) 2006 Elsevier Ltd. All rights reserved.

Keywords: Alginate, Analysis, Biosorption, Capacity, Chromium, Contribution, Correlation, Cu(II), Enteromorpha, Equilibrium, Exposure, FTIR, Heavy Metal, Heavy-Metal Biosorption, Ions, Lead, Marine Algae, Marine-Algae, Mechanisms, pH, Seaweed Biomass, Sorption, Uptake

Notes: highly cited

? Kim, S.D., Cho, J., Kim, I.S., Vanderford, B.J. and Snyder, S.A. (2007), Occurrence and removal of pharmaceuticals and endocrine disruptors in South Korean surface, drinking, and waste waters. *Water Research*, **41** (5), 1013-1021.

Full Text: [2007\Wat Res41, 1013.pdf](2007/Wat%20Res41,%201013.pdf)

Abstract: Liquid chromatography/tandem mass spectrometry (LC-MS/MS) with electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) was used to measure the concentrations of 14 pharmaceuticals, 6 hormones, 2 antibiotics, 3 personal care products (PCPs), and 1 flame retardant in surface waters and wastewater treatment plant effluents in South Korea. Tris (2-chloroethyl) phosphate (TCEP), iopromide, naproxen, carbamazepine, and caffeine were quite frequently observed (> 80%) in both surface waters and effluents. The analytes of greatest concentration were iopromide, TCEP, sulfamethoxazole, and carbamazepine. However, the primary estrogen hormones, 17 alpha-ethynylestradiol and 17 beta-estradiol, were rarely detected, while estrone was detected in both surface water and wastewater effluent. The elimination of these chemicals during drinking water and wastewater treatment processes at full- and pilot-scale also was investigated. Conventional drinking water treatment methods were relatively inefficient for contaminant removal, while efficient removal (approximate to 99%) was achieved by granular activated carbon (GAC). In wastewater treatment processes, membrane bioreactors (MBR) showed limited target compound removal, but were effective at eliminating hormones and some pharmaceuticals (e.g., acetaminophen, ibuprofen, and caffeine). Membrane filtration processes using reverse osmosis (RO) and nanofiltration. (NF) showed excellent removal (> 95%) for all target analytes. (C) 2006 Elsevier Ltd. All rights reserved.

Keywords: Wastewater, Treatment, Effluent, Drinking Water, Reuse, Membrane Bioreactor, Membrane Filtration, Activated Carbon, Reverse Osmosis, Nanofiltration, Ultrafiltration, Sewage-Treatment Plants, Personal Care Products, Mass-Spectrometry, Municipal Sewage, Estrogenic Chemicals, Activated-Sludge, STW Effluent, Bisphenol-A, Fate, Identification

? Akhtar, K., Waheed Akhtar, M. and Khalid, A.M. (2007), Removal and recovery of uranium from aqueous solutions by *Trichoderma harzianum*. *Water Research*, **41** (6), 1366-1378.

Full Text: [2007\Wat Res41, 1366.pdf](2007/Wat%20Res41,%201366.pdf)

Abstract: Removal and recovery of uranium from dilute aqueous solutions by indigenously isolated viable and non-viable fungus (*Trichoderma harzianum*) and algae (RD256, RD257) was studied by performing biosorption-desorption tests. Fungal strain was found comparatively better candidate for uranium biosorption than algae. The process was highly pH dependent. At optimized experimental parameters, the maximum uranium biosorption capacity of T. harzianum was 612 mg U g-1 whereas maximum values of uranium biosorption capacity exhibited by algal strains (RD256 and RD257) were 354 and 408 mg U g-1 and much higher in comparison with commercially available resins (Dowex-SBR-P and IRA-400). Uranium biosorption by algae followed Langmuir model while fungus exhibited a more complex multilayer phenomenon of biosorption and followed pseudo-second-order kinetics. Mass balance studies revealed that uranium recovery was 99.9%, for T. harzianum, and 97.1 and 95.3% for RD256 and RD257, respectively, by 0.1 M Hydrochloric acid which regenerated the uranium-free cell biomass facilitating the sorption-desorption cycles for better economic feasibility. © 2007 Elsevier Ltd. All rights reserved.

Keywords: Algae, Bioaccumulation, Biosorption, Kinetic Models, Multilayer, Pseudo-Second-Order Kinetics, *T. harzianum*, Uranium

? Lv, L., He, J., Wei, M., Evans, D.G. and Zhou, Z.L. (2007), Treatment of high fluoride concentration water by MgAl-CO3 layered double hydroxides: Kinetic and equilibrium studies. *Water Research*, **41** (7), 1534-1542.

Full Text: [2007\Wat Res41, 1534.pdf](2007/Wat%20Res41,%201534.pdf)

Abstract: MgAl-CO3 layered double hydroxides (LDHs) have been employed to treat high fluoride concentration solution. The influences of solution pH, initial fluoride concentration and other anions in the solution were investigated by a series of batch experiments. A marked decrease in the amount of adsorbed fluoride by LDHs is observed with increasing pH. The extent of fluoride removal in the presence of other anions decreases in the order HCO3-> Cl-> H2PO4-> SO42-. The equilibrium isotherm for fluoride uptake corresponds closely to the Langmuir-Freundlich (L-F) model. The maximum capacity of LDHs for fluoride ions and the Gibbs free energy (Delta G(0)) for the defluoridation process were calculated to be 319.8±5.7 mg/g and -9.0±0.66 kJ/mol, respectively. The negative value of Delta G(0) indicates the spontaneous nature of the treatment process. Four kinetic models have been evaluated in order to attempt to fit the experimental data, namely the pseudo-first order, the pseudo-second order, the modified multiplex and the double exponential models. It was found that the modified multiplex model, involving a rapid first order step and a slow second order step most closely described the kinetics. The activation energies for the two steps are 37.2±5.26 and 72.6±4.52 kJ/mol, respectively, suggesting that the rapid step is controlled by diffusion processes, whilst the second step is controlled by the reaction of fluoride with the LDHs. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Activation, Adsorption, Anions, Aqueous-Solutions, Batch Experiments, Capacity, Chromium(VI), Concentration, Defluoridation, Diffusion, Energy, Equilibrium, Fluoride, Hydrotalcite, Ions, Isotherm, Kinetic, Kinetic Models, Kinetics, Langmuir-Freundlich, Layered Double Hydroxides, Mg-Al-CO3 Hydrotalcite, Model, Models, Modified, pH, Process, Pseudo-First Order, Pseudo-Second Order, Pseudo-Second-Order, Reaction, Removal, Removal, Solution pH, Sorption, Treatment, Uptake, Waste-Water, Water

? Vilar, V.J.P., Botelho, C.M.S. and Boaventura, R.A.R. (2007), Copper desorption from *Gelidium* algal biomass. *Water Research*, **41** (7), 1569-1579.

Full Text: [2007\Wat Res41, 1569.pdf](2007/Wat%20Res41,%201569.pdf)

Abstract: Desorption of divalent copper from marine algae Gelidium sesquipedale, an algal waste (from agar extraction industry) and a composite material (the algal waste immobilized in polyacrylonitrile) was studied in a batch system. Copper ions were first adsorbed until saturation and then desorbed by HNO3 and Na(2)EDTA solutions. Elution efficiency using HNO3 increases as pH decreases. At pH = 1, for a solid to liquid ratio S/L = 4 g l(-1), elution efficiency was 97%, 95% and 88%, the stoichiometric coefficient for the ionic exchange, 0.70 +/- 0.02, 0.73 +/- 0.05 and 0.76 +/- 0.06 and the selectivity coefficient, 0.93 +/- 0.07, 1.0 +/- 0.3 and 1.1 +/- 0.3, respectively, for algae Gelidium, algal waste and composite material. Complexation of copper ions by EDTA occurs in a molar proportion of 1:1 and the elution efficiency increases with EDTA concentration. For concentrations of 1.4, 0.88 and 0.57 mmol l(-1), the elution efficiency for S/L = 4 g l(-1), was 91%, 86% and 78%, respectively, for algae Gelidium, algal waste and composite material. The S/L ratio, in the range 1-20 gl(-1), has little influence on copper recovery by using 0.1 M HNO3. Desorption kinetics was very fast for all biosorbents. Kinetic data using HNO3 as eluant were well described by the mass transfer model, considering the average metal concentration in the solid phase and the equilibrium relationship given by the mass action law. The homogeneous diffusion coefficient varied between 1.0 X 10(-7) cm(2) s(-1) for algae Gelidium and 3.0 x 10(-7) cm(2) s(-1) for the composite material. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorbents, Adsorption, Algal Waste, Biosorbent, Biosorbent Regeneration, Biosorption, Cadmium, Copper, Desorption, Diffusion, EDTA, Equilibrium, Exchange, Gelidium, Heavy-Metals, Industry, Ions, Kinetic, Kinetics, Mass Transfer, Model, pH, Ratio, Recovery, Removal, Sorption

? Blaney, L.M., Cinar, S. and SenGupta, A.K. (2007), Hybrid anion exchanger for trace phosphate removal from water and wastewater. *Water Research*, **41** (7), 1603-1613.

Full Text: [2007\Wat Res41, 1603.pdf](2007/Wat%20Res41,%201603.pdf)

Abstract: Throughout recent decades, the wastewater treatment industry has identified the discharge of nutrients, including phosphates and nitrates, into waterways as a risk to natural environments due to the serious effects of eutrophication. For this reason, new tertiary treatment processes have abounded; these processes generally utilize physicochemical and biological methods to remove nutrients from secondary wastewaters. The disadvantages of such methods involve larger reactor volumes, operating costs, and waste sludge production; furthermore, complete nutrient removal is unattainable due to thermodynamic and kinetic limitations. The subject study presents the development and performance of a new phosphate-selective sorbent, referred to as hybrid anion exchanger or HAIX. HAIX combines durability and mechanical strength of polymeric anion exchange resins with high sorption affinity of hydrated ferric oxide (HFO) toward phosphate. HAIX is essentially a polymeric anion exchanger within which HFO nanoparticles have been dispersed irreversibly. Laboratory studies show that HAIX selectively removes phosphate from the background of much higher concentrations of competing sulfate, chloride and bicarbonate anions due to the combined presence of Coulombic and Lewis acid-base interactions. Experimental results demonstrate that HAIX’s phosphate-sulfate separation factor is over two orders of magnitude greater than that of currently available commercial ion exchange resins. Additionally, optimal HAIX performance occurs at typical secondary wastewater pH conditions i.e., around 7.5. HAIX is amenable to efficient regeneration and reuse with no noticeable loss in capacity. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activated Alumina, Adsorption, Ammonium, Anion Exchange, Anion Exchanger, Capacity, Costs, Development, Eutrophication, Everglades, Hybrid Anion Exchanger, Hydrated Iron Oxide, Hydroxide, Industry, Ion Exchange, Ion-Exchangers, Iron, Nanoparticles, Nutrient Removal, Oxide, pH, Phosphate, Phosphorus Removal, Regeneration, Removal, Reuse, Risk, Selective Phosphate Removal, Sorbent, Sorption, Strength, Tertiary Treatment, Treatment, Wastewater, Wastewater Treatment

? Karamanis, D. and Assimakopoulos, P.A. (2007), Efficiency of aluminum-pillared montmorillonite on the removal of cesium and copper from aqueous solutions. *Water Research*, **41** (9), 1897-1906.

Full Text: [2007\Wat Res41, 1906.pdf](2007/Wat%20Res41,%201906.pdf)

Abstract: Aluminum-pillared-layered montmorillonites (PILMs) were tested for their potential application in the removal of copper or cesium from aqueous solutions. By varying the initial conditions, several PILMs were prepared and characterized by means of X-ray fluorescence (XRF), proton induced gamma-ray emission (PIGE), X-ray diffraction (XRD) and sorption isotherms. Uptake of metals was studied by means of XRF spectrometry for copper sorption or gamma-ray spectrometry for cesium, using Cs-137 as radiotracer. The sorption kinetics and capacity of PILMs were determined in relation to the effects of factors such as the initial metal concentration, initial pH of the solution and the presence of competitive cations. Kinetic studies showed that an equilibrium time of few minutes was needed for the adsorption of metal ions on PILMs. A pseudo-first-order equation was used to describe the sorption process for either copper or cesium. The most effective pH range for the removal of copper and cesium was found to be 4.0-6.0 and 3.0-8.0, respectively. Cesium sorption isotherms were best represented by a two-site Langmuir model while copper isotherms followed the Freundlich or the two-site Langmuir model. Cesium sorption experiments with inorganic or organic competitive cations as blocking agents revealed that the high selective sites of PILMs for cesium sorption (1-2% of total) are surface and edge sites in addition to interlayer exchange sites. In copper sorption, the two sites were determined as interlayer sites of PILMs after restoring their cation exchange capacity and sites associated with the pillar oxides. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Bentonite, Capacity, Cation Exchange, Cesium, Clays, Copper, Equilibrium, Heavy Metals, Heavy-Metals, Induced, Ion-Exchange, Ions, Isotherms, Kinetic, Kinetics, Langmuir Model, Low-Cost Adsorbents, Metals, Microporosity, Model, Montmorillonite, pH, Pillared Clays, Pseudo-First-Order, Removal, Sorbents, Sorption, Sorption Kinetics, Strontium, Water, XRD, XRF

? Kim, Y.I. and Bae, B.U. (2007), Design and evaluation of hydraulic baffled-channel PAC contactor for taste and odor removal from drinking water supplies. *Water Research*, **41** (10), 2256-2264.

Full Text: [2007\Wat Res41, 2256.pdf](2007/Wat%20Res41,%202256.pdf)

Abstract: Based on the concept of hydraulic flocculator, a baffled-channel powdered activated carbon (PAC) contactor, placed before the rapid-mixing basin, was designed and evaluated for removal of taste and odor (T&O) in drinking water. PAC adsorption kinetic tests for raw water samples were conducted for selection of design parameters related to contact time and degree of mixing. Within the tested range of velocity gradient (G) from 18 to 83s(-1), mixing had a relatively minor effect on the adsorption kinetics of the PAC. The hydrodynamic characteristics of the pilot-scale horizontally and vertically baffled-channel PAC contactor were investigated by tracer tests. It was found that the plug flow fractions of vertically baffled-channel PAC contactor (vBPC) were higher than those of the horizontally baffled-channel PAC contactor (hBPC) for the same bend width or bend height. However, the hBPC seems to be more appropriate than the vBPC in terms of construction and maintenance. The geosmin and MIB removal rate increased with the number of baffles, PAC dose and contact time increased regardless of bend width in the pilot-scale hBPC. The pair of full-scale hBPCs at Pohang water treatment plant, having a design capacity of 6.5 x 10(4) m(3)/d with 20min of hydraulic retention time with a safety factor of 2, was designed based on lab- and pilot-scale experimental results. Under a velocity gradient of 20 s(-1), the number of baffles to be installed was calculated to be 20 with a space of about 2 m between each baffle, resulting in a hydraulic head loss through the contactor of about 0.056 m. The successful application of hBPC for T&O removal from drinking water supplies should provide momentum for developing more effective treatment methods. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Adsorption Kinetics, Baffled-Channel PAC Contactor, Capacity, Design, Drinking Water, Evaluation, Flocculation, Geosmin, Kinetics, MIB, Optimal Design, PAC, Plant, Powdered Activated Carbon, Powdered Activated Carbon (PAC), Removal, Retention, Safety, Taste and Odor (T&O), Treatment, Velocity Gradient

? Le Noir, M. Lepeuple, A.S., Guieysse, B. and Mattiasson, B. (2007), Selective removal of 17 β-estradiol at trace concentration using a molecularly imprinted polymer. *Water Research*, **41** (12), 2825-2831.

Full Text: [2007\Wat Res41, 2825.pdf](2007/Wat%20Res41,%202825.pdf)

Abstract: A molecularly imprinted polymer (MIP) was synthesized with 17 beta-estradiol (E2) as template. It was then capable to recover this compound by 100±0.6% from a 2 μg/L aqueous solution. By comparison, E2 recoveries of 77±5.2%, 87.1±2.3% and 19.1±7.8%, were achieved using a non-imprinted polymer (NIP) synthesized under the same conditions (but without template), a commercial C18 extraction phase and granular-activated carbon (GAC), respectively When fluoxetine hydrochloride and acenaphthene were added as interferences to the aqueous solution at 2 μg/L each, E2 was recovered by 95.5±4.0% from the MIP, compared to 54.5±9.4%, 76.0±2% and 14.3±0.1% from the NIP, C18 and GAC phases, respectively Estrogenic activity equivalent to the effect caused by 22.4ng E2/L was recorded in the MIP extract from a wastewater sample whereas no activity was detected in the NIP extract. This suggested the imprinted polymers removed estrogenic compounds. This study therefore demonstrates the potential of MIPs for the selective removal of endocrine-disrupting compounds. By using a synthetic analogue to natural hormone receptors, adsorption is based on the same property that makes the contaminants harmful. Biological treatment of enriched E2 was also demonstrated. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Endocrine Disrupter, Estrogen, Molecular Imprinting, Trace Contaminant, Yeast Estrogen Screen, Waste-Water Contaminants, Activated-Sludge, Treatment Plants, Drinking-Water, Estrogenic Activity, Pharmaceuticals, Sewage, Degradation, Adsorption, Effluent

? Kim, Y.H., Ogata, T. and Nakano, Y. (2007), Kinetic analysis of palladium(II) adsorption process on condensed-tannin gel based on redox reaction models. *Water Research*, **41** (14), 3043-3050.

Full Text: [2007\Wat Res41, 3043.pdf](2007/Wat%20Res41,%203043.pdf)

Abstract: We have developed a novel recovery system of palladium (Pd) from wastes such as spent catalysts or scraps, using tannin gel particles synthesized from condensed -tannin molecules. The Pd(II) ionic species are reduced to metallic Pd(0) on the network of the tannin gel: a two-electron transfer from the tannin gel to Pd(II). The kinetic study of the electron transfer was performed with a multiple reaction model containing an intermediate step (formation of a ligand- substituted Pd(II)-tannin inner sphere complex), resulting in a better fit with the experimental results than with the single reaction model (outer sphere redox reaction), which means that the inner sphere redox mechanism is an appropriate reaction model for the Pd(II) adsorption process. Because the intermediate is included in the adsorption amount, the adsorption process can be divided into two steps: fast adsorption by the ligand substitution at the initial stage and slow adsorption by the subsequent redox reaction after the ligand substitution reaches an equilibrium state, with different adsorption rates between the Pd(II) ionic species (PdCl+ > PdCl2 > PdCl3-, PdCl42-). (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Analysis, Chloride Solutions, Equilibrium, Inner Sphere Redox Mechanism, Kinetic, Mechanism, Metal-Ions, Model, Palladium(II) Adsorption, Polymer, Reaction Modeling, Recovery, Removal, Resin, Seawater, Tannin Gel, Temperature

? Schideman, L.C., Snoeyink, V.L., Marinas, B.J., Ding, L. and Campos, C. (2007), Application of a three-component competitive adsorption model to evaluate and optimize granular activated carbon systems. *Water Research*, **41** (15), 3289-3298.

Full Text: [2007\Wat Res41, 3289.pdf](2007/Wat%20Res41,%203289.pdf)

Abstract: A recently developed kinetic model for granular activated carbon (GAC) adsorbers (COMPSORB-GAC) that quantitatively describes the adsorption of trace organic contaminant in the presence of competing natural organic matter (NOM) was applied to evaluate the performance of different GAC system configurations: conventional fixed-bed adsorbers, layered upflow carbon adsorbers (LUCA), and moving-bed adsorbers (with few or many bed sections). COMPSORB-GAC separately tracks the adsorption of three components: a trace compound, a strongly competing NOM fraction that reduces trace compound equilibrium capacity, and a pore-blocking NOM fraction that reduces kinetics. Performance was simulated for various design criteria and with model parameters derived for two natural waters with significantly different NOM concentrations. For the range of simulated conditions and with baseline performance defined by a fixed-bed adsorber, LUCA generally reduced carbon usage rates (CURs) by 15-35%. A 2-section and a 16-section moving-bed reactor reduced baseline CURs by 20-30% and 45-55%, respectively Projected CURs for the water source with a relatively high NOM concentration were 2-3 times higher for all reactor configurations and indicated that NOM preloading would cause performance deterioration in deep GAC beds, which highlights the importance of source water quality. These results show how COMPSORB-GAC can be used in a comprehensive, site-specific optimization of GAC systems to ensure robust system performance and to balance capital and operating costs. (C) 2007 Published by Elsevier Ltd.

Keywords: Activated Carbon, Adsorbers, Adsorption, Atrazine, Atrazine, Background Organic-Matter, Balance, Capacity, Competitive Adsorption, Costs, Design, Direct Site Competition, Equilibrium, Fixed-Bed, GAC, GAC Adsorption, Hsdm, Iast, Kinetics, Model, Moving-Bed Reactor, Natural Organic Matter, Natural Organic Matter (NOM), Natural-Water, Performance, Pore Blockage, Removal, Simplification, Verification

? Gupta, V.K., Ali, I. and Saino, V.K. (2007), Defluoridation of wastewaters using waste carbon slurry. *Water Research*, **41** (15), 3307-3316.

Full Text: [2007\Wat Res41, 3307.pdf](2007/Wat%20Res41,%203307.pdf)

Abstract: Adsorption of fluoride on waste carbon slurry was investigated. Waste carbon slurry was obtained from fuel oil based generators of a fertilizer industry. The work involves batch experiments to investigate the effects of contact time, pH, temperature and adsorbent dose on the extent of adsorption by carbon slurry. The contact time and pH for maximum fluoride uptake were found 1h and 7.58, respectively. Maximum adsorption capacity (4.861 mg g-1) of fluoride on carbon slurry was observed at 15.00 mgL-1 initial fluoride concentration using 1.0 gL-1 adsorbent dose. Among four applied models, the experimental isotherm data were found to follow Langmuir equation more closely Thermodynamically, adsorption was found endothermic with values 7.348kJ mol-1, -25.410 kJ mol-1 and 0.109 kJ mol-1 K-1 for enthalpy, free energy and entropy, respectively showing the feasibility of adsorption process. From kinetic analysis, the adsorption was found to follow second-order mechanism with rate constant 49.637 g mg-1 min-1. The rate-controlling step of the adsorption was found pore diffusion controlled. In order to investigate the potential of this adsorbent on industrial scale, column and desorption experiments were carried out. The breakthrough capacity of column was calculated 4.155 mg g-1 with at a flow rate of 1.5 mL min-1. The proposed adsorbent has been used to remove fluoride from groundwater and wastewater. Desorption has been achieved under alkaline conditions (pH 11.6) from exhausted carbon slurry. The performance of carbon slurry was compared with many other reported adsorbent for fluoride removal and it was observed that proposed adsorbent is effective in terms of performance and cost especially. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Capacity, Adsorption Process, Analysis, Aqueous-Solution, Batch, Batch Experiments, Breakthrough, Breakthrough Capacity, Capacity, Carbon, Carbon Slurry, Column, Column Study, Concentration, Contact Time, Cost, Defluoridation, Desorption, Diffusion, Drinking-Water, Earth, Effective, Effects, Endothermic, Energy, Enthalpy, Entropy, Experimental, Experiments, Fertilizer, Flow, Flow Rate, Fluoride, Fluoride Removal, Free Energy, Fuel Oil, Groundwater, Industrial, Isotherm, Isotherm Data, Isotherm Modeling, Kinetic, Langmuir, Langmuir Equation, Mechanism, Models, Oil, Order, Performance, pH, Pore, Pore Diffusion, Potential, Process, Rate, Rate Constant, Removal, Scale, Second Order, Slurry, Sorption, Temperature, Time, Uptake, Waste, Wastewater, Wastewaters

? Genz, A., Baumgarten, B., Goernitz, M. and Jekel, M. (2008), NOM removal by adsorption onto granular ferric hydroxide: Equilibrium, kinetics, filter and regeneration studies. *Water Research*, **42** (1-2), 238-248.

Full Text: [2008\Wat Res42, 238.pdf](2008/Wat%20Res42,%20238.pdf)

Abstract: Adsorption onto granular ferric hydroxide (GFH) with subsequent in-situ regeneration is studied as a new process for natural organic matter (NOM) removal from groundwater. Adsorbent equilibrium loadings of 10-30 mg DOC g(-1) GFH(-1) are obtained, whereas the non-adsorbable DOC fraction amounts to 1.5 mgL(-1) for all investigated groundwaters. The larger and UV-active NOM fractions (mainly fulvic acids) are well adsorbed while the smaller molecular fractions are poorly or not adsorbed. However, kinetic studies show that the smaller and medium-sized fulvic acids are removed first. The equilibrium is strongly dependent on pH but only weakly on ionic strength, pointing to ligand exchange as the dominant adsorption mechanism. With regard to NOM structure, prerequisites for adsorption onto GFH are both a minimum number of functional groups and a molecular size small enough to enter the GFH pores. NOM breakthrough curves are successfully simulated using the LDF model (homogeneous surface diffusion model (HSDM) with linear driving force approach for surface diffusion) and experimentally determined mass transfer coefficients. Regeneration of loaded GFH is possible either by use of NaOH or oxidatively by H2O2. The optimal quantities and concentrations are determined. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Breakthrough Curve, Carboxyl-Group Structures, Competitive Adsorption, Diffusion, DOC Isotherm, Driving, Equilibrium, Fixed-Bed Adsorption Filter, Fulvic-Acid, Functional, Goethite, Granular Ferric Hydroxide, Groundwater, Hsdm, Humic Substances, Iron-Oxide, Kinetics, Mass Transfer, Mass Transfer Coefficient, Mechanism, Model, Molecular, Natural Organic Matter, Natural Organic-Matter, pH, Regeneration, Removal, Sorption, Strength, Sulfate Adsorption, Suwannee River

? Rocher, V., Siauque, J.M., Cabuil, V. and Bee, A. (2008), Removal of organic dyes by magnetic alginate beads. *Water Research*, **42** (4-5), 1290-1298.

Full Text: [2008\Wat Res42, 1290.pdf](2008/Wat%20Res42,%201290.pdf)

Abstract: This study deals with the development of a clean and safe process for water pollution remediation. We have synthesized a magnetic adsorbent in order to develop a solid-phase extraction process assisted by a magnetic field. To follow an ‘ecoconception’ approach, magnetic beads containing magnetic nanoparticles and activated carbon are prepared with a biopolymer extracted from algae, sodium alginate. The use of renewable bioresources of low cost and those disposable in large amount allows the development of a product with a low impact on the environment. The adsorption properties of activated carbon and magnetic properties of iron oxide nanoparticles are combined to produce an interesting magnetic composite. Synthesis and characterization of the magnetic beads have been reported. Their adsorption capacity was investigated by measuring the removal of two dyes (methylene blue and methyl orange) of different charges from aqueous solutions. The efficiency of the beads has been compared with that of non-encapsulated activated carbon. The effects of initial dye concentration, pH and calcium content of the beads have been studied. Adsorption kinetics experiments have been carried out and the data have been well fitted by a pseudo-second-order equation. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Acid, Activated Carbon, Activated Carbon, Adsorbent, Adsorption, Adsorption Kinetics, Alginate, Alginate Bead, Aqueous Solutions, Calcium, Calcium Alginate, Capacity, Carbon, Characterization, Composite, Cost, Development, Dye, Dyes, Efficiency, Environment, Experiments, Ferrofluid, Gels, Heavy-Metal Removal, Immobilization, Iron, Iron Oxide, Kinetics, Magnetic, Magnetic Beads, Magnetic Field, Magnetic Nanoparticles, Magnetic Properties, Matrices, Methylene Blue, Microparticles, Nanoparticles, Oxide, P-Nitrophenol, pH, Pollution, Remediation, Removal, Rights, Water, Water Pollution

? Goh, K.H., Lim, T.T. and Dong, Z. (2008), Application of layered double hydroxides for removal of oxyanions: A review. *Water Research*, **42** (6-7), 1343-1368.

Full Text: [2008\Wat Res42, 1343.pdf](2008/Wat%20Res42,%201343.pdf)

Abstract: Layered double hydroxides (LDHs) are lamellar mixed hydroxides containing positively charged main layers and undergoing anion exchange chemistry. In recent years, many studies have been devoted to investigating the ability of LDHs to remove harmful oxyanions such as arsenate, chromate, phosphate, etc. from contaminated waters by both surface adsorption and anion exchange of the oxyanions for interlayer anions in the LDH structure. This review article provides an overview of the LDH synthesis methods, the LDH characterization techniques, and the recent advancement that has been achieved in oxyanion removal using LDHs, highlighting areas of consensus and currently unresolved issues. Experimental studies relating to the sorption behaviors of LDHs with various oxyanions, and the kinetic models adopted to explain the adsorption rate of oxyanions from aqueous solution onto LDHs, have been comprehensively reviewed. This review discusses several key factors such as pH, competitive anions, temperature, etc., that influence the oxyanion adsorption on LDHs. The reusability of LDHs is discussed and some mechanistic studies of oxyanion adsorption on LDHs are highlighted. The sorption capacities of LDHs for various oxyanions are also compared with those of other adsorbents. In addition, this review critically identifies the shortcomings in current research on LDHs, such as the common weaknesses in the adopted methodology, discrepancies among reported results and ambiguous conclusions. Possible improvement of LDHs and potential areas for future application of LDHs are also proposed. (c) 2007 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aluminum-Oxide, Anion Exchange, Aqueous-Solutions, Calcined Mg-Al-Co3 Hydrotalcite, Characterization, Chromate, Clay Anion-Exchangers, Hydrotalcite, Hydrotalcite-Like Compounds, Ion-Exchange Properties, Kinetic Models, Layered Double Hydroxides (LDHS), Methodology, Mixed Oxides, Overview, Oxyanions, pH, Phosphate, Removal, Research, Review, Sorption, Synthetic Hydrotalcite, Waste-Water, X-Ray-Diffraction

? Boyer, T.H., Miller, C.T. and Singer, P.C. (2008), Modeling the removal of dissolved organic carbon by ion exchange in a completely mixed flow reactor. *Water Research*, **42** (8-9), 1897-1906.

Full Text: [2008\Wat Res42, 1897.pdf](2008/Wat%20Res42,%201897.pdf)

Abstract: A mathematical model was developed to describe removal of dissolved organic carbon (DOC) by a macroporous, strong-base anion exchange resin in a completely mixed flow reactor with resin recycle and partial resin regeneration. The two-scale model consisted of a microscale model describing the uptake of DOC by the resin coupled with a macroscale model describing the continuous-flow process. Equilibrium and kinetic parameters were estimated from batch laboratory experiments. The model was validated using continuous-flow data from two pilot plant studies. Model predictions were found to be in good agreement with the observed pilot plant data. (C) 2007 Elsevier Ltd. All rights reserved.

Keywords: Batch Stirred-Tank, Diffusion-Coefficient, Dissolved Organic Carbon, Distributions, Equilibrium, Finite-Element Method, Fractionation, Magnetic Ion Exchange, Mathematical Model, Matter, Model, Modeling, Natural Organic Matter, Plant, Precursors, Protein Adsorption, Regeneration, Removal, Sorption, Spectroscopy, Two-Scale Modeling, Uptake, Water

? Ahn, S., Werner, D. and Luthy, R.G. (2008), Modeling PAH mass transfer in a slurry of contaminated soil or sediment amended with organic sorbents. *Water Research*, **42** (12), 2931-2942.

Full Text: [2008\Wat Res42, 2931.pdf](2008/Wat%20Res42,%202931.pdf)

Abstract: A three-compartment kinetic partitioning model was employed to assess contaminant mass transfer and intraparticle diffusion in systems comprising dense slurries of polluted soil or aquifer sediment with or without sorbent amendments to sequester polycyclic aromatic hydrocarbons (PAHs). The model was applied to simulate temporal changes in aqueous and particle-bound PAH concentrations comparing different pollution sources (heavy oil or tar sludge) and various sorbent amendments (polyoxymethylene (POM), coke breeze, and activated carbon). For the model evaluation, all the parameters needed were directly measured from a series of experiments, allowing full calibration and verification of model predictions without parameter fitting. The numerical model reproduced two separate laboratory-scale experiments reasonably: PAH uptake in POM beads and PAH uptake by semipermeable membrane devices. PAH mass transfer was then simulated for various scenarios, considering different sorbent doses and mass transfer rates as well as biodegradation. Such model predictions provide a quick assessment tool for identifying mass transfer limitations during washing, stabilization, or bioslurry treatments of polluted soil or sediment in mixed systems. It appears that PAHs would be readily released from materials contaminated by small oil droplets, but not tar decanter sludge. Released PAHs would be sequestered rapidly by activated carbon amendment but to a much lesser extent by coke breeze. If sorbing black carbon is present in the slurries, POM pellets would not be effective as a sequestration amendment. High first-order biodegradation rates in the free aqueous phase, e.g., in the order of 0.001 s(-1) for phenanthrene, would be required to compete effectively with adsorption and mass transfer for strong sorbents. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Activated Carbon, Adsorption, Assessment, Bioavailability, Diffusion, Equilibrium, Evaluation, Impacts, In-Situ Sequestration, Intraparticle Diffusion, Marine-Sediments, Mass Transfer, Matter, Model, Modeling, PAHs, Phenanthrene Sorption, Polychlorinated-Biphenyls, Polycyclic Aromatic Hydrocarbons, Polycyclic Aromatic-Hydrocarbons, Polyoxymethylene, Polyoxymethylene, Slurry System, Sorbent, Uptake

? Francesca, P., Sara, M. and Luigi, T. (2008), New biosorbent materials for heavy metal removal: Product development guided by active site characterization. *Water Research*, **42** (12), 2953-2962.

Full Text: [2008\Wat Res42, 2953.pdf](2008/Wat%20Res42,%202953.pdf)

Abstract: Olive pomace wastes were used as precursors for the development of new biosorbents for heavy metals. Thermal and/or chemical treatments were addressed in terms of their effects on functional group properties and copper removal. Product development was guided by experimental characterization (potentiometric titrations, IR spectra, copper biosorption, total surface area) and theoretical modeling of acid-base properties. Olive pomace was characterized by negative charge due to dissociation of two weakly acidic sites (carboxylic and phenolic). After thermal treatment, a char-like material was obtained characterized by basic sites with positive charge in the acidic pH range. Copper biosorption properties of this material were improved with respect to olive pomace due to the binding ability of pyrone-like sites. Both native and carbonized olive pomace samples were chemically treated by HNO3. Experimental tests were performed according to factorial designs and analysis of variance was used to evaluate significant effects on copper removal of both oxidant concentration and temperature. Chemical treatment by HNO3 Of carbonized material developed negatively charged groups in the acidic pH range (carboxylic groups), but presented a decreased copper removal. Chemical treatment by HNO3 of olive pomace without carbonization gave biosorbents with acid-base properties similar to those of native olive pomace, but with a significant increase of copper biosorption. Specific carboxylic-copper interactions indicated by IR spectra and increased surface area due to chemical treatment were simultaneously responsible for such improvement. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Olive Pomace, Biosorption, Potentiometric Titration, Modeling, IR Spectra, Aqueous-Solutions, Olive Stones, Waste-Water, Solid Residue, Carbon, Biosorption, Ions, Surface, Sorption, Biomass

? Yu, Q., Deng, S.B. and Yu, G. (2008), Selective removal of perfluorooctane sulfonate from aqueous solution using chitosan-based molecularly imprinted polymer adsorbents. *Water Research*, **42** (12), 3089-3097.

Full Text: [2008\Wat Res42, 3089.pdf](2008/Wat%20Res42,%203089.pdf)

Abstract: Perfluorooctane sulfonate (PFOS) pollution in aqueous environment is a problem of global concern. A novel chitosan-based molecularly imprinted polymer (MIP) was prepared by crosslinking with epichlorohydrin (ECH) in the presence of PFOS as the template. During the preparation of the MIP adsorbents, the template amount and crosslinking agents significantly affected the imprinting effect. The optimized MIP adsorbents had a sorption amount of 560 μmol g-1 for PFOS, while the sorption amount of the non-imprinted polymer (NIP) was only 258 μmolg-1. The sorption behaviors of the MIP adsorbents including sorption kinetics, isotherms, effect of pH, ionic strength and selective sorption were investigated in detail. Sorption experimental results showed that the MIP adsorbents had good selectivity for PFOS, while other anionic contaminants with different structure had little influence on the sorption of the target PFOS. It was found that the electrostatic interaction played an important role in recognizing the target compound in the sorption process. Additionally, the MIP adsorbents could be used at least five times without any loss in sorption capacity. The chitosan-based MIP adsorbents may find potential application in water or wastewater treatment for the selective removal of PFOS. (c) 2008 Elsevier Ltd. All rights reserved.

Keywords: PFOS, Chitosan, Selective Adsorption, MIP Adsorbent, Electrostatic Interaction, Perfluorinated Surfactants, Mass-Spectrometry, Adsorption, Water, Sorption, Decomposition, Environment, Kinetics, Beads, Acid

? Banerjee, K., Amy, G.L., Prevost, M., Nour, S., Jekel, M., Gallagher, P.M. and Blumenschein, C.D. (2008), Kinetic and thermodynamic aspects of adsorption of arsenic onto granular ferric hydroxide (GFH). *Water Research*, **42** (13), 3371-3378.

Full Text: [2008\Wat Res42, 3371.pdf](2008/Wat%20Res42,%203371.pdf)

Abstract: Relatively limited information is available regarding the impacts of temperature on the adsorption kinetics and equilibrium capacities of granular ferric hydroxide (GFH) for arsenic M and arsenic(III) in an aqueous solution. In general, very little information is available on the kinetics and thermodynamic aspects of adsorption of arsenic compounds onto other iron oxide-based adsorbents as well. In order to gain an understanding of the adsorption process kinetics, a detailed study was conducted in a controlled batch system. The effects of temperature and pH on the adsorption rates of arsenic(V) and arsenic(III) were investigated. Reaction rate constants were calculated at pH levels of 6.5 and 7.5. Rate data are best described by a pseudo first-order kinetic model at each temperature and pH condition studied. At lower pH values, arsenic(V) exhibits greater removal rates than arsenic(III). An increase in temperature increases the overall adsorption reaction rate constant values for both arsenic M and arsenic(III). An examination of thermodynamic parameters shows that the adsorption of arsenic M as well as arsenic(III) by GFH is an endothermic process and is spontaneous at the specific temperatures investigated. (c) 2008 Elsevier Ltd. All rights reserved.

Keywords: Arsenic, Adsorption, Kinetics, Iron Oxide, Granular Ferric Hydroxide, Drinking-Water, Removal, Goethite, Soils, Iron, Ferrihydrite, Temperature, Groundwater, Phosphate, Sorption

? Zhang, N., Lin, L.S. and Gang, D.C. (2008), Adsorptive selenite removal from water using iron-coated GAC adsorbents. *Water Research*, **42** (14), 3809-3816.

Full Text: [2008\Wat Res42, 3809.pdf](2008/Wat%20Res42,%203809.pdf)

Abstract: Removal of selenite from aqueous phase using iron-coated granular activated carbons (GAC) was investigated in this study. Five different types of GAC were used for iron coating by oxidizing ferrous chloride with sodium hypochlorite and the iron-coated GAC (Fe-GAC) were tested for selenite removal. Nitrogen adsorption-desorption analyses indicated that Brunauer-Emmett-Teller (BET) specific surface area, pore size, and pore volume decreased with the iron coating. The Darco 12 x 20 GAC was shown to be the most effective adsorbent among the five tested GACs after iron coating. Among the different concentrations used for iron coating, the Darco 12 x 20 GAC coated with 0.1 M ferrous chloride achieved the highest selenite removal (97.3%). High removal efficiency of selenite occurred in a wide range of pH (i.e., 2-8), but the efficiency decreased when pH was higher than 8. Adsorption kinetics showed that selenite removal efficiency reached more than 90% after 6-h adsorption for initial selenium concentration of 2 mg/L and equilibrium was obtained after 48 h. A pseudo-second-order kinetic model was found to characterize the adsorption kinetics well for all the initial selenium concentrations and temperatures tested (R-2 >= 0.9969). Three temperatures (25, 35, 45 degrees C) were used to examine temperature effect on the adsorption behavior of the Fe-GAC with initial selenium concentration of 1 mg/L. Activation energy was calculated to be 30.42 kJ/mol. Adsorption isotherms for initial selenium concentration of 2 mg/L at various temperatures and ionic strengths were developed and the data generally fit the Langmuir model well (R-2 >= 0.994). The adsorption capacity reached as high as 2.50 mg-Se/g-adsorbent at equilibrium for initial concentration of 2 mg/L at 25 degrees C. The Gibbs free energy was determined to be negative, indicating the spontaneous nature of the adsorption reaction. Oxyanion competitive adsorption showed that sulfate (0.1-5 mM) barely affected selenite adsorption. Other anions (phosphate, silicate and carbonate) impact selenite adsorption to various degrees with phosphate completely excluded selenite adsorption at 5 mM. The possible adsorption mechanisms were discussed. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbons, Adsorbent, Adsorption, Adsorption Isotherm, Adsorption Isotherms, Adsorption Kinetics, Adsorption-Desorption, Anion Adsorption, Behavior, Capacity, Carbons, Energy, Equilibrium, GAC, Gibbs Free Energy, Hydroxides, Impact, Iron, Iron-Coated GAC, Isotherms, Kinetics, Langmuir Model, Model, Oxide-Solution Interfaces, pH, Phosphate, Pseudo-Second-Order, Removal, Selenite Removal, Sodium Hypochlorite, Soil

? McCuen, R.H. and Surbeck, C.Q. (2008), An alternative to specious linearization of environmental models. *Water Research*, **42** (15), 4033-4040.

Full Text: [2008\Wat Res42, 4033.pdf](2008/Wat%20Res42,%204033.pdf)

Abstract: The solution of a number of environmental models is incorrectly obtained by linearizing a nonlinear analytical solution. The linearization can yield a model that includes a common variable on both sides of the equal sign (i.e., ratio analysis), which in calibration causes highly inflated goodness-of-fit statistics. These specious practices continue likely because of tradition, i.e., “that is the way it is done”. Goodness-of-fit statistics that result from these erroneous practices do not accurately reflect the actual prediction accuracy of the model. Additionally, the linearly calibrated coefficients can be poor estimators of the true coefficients. The goal of this paper is to demonstrate the pitfalls of models based on ratio analyses. Several environmental models are used to demonstrate the erroneous procedure. Monte Carlo simulation is used to show the distribution of the true correlation coefficient and compare it to the distribution that results from the erroneous linearization. Linearization can produce correlation coefficients above 0.9 when the actual correlation is near 0. Nonlinear least squares algorithms can be used to more accurately fit nonlinear data to nonlinear models. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Modeling, Ratio Correlation, Linearization, Specious Correlation, Spurious Correlation, Monte Carlo Analysis, Nonlinear Least Squares, Monod, Michaelis-Menten, Sludge Filtration, Adsorption, Sediment Rating Curve

? Canterino, M., Di Somma, I., Marotta, R. and Andreozzi, R. (2008), Kinetic investigation of Cu(II) ions photoreduction in presence of titanium dioxide and formic acid. *Water Research*, **42** (17), 4498-4506.

Full Text: [2008\Wat Res42, 4498.pdf](2008/Wat%20Res42,%204498.pdf)

Abstract: The photoreduction of Cu(II) in presence of an organic species as sacrificial agent has been investigated by many research groups but some controversial results are reported in literature. In this work, the photoreduction process of Cu(II) in presence of formic acid is investigated aiming at clarifying the reaction mechanism and assess the reaction kinetics. The effect of operating conditions such as TiO2 load, initial concentration of sacrificial agent, pH and ionic strength was studied. The results of the work are: (1) the system reactivity does not depend neither on pH (in the range 2.0-3.5) nor on ionic strength of the solution; (2) formic acid is adsorbed on TiO2 surface; (3) the nature of anionic species can influence the Cu(II) photoreduction (e.g. the addition of sulphate or phosphates reduces the reaction rates); and (4) FA can be completely mineralized during this photoxidation process; for example, this is observed for a TiO2 load of 0.1 g/L after a reaction time of about 240 min. A simplified kinetic model is developed to describe the behavior of the system and validated by analysing the data collected during the experimental work. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aqueous Suspensions, Behavior, Copper, Copper Ions, Cu(II), Deposition, FA, Formic Acid, Heavy-Metal, Ions, Kinetic, Kinetics, Literature, Mechanism, Metal-Ions, Model, pH, Photocatalytic Degradation, Photoreduction, Reduction, Research, Sacrificial Agent, Strength, TiO2, Waste-Water

? Li, K., Hokanson, D.R., Crittenden, J.C., Trussell, R.R. and Minakata, D. (2008), Evaluating UV/H2O2 processes for methyl tert-butyl ether and tertiary butyl alcohol removal: Effect of pretreatment options and light sources. *Water Research*, **42** (20), 5045-5053.

Full Text: [2008\Wat Res42, 5045.pdf](2008/Wat%20Res42,%205045.pdf)

Abstract: In this paper, we evaluate the efficiency of UV/H(2)O(2) process to remove methyl tert-butyl ether (MtBE) and tertiary butyl alcohol (tBA) from a drinking water source. Kinetic models were used to evaluate the removal efficiency of the UV/H(2)O(2) technologies with different pretreatment options and light sources. Two commercial UV light sources, i.e. low pressure, high intensity lamps and medium pressure, high intensity lamps, were evaluated. The following pretreatment alternatives were evaluated: (1) ion exchange softening with seawater regeneration (NaIX); (2) Pellet Softening; (3) weak acid ion exchange (WAIX); and (4) high pH lime softening followed by reverse osmosis (RO). The presence or absence of a dealkalization step prior to the UV/H(2)O(2) Advanced Oxidation Process (AOP) was also evaluated for each pretreatment possibility. Pretreatment has a significant impact on the performance of UV/H(2)O(2) process. The NaIX with dealkalization was shown to be the most cost effective. The electrical energy per order (EEO) values for MtBE and tBA using low pressure high output UV lamps (LPUV) and 10 mg/L H(2)O(2) are 0.77 and 3.0 kWh/kgal-order, or 0.20 and 0.79 kWh/m(3)-order, respectively. For medium pressure UV high output lamps (MPUV), EEO values for MtBE and tBA are 4.6 and 15 kWh/kgal-order, or 1.2 and 4.0 kWh/m(3)-order, for the same H(2)O(2) dosage. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Alcohol, Bromate Formation, Chlorine, Degradation, Drinking Water, Electrical Energy Per Order, Energy, Hydroxyl Radical, Hydroxyl Radicals, Impact, Kinetic, Kinetic Models, Low Pressure UV System, Medium Pressure UV System, Methyl Tert-Butyl Ether, Molecular Ozone, Oxidation, Ozonation, Pathways, Peroxide, pH, Pressure, Regeneration, Removal, Tertiary Butyl Alcohol, Ultraviolet Light, Hydrogen Peroxide Process

? Upadhyayula, V.K.K., Deng, S.G., Smith, G.B. and Mitchell, M.C. (2009), Adsorption of Bacillus subtilis on single-walled carbon nanotube aggregates, activated carbon and NanoCeram (TM). *Water Research*, **43** (1), 148-156.

Full Text: [2009\Wat Res43, 148.pdf](2009/Wat%20Res43,%20148.pdf)

Abstract: Adsorption equilibrium and kinetics of Bacillus subtilis spores on single-walled carbon nanotube aggregates were investigated to explore the possibility of using single-walled carbon nanotubes for concentration, detection and removal of pathogens from contaminated water sources. Batch adsorption experiments were conducted to determine adsorption kinetics and adsorption equilibrium of B. subtilis spores on single-walled carbon nanotube aggregates, activated carbon and NanoCeram (TM). The adsorption kinetics data were analyzed with both the Lagergren pseudo first order and a pseudo second order models. The adsorption equilibrium data on three porous media were quantified by the Henry’s law constant. It was observed that both the Lagergren first order rate model and the pseudo second order model correlate the adsorption kinetic data well although the calculated adsorption rate constants vary with adsorbate concentrations. The Henry’s law adsorption equilibrium constant of B. subtilis spores on single-walled carbon nanotube aggregates is about 27-37 times higher than those on activated carbon and NanoCeram (TM). The high adsorption affinity of carbon nanotubes towards the B. subtilis spores is due to the mesoporous structure and unique surface properties of carbon nanotubes. These results suggest that single-walled carbon nanotube aggregates are good candidates as biosensors and adsorbent media for concentrating, detecting and removal of pathogens from contaminated water resources. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Equilibrium, Adsorption Kinetics, Bacillus, Bacillus Subtilis, Bacterial-Cells, Biosensor, Biosensors, Equilibrium, Filters, Growth, Immobilization, Inactivation, Kinetics, Microorganisms, Model, Pseudo-First-Order, Pseudo-Second-Order, Removal, Single-Walled Carbon Nanotubes, Substances

? Bahdod, A., El Asri, S., Saoiabi, A., Coradin, T. and Laghzizil, A. (2009), Adsorption of phenol from an aqueous solution by selected apatite adsorbents: Kinetic process and impact of the surface properties. *Water Research*, **43** (2), 313-318.

Full Text: [2009\Wat Res43, 313.pdf](2009/Wat%20Res43,%20313.pdf)

Abstract: Batch adsorption experiments were conducted to investigate the removal of phenol from wastewater by addition of three apatites (porous hydroxyapatite (PHAp) and crystalline hydroxyl- (HAp) and fluoroapatite (FAp)). The best performances were obtained with porous hydroxyapatite PHAp, which presented higher adsorption capacities (experimental: 8.2 mg g(-1); calculated 9.2 mg g(-1)) than HAp and FAp (3-4 mg g(-1)). Different models of adsorption were used to describe the kinetics data, to calculate corresponding rate constants and to predict the theoretical capacities of apatite surfaces for phenol adsorption. A mechanism of phenol adsorption associating chemisorption and physisorption processes is presented allowing the discussion of the variations in adsorption behavior between these materials in terms of specific surface area and chemical composition. These data suggest that apatites are promising materials for phenol sorption. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Apatites, Behavior, Desorption, Hydroxyapatite, Impact, Isotherms, Kinetic, Kinetic Isotherms, Kinetics, Liquid-Phase Adsorption, Mechanism, Phenol, Phenol Removal, Proteins, Reactor, Regeneration, Removal, Sorption, Waste-Water, Wastewater

? Kumar, E., Bhatnagar, A., Ji, M., Jung, W., Lee, S.H., Kim, S.J., Lee, G., Song, H., Choi, J.Y., Yang, J.S. and Jeon, B.H. (2009), Defluoridation from aqueous solutions by granular ferric hydroxide (GFH). *Water Research*, **43** (2), 490-498.

Full Text: [2009\Wat Res43, 490.pdf](2009/Wat%20Res43,%20490.pdf)

Abstract: This research was undertaken to evaluate the feasibility of granular ferric hydroxide (GFH) for fluoride removal from aqueous solutions, Batch experiments were performed to study the influence of various experimental parameters such as contact time (1 min-24 h), initial fluoride concentration (1-100 mg L-1), temperature (10 and 2S°C), pH (3-12) and the presence of competing anions on the adsorption of fluoride on GFH. Kinetic data revealed that the uptake rate of fluoride was rapid in the beginning and 95% adsorption was completed within 10 min and equilibrium was achieved within 60 min. The sorption process was well explained with pseudo-first-order and pore diffusion models. The maximum adsorption capacity of GFH for fluoride removal was 7.0 mg g-1. The adsorption was found to be an endothermic process and data conform to Langmuir model. The optimum fluoride removal was observed between pH ranges of 4-8. The fluoride adsorption was decreased in the presence of phosphate followed by carbonate and sulphate. Results from this study demonstrated potential utility of GFH that could be developed into a viable technology for fluoride removal from drinking water. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Alumina, Adsorption Isotherms, Chemical-Model, Competing Anions, Defluoridation, Diffusion, Fluoride Ions, Granular Ferric Hydroxide (GFH), Kinetic Modeling, Kinetics, pH, Phosphate Adsorption, Physicochemical Characterization, Removal, Temperature Effect, Waste-Water, Water-Treatment

? Yu, Q., Zhang, R.Q., Deng, S.B., Huang, J. and Yu, G. (2009), Sorption of perfluorooctane sulfonate and perfluorooctanoate on activated carbons and resin: Kinetic and isotherm study. *Water Research*, **43** (4), 1150-1158.

Full Text: [2009\Wat Res43, 1150.pdf](2009/Wat%20Res43,%201150.pdf)

Abstract: Perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) have increasingly attracted global concerns in recent years due to their global distribution, persistence, strong bioaccumulation and potential toxicity. The feasibility of using powder activated carbon (PAC), granular activated carbon (GAC) and anion-exchange resin (AI400) to remove PFOS and PFOA from water was investigated with regard to their sorption kinetics and isotherms. Sorption kinetic results show that the adsorbent size influenced greatly the sorption velocity, and both the GAC and AI400 required over 168 h to achieve the equilibrium, much longer than 4 h for the PAC. Two kinetic models were adopted to describe the experimental data, and the pseudo-second-order model well described the sorption of PFOS and PFOA on the three adsorbents. The sorption isotherms show that the GAC had the lowest sorption capacity both for PFOS and PFOA among the three adsorbents, while the PAC and AI400 possessed the highest sorption capacity of 1.04 mmol g-1 for PFOS and 2.92 mmol g-1 for PFOA according to the Langmuir fitting. Based on the sorption behaviors and the characteristics of the adsorbents and adsorbates, ion exchange and electrostatic interaction as well as hydrophobic interaction were deduced to be involved in the sorption, and some hemi-micelles and micelles possibly formed in the intraparticle pores. (C) 2008 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Anion-Exchange Resin, Aqueous-Solution, Chitosan, Defluorination, Isotherm, Kinetic, Kinetics, Liquid-Phase Adsorption, Perfluorinated Surfactants, PFOA, PFOS, Reactive Dyes, Removal, Reverse-Osmosis, Sorption Isotherm, Sorption Kinetics, Waste-Water

? Rentz, J.A., Turner, I.P. and Ullman, J.L. (2009), Removal of phosphorus from solution using biogenic iron oxides. *Water Research*, **43** (7), 2029-2035.

Full Text: [2009\Wat Res43, 2029.pdf](2009/Wat%20Res43,%202029.pdf)

Abstract: Phosphorus removal by biogenic iron oxides was investigated, providing an initial characterization of a potentially regenerable iron-rich sorbent. The biogenic iron oxides were collected from a wetland ecosystem and were dominated by the sheaths of Leptothrix ochracea. Sorption kinetics followed a pseudo-1st order model (R2 = 0.998) with a rate constant of 0.154±0.013 h(-1). The Langmuir isotherm adequately described sorption for all samples (R2 = 0.923-0.981); the Freundlich model was a better fit for only one of four samples. Maximum phosphorus sorption estimated using the Langmuir parameter ranged from 46.9±2.9 to 165.0±21.2 mg P/g Fe and was similar to other iron-rich substrates. Maximum sorption normalized to total solids ranged from 10.8±0.7 to 39.9±3.2 mg P/g, which represented the highest published values for iron-rich substrates. The high sorption capacity with respect to both iron and solids warrants further evaluation of biogenic iron oxides as a substrate for phosphorus removal. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Biofilm, Circumneutral Ph, Enhanced Secondary-Treatment, Isotherm, Kinetics, Media, Municipal Waste-Water, Oxidation, Oxidizing Bacteria, Particles, Phosphate Adsorption, Reactive Filtration, Regenerable, Sorption, Sorption, Stormwater, Sustainable, Wastewater

? Putra, E.K., Pranowo, R., Sunarso, J., Indraswati, N. and Ismadji, S. (2009), Performance of activated carbon and bentonite for adsorption of amoxicillin from wastewater: Mechanisms, isotherms and kinetics. *Water Research*, **43** (9), 2419-2430.

Full Text: [2009\Wat Res43, 2419.pdf](2009/Wat%20Res43,%202419.pdf)

Abstract: Amoxicillin’s traces within pharmaceutical effluents have toxic impact toward the algae and other lower organisms within food web. Adsorption, as an efficient process to remove contaminants from water was chosen; in particular with bentonite and activated carbon as adsorbents. The study was carried out at several pH values. Langmuir and Freundlich models were then employed to correlate the equilibria data on which both models equally well-fit the data. For kinetic data, pseudo-first and second order models are selected. While chemisorption is the dominant adsorption mechanism on the bentonite case, both physisorption and chemisorption play important roles for adsorption onto activated carbon. Also, several possible mechanisms for these adsorption systems were elaborated further. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Algal Toxicity, Amoxicillin, Antibacterial Agents, Antibiotics, Environment, Fate, Kinetics, Mechanism, Models, Removal, Wastewaters

? Hernández-Soriano, M.C., Mingorance, M.D. and Peña, A. (2009), Dissipation of insecticides in a Mediterranean soil in the presence of wastewater and surfactant solutions. A kinetic model approach. *Water Research*, **43** (9), 2481-2492.

Full Text: [2009\Wat Res43, 2481.pdf](2009/Wat%20Res43,%202481.pdf)

Abstract: The simultaneous disappearance of four organophosphorous insecticides in a Mediterranean calcareous soil was evaluated in the presence of surfactant solutions and municipal wastewater. A cationic, an anionic and a non-ionic surfactant were used at a low (0.75 mg L(-1)) and at a high (twice the critical micelle concentration) concentration level. The cationic surfactant was also studied at a higher concentration. Dissipation in control soil was rapid for malathion (half-life 4 days), intermediate for dimethoate and methidathion (ca. 6 days) and slow for diazinon (29 days). Wastewater did either not modify (diazinon, dimethoate and methidathion) or slightly enhance (malathion) insecticide decay. The increase in concentration of the non-ionic surfactant Tween 80 resulted in enhanced dissipation rates for all the pesticides except diazinon. The addition of the anionic surfactant did not show a clear trend. At the highest cationic surfactant concentration a reduction of pesticide disappearance occurred linked with a reduced availability, since the insecticides were retained on the surfactant-modified soil (final residual concentration of 85% for diazinon and approximate to 55% for methidathion and dimethoate). Soil microbial activity, estimated by measuring dehydrogenase activity, was low in wastewater- and surfactant-treated soil at the high levels. Fitting of the experimental data to commonly used mathematical models was poor and alternatives were looked for. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Atrazine, Bi-Phasic Kinetic Models, Cationic Surfactant, Control, Degradation, Enhanced Desorption, Insecticides, Model, Organic Amendments, Organophosphorus Pesticides, Persistence, Pesticides, Samples, Sewage-Sludge, Sorption, Surfactants, Trend, Triton X-100, Wastewater

? Li, Y.J., Gao, B.Y., Wu, T., Sun, D.J., Li, X., Wang, B. and Lu, F.J. (2009), Hexavalent chromium removal from aqueous solution by adsorption on aluminum magnesium mixed hydroxide. *Water Research*, **43** (12), 3067-3075.

Full Text: [2009\Wat Res43, 3067.pdf](2009/Wat%20Res43,%203067.pdf)

Abstract: A series of sols consisting of aluminum magnesium mixed hydroxide (AMH) nanoparticles with various Mg/Al molar ratios were prepared by coprecipitation. The use of AMH as adsorbent to remove Cr(VI) from aqueous solution was investigated. Adsorption experiments were carried out as a function of the Mg/Al molar ratio, pH, contact time, concentration of Cr(VI) and temperature. It was found that AMH with Mg/Al molar ratio 3 has the largest adsorption efficiency due to the smallest average particle diameter and the highest zeta potential; AMH was particularly effective for the Cr(VI) removal in a pH range from acid to slightly alkaline, even though the most effective pH range was between 2.5 and 5.0. The adsorption of Cr(VI) on AMH reached equilibrium within 150 min. The saturated adsorption capacities of AMH for Cr(VI) were 105.3-112.0 mg/g at 20-40°C. The interaction between the surface sites of AMH and the Cr(VI) ions may be a combination of both anion exchange and surface complexation. The pseudo-second-order model best described the adsorption kinetics of Cr(VI) onto AMH. The results showed that AMH can be used as a new adsorbent for Cr(VI) removal which has higher adsorption capacity and faster adsorption rate at pH values close to that at which pollutants are usually found in the environment. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption Capacities, Adsorption Capacity, Adsorption Kinetics, Adsorption Rate, Aluminum, Aluminum Magnesium Mixed, Aqueous Solution, Capacity, Chromate, Chromium, Chromium Removal, Complexation, Concentration, Coprecipitation, Cr(VI), Efficiency, Environment, Equilibrium, Experiments, Function, Hexavalent Chromium, Hydrotalcite-Like Compounds, Hydroxide, Interaction, Ion-Exchange, Ions, Kinetics, Kinetics, Layered Double Hydroxides, Magnesium, Mechanisms, Mg-Al-CO3 Hydrotalcite, Model, Nanoparticles, pH, Pollutants, Potential, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Removal, Rights, Solution, Sorption, Surface, Surface Complexation, Temperature, Zeta Potential

? Matsui, Y., Ando, N., Sasaki, H., Matsushita, T. and Ohno, K. (2009), Branched pore kinetic model analysis of geosmin adsorption on super-powdered activated carbon. *Water Research*, **43** (12), 3095-3103.

Full Text: [2009\Wat Res43, 3095.pdf](2009/Wat%20Res43,%203095.pdf)

Abstract: Super-powdered activated carbon (S-PAC) is activated carbon of much finer particle size than powdered activated carbon (PAC). Geosmin is a naturally occurring taste and odor compound that impairs aesthetic quality in drinking water. Experiments on geosmin adsorption on S-PAC and PAC were conducted, and the results using adsorption kinetic models were analyzed. PAC pulverization, which produced the S-PAC, did not change geosmin adsorption capacity, and geosmin adsorption capacities did not differ between SPAC and PAC. Geosmin adsorption kinetics, however, were much higher oil S-PAC than on PAC. A solution to the branched pore kinetic model (BPKM) was developed, and experimental adsorption kinetic data were analyzed by BPKM and by a homogeneous surface diffusion model (HSDM). The HSDM describing the adsorption behavior of geosmin required different surface diffusivity values for S-PAC and PAC, which indicated a decrease in surface diffusivity apparently associated with activated carbon particle size. The BPKM, consisting of macropore diffusion followed by mass transfer from macropore to micropore, successfully described the batch adsorption kinetics on S-PAC and PAC with the same set of model parameter values, including surface diffusivity. The BPKM simulation clearly showed geosmin removal was improved as activated carbon particle size decreased. The simulation also implied that the rate-determining step in overall mass transfer shifted from intraparticle radial diffusion in macropores to local mass transfer from macropore to micropore. Sensitivity analysis showed that adsorptive removal of geosmin improved with decrease in activated carbon particle size down to I pm, but further particle size reduction produced little improvement. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: 2-Methylisoborneol, Activated Carbon, Adsorber, Adsorption, Adsorption Kinetics, Analysis, Behavior, Capacity, Diffusion, Drinking Water, Equilibrium, Geosmin, HSDM, Kinetic Models, Kinetics, Mechanism, Model, Natural Organic-Matter, PAC, Particle Size, Particles, Removal, Sorption, Submicron, Taste and Odor, Waters

? Jang, M., Cannon, F.S., Parette, R.B., Yoon, S.J. and Chen, W.F. (2009), Combined hydrous ferric oxide and quaternary ammonium surfactant tailoring of granular activated carbon for concurrent arsenate and perchlorate removal. *Water Research*, **43** (12), 3133-3143.

Full Text: [2009\Wat Res43, 3133.pdf](2009/Wat%20Res43,%203133.pdf)

Abstract: Activated carbon was tailored with both iron and quaternary ammonium surfactants so as to concurrently remove both arsenate and perchlorate from groundwater. The iron (hydr)oxide preferentially removed the arsenate oxyanion but not perchlorate; while the quaternary ammonium preferentially removed the perchlorate oxyanion, but not the arsenate. The co-sorption of two anionic oxyanions via distinct mechanisms has yielded intriguing phenomena. Rapid small-scale column tests (RSSCTs) with these dually prepared media employed synthetic waters that were concurrently spiked with arsenate and Perchlorate; and these trial results showed that the quaternary ammonium surfactants enhanced arsenate removal bed life by 25-50% when compared to activated carbon media that had been preloaded merely with iron (hydr)oxide; and the surfactant also enhanced the diffusion rate of arsenate per the Donnan effect. The authors also employed natural groundwater from Rutland, MA which contained 60 μg/L As and traces of silica, and sulfate; and the authors spiked this with 40 μg/L Perchlorate. When processing this water, activated carbon that had been tailored with iron and cationic surfactant could treat 12,500 bed volumes before 10 μg/L arsenic breakthrough, and 4500 bed volumes before 6 μg/l, Perchlorate breakthrough. Although the quaternary ammonium surfactants exhibited only a slight capacity for removing arsenate, these surfactants did facilitate a more favorably positively charged avenue for the arsenate to diffuse through the media to the iron sorption site (i.e. via the Donnan effect). (C) 2009 Published by Elsevier Ltd.

Keywords: Activated Carbon, Adsorption, Ammonium, Aqueous-Solution, Arsenate, Arsenate Removal, Arsenic, Arsenic and Perchlorate, Authors, Breakthrough, Capacity, Carbon, Cationic Surfactant, Cationic Surfactants, Column, Column Tests, Diffusion, Equilibrium, Ferric Oxide, Granular Activated Carbon, Groundwater, Hydrous Ferric Oxide, Hydroxide GFH, Iron, Iron-Oxides, Life, Mechanisms, Media, Micellar-Enhanced Ultrafiltration, Natural, Oxide, Perchlorate, Removal, Silica, Site, Sorption, Speciation, Sulfate, Surfactant, Surfactants, Trial, Water, Waters, XANES Spectroscopy

? Kurniawan, T.A. and Lo, W.H. (2009), Removal of refractory compounds from stabilized landfill leachate using an integrated H2O2 oxidation and granular activated carbon (GAC) adsorption treatment. *Water Research*, **43** (16), 4079-4091.

Full Text: [2009\Wat Res43, 4079.pdf](2009/Wat%20Res43,%204079.pdf)

Abstract: This study investigated the treatment performances of H2O2 oxidation alone and its combination with granular activated carbon (GAC) adsorption for raw leachate from the NENT landfill (Hong Kong) with a very low biodegradability ratio (BODS/COD) of 0.08. The COD removal of refractory compounds (as indicated by COD values) by the integrated H2O2 and GAC treatment was evaluated, optimized and compared to that by H2O2 treatment alone with respect to dose, contact time, pH, and biodegradability ratio. At an initial COD concentration of 8000 mg/L and NH3-N of 2595 mg/L, the integrated treatment has substantially achieved a higher removal (COD: 82%; NH3-N: 59%) than the H2O2 oxidation alone (COD: 33%; NH3-N: 4.9%) and GAC adsorption alone (COD: 58%) at optimized experimental conditions (p <= 0.05; t-test). The addition of an Fe(II) dose at 1.8 g/L further improved the removal of refractory compounds by the integrated treatment from 82% to 89%. Although the integrated H2O2 oxidation and GAC adsorption could treat leachate of varying strengths, treated effluents were unable to meet the local COD limit of less than 200 mg/L and the NHYN of lower than 5 mg/L. However, the integrated treatment significantly improved the biodegradability ratio of the treated leachate by 350% from 0.08 to 0.36, enabling the application of subsequent biological treatments for complementing the degradation of target compounds in the leachate prior to their discharge. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: 4-Chlorophenol, Activated Carbon, Adsorption, Advanced Oxidation Process (AOP), Application, Aqueous-Solution, Biological, Carbon, Catalytic Decomposition, Chemical Precipitation, Cod, Concentration, Degradation, Discharge, Effluents, Environmental Protection, Experimental, Fenton’s Oxidation, GAC, Granular Activated Carbon, H2O2, Hong Kong, Hydrogen-Peroxide, Landfill, Landfill Leachate, Landfill Leachate Treatment, Leachate, Local, NH3-N, Optimization, Oxidation, Ozone, pH, Recalcitrant Compounds, Removal, Reverse-Osmosis, Rights, Si, Solid Waste Management, Treatment, Wastewater Treatment, Water

? Chan, Y.T., Kuan, W.H., Chen, T.Y. and Wang, M.K. (2009), Adsorption mechanism of selenate and selenite on the binary oxide systems. *Water Research*, **43** (17), 4412-4420.

Full Text: [2009\Wat Res43, 4412.pdf](2009/Wat%20Res43,%204412.pdf)

Abstract: Removal of selenium oxyanions by the binary oxide systems, Al- or Fe-oxides mixed with X-ray noncrystalline SiO2, was previously not well understood. This study evaluates the adsorption capacity and kinetics of selenium oxyanions by different metal hydroxides onto SiO2, and uses X-ray absorption spectroscopy (XAS) to assess the interaction between selenium oxyanions and the sorbents at pH 5.0. The binary oxide systems of Al(III)- or Fe(III)-oxides mixed with SiO2 were prepared, and were characterized for their surface area, point of zero charge (PZC), pH envelopes, X-ray diffraction analysis (XRD), and then macroscale adsorption isotherm and kinetics of selenite and selenate, micro-scale adsorption XAS. The adsorption capacity of selenite and selenate on Al(III)/SiO2 is greater than on Fe(III)/SiO2. Adsorption isothermal and kinetic data of selenium can be well fitted to the Langmuir isotherm and pseudo-second-order kinetic models. Based on simple geometrical constraints, selenite on both the binary oxide systems forms bidentate inner-sphere surface complexes, and selenate on Fe(III)/SiO2 forms stronger complexes than on Al(III)/SiO2. (c) 2009 Elsevier Ltd. All rights reserved.

Keywords: Absorption, Adsorption, Adsorption Capacity, Adsorption Isotherm, Adsorption Mechanism, Analysis, Binary Oxide Systems, Capacity, Charge, Coated Sand, Data, Forms, Interaction, Isotherm, Isothermal, Kinetic, Kinetic Models, Kinetics, Langmuir, Langmuir Isotherm, Mechanism, Metal, Mixed Oxides, Models, Oxide, Oxyanions, pH, Point of Zero Charge, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Rights, Selenate, Selenium, Selenium Oxyanions, Silicic-Acid, Sorbents, Spectroscopy, Sulfate Adsorption, Surface, Surface Area, Surface Complexes, Systems, Water, X-Ray, X-Ray Absorption Spectroscopy, X-Ray Absorption Spectroscopy (XAS), X-Ray Diffraction, X-Ray-Absorption, XAS, XRD

? Hale, S.E., Tomaszewski, J.E., Luthy, R.G. and Werner, D. (2009), Sorption of dichlorodiphenyltrichloroethane (DDT) and its metabolites by activated carbon in clean water and sediment slurries. *Water Research*, **43** (17), 4336-4346.

Full Text: [2009\Wat Res43, 4336.pdf](2009/Wat%20Res43,%204336.pdf)

Abstract: Polyethylene-water partitioning coefficients (K(PE)) and mass transfer coefficients (k(PE)) for the ortho and para isomers of the organochlorine pesticide dichlorodiphenyltrichloroethane (DDT) and its metabolites dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE) and, dichlorodiphenylmonochloroethylene (DDMU) were measured. These data were used to derive activated carbon (AC) sorption isotherms in clean water in the sub-nanogram per litre free aqueous concentration range for a Virgin and a regenerated AC. The sorption strength of AC for DDT and its metabolites was very high and logarithmic values of the AC-water partitioning coefficients, logK(AC), ranged from 8.47 to 9.26. A numerical mass transfer model was calibrated with this data to interpret previously reported reductions in DDT uptake by semipermeable membrane devices after AC amendment of sediment from Lauritzen Channel, California, USA. The activated carbon-water partitioning coefficient values (K(AC)) measured in clean water systems appear to overestimate the AC sorption capacity in sediment up to a factor 32 for DDT and its metabolites at long contact time with fine-sized AC. Modelling results show decreased attenuation of the AC sorption capacity with increased sediment-AC contact time. We infer that increased resistance in mass transfer of DDTs to sorption sites in the microporous region likely caused by deposits of dissolved organic matter in the macro- and mesopores of AC appears to be the most relevant fouling mechanism. These results suggest that DDTs may diffuse through possible deposits of dissolved organic matter over time, implying that the effects of sediment on the sorption of DDTs by AC may be more kinetic than competitive. (c) 2009 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Activated Carbon Fouling, Adsorption, Capacity, Contaminated Sediment, Environmental Black Carbon, Isotherms, Macoma-Balthica, Marine Sediment, Mechanism, Metabolites, Model, Native Pahs, Organic-Compounds, Organochlorine Pesticide, Passive Sampling, Polychlorinated-Biphenyls, Polyethylene, Polyethylene Devices, Resistance, Semipermeable-Membrane Devices, Sorbent Amendment, Sorption, Strength, Uptake

? Chan, Y.T., Kuan, W.H., Chen, T.Y. and Wang, M.K. (2009), Adsorption mechanism of selenate and selenite on the binary oxide systems. *Water Research*, **43** (17), 4412-4420.

Full Text: [2009\Wat Res43, 4412.pdf](2009/Wat%20Res43,%204412.pdf)

Abstract: Removal of selenium oxyanions by the binary oxide systems, Al- or Fe-oxides mixed with X-ray noncrystalline SiO(2), was previously not well understood. This study evaluates the adsorption capacity and kinetics of selenium oxyanions by different metal hydroxides onto SiO(2), and uses X-ray absorption spectroscopy (XAS) to assess the interaction between selenium oxyanions and the sorbents at pH 5.0. The binary oxide systems of Al(III)- or Fe(III)-oxides mixed with SiO(2) were prepared, and were characterized for their surface area, point of zero charge (PZC), pH envelopes, X-ray diffraction analysis (XRD), and then macroscale adsorption isotherm and kinetics of selenite and selenate, micro-scale adsorption XAS. The adsorption capacity of selenite and selenate on Al(III)/SiO(2) is greater than on Fe(III)/SiO(2). Adsorption isothermal and kinetic data of selenium can be well fitted to the Langmuir isotherm and pseudo-second-order kinetic models. Based on simple geometrical constraints, selenite on both the binary oxide systems forms bidentate inner-sphere surface complexes, and selenate on Fe(III)/SiO(2) forms stronger complexes than on Al(III)/SiO(2). (c) 2009 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Analysis, Binary Oxide Systems, Capacity, Coated Sand, Isotherm, Kinetic Models, Kinetics, Langmuir Isotherm, Mechanism, Mixed Oxides, Oxyanions, pH, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Removal, Selenium Oxyanions, Silicic-Acid, Sulfate Adsorption, Surface, Water, X-Ray Absorption Spectroscopy (XAS), X-Ray-Absorption, XRD

? Parab, H. and Sudersanan, M. (2010), Engineering a lignocellulosic biosorbent - Coir pith for removal of cesium from aqueous solutions: Equilibrium and kinetic studies. *Water Research*, **44** (3), 854-860.

Full Text: [2010\Wat Res44, 854.pdf](2010/Wat%20Res44,%20854.pdf)

Abstract: A novel method of engineering lignocellulosic biosorbent- coir pith (CP) by incorporation of nickel hexacyanoferrate (NiHCF), also referred to as Prussian blue analogue (PBA) inside its porous matrix is reported. Structural characterization confirmed the successful synthesis of NiHCF in the coir pith matrix. Sorption capacity of coir pith (CP) before and after loading of NiHCF was investigated for cesium (Cs) in batch equilibrium studies. Kinetic studies showed that the sorption process was rapid and saturation was attained within 30 min. The applicability of non linear Langmuir, Freundlich and Redlich Peterson isotherms was examined for the experimental data. The present studies revealed that there was nearly 100% increase in the sorption capacity of CP after its surface modification with NiHCF. Owing to its low cost, fast sorption kinetics and high uptake capacity, coir pith loaded with NiHCF (CP-NiHCF) seems to be one of the most promising biosorbents for recovery of cesium from liquid nuclear wastes. (c) 2009 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Biosorption, Capacity, Cesium, Characterization, Chemically-Modified Biomass, Clinoptilolite, Coir Pith, Electrochemical Properties, Equilibrium, Isotherms, Kinetic, Kinetics, Lignocellulosic, Modification, Nickel Hexacyanoferrate, Nickel Hexacyanoferrate, Nuclear Waste Solutions, Prussian Blue, Recovery, Removal, Self-Assembled Films, Sorption, Sorption, Sorption Kinetics, Uptake

? Luo, P., Zhao, Y.F., Zhang, B., Liu, J.D., Yang, Y. and Liu, J.F. (2010), Study on the adsorption of Neutral Red from aqueous solution onto halloysite nanotubes. *Water Research*, **44** (5), 1489-1497.

Full Text: [2010\Wat Res44, 1489.pdf](2010/Wat%20Res44,%201489.pdf)

Abstract: Halloysite nanotubes (HNTs), a low-cost available clay mineral, were tested for the ability to remove cationic dye, Neutral Red (NR), from aqueous solution. Natural HNTs used as adsorbent in this work were initially characterized by XRD, FT-IR, TEM and BET. The effect of adsorbent dose, initial pH, temperature, initial concentration and contact time were investigated. Adsorption increased with increase in adsorbent dose, initial pH, temperature and initial concentration. The equilibrium data were well described by both the Langmuir and Freundlich isotherm models. The maximum adsorption capacity was 54.85, 59.24 and 65.45 mg/g at 298, 308 and 318 K, respectively. Batch kinetic experiments showed that the adsorption followed pseudo-second-order kinetic model with correlation coefficients greater than 0.999. Thermodynamic parameters of Delta G(0), Delta H(0) and Delta S(0) indicated the adsorption process was spontaneous and endothermic. The results above confirmed that HNTs had the potential to be utilized as low-cost and relatively effective adsorbent for cationic dyes removal. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbons, Adsorbent, Adsorption, Basic-Dyes, Capacity, Cationic Dyes, Clay Nanotubes, De-Oiled Soya, Dye Adsorption, Equilibrium, Ftir, Halloysite, Halloysite Nanotubes, Industry Waste, Isotherm, Isotherm Models, Kinetic Model, Methylene-Blue, Model, Natural Halloysite, Neutral Red, pH, Pseudo-Second-Order, Removal, Thermodynamic, Thermodynamic Parameter, Thermodynamic Parameters, Waste-Water, XRD

? Hosseini, S.D., Asghari, F.S. and Yoshida, H. (2010), Decomposition and decoloration of synthetic dyes using hot/liquid (subcritical) water. *Water Research*, **44** (6), 1900-1908.

Full Text: [2010\Wat Res44, 1900.pdf](2010/Wat%20Res44,%201900.pdf)

Abstract: We have studied the decomposition and decoloration of 4-(2-Hydroxynaphthylazo) benzenesulfonic acid sodium salt (AO7, acid dye) as a model for textile wastes by using a flow-type subcritical water system. The operating temperature was ranged from 180 to 374 degrees C at 10-25 MPa at a wide range of residence time. The pressure (up to 25 MPa) did not affect the decomposition reactions. AO7 completely decomposed at higher temperatures and or longer residence times. The main products from decomposition of AO7 were found to be 2-naphthalenol, phenol, 1,1’-Binaphthalene-2,2’-diol, and N-(phenylmethylene)benzenamine. In order to identify the decomposition pathways, the products were also individually treated under a batch type subcritical water conditions. We found that 2-naphthalenol underwent to further decomposition to 1,1’-Binaphthalene-2,2’-diol during the subcritical water reaction. Other decomposition products resulted from the decomposition of directly AO7. Kinetic model of the subcritical water reaction was developed by considering major products. The kinetic constants obtained from the proposed reaction pathway showed good agreement with experimental results. (C) 2009 Elsevier Ltd. All rights reserved.

Keywords: 2-Naphthalenol, Acid Dye, Acid Orange 7, Adsorption, Azo, Basic Dye, Cellulose Membrane, Decoloration, Degradation, Diffusion, Kinetic, Kinetic Model, Low-Cost Adsorbent, Model, Phenol, Pressure, Subcritical Water, Textile Wastewater, Waste-Water

? Ispas, C.R., Ravalli, M.T., Steere, A. and Andreescu, S. (2010), Multifunctional biomagnetic capsules for easy removal of phenol and bisphenol A. *Water Research*, **44** (6), 1961-1969.

Full Text: [2010\Wat Res43, 1961.pdf](2010/Wat%20Res43,%201961.pdf)

Abstract: This paper reports fabrication, optimization and characterization of multifunctional biocapsules with immobilized enzyme using a layer-by-layer configuration and their application for removal of phenol and bisphenol A (BPA). The method is based on the combined use of enzymatic oxidation of the BPA and subsequent binding of the reaction product onto a chitosan core biopolymer. This platform has multiple functions including: (1) enzymatic degradation of BPA, (2) adsorption of the degraded compound within the core material, (3) colorimetric quantification and (4) magnetic capabilities. We examined various configurations of core/shell structures of alginate and chitosan and determined the stability and the optimum conditions in which these structures provide the most effective removal capacity. The amount of BPA that can be removed per capsule is 5.6 ppm while phenol can be removed up to 10 ppm per capsule within 15 h.

Keywords: Bisphenol A, Phenol, Removal, Microencapsulation, Tyrosinase, Chitosan, Biocapsules

? Stutter, M.I., Demars, B.O.L. and Langan, S.J. (2010), River phosphorus cycling: Separating biotic and abiotic uptake during short-term changes in sewage effluent loading. *Water Research*, **44** (15), 4425-4436.

Full Text: [2010\Wat Res44, 4425.pdf](2010/Wat%20Res44,%204425.pdf)

Abstract: Medium to small scale point sources continue to threaten river ecosystems through P loadings. The capacity and timescales of within-river processing and P retention are a major factor in how rivers respond to, and protect downstream ecosystems from, elevated concentrations of soluble reactive P (SRP). In this study, the bio-geochemical response of a small river (similar to 40 km(2) catchment area) was determined before, during and after exposure to a fourteen day pulse of treated sewage effluent using an upstream reach as a control. A wide array of approaches (batch and column simulations to in-situ whole stream metabolism) allowed independent comparison and quantification, of the relative contribution of abiotic and biotic processes in-river P cycling. This enabled, for the first time, separating the relative contributions of algae, bacteria and abiotic sorption without the use of labelled P (radioisotope). An SRP mass balance showed that the ecosystem switched from a P sink (during effluent inputs) to a P source (when effluent flow ceased). However, 65-70% of SRP was retained during the exposure time and remained sequestered two-weeks after-effluent flow ceased. Batch studies treated with biocide gave unrealistic results, but P uptake rates derived by other methods were highly comparable. Downstream of the effluent input, net P uptake by algae, bacteria and sediment (including the biofilm polysaccharide matrix) were 0.2 (+/- 0.1), 0.4 (+/- 0.3), and 1.0 (+/- 0.9) mmol m(-2) day(-1) during effluent exposure. While autotrophic production did not respond to the effluent exposure, heterotrophic production increased by 67% relative to the control and this translated into a 50% increase in biological P uptake rate. Therefore, both biological and abiotic components of stream ecosystems uptake P during exposure to treated sewage effluent P inputs, and maintain a long ‘memory’ of this input in terms of P storage for considerable timescales after loading. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Algal Assays, Bacteria, Balance, Bed-Sediments, Biofilm, Capacity, Contribution, Control, Dissolved Organic-Carbon, Dynamics, Ecosystem, Exposure, Kinetic Sorption Studies, Lowland Streams, Memory, Nutrient Spiralling, Nutrient-Uptake, Open Flow-Through Columns, Oxygen Change Technique, Phosphorus, Retention, Sediment-Phosphorus, Sorption, Stoichiometry, Uptake, Whole Stream Metabolism, Whole-Stream Metabolism

? Wainipee, W., Weiss, D.J., Sephton, M.A., Coles, B.J., Unsworth, C. and Court, R. (2010), The effect of crude oil on arsenate adsorption on goethite. *Water Research*, **44** (19), 5673-5683.

Full Text: [2010/Wat Res44, 5673.pdf](2010/Wat%20Res44,%205673.pdf)

Abstract: This study reports the adsorption of arsenate, As(V), on goethite (alpha-FeO(OH)) and oil-coated goethite at experimental conditions chosen to mimic settings of wastewater from oil fields being released into marine and freshwater bodies. Similarities are evident between the As(V)-goethite and AsM-oil-goethite systems: i) Adsorption is fast and saturation is achieved within 180 min, ii) Reaction rates approximate to a pseudo second order rate expression and range between 6.5 and 52.3 x 10(-4) g/mu mol/min, iii) Adsorption mechanisms are best described with a Langmuir model, and iv) Adsorption capacity rises with decreasing pH reflecting the increase of positive charges on the goethite surface. A difference is discernable in that the adsorption of As(V) is reduced significantly when the goethite is coated with oil. The similar experimental macroscopic observations for both systems, i.e., Langmuir model fits, reaction rates, and the effect of pH and ionic strength (I), suggest that the oil reduces the effective and/or reactive surface area. The zeta potential () indicates that the oil coating also changes the surface charge of the goethite, shifting the pH point of zero charge from 9.8 to about 3, thus contributing to the reduced As(V) adsorption. FTIR spectra show that As(V) interacts with the carbonyl functional groups of the oil. Our results suggest that oil-covered goethite significantly reduces the adsorption of As(V) and this points to a potentially significant indirect effect of oil on the cycling of As(V) and other oxyanions in oil polluted waters. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Adsorption Capacity, Adsorption Mechanisms, Alpha-Feooh, Arsenate, Arsenic, As(V), As(V) Adsorption, Bodies, Capacity, Changes, Charge, Coated, Coating, Crude Oil, Experimental, Expression, Ferrihydrite, Freshwater, FTIR, FTIR Spectra, Functional Groups, Goethite, Humic Substances, Ionic Strength, Iron-Oxide, Langmuir, Langmuir Model, Mechanisms, Mineral, Water Interfaces, Model, Nov, Oil, Oil And Gas Rigs, Organic-Matter, Oxide Minerals, pH, Point of Zero Charge, Potential, Production Waters, Pseudo Second Order, Pseudo-Second-Order, Rates, Rights, Saturation, Second Order, Second-Order, Si, Sorption, Strength, Surface, Surface Area, Surface Charge, Surface-Chemistry, Systems, Wastewater, Waters, Zeta Potential

? Yang, W.C., Kan, A.T., Chen, W. and Tomson, M.B. (2010), pH-dependent effect of zinc on arsenic adsorption to magnetite nanoparticles. *Water Research*, **44** (19), 5693-5701.

Full Text: [2010\Wat Res44, 5693.pdf](2010/Wat%20Res44,%205693.pdf)

Abstract: The effect of Zn(2+) on both the kinetic and equilibrium aspects of arsenic adsorption to magnetite nanoparticles was investigated at pH 4.5-8.0. At pH 8.0, adsorption of both arsenate and arsenite to magnetite nanoparticles was significantly enhanced by the presence of small amount of Zn(2+) in the solution. With less than 3 mg/L of Zn(2+) added to the arsenic solution prior to the addition of magnetite nanoparticles, the percentage of arsenic removal by magnetite nanoparticles increased from 66% to over 99% for arsenate, and from 80% to 95% for arsenite from an initial concentration of similar to 100 mu g& As at pH 8.0. Adsorption rate also increased significantly in the presence of Zn(2+). The adsorption-enhancement effect of Zn(2+) was not observed at pH 4.5-6.0, nor with ZnO nanoparticles, nor with surface-coated Zn-magnetite nanoparticles. The enhanced arsenic adsorption in the presence of Zn(2+) cannot be due to reduced negative charge of the magnetite nanoparticles surface by zinc adsorption. Other cations, such as Ca(2+) and Ag(+), failed to enhance arsenic adsorption. Several potential mechanisms that could have caused the enhanced adsorption of arsenic have been tested and ruled out. Formation of a ternary surface complex by zinc, arsenic and magnetite nanoparticles is a possible mechanism controlling the observed zinc effect. Zinc-facilitated adsorption provides further advantage for magnetite nanoparticle-enhanced arsenic removal over conventional treatment approaches. Synopsis: Arsenic adsorption to magnetite nanoparticles at neutral or slightly basic pH can be significantly enhanced with trace amount of Zn(2+) due to the formation of a ternary complex. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Arsenic, Chemistry, Desorption, Equilibrium, Goethite, Kaolinite, Magnetite Nanoparticles, Mechanism, Mechanisms, Oxidation, pH, Removal, Soils, Substances, Surface, Ternary Surface Complex, Treatment, Water Interface, Zinc

? Miller, S.M. and Zimmerman, J.B. (2010), Novel, bio-based, photoactive arsenic sorbent: TiO2-impregnated chitosan bead. *Water Research*, **44** (19), 5722-5729.

Full Text: [2010\Wat Res44, 5722.pdf](2010/Wat%20Res44,%205722.pdf)

Abstract: A novel sorbent for arsenic, TiO2-impregnated chitosan bead (TICS), has been synthesized and successfully tested. Kinetic plots, pH dependence, isotherm data, and bead morphology are reported. Equilibrium is achieved after 185 h in batch experiments with exposure to UV light. The TICB system performs similarly to the mass equivalent of neat TiO2 nanopowder. The point of zero charge (pzc) for TICB was determined to be 7.25, and as with other TiO2-based arsenic removal technologies, the optimal pH range for sorption is below this pH(pzc). Without exposure to UV light, TICB removes 2198 mu g As(III)/g TICB and 2050 mu g As(V)/g TICB. With exposure to UV light, TICB achieves photo-oxidation of As (III) to As(V), the less toxic and more easily sequestered arsenic form. UV irradiation also results in enhanced arsenic removal, reaching sorption capacities of 6400 mu g As/g TICB and 4925 mu g As/g TICB, where arsenic is initially added as As(III) and As(V), respectively. Because the TICB system obviates filtration post-treatment, TICB is superior to TiO2 nanopowder from the perspective of implementation for decentralized water treatment. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Activated Alumina, Adsorption, Aqueous-Solutions, Arsenic, Bio-Based, Chitosan, Drinking-Water, Equilibrium, Exposure, Fixed-Bed, Isotherm, Kinetic, Nanocrystalline Titanium-Dioxide, pH, Photocatalytic Oxidation, Removal, Sorption, Sustainable, TiO2, TiO2-Photocatalyzed As(III) Oxidation, Treatment, Water, Water-Treatment

? Mao, J., Lee, S.Y., Won, S.W. and Yun, Y.S. (2010), Surface modified bacterial biosorbent with poly(allylamine hydrochloride): Development using response surface methodology and use for recovery of hexachloroplatinate (IV) from aqueous solution. *Water Research*, **44** (20), 5919-5928.

Full Text: [2010/Wat Res44, 5919.pdf](2010/Wat%20Res44,%205919.pdf)

Abstract: In this study, poly(allylamine hydrochloride) (PAA/HCl) was cross-linked with fermentation bacterial waste (Escherichia coli) in order to introduce a large amount of amine groups as binding sites for potassium hexachloroplatinate(IV), as a model anionic pollutant. The sorption performance of PAA/HCl-modified E. coli was greatly affected by the dosages of PAA/HCl and crosslinker (epichlorohydrin, ECH), and by the pH of the modification reaction medium. These factors were optimized through the response surface methodology (RSM). A three-level factorial Box-Behnken design was performed, and a second-order polynomial model was successfully used to describe the effects of PAA/HCl, ECH and the pH on the Pt(IV) uptake (R-2 = 0.988). The optimal conditions that were obtained from the RSM were 0.49 g of PAA/HCl, 0.05 mL of ECH and pH 10.02, with 1.0 g of dried E. coli biomass. The biosorption isotherm and kinetics studies were carried out in order to evaluate the sorption potential of the PAA/HCl-modified E. coli that was prepared under the optimized conditions. The sorption performance of the developed bacterial biosorbent was 4.36 times greater than that of the raw E. coli. Desorption was carried out using 0.05 M acidified thiourea and the biosorbent was successfully regenerated and reused up to four cycles. Therefore, this simple and cost-effective method suggested here is a useful modification tool for the development of high performance biosorbents for the recovery of anionic precious metals. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aqueous Solution, Binding, Binding Sites, Biomass, Biosorbent, Biosorbents, Biosorption, Biosorption, Biosorption Isotherm, Cadmium, Corynebacterium-Glutamicum, Cost-Effective, Cross-Linked, Design, Desorption, Development, Escherichia, Escherichia Coli, Fermentation, Ions, Isotherm, Iv, Kinetics, Lead, Metals, Methodology, Model, Modification, Modified, Palladium, Performance, Ph, Platinum, Potassium, Potential, Precious Metals, Pt(IV), Recovery, Response Surface Methodology, Rights, Second Order, Second-Order, Solution, Sorption, Sorption Potential, Surface, Surface Modification, Uptake, Waste

? Díaz, V., Ibáñez, R., Gómez, P., Urtiaga, A.M. and Ortiz, I. (2011), Kinetics of electro-oxidation of ammonia-N, nitrites and COD from a recirculating aquaculture saline water system using BDD anodes. *Water Research*, **45** (1), 125-134.

Full Text: [2011\Wat Res45, 125.pdf](2011/Wat%20Res45,%20125.pdf)

Abstract: The viability of the electro-oxidation technology provided with boron doped diamond (BDD) electrodes for the treatment and reuse of the seawater used in a Recirculating Aquaculture System (RAS) was evaluated in this work. The influence of the applied current density (5-50 A m(-2)) in the removal of Total Ammonia Nitrogen (TAN), nitrite and chemical oxygen demand (COD) was analyzed observing that complete TAN removal together with important reductions of the other considered contaminants could be achieved, thus meeting the requirements for reuse of seawater in RAS systems. TAN removal, mainly due to an indirect oxidation mechanism was described by a second order kinetics while COD and nitrite removal followed zero-th order kinetics. The values of the kinetic constants for the anodic oxidation of each compound were obtained as a function of the applied current density (k(TAN) = 7.86 x 10(-5).exp(6.30 x 10(-2) J); k(NO2) = 3.43 x 10(-2) J; k(COD)= 1.35 x 10(-2) J). The formation of free chlorine and oxidation by-products, i.e., trihalomethanes (THMs) was followed along the electro-oxidation process. Although a maximum concentration of 1.7 mg l(-1) of total trihalomethanes was detected an integrated process combining electrochemical oxidation in order to eliminate TAN, nitrite and COD and adsorption onto activated carbon to remove the residual chlorine and THMs is proposed, as an efficient alternative to treat and reuse the seawater in fish culture systems. Finally, the energy consumption of the treatment has been evaluated. (c) 2010 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorption, Aquaculture Saline Water Reuse, Aqueous-Solution, BDD Anode, By-Products, COD, Culture, Doped Diamond Anodes, Electro-Oxidation, Electrochemical Oxidation, Electrodes, Energy, Fish, Kinetics, Landfill Leachate, Mechanism, Nitrogen Compounds, Oxidation, Oxygen-Demand, Removal, Reuse, Scale-up, Sea-Water, Treatment, Viability, Waste-Water

? Liu, H.J., Yang, F., Zheng, Y.M., Kang, J., Qu, J.H. and Chen, J.P. (2011), Improvement of metal adsorption onto chitosan/*Sargassum* sp. composite sorbent by an innovative ion-imprint technology. *Water Research*, **45** (1), 145-154.

Full Text: [2011\Wat Res45, 145.pdf](2011/Wat%20Res45,%20145.pdf)

Abstract: Technology for immobilization of biomass has attracted a great interest due to the high sorption capacity of biomass for sequestration of toxic metals from industrial effluents. However, the currently practiced immobilization methods normally reduce the metal sorption capacities. In this study, an innovative ion-imprint technology was developed to overcome the drawback. Copper ion was first imprinted onto the functional groups of chitosan that formed a pellet-typed sorbent through the granulation with Sargassum sp.; the imprinted copper ion was chemically detached from the sorbent, leading to the formation of a novel copper ion-imprinted chitosan/Sargassum sp. (CICS) composite adsorbent. The copper sorption on CICS was found to be highly pH-dependent and the maximum uptake capacity was achieved at pH 4.7-5.5. The adsorption isotherm study showed the maximum sorption capacity of CICS of 1.08 mmol/g, much higher than the non-imprinted chitosan/Sargassum sp. sorbent (NICS) (0.49 mmol/g). The used sorbent was reusable after being regenerated through desorption. The FTIR and XPS studies revealed that the greater sorption of heavy metal was attributed to the large number of primary amine groups available on the surfaces of the ion-imprinted chitosan and the abundant carboxyl groups on Sargassum sp.. Finally, an intraparticle surface diffusion controlled model well described the sorption history of the sorbents. (c) 2010 Elsevier Ltd. All rights reserved.

Keywords: Biosorption, Copper Removal, Granulation, Ion-Imprinted Chitosan, Sargassum sp., Modified Sargassum Sp, Chitosan Gel Beads, Algal Biomass, Ca-Alginate, Waste-Water, Biosorption, Copper, Removal, Cadmium, Lead

? Kim, E.A., Seyfferth, A.L., Fendorf, S. and Luthy, R.G. (2011), Immobilization of Hg(II) in water with polysulfide-rubber (PSR) polymer-coated activated carbon. *Water Research*, **45** (2), 453-460.

Full Text: [2011\Wat Res45, 453.pdf](2011/Wat%20Res45,%20453.pdf)

Abstract: An effective mercury removal method using polymer-coated activated carbon was studied for possible use in water treatment. In order to increase the affinity of activated carbon for mercury, a sulfur-rich compound, polysulfide-rubber (PSR) polymer, was effectively coated onto the activated carbon. The polymer was synthesized by condensation polymerization between sodium tetrasulfide and 1,2-dichloroethane in water. PSR-mercury interactions and Hg-S bonding were elucidated from x-ray photoelectron spectroscopy, and Fourier transform infra-red spectroscopy analyses. The sulfur loading levels were controlled by the polymer dose during the coating process and the total surface area of the activated carbon was maintained for the sulfur loading less than 2 wt%. Sorption kinetic studies showed that PSR-coated activated carbon facilitates fast reaction by providing a greater reactive surface area than PSR alone. High sulfur loading on activated carbon enhanced mercury adsorption contributing to a three orders of magnitude reduction in mercury concentration. mu-X-ray absorption near edge spectroscopic analyses of the mercury bound to activated carbon and to PSR on activated carbon suggests the chemical bond with mercury on the surface is a combination of Hg-Cl and Hg-S interaction. The pH effect on mercury removal and adsorption isotherm results indicate competition between protons and mercury for binding to sulfur at low pH. (c) 2010 Published by Elsevier Ltd.

Keywords: Activated Carbon, Adsorption, Bioaccumulation, Bonding, Complexes, Heavy Metal Adsorption, Isotherm, Mercury, Mercury, Molecules, pH, Polysulfide-Rubber Polymer, Removal, Sorption, Spectra, Treatment, X-Ray

? Selvakumar, R., Jothi, N.A., Jayavignesh, V., Karthikaiselvi, K., Antony, G.I., Sharmila, P.R., Kavitha, S. and Swaminathan, K. (2011), As(V) removal using carbonized yeast cells containing silver nanoparticles. *Water Research*, **45** (2), 583-592.

Full Text: [2011\Wat Res45, 583.pdf](2011/Wat%20Res45,%20583.pdf)

Abstract: The present study involves the development of adsorbent containing silver nanoparticles for arsenate removal using silver reducing property of a novel yeast strain Saccharomyces cerevisiae BU-MBT-CY1 isolated from coconut cell sap. Biological reduction of silver by the isolate was deduced at various time intervals. The yeast cells after biological silver reduction were harvested and subjected to carbonization at 400º C for 1 h and its properties were analyzed using Fourier Transform Infra-Red spectroscopy, X-ray diffraction, scanning electron microscope attached with energy dispersive spectroscopy and transmission electron microscope. The average size of the silver nanoparticles present on the surface of the carbonized silver containing yeast cells (CSY) was 19±9 nm. The carbonized control yeast cells (CCY) did not contain any particles on its surface. As(V) adsorption efficiency of CCY and CSY was deduced in batch mode by varying parameters like contact time, initial concentration, and pH. Desorption studies were also carried out by varying the pH. The experimental data were fitted onto Langmuir and D-R Isotherms and Lagergren and pseudo second order kinetic models. The CSY was more efficient in arsenate removal when compared to CCY. (c) 2010 Elsevier Ltd. All rights reserved.

Keywords: Adsorption, Aqueous-Solution, Arsenic Removal, As(V) Removal, Bioreduction, Characterization, Complex, Desorption, Fungus, Gold Nanoparticles, Iron-Oxide, Isotherm, Isotherms, Kinetics, Langmuir, pH, *Saccharomyces cerevisiae*, Silver Nanoparticles, Sorption, Water

? Li, L.J., Liu, F.Q., Jing, X.S., Ling, P.P. and Li, A.M. (2011), Displacement mechanism of binary competitive adsorption for aqueous divalent metal ions onto a novel IDA-chelating resin: Isotherm and kinetic modeling. *Water Research*, **45** (3), 1177-1188.

Full Text: [2011\Wat Res45, 1177.pdf](2011/Wat%20Res45,%201177.pdf)

Abstract: Adsorptive properties for Cu (II), Pb (II) and Cd (II) onto an iminodiacetic acid (IDA) chelating resin were systematically investigated at the optimal pH-value in both single and binary solutions using batch experiments. The Langmuir isotherm model and the pseudo second-order rate equation could explain respectively the isotherm and kinetic experimental data for sole-component system with much satisfaction. The maximum adsorption capacity in single system for Cu (II), Pb (II) and Cd (II) was calculated to be 2.27 mmol/g, 1.27 mmol/g and 0.65 mmol/g individually. The initial adsorption rate followed the order as Cu (II) > Pb (II) > Cd (II) at the fixed initial concentration, and for each metal the initial sorption rate increased as the initial concentration increased. In addition, the modified Langmuir model could describe the binary competitive adsorption behavior successfully, with which the interaction coefficient was obtained to follow the order as Cu (II) < Pb (II) < Cd (II). Furthermore, in every case of the investigated three binary systems, the reduction in both the uptake amounts and distribution coefficients testified the antagonistic competitive phenomena. Obviously, this novel IDA-chelating resin possessed of a good selectivity toward Cu (II) over Pb (II) and Cd (II) for the obtained highest separation factor values were up to 21.30 and 133.91 in the range of tested. This interaction mechanism between the favorable component and other metal ions could mainly contribute to the direct displacement impact which be herewith illustrated schematically. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Behavior, Biosorption, Capacity, Chemical-Modification, Competitive Adsorption, Copper, Cu(II), Displacement Mechanism, Distribution Coefficients, Equilibrium, Exchange, Iminodiacetic Acid Chelating Resin, Impact, Ions, Isotherm, Langmuir Isotherm, Langmuir Model, Mechanism, Metal Ion, Model, Modeling, Modified, Pb(II), pH Value, Pseudo-Second-Order, Selective Removal, Selectivity, Sorption, Uptake

? Matsui, Y., Ando, N., Yoshida, T., Kurotobi, R., Matsushita, T. and Ohno, K. (2011), Modeling high adsorption capacity and kinetics of organic macromolecules on super-powdered activated carbon. *Water Research*, **45** (4), 1720-1728.

Full Text: [2011\Wat Res45, 1720.pdf](2011/Wat%20Res45,%201720.pdf)

Abstract: The capacity to adsorb natural organic matter (NOM) and polystyrene sulfonates (PSSs) on small particle-size activated carbon (super-powdered activated carbon, SPAC) is higher than that on larger particle-size activated carbon (powdered-activated carbon, PAC). Increased adsorption capacity is likely attributable to the larger external surface area because the NOM and PSS molecules do not completely penetrate the adsorbent particle; they preferentially adsorb near the outer surface of the particle. In this study, we propose a new isotherm equation, the Shell Adsorption Model (SAM), to explain the higher adsorption capacity on smaller adsorbent particles and to describe quantitatively adsorption isotherms of activated carbons of different particle sizes: PAC and SPAC. The SAM was verified with the experimental data of PSS adsorption kinetics as well as equilibrium. SAM successfully characterized PSS adsorption isotherm data for SPACs and PAC simultaneously with the same model parameters. When SAM was incorporated into an adsorption kinetic model, kinetic decay curves for PSSs adsorbing onto activated carbons of different particle sizes could be simultaneously described with a single kinetics parameter value. On the other hand, when SAM was not incorporated into such an adsorption kinetic model and instead isotherms were described by the Freundlich model, the kinetic decay curves were not well described. The success of the SAM further supports the adsorption mechanism of PSSs preferentially adsorbing near the outer surface of activated carbon particles. (C) 2010 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Activated Carbons, Adsorbent, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Capacity, Carbons, Competitive Adsorption, Design, Diffusion, Equilibrium, GAC, Geosmin, Hand, Homogeneous Surface Diffusion Model (HSDM), Isotherm, Isotherm, Isotherms, Kinetics, Matter, Mechanism, Model, Modeling, PAC, Removal, Shell, Success, System, Tests

? Zhang, M., He, F., Zhao, D.Y. and Hao, X.D. (2011), Degradation of soil-sorbed trichloroethylene by stabilized zero valent iron nanoparticles: Effects of sorption, surfactants, and natural organic matter. *Water Research*, **45** (7), 2401-2414.

Full Text: [2011\Wat Res45, 2401.pdf](2011/Wat%20Res45,%202401.pdf)

Abstract: Zero valent iron (ZVI) nanoparticles have been studied extensively for degradation of chlorinated solvents in the aqueous phase, and have been tested for in-situ remediation of contaminated soil and groundwater. However, little is known about its effectiveness for degrading soil-sorbed contaminants. This work studied reductive dechlorination of trichloroethylene (TCE) sorbed in two model soils (a potting soil and Smith Farm soil) using carboxymethyl cellulose (CMC) stabilized Fe-Pd bimetallic nanoparticles. Effects of sorption, surfactants and dissolved organic matter (DOC) were determined through batch kinetic experiments. While the nanoparticles can effectively degrade soil-sorbed TCE, the TCE degradation rate was strongly limited by desorption kinetics, especially for the potting soil which has a higher organic matter content of 8.2%. Under otherwise identical conditions, similar to 44% of TCE sorbed in the potting soil was degraded in 30 h, compared to similar to 82% for Smith Farm soil (organic matter content = 0.7%). DOG from the potting soil was found to inhibit TCE degradation. The presence of the extracted SOM at 40 ppm and 350 ppm as TOC reduced the degradation rate by 34% and 67%, respectively. Four prototype surfactants were tested for their effects on TCE desorption and degradation rates, including two anionic surfactants known as SDS (sodium dodecyl sulfate) and SDBS (sodium dodecyl benzene sulfonate), a cationic surfactant hexadecyltrimethylammonium (HDTMA) bromide, and a non-ionic surfactant Tween 80. All four surfactants were observed to enhance ICE desorption at concentrations below or above the critical micelle concentration (cmc), with the anionic surfactant SDS being most effective. Based on the pseudo-first-order reaction rate law, the presence of 1xcmc SDS increased the reaction rate by a factor of 2.5 when the nanoparticles were used for degrading TCE in a water solution. SDS was effective for enhancing degradation of ICE sorbed in Smith Farm soil, the presence of SDS at sub-cmc increased TCE degraded by similar to 10%. However, effect of SDS on degradation of TCE in the potting soil was more complex. The presence of SDS at sub-cmc decreased TCE degradation by 5%, but increased degradation by 5% when SDS dosage was raised to 5xcmc. The opposing effects were attributed to combined effects of SDS on TCE desorption and degradation, release of soil organic matter and nanoparticle aggregation. The findings strongly suggest that effect of soil sorption on the effectiveness of Fe-Pd nanoparticles must be taken into account in process design, and soil organic content plays an important role in the overall degradation rate and in the effectiveness of surfactant uses. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Aqueous-Solutions, Carboxymethyl Cellulose, Chlorinated Solvents, Contaminated Soil, Dechlorination, Design, Desorption, Effectiveness, Fe-Pd Nanoparticles, Groundwater, Humic-Acid, In-Situ Remediation, Iron, Kinetics, Model, Nanoparticles, Nanoscale Zerovalent Iron, Nonionic Surfactant, Polynuclear Aromatic-Hydrocarbons, Pseudo-First-Order, Remediation, Sodium Dodecyl-Sulfate, Sorption, Surfactant, TCE, Trichloroethylene, Zero Valent Iron

? Ho, Y.S. (2011), Comment on “Adsorption mechanism of selenate and selenite on the binary oxide systems” by Y.T. Chan et al. [Water Research 43 (2009) 4412-4420]. *Water Research*, **45** (7), 2437.

Full Text: [2011\Wat Res45, 2437.pdf](2011/Wat%20Res45,%202437.pdf); [2010\Wat Res-Ho1.pdf](2010/Wat%20Res-Ho1.pdf); [2010\Wat Res-Ho2.pdf](2010/Wat%20Res-Ho2.pdf)

? Dou, X.M., Zhang, Y.S., Wang, H.J., Wang, T.J. and Wang, Y.L. (2011), Performance of granular zirconium-iron oxide in the removal of fluoride from drinking water. *Water Research*, **45** (12), 3571-3578.

Full Text: [2011\Wat Res45, 3571.pdf](2011/Wat%20Res45,%203571.pdf)

Abstract: In this study, a granular zirconium-iron oxide (GZI) was successfully prepared using the extrusion method, and its defluoridation performance was systematically evaluated. The GZI was composed of amorphous and nano-scale oxide particles. The Zr and Fe were evenly distributed on its surface, with a Zr/Fe molar ratio of similar to 2.3. The granular adsorbent was porous with high permeability potential. Moreover, it had excellent mechanical stability and high crushing strength, which ensured less material breakage and mass loss in practical use. In batch tests, the GZI showed a high adsorption capacity of 9.80 mg/g under an equilibrium concentration of 10 mg/L at pH 7.0, which outperformed many other reported granular adsorbents. The GZI performed well over a wide pH range, of 3.5-8.0, and especially well at pH 6.0-8.0, which was the preferred range for actual application. Fluoride adsorption on GZI followed pseudo-second-order kinetics and could be well described by the Freundlich equilibrium model. With the exception of HCO(3)(-), other co-existing anions and HA did not evidently inhibit fluoride removal by GZI when considering their real concentrations in natural groundwater, which showed that GZI had a high selectivity for fluoride. In column tests using real groundwater as influent, about 370, 239 and 128 bed volumes (BVs) of groundwater were treated before breakthrough was reached under space velocities (SVs) of 0.5, 1 and 3 h-1, respectively. Additionally, the toxicity characteristic leaching procedure (TCLP) results suggested that the spent GZI was inert and could be safely disposed of in landfill. In conclusion, this granular adsorbent showed high potential for fluoride removal from real groundwater, due to its high performance and physical-chemical properties. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Adsorbent, Adsorption, Adsorption-Kinetics, Alumina, Aqueous-Solution, Bone Char, Composite, Defluoridation, Defluoridation, Equilibrium, Ferric Hydroxide GFH, Fluoride, Granular Adsorbent, Kinetics, Model, Performance, Permeability, pH, Pseudo-Second-Order, Sorption, Zirconium-Iron Oxide

? Wick, A., Marincas, O., Moldovan, Z. and Ternes, T.A. (2011), Sorption of biocides, triazine and phenylurea herbicides, and UV-filters onto secondary sludge. *Water Research*, **45** (12), 3638-3652.

Full Text: [2011\Wat Res45, 3638.pdf](2011/Wat%20Res45,%203638.pdf)

Abstract: The sludge-water distribution of a total of 41 organic micropollutants (9 phenylurea herbicides, 11 triazines, 16 biocides and 5 UV-filters) was investigated in laboratory batch experiments with fresh secondary sludge taken from a municipal WWTP. Sorption kinetics as well as sorption isotherms were examined by analyzing the compound concentration in the aqueous and solid phase for mass balance control and quality assurance. The sorption kinetic experiments revealed a sorption equilibrium time of <2 h and adverse effects of sodium azide on the sludge-water distribution of several compounds. Sorption isotherms were constructed for 6 different spiking levels spanning 3 orders of magnitude (100 ng L(-1)-30,000 ng L(-1)) and were well described by the Freundlich model. For some compounds non-linear sorption with Freundlich exponents n < 1 revealed a decreased sorption affinity to the sludge flocs with increasing aqueous phase concentration. Therefore, sludge-water distribution coefficients (K(d,sec)) were calculated from the isotherm data for a constant concentration level of 1 mu g L(-1). Based on the sludge dry weight (dw), the K(d,sec), values of phenylurea herbicides ranged from 9 L kg(dw) (-1)(sludge) (soproturon) to 320 L kg(dw sludge)(-1) (neburon), those of triazines from 5 L kg(dw) (-1)(sludge) (atrazine) to 190 L kg(dw) (-1)(sludge) (terbutryn), those of biocides from 10 L kg(dw) (-1)(sludge) (N,N-dimethyl-N’-p-tolylsulfamide) to 40,000 L kg(dw) (-1)(sludge) (triclocarban) and those of UV-filters from 9 L kg(dw) (-1)(sludge) (phenylbenzimidazole sulfonic acid) to 720 L kg(dw) (-1)(sludge) (benzophenone-3). For most compounds K(d,sec) values were below 500 L kg(dw) (-1)(sludge) and thus removal in WWTPs by the withdrawal of excess sludge is expected to be negligible (<10%) except for the biocides triclocarban (80-95%), triclosan (55-85%), chlorophene (30-60%), imazalil (25-55%) and fenpropimorph (15-40%) as well as the UV-filter benzophenone-3 (5-20%). A simple linear free-energy relationship (LEER) approach using the logarithmized octanol-water partition coefficient log K(OW) as single descriptor is discussed for a rough classification of nonionic compounds regarding their potential removal in WWTPs by sorption.

Keywords: Activated-Sludge, Adverse Effects, Balance, Beta-Blockers, Biocides, Bisphenol-A, Coefficient K-D, Control, Digested-Sludge, Distribution Coefficients, Equilibrium, Freundlich Isotherms, Isotherm, Isotherms, Kinetics, Model, Musk Fragrances, Phenylurea Herbicides, Quality Assurance, Removal, Secondary Sludge, Sewage-Treatment, Sludge-Water Distribution Coefficients, Sorption, Sorption Isotherms, Sorption Kinetics, Surface Waters, Treatment Plants, Triazines, UV-Filters, Waste-Water Treatment

? Morisada, S., Rin, T., Ogata, T., Kim, Y.H. and Nakano, Y. (2011), Adsorption removal of boron in aqueous solutions by amine-modified tannin gel. *Water Research*, **45** (13), 4028-4034.

Full Text: [2011\Wat Res45, 4028.pdf](2011/Wat%20Res45,%204028.pdf)

Abstract: A tannin gel (TG) synthesized from condensed tannin molecules has a remarkable ability to adsorb various metal ions in aqueous solutions. In the present study, the adsorption removal of boron in solutions at various pHs and temperatures has been examined using the TG and the amine-modified tannin gel (ATG) prepared with ammonia treatment of the TG. The adsorption amounts of boron for the TG and the ATG were relatively small and almost constant below pH 7, whereas the boron adsorption amounts increased with increasing pH in the range of pH above 7. Considering that in aqueous solutions above pH 7, the mole fraction of boric acid decreases while that of tetrahydroxyborate ion increases with increasing pH, the boron adsorption onto both gels takes place probably through the chelate formation of tetrahydroxyborate ion with the hydroxy and the amino groups in the gels. Besides, the adsorbability of the ATG for boron was higher than that of the TG due to the stable coordination bond between boron and nitrogen of the amino group in the ATG. The adsorption kinetics were adequately described by the pseudo-second order kinetic equation while the adsorption isotherms followed both the Langmuir and the Freundlich equations. The boron adsorbability of both the TG and the ATG at low boron concentration were comparable or fairly good compared with other adsorbents. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Adhesives, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Amine Modification, Batch Adsorption, Boron Removal, Freundlich, Gels, Ion-Exchange, Isotherms, Kinetic, Kinetics, Langmuir, Mechanism, Natural Condensed Tannin, Performance, pH, Redox, Removal, Resin, Sorption, Tannin Gel, Water, Water Treatment

? Gupta, V.K., Gupta, B., Rastogi, A., Agarwal, S. and Nayak, A. (2011), Pesticides removal from waste water by activated carbon prepared from waste rubber tire. *Water Research*, **45** (13), 4047-4055.

Full Text: [2011\Wat Res45, 4047.pdf](2011/Wat%20Res45,%204047.pdf)

Abstract: Waste rubber tire has been used for the removal of pesticides from waste water by adsorption phenomenon. By applying successive chemical and thermal treatment, a basically cabonaceous adsorbent is prepared which has not only a higher mesopore, macropore content but also has a favorable surface chemistry. Presence of oxygen functional groups as evidenced by FTIR spectra along with excellent porous and surface properties were the driving force for good adsorption efficiency observed for the studied pesticides: methoxychlor, methyl parathion and atrazine. Batch adsorption studies revealed maximum adsorption of 112.0 mg g(-1), 104.9 mg g(-1) and 88.9 mg g(-1) for methoxychlor, atrazine and methyl parathion respectively occurring at a contact time of 60 min at pH 2 from an initial pesticide concentration of 12 mg/L. These promising results were confirmed by column experiments; thereby establishing the practicality of the developed system. Effect of various operating parameters along with equilibrium, kinetic and thermodynamic studies reveal the efficacy of the adsorbent with a higher adsorption capacity than most other adsorbents. The adsorption equilibrium data obey Langmuir model and the kinetic data were well described by the pseudo-first-order model. Applicability of Bangham's equation indicates that diffusion of pesticide molecules into pores of the adsorbent mainly controls the adsorption process. Spontaneous, exothermic and random characteristics of the process are confirmed by thermodynamic studies. The developed sorbent is inexpensive in comparison to commercial carbon and has a far better efficiency for pesticide removal than most other adsorbents reported in literature. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption Isotherm, Aqueous-Solution, Atrazine, Bagasse Fly-Ash, Capacity, Char, Diffusion, Driving, Efficacy, Equilibrium, FTIR, Functional, Kinetics, Langmuir Model, Literature, Methoxychlor, Methyl Parathion, Model, Peat, Pesticides, pH, Pseudo-First-Order, Pyrolysis, Removal, Sorption, Sugar-Industry Waste, Treatment, Waste, Waste Rubber Tire

? Carabineiro, S.A.C., Thavorn-Amornsri, T., Pereira, M.F.R. and Figueiredo, J.L. (2011), Adsorption of ciprofloxacin on surface-modified carbon materials. *Water Research*, **45** (15), 4583-4591.

Full Text: [2011\Wat Res45, 4583.pdf](2011/Wat%20Res45,%204583.pdf)

Abstract: The adsorption capacity of ciprofloxacin (CPX) was determined on three types of carbon-based materials: activated carbon (commercial sample), carbon nanotubes (commercial multi-walled carbon nanotubes) and carbon xerogel (prepared by the resorcinol/formaldehyde approach at pH 6.0). These materials were used as received/prepared and functionalised through oxidation with nitric acid. The oxidised materials were then heat treated under inert atmosphere (N(2)) at different temperatures (between 350 and 900 degrees C). The obtained samples were characterised by adsorption of N(2) at -196 degrees C, determination of the point of zero charge and by temperature programmed desorption. High adsorption capacities ranging from approximately 60 to 300 mg(CPx) g(C)(-1) were obtained (for oxidised carbon xerogel, and oxidised thermally treated activated carbon Norit ROX 8.0, respectively). In general, it was found that the nitric acid treatment of samples has a detrimental effect in adsorption capacity, whereas thermal treatments, especially at 900 degrees C after oxidation, enhance adsorption performance. This is due to the positive effect of the surface basicity. The kinetic curves obtained were fitted using 1st or 2nd order models, and the Langmuir and Freundlich models were used to describe the equilibrium isotherms obtained. The 2nd order and the Langmuir models, respectively, were shown to present the best fittings. (C) 2011 Elsevier Ltd. All rights reserved.

Keywords: Activated Carbon, Activated Carbons, Adsorption, Antibiotics, Aqueous-Solutions, Aromatic-Compounds, Capacity, Carbon Nanotubes, Carbon Xerogel, Chemistry, Ciprofloxacin, Degradation, Desorption, Equilibrium, Fluoroquinolone Antibacterial Agents, Isotherms, Langmuir and Freundlich Models, Multiwalled Carbon Nanotubes, Nanotubes, Oxidation, Ozonation, pH, Treatment, Waste-Water

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? Weber, Jr., W.J. and Rumer, Jr., R.R. (1965), Intraparticle transport of sulfonated alkylbenzenes in a porous solid: Diffusion with nonlinear adsorption. *Water Resources Research*, **1** (3), 361-373.

Full Text: [1960-80\Wat Res Res1, 361.pdf](1960-80/Wat%20Res%20Res1,%20361.pdf)

Abstract: Molecular diffusion is one of several phenomena contributing to establishment of rates of transfer of adsorbed materials from the exterior sites of a porous adsorbent to surfaces bounding inner pore spaces. For many applications of adsorption and ion exchange the rate of intraparticle transport in turn governs the over-all rate of removal of solute from solution. The present work represents an approach to partial characterization of intraparticle transport kinetics by separation and evaluation of component molecular diffusion parameters. Data have been collected for rates of adsorption in several dilute, aqueous, single-solute experimental systems, each comprised of a linear-chain sulfonated alkylbenzene in micromolar concentration as the adsorbate and porous granular carbon as the absorbent. From measurements of rate of removal of solute from bulk solution for each system, and from separate measurements of adsorption isotherms, values for the corresponding coefficients of molecular diffusion have been calculated by numerical integration of the conservation of diffusing mass equation, incorporating an expression for simultaneous adsorption according to the nonlinear Langmuir monolayer model for adsorption. Calculated values for the coefficients of diffusion for the respective solutes, of the order of 10−5−10−7 square centimeter per second, derived from measurements in the experimental systems, agree with values cited in the literature for the same and similar solutes measured in aqueous solution. This accordance indicates that the postulated model for intraparticle transport may be valid for description of the rate-limiting process in agitated nonflow systems similar to those from which the experimental data have been derived. The technique further permits reduction of experimental data to a common parameter to facilitate system-to-system comparisons.

Guta, S.P. and Greenkorn, R.A. (1973), Dispersion during flow in porous media with bilinear adsorption. *Water Resources Research*, **9** (5), 1357-1368.

Full Text: [1960-80\Wat Res Res9, 1357.pdf](1960-80/Wat%20Res%20Res9,%201357.pdf)

Abstract: Major sources of the pollution in underground water are various compounds that may come from the runoff of cattle feedlots, from the runoff of fertilizers, pesticides, and herbicides from the cultivated lands, and from domestic and industrial wastes. The equations for the dispersion and adsorption of various chemicals in porous media are formulated to calculate pollution movement. If a bilinear rate of adsorption is assumed, two coupled nonlinear parabolic partial differential equations result. The equations can be solved by the Crank-Nicolson method, which is a stable, two-step method. Solutions for the range of variables involved in the movement of pollutants in porous media are obtained for a one-dimensional model.

Notes: highly cited

? Mualem, Y. (1976), New model for predicting hydraulic conductivity of unsaturated porous media. *Water Resources Research*, **12** (3), 513-522.

Full Text: [1960-80\Wat Res Res12, 513.pdf](1960-80/Wat%20Res%20Res12,%20513.pdf)

Abstract: A simple analytic model is proposed which predicts the unsaturated hydraulic conductivity curves by using the moisture content-capillary head curve and the measured value of the hydraulic conductivity at saturation. It is similar to the Childs and Collis-George (1950) model but uses a modified assumption concerning the hydraulic conductivity of the pore sequence in order to take into account the effect of the larger pore section. A computational method is derived for the determination of the residual water content and for the extrapolation of the water content-capillary head curve as measured in a limited range. The proposed model is compared with the existing practical models of Averjanov (1950), Wyllie and Gardner (1958), and Millington and Quirk (1961) on the basis of the measured data of 45 soils. It seems that the new model is in better agreement with observations.

Keywords: Model

Cameron, D.R. and Klute, A. (1977), Convective-dispersive solute transport with a combined equilibrium and kinetic adsorption model. *Water Resources Research*, **13** (1), 183-188.

Full Text: [1960-80\Wat Res Res13, 183.pdf](1960-80/Wat%20Res%20Res13,%20183.pdf)

Abstract: A given chemical may react at different rates with various soil constituents and be involved in several kinds of reactions. A combination of equilibrium and kinetic adsorption models is hypothesized to describe the nature of the overall reaction. An analytical solution to the one-dimensional convectivedispersive transport equation with a combination linear Freundlich isotherm and first-order reversible kinetic adsorption model is developed. The individual and combined effects of the model parameters on the breakthrough curves and retention profiles are examined. The combination equilibrium-kinetic model is shown to be applicable to pesticide, nutrient, and metal transport in soils.

Notes: highly cited

? Clapp, R.B. and Hornberger, G.M. (1978), Empirical equations for some soil hydraulic-properties. *Water Resources Research*, **14** (4), 601-604.

Full Text: [1960-80\Wat Res Res14, 601.pdf](1960-80/Wat%20Res%20Res14,%20601.pdf)

Abstract: The soil moisture characteristic may be modeled as a power curve combined with a short parabolic section near saturation to represent gradual air entry. This two-part function—together with a power function relating soil moisture and hydraulic conductivity—is used to derive a formula for the wetting front suction required by the Green-Ampt equation. Representative parameters for the moisture characteristic, the wetting front suction, and the sorptivity, a parameter in the infiltration equation derived by Philip (1957), are computed by using the desorption data of Holtan et al. (1968). Average values of the parameters, and associated standard deviations, are calculated for 11 soil textural classes. The results of this study indicate that the exponent of the moisture characteristic power curve can be predicted reasonably well from soil texture and that gradual air entry may have a considerable effect on a soil's wetting front suction.

Keywords: Soil

Notes: highly cited

? Topp, G.C., Davis, J.L. and Annan, A.P. (1980), Electromagnetic determination of soil water content: Measurements in coaxial transmission lines. *Water Resources Research*, **16** (3), 574-582.

Full Text: [1960-80\Wat Res Res16, 574.pdf](1960-80/Wat%20Res%20Res16,%20574.pdf)

Abstract: The dependence of the dielectric constant, at frequencies between 1 MHz and 1 GHz, on the volumetric water content is determined empirically in the laboratory. The effect of varying the texture, bulk density, temperature, and soluble salt content on this relationship was also determined. Time-domain reflectometry (TDR) was used to measure the dielectric constant of a wide range of granular specimens placed in a coaxial transmission line. The water or salt solution was cycled continuously to or from the specimen, with minimal disturbance, through porous disks placed along the sides of the coaxial tube.

Four mineral soils with a range of texture from sandy loam to clay were tested. An empirical relationship between the apparent dielectric constant Ka and the volumetric water content θv, which is independent of soil type, soil density, soil temperature, and soluble salt content, can be used to determine θv, from air dry to water saturated, with an error of estimate of 0.013. Precision of θv to within ±0.01 from Ka can be obtained with a calibration for the particular granular material of interest. An organic soil, vermiculite, and two sizes of glass beads were also tested successfully. The empirical relationship determined here agrees very well with other experimenters' results, which use a wide range of electrical techniques over the frequency range of 20 MHz and 1 GHz and widely varying soil types. The results of applying the TDR technique on parallel transmission lines in the field to measure θv versus depth are encouraging.

Notes: highly cited

? Hirsch, R.M., Slack, J.R. and Smith, R.A. (1982), Techniques of trend analysis for monthly water-quality data. *Water Resources Research*, **18** (1), 107-121.

Full Text: 1982\Wat Res Res18, 107.pdf

Notes: highly cited

? Beven, K. and Germann, P. (1982), Macropores and water-flow in soils. *Water Resources Research*, **18** (5), 1311-1325.

Full Text: [1982\Wat Res Res18, 1311.pdf](1982/Wat%20Res%20Res18,%201311.pdf)

Abstract: This paper reviews the importance of large continuous openings (macropores) on water flow in soils. The presence of macropores may lead to spatial concentrations of water flow through unsaturated soil that will not be described well by a Darcy approach to flow through porous media. This has important implications for the rapid movement of solutes and pollutants through soils. Difficulties in defining what constitutes a macropore and the limitations of current nomenclature are reviewed. The influence of macropores on infiltration and subsurface storm flow is discussed on the basis of both experimental evidence and theoretical studies. The limitations of models that treat macropores and matrix porosity as separate flow domains is stressed. Little-understood areas are discussed as promising lines for future research. In particular, there is a need for a coherent theory of flow through structured soils that would make the macropore domain concept redundant.

Notes: highly cited

? Gelhar, L.W. and Axness, C.L. (1983), Three-Dimensional stochastic analysis of macrodispersion in aquifers. *Water Resources Research*, **19** (1), 161-180.

Full Text: [1983\Wat Res Res19, 161.pdf](1983/Wat%20Res%20Res19,%20161.pdf)

Abstract: The dispersive mixing resulting from complex flow in three-dimensionally heterogeneous porous media is analyzed using stochastic continuum theory. Stochastic solutions of the perturbed steady flow and solute transport equations are used to construct the macroscopic dispersive flux and evaluate the resulting macrodispersivity tensor in terms of a three-dimensional, statistically anisotropic input covariance describing the hydraulic conductivity. With a statistically isotropic input covariance, the longitudinal macrodispersivity is convectively controlled, but the transverse macrodispersivity is proportional to the local dispersivity and is several orders of magnitude smaller than the longitudinal term. With an arbitrarily oriented anisotropic conductivity covariance, all components of the macrodispersivity tensor are convectively controlled, and the ratio of transverse to longitudinal dispersivity is of the order of 10−1. In this case the off-diagonal components of the dispersivity tensor are significant, being numerically larger than the diagonal transverse terms, and the transverse dispersion process can be highly anisotropic. Dispersivities predicted by the stochastic theory are shown to be consistent with controlled field experiments and Monte Carlo simulations. The theory, which treats the asymptotic condition of large displacement, indicates that a classical gradient transport (Fickian) relationship is valid for large-scale displacements.

Notes: highly cited

? Cosby, B.J., Hornberger, G.M., Galloway, J.N. and Wright, R.F. (1985), Modeling the effects of acid deposition - assessment of a lumped parameter model of soil-water and streamwater chemistry. *Water Resources Research*, **21** (1), 51-63.

Full Text: 1985\Wat Res Res21, 51.pdf

? Morgan, D.R. and Goulter, I.C. (1985), Optimal urban water distribution design. *Water Resources Research*, **21** (5), 642-652.

Full Text: [1985\Wat Res Res21, 642.pdf](1985/Wat%20Res%20Res21,%20642.pdf)

Abstract: A heuristic linear programming-based procedure has been developed for the least cost layout and design of water distribution networks. The methodology is capable of analyzing a wide range of demand pattern and pipe failure combinations. Hydraulic consistency is ensured throughout the procedure through the use of the Hardy-Cross network solver technique. The procedure can also be extended for use in the expansion or reinforcement of existing network systems. While the techniques used to reduce the size of the constraint set to enable the procedure to handle a wide range of loading conditions do not guarantee global optimality, a pragmatic “reasonable” optimum is achieved. The method is demonstrated by application to the design of a new network and the expansion of an existing network. In the expansion of the existing network problem the solution obtained was less expensive than any previously published solution.

Notes: highly cited

? Yeh, W.W.G. (1986), Review of parameter-identification procedures in groundwater hydrology: The inverse problem. *Water Resources Research*, **22** (2), 95-108.

Full Text: 1986\Wat Res Res22, 95.pdf

Notes: highly cited

? Sudicky, E.A. (1986), A natural gradient experiment on solute transport in a sand aquifer - spatial variability of hydraulic conductivity and its role in the dispersion process. *Water Resources Research*, **22** (13), 2069-2082.

Full Text: 1986\Wat Res Res22, 2069.pdf

Keywords: Experiment

Notes: highly cited

? Bahr, J.M. and Rubin, J. (1987), Direct comparison of kinetic and local equilibrium formulations for solute transport affected by surface reactions. *Water Resources Research*, **23** (3), 438-452.

Full Text: [1987\Wat Res Res23, 438.pdf](1987/Wat%20Res%20Res23,%20438.pdf)

Abstract: Modeling transport of reacting solutes in porous media often requires a choice between models based on the local equilibrium assumption (LEA) and models involving reaction kinetics. Direct comparison of the mathematical formulations for these two types of transport models can aid in this choice. For cases of transport affected by surface reaction, such a comparison is made possible by a new derivation procedure. This procedure yields a kinetics-based formulation that is the sum of the LEA formulation and one or more kinetically influenced terms. The dimensionless form of the new kinetics-based formulation facilitates identification of critical parameter groupings which control the approach to transport behavior consistent with LEA model predictions. Results of numerical experiments demonstrate that criteria for LEA applicability can be expressed conveniently in terms of these parameter groupings. The derivation procedure is demonstrated for examples of surface reactions including first-order reversible sorption, Langmuir-type kinetics and binary, homovalent ion exchange.

Notes: highly cited

? Carsel, R.F. and Parrish, R.S. (1988), Developing joint probability distributions of soil water retention characteristics. *Water Resources Research*, **24** (5), 755-769.

Full Text: 1988\Wat Res Res24, 755.pdf

Abstract: A method is presented for developing probability density functions for parameters of soil moisture relationships of capillary head [h(θ)] and hydraulic conductivity [K(θ)]. These soil moisture parameters are required for the assessment of water flow and solute transport in unsaturated media. The method employs a statistical multiple regression equation proposed in the literature for estimating [h(θ)] or [K(θ)] relationships using the soil saturated water content and the percentages of sand and clay. In the absence of known statistical distributions for either [h(θ)] or [K(θ)] relationships, the method facilitates modeling by providing variability estimates that can be used to examine the uncertainty associated with water flow or solute transport in unsaturated media.

? White, I. (1988), A natural gradient experiment on solute transport in a sand aquifer - spatial variability of hydraulic conductivity and its role in the dispersion process - Comment. *Water Resources Research*, **24** (6), 892-894.

Full Text: 1988\Wat Res Res24, 892.pdf

Keywords: Experiment

? Sudicky, E.A. (1988), A natural gradient experiment on solute transport in a sand aquifer - spatial variability of hydraulic conductivity and its role in the dispersion process - Reply. *Water Resources Research*, **24** (6), 895-896.

Full Text: 1988\Wat Res Res24, 895.pdf

Keywords: Experiment

? Molz, F.J. and Guven, O. (1988), A natural gradient experiment on solute transport in a sand aquifer - spatial variability of hydraulic conductivity and its role in the dispersion process - Comment. *Water Resources Research*, **24** (7), 1209-1210.

Full Text: 1988\Wat Res Res24, 1209.pdf

Keywords: Experiment

? Sudicky, E.A. (1988), A natural gradient experiment on solute transport in a sand aquifer - spatial variability of hydraulic conductivity and its role in the dispersion process - Reply. *Water Resources Research*, **24** (7), 1211-1216.

Full Text: 1988\Wat Res Res24, 1211.pdf

Keywords: Experiment

Notes: highly cited

? Celia, M.A., Bouloutas, E.T. and Zarba, R.L. (1990), A general mass-conservative numerical-solution for the unsaturated flow equation. *Water Resources Research*, **26** (7), 1483-1496.

Full Text: 1990\Wat Res Res26, 1483.pdf

Notes: highly cited

? Duan, Q.Y., Sorooshian, S. and Gupta, V. (1992), Effective and efficient global optimization for conceptual rainfall-runoff models. *Water Resources Research*, **28** (4), 1015-1031.

Full Text: 1992\Wat Res Res28, 1015.pdf

Abstract: The successful application of a conceptual rainfall-runoff (CRR) model depends on how well it is calibrated. Despite the popularity of CRR models, reports in the literature indicate that it is typically difficult, if not impossible, to obtain unique optimal values for their parameters using automatic calibration methods. Unless the best set of parameters associated with a given calibration data set can be found, it is difficult to determine how sensitive the parameter estimates (and hence the model forecasts) are to factors such as input and output data error, model error, quantity and quality of data, objective function used, and so on. Results are presented that establish clearly the nature of the multiple optima problem for the research CRR model SIXPAR. These results suggest that the CRR model optimization problem is more difficult than had been previously thought and that currently used local search procedures have a very low probability of successfully finding the optimal parameter sets. Next, the performance of three existing global search procedures are evaluated on the model SIXPAR. Finally, a powerful new global optimization procedure is presented, entitled the shuffled complex evolution (SCE-UA) method, which was able to consistently locate the global optimum of the SIXPAR model, and appears to be capable of efficiently and effectively solving the CRR model optimization problem.

Keywords: Parameter-Estimation Techniques, Small Hypothetical Catchments, Calibration Data Variability, Algorithms, Credibility, Represent, Dynamics, Ability, Length

Grant, S.B., List, E.J. and Lidstrom, M.E. (1993), Kinetic analysis of virus adsorption and inactivation in batch experiments. *Water Resources Research*, **29** (7), 2067-2085.

Full Text: [1993\Wat Res Res29, 2067.pdf](1993/Wat%20Res%20Res29,%202067.pdf)

Abstract: The mobility and ecology of viruses in natural environments is strongly influenced by the adsorption of virus particles to sand or soil surfaces. This binding process is frequently studied by conducting batch experiments in which fluid suspensions of virus particles are contacted with the adsorbent of interest. In this report, a simple first-order kinetic theory is presented which accounts for many of the complicated interactions that can occur when viruses contact an adsorbent in a batch system. Closed-form solutions and numerical simulations of the model indicate that four classes of virus-surface interactions can be identified, including quasi-equilibrium adsorption, quasi-equilibrium adsorption with surface sinks, quasi-equilibrium adsorption with reduced inactivation, and direct irreversible adsorption. Based on these results, a new experimental approach for studying virus-surface interactions is proposed and tested using a model system consisting of bacteriophage lambda and Ottawa sand. Fluid samples were collected from sand-containing and sand-free virus suspensions over the course of 5-6 days and analyzed for plaque forming units (PFU). These experiments were repeated using three different pH values and six different electrolyte compositions. Nondimensionalization of the PFU data from the sand-free suspension collapsed all of the data onto a single fine, as predicted by the kinetic model. When plotted in a nondimensional format, data from the sand-containing suspensions exhibited behavior which could readily be interpreted within the context of the kinetic model. These results suggest that the proposed approach offers a powerful alternative to conventional methods for studying virus adsorption at the solid-liquid interface, and for predicting the potential mobility and fate of viruses in porous media.

Keywords: Bacteriophage-Lambda, Porous-Media, Transport, Poliovirus, Soil, Water, Minerals, Surfaces, Survival, Particle

Notes: highly cited

? Corapcioglu, M.Y. and Jiang, S.Y. (1993), Colloid-facilitated groundwater contaminant transport. *Water Resources Research*, **29** (7), 2215-2226.

Full Text: [1993\Wat Res Res29, 2215.pdf](1993/Wat%20Res%20Res29,%202215.pdf)

Abstract: Colloidal particles or dissolved organic matter (DOM) can act as carriers to enhance the transport of contaminants in groundwater by reducing retardation effects. When either of these materials is present, the system can be treated as consisting of three phases: an aqueous phase, a carrier phase, and the stationary solid matrix phase. The contaminant may be present in either or all of these phases. In the work reported, a mathematical model was developed to describe the transport and fate of the contaminant and carrier material in a porous medium. The model is based on mass balance equations describing the transport and fate of the contaminant and carrier in a three-phase medium. Colloid/contaminant and colloid/matrix mass transfer mechanisms are represented by first-order kinetics. Equilibrium partitioning of DOM acting as a carrier of the contaminant introduces a significant simplification in the model formulation, For a constant DOM concentration a much smaller retardation coefficient can be obtained in the three-phase system than the coefficient obtained in a conventional advective/dispersive transport equation for a two-phase system. The modified retardation coefficient reflects the presence of the mobile carrier by incorporating both the sorption of the contaminant and capture of the carrier on the solid matrix. Numerical solutions for the model were obtained by using a finite difference scheme to provide estimates of contaminant and carrier concentrations. Significant sensitivities to model parameters, particularly the rate constants of carrier capture and sorption were discovered. The numerical results of the DOM carrier effect matched favorably with experimental data reported in the literature.

Keywords: First Order, Kinetics, Mass Transfer, Model, Particles, Partitioning, Porous-Media, Sorption, Water Filtration

Ma, L.W. and Selim, H.M. (1994), Predicting atrazine adsorption-desorption in soils: A modified second-order kinetic model. *Water Resources Research*, **30** (2), 447-456.

Full Text: [1994\Wat Res Res30, 447.pdf](1994/Wat%20Res%20Res30,%20447.pdf)

Abstract: Atrazine retention on a Sharkey clay soil was quantified using a kinetic batch method for different soil to solution ratios. Time-dependent adsorption-desorption was also measured using a batch method with successive dilution steps. Adsorption was found to be highly kinetic in nature. In addition, adsorption-desorption isotherms exhibited a strong hysteretic behavior. The extent of observed hysteresis increased with retention time. Attempts were made to describe atrazine retention based on a modified second-order approach where heterogeneity of adsorption sites was assumed. Two retention sites were considered: type 1 (*S*e) represented that retained on noncatalytic sites with low binding energy and type 2 (*S*k) was that retained on catalytic sites and form strong interactions with matrix surfaces. A third type (*S*i) represented irreversible sites occupied by hydroxyatrazine following hydrolysis or other physical/chemical transformations. The rates of reactions were assumed as a function of vacant or available sites which were equally accessible to either *S*e or *S*k. A direct method to quantify the adsorption capacity (*φ*m) as a measure of the total retention sites by maintaining high atrazine concentrations in soil solution was not successful. However, the use of an indirectly estimated (*φ*m) along with nonlinear least squares adequately described kinetic retention results. Based on least square best fit, model parameters were independent of initial concentrations (*C*i) and an overall set of parameters was capable of describing an entire data set for all *C*i. The model was also successful in predicting atrazine retention for a different data set and for all *C*i using one set of model parameters which were obtained independently from another data set. Further application of the model was to test whether these independently estimated model parameters can predict the kinetics of adsorption-desorption hysteresis. Unlike other approaches where adsorption and desorption isotherms were separately described, the second-order model was capable of describing both adsorption and desorption kinetics. Improved hysteresis predictions were observed when model parameters were derived from experiments of similar conditions.

Saiers, J.E., Hornberger, G.M. and Liang, L. (1994), First- and second-order kinetics approaches for modeling the transport of colloidal particles in porous media. *Water Resources Research*, **30** (9), 2499-2506.

Full Text: [1994\Wat Res Res30, 2499.pdf](1994/Wat%20Res%20Res30,%202499.pdf)

Abstract: We present results from experiments on the migration of inorganic colloids through laboratory columns containing clean quartz sand. Particle retention on the quartz collectors was found to be substantially less in experiments using negatively charged silica (SiO2) colloids than in experiments using positively charged anatase (TiO2) or boehmite (AlOOH) colloids. Analysis of these data with respect to two different advection-dispersion models indicates that deposition of colloidal silica follows a first-order, reversible kinetics process, while deposition of both anatase and boehmite is more closely depicted by second-order kinetics. Fitted values of the rate constant used to describe particle attachment vary consistently with the mean grain size of the sand and, for anatase and boehmite, are within a factor of 2 of the values predicted on the basis of colloid filtration theory.

Keywords: Suspended Particles, Brownian Particles, Flow Conditions, Double-Layer, Packed-Beds, Deposition, Mobilization, Filtration, Adsorption, Dynamics

Notes: highly cited

? Tarboton, D.G. (1997), A new method for the determination of flow directions and upslope areas in grid digital elevation models. *Water Resources Research*, **33** (2), 309-319.

Full Text: [1997\Wat Res Res33, 309.pdf](1997/Wat%20Res%20Res33,%20309.pdf)

Abstract: A new procedure for the representation of flow directions and calculation of upslope areas using rectangular grid digital elevation models is presented. The procedure is based on representing flow direction as a single angle taken as the steepest downward slope on the eight triangular facets centered at each grid point. Upslope area is then calculated by proportioning flow between two downslope pixels according to how close this flow direction is to the direct angle to the downslope pixel. This procedure offers improvements over prior procedures that have restricted flow to eight possible directions (introducing grid bias) or proportioned flow according to slope (introducing unrealistic dispersion). The new procedure is more robust than prior procedures based on fitting local planes while retaining a simple grid based structure. Detailed algorithms are presented and results are demonstrated through test examples and application to digital elevation data sets.

Keywords: Erosion Thresholds, Channel Networks, Representation, Topmodel, Morphology

? Bales, R.C., Li, S.M., Yeh, T.C.J., Lenczewski, M.E. and Gerba, C.P. (1997), Bacteriophage and microsphere transport in saturated porous media: Forced-gradient experiment at Borden, Ontario. *Water Resources Research*, **33** (4), 639-648.

Full Text: [1997\Wat Res Res33, 639.pdf](1997/Wat%20Res%20Res33,%20639.pdf)

Abstract: A two-well forced-gradient experiment involving virus and microsphere transport was carried out in a sandy aquifer in Borden, Ontario, Canada. Virus traveled at least a few meters in the experiment, but virus concentrations at observation points 1 and 2.54 m away from the injection well were a small fraction of those injected. A simplified planar radial advection-dispersion equation with constant dispersivity, coupled with equilibrium and reversible first-order mass transfer, was found to be adequate to simulate the attachment and transport process, During the experiment a short-duration injection of high-pH water was also made, which caused detachment of previously attached viruses. For simulating this detachment and associated transport, the same transport and mass-transfer equations were used; but all rate parameters were varied as groundwater pH changed from 7.4 to 8.4 and then back to 7.4. The physicochemical parameters obtained from fitting breakthrough curves at one sampling well were used to predict those at another well downstream. However, laboratory-determined parameters overpredicted colloid removal. The predicted pattern and timing of biocolloid breakthrough was in agreement with observations, though the data showed a more-disperse breakthrough than expected from modeling, Though clearly not an equilibrium process, retardation involving a dynamic steady state between attachment and detachment was nevertheless a major determinant of transport versus retention of virus in this field experiment.

Keywords: Solute Transport, Sandy Aquifer, Natural-Gradient, Chemical Perturbations, Groundwater-Flow, Adsorption, Virus, Model, Movement, Soils

Notes: highly cited

? Gupta, H.V., Sorooshian, S. and Yapo, P.O. (1998), Toward improved calibration of hydrologic models: Multiple and noncommensurable measures of information. *Water Resources Research*, **34** (4), 751-763.

Full Text: [1998\Wat Res Res34, 751.pdf](1998/Wat%20Res%20Res34,%20751.pdf)

Abstract: Several contributions to the hydrological literature have brought into question the continued usefulness of the classical paradigm for hydrologic model calibration. With the growing popularity of sophisticated "physically based" watershed models (e.g., land-surface hydrology and hydrochemical models) the complexity of the calibration problem has been multiplied many fold. We disagree with the seemingly widespread conviction that the model calibration problem will simply disappear with the availability of more and better field measurements. This paper suggests that the emergence of a new and more powerful model calibration paradigm must include recognition of the inherent multiobjective nature of the problem and must explicitly recognize the role of model error. The results of our preliminary studies are presented. Through an illustrative case study we show that the multiobjective approach is not only practical and relatively simple to implement but can also provide useful information about the limitations of a model.

Keywords: Rainfall-Runoff Models, Multiobjective Parameter-Estimation, Objective Decision-Making, Automatic Calibration, Global Optimization, Catchment Models, Uncertainty, Prediction, Identification, Eutrophication

Walker, M.J., Montemagno, C.D. and Jenkins, M.B. (1998), Source water assessment and nonpoint sources of acutely toxic contaminants: A review of research related to survival and transport of *Cryptosporidium parvum*. *Water Resources Research*, **34** (12), 3383-3392.

Full Text: [1998\Wat Res Res34, 3383.pdf](1998/Wat%20Res%20Res34,%203383.pdf)

Abstract: Amendments to the Safe Drinking Water Act (PL-930123) in 1996 required that public water supply managers identify potential sources of contamination within contributing areas. Nonpoint sources of acutely toxic microbial contaminants, such as *Cryptosporidium parvum*, challenge current approaches to source identification and management as a first step toward developing management plans for public water supply protection. Little may be known about survival and transport in the field environment, prescribed practices may not be designed to manage such substances; acid infective stages may be present in vast numbers and may resist water treatment and disinfection processes. This review summarizes research related to survival and transport of *C. parvum* oocysts, as an example of an acutely toxic contaminant with nonpoint sources in animal agriculture. It discusses (1) significance of infected domesticated animals as potential sources of *C. parvum*, (2) laboratory and field studies of survival and transport, and (3) approaches to source control in the context of public health protection.

Notes: highly cited

? Legates, D.R. and Mccabe, G.J. (1999), Evaluating the use of “goodness-of-fit” measures in hydrologic and hydroclimatic model validation. *Water Resources Research*, **35** (1), 233-241.

Full Text: [1999\Wat Res Res35, 233.pdf](1999/Wat%20Res%20Res35,%20233.pdf)

Abstract: Correlation and correlation-based measures (e.g., the coefficient of determination) have been widely used to evaluate the “goodness-of-fit” of hydrologic and hydroclimatic models. These measures are oversensitive to extreme values (outliers) and are insensitive to additive and proportional differences between model predictions and observations. Because of these limitations, correlation-based measures can indicate that a model is a good predictor, even when it is not. In this paper, useful alternative goodness-of-fit or relative error measures (including the coefficient of efficiency and the index of agreement) that overcome many of the limitations of correlation-based measures are discussed. Modifications to these statistics to aid in interpretation are presented. It is concluded that correlation and correlation-based measures should not be used to assess the goodness-of-fit of a hydrologic or hydroclimatic model and that additional evaluation measures (such as summary statistics and absolute error measures) should supplement model evaluation tools.

Keywords: Bootstrap, Climate-Change, Evaluation, Extreme Values, Jackknife, Model, Models, Predictions, Search, Statistics, Validation

Notes: highly cited

? Western, A.W., Grayson, R.B., Blöschl, G., Willgoose, G.R. and McMahon, T.A. (1999), Observed spatial organization of soil moisture and its relation to terrain indices. *Water Resources Research*, **35** (3), 797-810.

Full Text: [1999\Wat Res Res35, 797.pdf](1999/Wat%20Res%20Res35,%20797.pdf)

Abstract: We analyze the degree of spatial organization of soil moisture and the ability of terrain attributes to predict that organization. By organization we mean systematic spatial variation or consistent spatial patterns. We use 13 observed spatial patterns of soil moisture, each based on over 500 point measurements, from the 10.5 ha Tarrawarra experimental catchment in Australia. The measured soil moisture patterns exhibit a high degree of organization during wet periods owing to surface and subsurface lateral redistribution of water. During dry periods there is little spatial organization. The shape of the distribution function of soil moisture changes seasonally and is influenced by the presence of spatial organization. Generally, it is quite different from the shape of the distribution functions of various topographic indices. A correlation analysis found that In(a), where a is the specific upslope area, was the best univariate spatial predictor of soil moisture for wet conditions and that the potential radiation index was best during dry periods. Combinations of In(a) or In(a/tan(beta)), where beta is the surface slope, and the potential solar radiation index explain up to 61% of the spatial variation of soil moisture during wet periods and up to 22% during dry periods. These combinations explained the majority of the topographically organized component of the spatial variability of soil moisture a posteriori. A scale analysis indicated that indices that represent terrain convergence (such as In(a) or In(a/tan(beta))) explain variability at all scales from 10 m up to the catchment scale and indices that represent the aspect of different hillslopes (such as the potential solar radiation index) explain variability at scales from 80 m to the catchment scale. The implications of these results are discussed in terms of the organizing processes and in terms of the use of terrain attributes in hydrologic modeling and scale studies. A major limitation on the predictive power of terrain indices is the degree of spatial organization present in the soil moisture pattern at the time for which the prediction is made.

Keywords: Surface Saturation, Regularized Spline, Water Content, Catchment, Model, Runoff, Scale, Flow, Interpolation, Variability

Notes: highly cited

? Rodriguez-Iturbe, I. (2000), Ecohydrology: A hydrologic perspective of climate-soil-vegetation dynamics. *Water Resources Research*, **36** (1), 3-9.

Full Text: [2000\Wat Res Res36, 3.pdf](2000/Wat%20Res%20Res36,%203.pdf)

Abstract: The hydrologic mechanisms underlying the climate-soil-vegetation dynamics and thus controlling the most basic ecologic patterns and processes are described as one very exciting research frontier for the years to come. In this personal opinion I have concentrated on those processes where soil moisture is the key link between climate fluctuations and vegetation dynamics in space and time. The soil moisture balance equation at a site is shown to be the keystone of numerous fundamental questions which may be instrumental in the quantitative linkage between hydrologic dynamics and ecological patterns and processes. Some of those questions are outlined here, and possible avenues of attack are suggested. The space-time links between climate, soil, and vegetation are also explored from the hydrologic perspective, and some exciting research perspectives are outlined.

? Saiers, J.E. and Tao, G.J. (2000), Evaluation of continuous distribution models for rate-limited solute adsorption to geologic media. *Water Resources Research*, **36** (7), 1627-1639.

Full Text: [2000\Wat Res Res36, 1627.pdf](2000/Wat%20Res%20Res36,%201627.pdf)

Abstract: We develop two mathematical models for coupled solute transport and nonlinear adsorption to geologic media. Both models quantify nonuniformity in mass transfer rates with parameters that vary according to a gamma (gamma) probability density function. The multisite model, which describes surface-reaction controls on adsorption kinetics, solves equations for a second-order rate law. The adsorption rate coefficient of the kinetics equation is correlated with a gamma-distributed desorption rate coefficient. The mobile-immobile model is based on the assumption that rate limitations are diffusion controlled and account for a gamma distribution in solute exchange rates between zones of mobile and immobile water. Solute adsorption in the immobile zone is quantified with the nonlinear expression for the Langmuir equilibrium isotherm. We test the models against results of column experiments on the transport of hydroxyatrazine (HA), a persistent contaminant produced from the degradation of atrazine. We find that the experimental data are matched more closely by calculations of the multisite model than by calculations of the mobile-immobile model, suggesting that HA adsorption can be understood best as a kinetics reaction with a solid phase composed of binding sites with a broad distribution in adsorption and desorption energies.

Keywords: Scale Mass-Transfer, Porous-Media, Nonequilibrium Sorption, Subsurface Systems, Volatile Organics, Bound Residue, Transport, Soil, Atrazine, Hydroxyatrazine

Notes: highly cited

? Iverson, R.M. (2000), Landslide triggering by rain infiltration. *Water Resources Research*, **36** (7), 1897-1910.

Full Text: [2000\Wat Res Res36, 1897.pdf](2000/Wat%20Res%20Res36,%201897.pdf)

Abstract: Landsliding in response to rainfall involves physical processes that operate on disparate timescales. Relationships between these timescales guide development of a mathematical model that uses reduced forms of Richards equation to evaluate effects of rainfall infiltration on landslide occurrence, timing, depth, and acceleration in diverse situations. The longest pertinent timescale is A/D-0, where D-0, is the maximum hydraulic diffusivity of the soil and A is the catchment area that potentially affects groundwater pressures at a prospective landslide slip surface location with areal coordinates x, y and depth H. Times greater than A/D-0 are necessary for establishment of steady background water pressures that develop at (x, y, H) in response to rainfall averaged over periods that commonly range from days to many decades. These steady groundwater pressures influence the propensity for landsliding at (x, y, H), but they do not trigger slope failure. Failure results from rainfall over a typically shorter timescale H-2/D-0 associated with transient pore pressure transmission during and following storms. Commonly, this timescale ranges from minutes to months. The shortest timescale affecting landslide responses to rainfall is root H/g, where g is the magnitude of gravitational acceleration. Postfailure landslide motion occurs on this timescale, which indicates that the thinnest landslides accelerate most quickly if all other factors are constant. Effects of hydrologic processes on landslide processes across these diverse timescales are encapsulated by a response function, R(t\*) = root t\*/pi exp (-1/t\*) - erfc (1/root t\*), which depends only on normalized time, t\*. Use of R(t\*) in conjunction with topographic data, rainfall intensity and duration information, an infinite-slope failure criterion, and Newton's second law predicts the timing, depth, and acceleration of rainfall-triggered landslides. Data from contrasting landslides that exhibit rapid, shallow motion and slow, deep-seated motion corroborate these predictions.

Keywords: Hydrologic Response, Groundwater-Flow, Slope Stability, Debris Flows, Model, Steep

Notes: highly cited

? McArthur, J.M., Ravenscroft, P., Safiulla, S. and Thirlwall, M.F. (2001), Arsenic in groundwater: Testing pollution mechanisms for sedimentary aquifers in Bangladesh. *Water Resources Research*, **37** (1), 109-117.

Full Text: [2001\Wat Res Res37, 109.pdf](2001/Wat%20Res%20Res37,%20109.pdf)

Abstract: In the deltaic plain of the Ganges-Meghna-Brahmaputra Rivers, arsenic concentrations in groundwater commonly exceed regulatory limits (>50 mug L-1) because FeOOH is microbially reduced and releases its sorbed load of arsenic to groundwater. Neither pyrite oxidation nor competitive exchange with fertilizer phosphate contribute to arsenic pollution. The most intense reduction and so severest pollution is driven by microbial degradation of buried deposits of peat. Concentrations of ammonium up to 23 mg L-1 come from microbial fermentation of buried peat and organic waste in latrines. Concentrations of phosphorus of up to 5 mg L-1 come from the release of sorbed phosphorus when FeOOH is reductively dissolved and from degradation of peat and organic waste from latrines. Calcium and barium in groundwater come from dissolution of detrital land possibly pedogenic) carbonate, while magnesium is supplied by both carbonate dissolution and weathering of mica. The Sr-87/Sr-86 values of dissolved strontium define a two-component mixing trend between monsoonal rainfall (0.711±0.001) and detrital carbonate (<0.735).

Keywords: Aquifers, Arsenic, Bangladesh, Calcium, Carbon, Degradation, Dissolution, Ganges Delta, Geochemistry, Groundwater, Himalayan Rivers, Lacustrine Sediments, Magnesium, Mechanisms, Microbial Degradation, Mineralization, Peat, Phosphate, Phosphorus, Rainfall, Sulfate Reduction, United-States, Water, West-Bengal

Notes: highly cited

? Zhang, L., Dawes, W.R. and Walker, G.R. (2001), Response of mean annual evapotranspiration to vegetation changes at catchment scale. *Water Resources Research*, **37** (3), 701-708.

Full Text: [2001\Wat Res Res37, 701.pdf](2001/Wat%20Res%20Res37,%20701.pdf)

Abstract: It is now well established that forested catchments have higher evapotranspiration than grassed catchments. Thus land use management and rehabilitation strategies will have an impact on catchment water balance and hence water yield and groundwater recharge. The key controls on evapotranspiration are rainfall interception, net radiation, advection, turbulent transport, leaf area, and plant-available water capacity. The relative importance of these factors depends on climate, soil, and vegetation conditions. Results from over 250 catchments worldwide show that for a given forest cover, there is a good relationship between long-term average evapotranspiration and rainfall. From these observations and on the basis of previous theoretical work a simple two-parameter model was developed that relates mean annual evapotranspiration to rainfall, potential evapotranspiration, and plant-available water capacity. The mean absolute error between modeled and measured evapotranspiration was 42 mm or 6.0%; the least squares line through the origin had a slope of 1.00 and a correlation coefficient of 0.96. The model showed potential for a variety of applications including water yield modeling and recharge estimation. The model is a practical tool that can be readily used for assessing the long-term average effect of vegetation changes on catchment evapotranspiration and is scientifically justifiable.

Keywords: Soil-Water Storage, Climate

Notes: highly cited

? Vrugt, J.A., Gupta, H.V., Bouten, W. and Sorooshian, S. (2003), A Shuffled Complex Evolution Metropolis algorithm for optimization and uncertainty assessment of hydrologic model parameters. *Water Resources Research*, **39** (8), Article Number: 1201.

Full Text: [2003\Wat Res Res39, 1201.pdf](2003/Wat%20Res%20Res39,%201201.pdf)

Abstract: Markov Chain Monte Carlo (MCMC) methods have become increasingly popular for estimating the posterior probability distribution of parameters in hydrologic models. However, MCMC methods require the a priori definition of a proposal or sampling distribution, which determines the explorative capabilities and efficiency of the sampler and therefore the statistical properties of the Markov Chain and its rate of convergence. In this paper we present an MCMC sampler entitled the Shuffled Complex Evolution Metropolis algorithm (SCEM-UA), which is well suited to infer the posterior distribution of hydrologic model parameters. The SCEM-UA algorithm is a modified version of the original SCE-UA global optimization algorithm developed by Duan et al. [1992]. The SCEM-UA algorithm operates by merging the strengths of the Metropolis algorithm, controlled random search, competitive evolution, and complex shuffling in order to continuously update the proposal distribution and evolve the sampler to the posterior target distribution. Three case studies demonstrate that the adaptive capability of the SCEM-UA algorithm significantly reduces the number of model simulations needed to infer the posterior distribution of the parameters when compared with the traditional Metropolis-Hastings samplers.

Keywords: Parameter Optimization, Uncertainty Assessment, Markov Chain Monte Carlo, Automatic Calibration, Proposal Distribution, Hydrologic Models, Rainfall-Runoff Models, Global Optimization, Monte-Carlo, Automatic Calibration, Catchment Models, Information, Convergence, Prediction, Hastings

Notes: highly cited

? Bowen, G.J. and Revenaugh, J. (2003), Interpolating the isotopic composition of modern meteoric precipitation. *Water Resources Research*, **39** (10), Article Number: 1299.

Full Text: [2003\Wat Res Res39, 1299.pdf](2003/Wat%20Res%20Res39,%201299.pdf)

Abstract: An accurate representation of the spatial distribution of stable hydrogen and oxygen isotopes in modern precipitation is required for many hydrological, paleoclimate, and ecological applications. No standardized method for achieving such a representation exists, and potential errors associated with previously employed methods are not understood. Using resampling, we test the accuracy of interpolated deltaD and delta(18)O estimates made using four methods. Prediction error for all methods is strongly related to number of data and will likely decline with the addition of new data. The best method lowers estimation error by 10-15% relative to others tested and gives an average error, using all available data, approximate to2.5% of the global range. We present and interpret global maps of interpolated deltaD, delta(18)O, and deuterium excess in precipitation and the 95% confidence intervals for these values created using the optimal method. These depict global and regional patterns, make evident the robustness of interpolated isotopic patterns, and highlight target areas for future precipitation sampling.

Keywords: Oxygen, Deuterium, Hydrogen, Stable Isotopes, Meteoric Water, Maps, Atmospheric Circulation, Late Quaternary, Climate, Water, Delta-O-18, Holocene, Patterns, Minerals, America, Records

? Turner, N.B., Ryan, J.N. and Saiers, J.E. (2006), Effect of desorption kinetics on colloid-facilitated transport of contaminants: Cesium, strontium, and illite colloids. *Water Resources Research*, **42** (12), Art. No. W12S09.

Full Text: [2006\Wat Res Res42, W12S09.pdf](2006/Wat%20Res%20Res42,%20W12S09.pdf)

Abstract: [1] To examine the importance of desorption kinetics to colloid-facilitated transport, we conducted column experiments comparing the transport of cesium and strontium through a saturated quartz sand porous medium in the absence and presence of illite colloids at two ionic strengths. Because cesium desorption from illite was anticipated to be slower than that of strontium, we expected to see a contrast in the colloid-facilitated transport of the cations. A model of colloid-facilitated transport accounting for second-order cation adsorption to and desorption from the quartz, second-order cation adsorption to and desorption from fast and slow sites on the illite colloids, and second-order colloid deposition to and release from the quartz accurately simulated the cation transport in the absence and presence of the illite colloids. The column results and model simulations revealed that cesium desorption was indeed slower than strontium desorption and that this contrast in desorption kinetics resulted in greater colloid-facilitated transport of the cesium. The desorption of both cations was slow relative to the rate of advection. The fast and slow sites on the illite colloids behaved like planar and frayed edge sites typically identified for cesium adsorption to illite. The amount of cesium adsorbed to the slow, or frayed edge, sites was similar to the frayed edge site density of illite estimated by other researchers.

Keywords: Adsorption, Cation-Exchange Model, Density, Distribution Coefficients, Fractured Rock, Grimsel Test-Site, Hanford Site, Kinetics, Metal-Ion Sorption, Model, Nevada Test-Site, Porous-Media, Radionuclide Transport, Strengths, Subsurface Sediments

? Chaudhuri, A. and Sekhar, M. (2007), Stochastic finite element method for analysis of transport of nonlinearly sorbing solutes in three-dimensional heterogeneous porous media. *Water Resources Research*, **43** (7), Art. No. W07442.

Full Text: [2007\Wat Res Res43, W07442.pdf](2007/Wat%20Res%20Res43,%20W07442.pdf)

Abstract: [1] The probabilistic analysis by Monte Carlo simulation method (MCSM) for the transport of nonlinear reactive solutes in a three-dimensional heterogeneous porous medium is a computationally prohibitive task. For linear transport problems, the perturbation-based stochastic finite element method (SFEM) has been found to be computationally efficient with acceptable accuracy. This provides a motivation to develop the SFEM for the nonlinear reactive solute transport. In the present study, SFEM is developed for the transport of equilibrium nonlinear sorbing solutes, which follow the Langmuir-Freundlich isotherm. This method produces a second-order accurate mean and a first-order accurate standard deviation of concentration. In this study, the governing medium propertis viz. hydraulic conductivity, dispersivity, molecular diffusion, porosity, sorption, and decay coefficients are considered to vary randomly in space. The performance of SFEM is compared to MCSM for both one-and three-dimensional transport problems. The mean and the standard deviation of concentration for various test cases obtained with the SFEM compares well for the mild heterogeneity cases (standard deviation of log hydraulic conductivity less than 0.85) tested. SFEM produces a sharp front for the mean and the standard deviation of concentration while fronts obtained by MCSM are found to be dispersive. The error associated with the results obtained by SFEM is sensitive to the boundary conditions, the size of the domain, and the plume size. For a higher nonlinearity of sorption isotherm, the prediction uncertainty is higher. The pattern of the statistical moments of concentration is similar for cases with different correlation lengths of the parameters.

Keywords: Accuracy, Adsorbing Solute, Analysis, Aquifers, Biodegradation, Boundary Conditions, Coefficients, Concentration, Conductivity, Correlation, Decay, Diffusion, Dispersivity, Equilibrium, Finite Element, Finite Element Method, First Order, Front, Heterogeneity, Heterogeneous, Hydraulic Conductivity, Isotherm, Langmuir-Freundlich, Langmuir-Freundlich Isotherm, Linear, Localized Analyses, Media, Monte Carlo, Monte Carlo Simulation, Monte-Carlo, Motivation, Nonlinear, Nonlinearity, Parameters, Performance, Plume, Porosity, Porous, Porous Media, Porous Medium, Prediction, Reactive Solute, Reactive Solute Transport, Second Order, Simulation, Size, Solute Transport, Solutes, Sorption, Sorption Isotherm, Standard, Steady-State Flow, Stochastic, Test, Three-Dimensional, Transport, Uncertainty

# Title: Water SA

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Full Journal Title: [Water SA](http://www.scielo.org.za/scielo.php?script=sci_issues&pid=1816-7950&lng=en&nrm=iso); [Water SA](http://www.journals.co.za/ej/ejour_waters.html)

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? Ekama, G.A. and Marais, G.V.R. (1978), Adsorption in activated sludge process. *Water SA*, **4** (1), 39-48.

Full Text: [1960-80\Wat SA4, 39.pdf](1960-80/Wat%20SA4,%2039.pdf)

Abstract: Investigations into the phenomenon of storage of substrate in the activated sludge process indicate that this phase is preceded by an adsorption phase, which requires the expenditure of energy. Incorporation of the adsorption mechanism into the general model of the activated sludge process by Ekama and Marais (1977) allowed the reinstatement in their model of the widely accepted Monod formulation for nitrification. Application of the modified model to processes with imposed dynamic loading conditions operated at long and short sludge ages gave improved predictions of the process response variables, i.e. oxygen consumption rate, effluent total Kjeldahl nitrogen (TKN) and nitrate concentrations.

? Ekama, G.A. and Marais, G.V.R. (1979), Adsorption in the activated sludge process - Reply. *Water SA*, **5** (1), 57-60.

Full Text: 1979\Water SA5, 57.pdf

? Fox, V.G. (1979), Letter to the editor with regard to the paper adsorption in the activated sludge process. *Water SA*, **5** (1), 57.

Full Text: [1960-80\Wat SA5, 57.pdf](1960-80/Wat%20SA5,%2057.pdf)

? Saucedo, I., Guibal, E., Roussy, J., Roulph, C. and Le Cloirec, P. (1993), Uranium sorption by glutamate glucan: A modified chitosan. Part I. Equilibrium studies. *Water SA*, **19** (2), 113-118.

Full Text: [1993\Wat SA19, 113.pdf](1993/Wat%20SA19,%20113.pdf)

Abstract: Chitosan, a natural polymer, is modified by an oxo-2-glutaric acid substitution and a subsequent reduction to form glutamate glucan. This modified chitosan is then used to examine uranium sorption. The main parameters that play an important part in sorption mechanisms are the pH and the total metal concentration. Other parameters such as temperature, agitation and particle size of the sorbent show a restricted effect on the sorption equilibrium.The maximum uptake capacity, obtained at pH 5 to 6, reaches approximately 500 mgU, g. At pH 5, a sorption monolayer is predominant; at higher pH, the sorption becomes more complicated. A surface precipitation model of uranium sorption is proposed.

Keywords: Adsorption, Ascorbic-Acid, Chitosan, Glutamate Glucan, Metal, Particle Size, Reduction, Sorption, Temperature, Uranium, Water

? Guibal, E., Saucedo, I., Roussy, J., Roulph, C. and Le Cloirec, P. (1993), Uranium sorption by glutamate glucan: A modified chitosan. Part II. Kinetic studies. *Water SA*, **19** (2), 119-126.

Full Text: [1993\Wat SA19, 119.pdf](1993/Wat%20SA19,%20119.pdf)

Abstract: The kinetics of uranium sorption by glutamate glucan, a modified chitosan polymer, were studied. The effects of the particle size of sorbent, pH, metal concentration, temperature and agitation were investigated. Diffusion mechanisms were predominant in rate-controlling steps: external mass transfer seemed to have a restricted effect on kinetic behaviour, on the other hand intraparticle diffusion was the main resistance model. Metal concentration, pH and particle size of the polymer were the major parameters, showing a great effect on the rate ratio of the intraparticle diffusion model and on diffusion coefficient D’i, whose value varied between 1,5 and 36×10-12 m2, min.

Keywords: Activated Carbon, Adsorbents, Adsorption, Chitosan, Diffusion, Functional Polymers, Glutamate Glucan, Highly Phosphorylated Derivatives, Kinetics, Metal, Partially Deacetylated Chitin, Particle Size, Removal, Sorption, Temperature, Uranium, Water

Gaid, A., Kaoua, F., Mederres, N. and Khodjsa, M. (1994), Surface mass transfer processes using activated date pits as adsorbent. *Water SA*, **20** (4), 273-278.

Full Text: [1994\Wat SA20, 273.pdf](1994/Wat%20SA20,%20273.pdf)

Abstract: The factors affecting the initial rate of adsorption of some organic compounds onto activated date pits, have been investigated in detail. Phenol, aniline, Methylene Blue, procion red and humic substances were employed to test this adsorbent.

The applicability of the Langmuir isotherm for the present system has been tested and the surface mass transfer coefficient and the surface diffusion coefficient at 20-degrees-C determined. The kinetics of adsorption indicates that the process is diffusion controlled.

Keywords: Removal, Adsorption, Carbon, Dye

Notes: highly cited

? Carliell, C.M., Barclay, S.J., Naidoo, N., Buckley, C.A., Mulholland, D.A. and Senior, E. (1995), Microbial decolorization of a reactive azo dye under anaerobic conditions. *Water SA*, **21** (1), 61-69.

Full Text: [1995\Wat SA21, 61.pdf](1995/Wat%20SA21,%2061.pdf)

Abstract: Water-soluble azo dyes are used extensively in the textile industry and are known to be problematic with respect to the removal of colour from textile waste waters. Under anaerobic conditions azo dyes can be utilised as terminal electron acceptors in microbial respiration, and are reduced and decolourised concurrently with re-oxidation of reduced flavin nucleotides. The microbial decolourisation of an azo dye (C.I. Reactive Red 141) was investigated with respect to the kinetic order of azo reduction and rate-controlling factors of the reaction. Decolourisation of C.I. Reactive Red 141 was found to be first order with respect to dye concentration, although increasing the initial dye concentration in the serum bottles resulted in decreasing k values of -0.441/h (100 mg/l of C.I. Reactive Red 141), -0.316/h (150 mg/l) and -0.252/h (200 mg/l). The presence of labile carbon in the anaerobic systems was found to be essential in order to obtain an acceptable rate of decolourisation. The k value obtained for decolourisation of the azo dye without a supplemental carbon source (glucose) was -0.012/h, in comparison to a k value of -0.441/h when supplemented with glucose (1 g/l). The presence of nitrate in the anaerobic system was found to inhibit decolourisation, while the presence of sulphate was found to have no discernible effect on the rate of decolourisation. A low redox potential (-450 to -500 mV) was found to be conducive to rapid decolourisation of C.I. Reactive Red 141. AC.I. Reactive Red 141 degradation product was positively identified as 2-aminonaphthalene-1,5-disulphonic acid, confirming that azo reduction was responsible for decolourisation of the azo dye. A toxicity assay was performed which showed that C.I. Reactive Red 141 was inhibitory to the anaerobic microbial community at concentrations > 100 mg/l, but that prior exposure of the biomass to the dye increased the resistance to previously inhibitory dye concentrations.

Keywords: Growth-Inhibition, Bacillus-Subtilis, Basic-Dyes, Reduction, Degradation

? Guibal, E., Roussy, J. and Le Cloirec, P. (1996), Photochemical reaction of uranium with glucosamine, acetylglucosamine and related polymers: Chitin and chitosan. *Water SA*, **22** (1), 19-26.

Full Text: [1996\Wat SA22, 19.pdf](1996/Wat%20SA22,%2019.pdf)

Abstract: Uranyl ions can interact with amino-ligands and polymers such as chitin and chitosan by complexation and adsorption. This reaction can be affected by certain circumstances, such as a direct exposure to visible light, to give photoreactions. Among the main photoreduction mechanisms, sensitised photoactivation (SP) and charge transfer to mass (CTTM) are thought to explain the various responses obtained under several experimental conditions, where the nature of the ligand and the aerobic or anaerobic media are all changed. It seems that a preliminary complexation of uranium by ligand is required to optimise the reduction rate. The pH of the solution is significantly affected by the photoreaction, depending on the experimental procedure, and a precipitate appears after a duration. Elemental analysis and infra-red studies enable the structure of the precipitates to be determined as dihydrated uranate forms.

Keywords: Adsorption, Biosorption, Chitosan, Glutamate Glucan, Mechanism, pH, Photo-Oxidation, Photoreduction, Reduction, Sorption, Uranyl Ions, Water

Sharma, D.C. and Forster, C.F. (1996), Removal of hexavalent chromium from aqueous solutions by granular activated carbon. *Water SA*, **22** (2), 153-160.

Full Text: [1996\Wat SA22, 153.pdf](1996/Wat%20SA22,%20153.pdf)

Abstract: Batch absorption trials were used to assess the effectiveness of using activated carbon as a sorbent for the removal of hexavalent chromium from solution. The results show that, although the pH for maximum efficiency varied slightly with the concentration of Cr(VI) being applied, the most effective pH was in the range 2.5 to 3.0. Based on linear regression analysis, the data obtained from the batch studies showed a good compliance with both the Langmuir and the Freundlich equations. The values obtained for the isotherm constants showed that the maximum adsorption capacity. Xm, was 145 mg/g. An examination of the adsorption kinetics was also made and an analysis of the data shows that pore diffusion is not the only factor governing the sorption rate.

Keywords: Peat, Moss

Ho, Y.S., Wase, D.A.J. and Forster, C.F. (1996), Removal of lead ions from aqueous solution using sphagnum moss peat as adsorbent. *Water SA*, **22** (3), 219-224.

Full Text: [1996\Wat SA22, 219.pdf](1996/Wat%20SA22,%20219.pdf)

Abstract: The use of sphagnum moss peat for the removal of lead from aqueous solution has been studied in batch experiments. Investigations include the effect of pH and temperature and kinetics of adsorption. The adsorption equilibria data were found to follow Langmuir models. It was found that the efficiency of lead removal using sphagnum moss peat as adsorbent depended very little either on the reaction temperatures (10 to 40°C) or on the initial pH values (4.0 to 6.0). Kinetic data suggested that the adsorption process was endothermic and pore diffusion was not the only rate-determining step.

Keywords: Cross-Flow Microfiltration, Heavy-Metals, Adsorption, Effluents, Waste, Clay

Grebenyuk, V.D., Linkov, N.A. and Linkov, V.M. (1998), Removal of Ni and Cu ions from aqueous solutions by means of a hybrid electrosorption/electrodialysis process. *Water SA*, **24** (2), 123-127.

Full Text: [1998\Wat SA24, 123.pdf](1998/Wat%20SA24,%20123.pdf)

Abstract: The hybrid adsorption/electrodialysis process was shown to be effective in the removal of Ni Cu ions from aqueous solutions imitating electroplating effluents. Adsorption of the ions on the cation-exchange and amphoteric resins packed in the desalination compartment of the electrodialysis cell with (electrosorption) with without the influence of electrical current was studied. In the case of the ion-saturation operation carried out before the electrosorption process, no direct relationship between the type of resin and the ion-removal efficiency was found; the process performance was affected by over-equivalent adsorption resulting from electrochemical reactions taking place in the boundary layer between the resin and the solution. Under the influence of electrical current as high as sixfold higher metal ion extraction than in a conventional adsorption process was observed. The presence of ion-exchange resins in the desalination compartment also affected the performance of ion-exchange membranes used in the cell. The method was found more applicable to Cu containing solutions.

Keywords: Electrodialysis, Separation

Atkinson, B.W., Bux, F. and Kasan, H.C. (1998), Considerations for application of biosorption technology to remediate metal-contaminated industrial effluents. *Water SA*, 24 (2), 123-127.

Full Text: [1998\Wat SA24, 129.pdf](1998/Wat%20SA24,%20129.pdf)

Abstract: Inorganic contaminants present in waste streams may be removed by one of three methods, viz. physical, chemical or biological. Chemical and physical techniques have traditionally been employed to remediate such streams. However, due to the crisis of rapidly deteriorating potable water quality, legislation governing the levels of contaminants is becoming progressively stricter. Therefore, alternative methods for treatment have been investigated. Biosorption technology, utilising any natural form of biomass to passively adsorb and immobilise solubilised heavy metals or radionuclides, offers such an alternative. However, the technology needs to effectively compete both on a cost and performance basis with existing methods before industry will accept and implement it. A pilot-plant feasibility study, using waste activated sludge to bioremediate a metal plating effluent, showed that the currently used method of chemical precipitation is more cost-effective. This paper describes the factors that must be considered when selecting bioremediation as a cleanup technology for inorganics.

Ning, Z., Kennedy, K.J. and Fernandes, L. (1998), pH dependency of 2,4-chlorophenol dechlorination by acclimated anaerobic granules. *Water SA*, **24** (2), 1153-1156.

Full Text: [1998\Wat SA24, 1153.pdf](1998/Wat%20SA24,%201153.pdf)

Abstract: The pH dependency of anaerobic dechlorination of 2,4-dichlorophenol by acclimated anaerobic granules was investigated. The results showed that the dechlorination could be performed by these granules at a wide pH range of 6.8 to 7.9, but dechlorination rate increased as pH value went up. The data analysis considering the effect of sorption indicated that the increase of the dechlorination rate was due to pH dependence of metabolic activity of the acclimated anaerobic granules.

Notes: highly cited

Quek, S.Y., Wase, D.A.J. and Forster, C.F. (1998), The use of sago waste for the sorption of lead and copper. *Water SA*, **24** (3), 251-256.

Full Text: [1998\Wat SA24, 251.pdf](1998/Wat%20SA24,%20251.pdf)

Abstract: Sago processing waste, which is both a waste and a pollutant, was used to adsorb lead and copper ions from solution. The sorption process was examined in terms of it equilibria and its kinetics. The effect of pH, contact time, sorbate concentration, particle size and sorbent mass were also studied. The most effective pH range was found to be 4 to 5.5 for both metals. The equilibrium data for both metals fitted both the Langmuir and the Freundlich models and, based on the Langmuir constants, the sage waste had a greater sorption capacity for lead (46.6 mg/g) than for copper (12.4 mg/g) The kinetic studies showed that the sorption rates could be described better by a second-order expression than by the more commonly applied Lagergren equation.

Keywords: Sphagnum Moss Peat, Aqueous-Solution, Removal, Adsorption, Ions, Adsorbent, Cadmium, Water

Srinivasan, P.T., Viraraghavan, T. and Subramanian, K.S. (1999), Aluminium in drinking water: An overview. *Water SA*, **25** (1), 47-55.

Full Text: [1999\Wat SA25, 47.pdf](1999/Wat%20SA25,%2047.pdf)

Abstract: Aluminium (Al) is one of the trace inorganic metals present in drinking water. In addition to the naturally occurring Al in raw waters, use of Al-based coagulants especially Al2(SO4)3 (alum) often leads to an increase in treated water Al concentrations. A high (3.6 to 6 mg/l) concentration of Al may precipitate as aluminium hydroxide giving rise to consumer complaints. Al is also a suspected causative agent of neurological disorders such as Alzheimer’s disease and presenile dementia. During conventional water treatment processes, Al undergoes various transformations (also called ‘speciation’ of Al) which are influenced by factors such as pH, turbidity, temperature of water source, and the organic and inorganic ligands present in water. Chemical precipitation, reverse osmosis, electrodialysis and cation exchange methods are efficient in AI removal from water. This paper gives an overview of the presence of Al in drinking water with reference to its speciation, removal (treatment methods), water supply and health problems, and the regulation of its levels in drinking water.

Keywords: Aqueous Aluminum

? Lahav, O. and Green, M. (2000), Bioregenerated ion-exchange process: The effect of the biofilm on ion-exchange capacity and kinetics. *Water SA*, **26** (1), 51-57.

Full Text: [2000\Wat SA26, 51.pdf](2000/Wat%20SA26,%2051.pdf)

Abstract: A new process for ammonium removal from wastewater using zeolite has been developed. The zeolite (chabazite) serves the dual purpose of an ion exchanger and a physical carrier for nitrifying bacteria which bio-regenerate the ammonium-saturated mineral. The entire process is carried out in a single, compact reactor and takes place in two phases: ion-exchange phase and bioregeneration phase.

This paper describes the effects of the biofilm on ion-exchange capacity and kinetics. Batch and continuous experiments showed a reduction of about 25 to 30% in the ion-exchange rate in biofilm covered chabazite as compared to virgin chabazite, while the ion-exchange capacity did not change. Experiments conducted indicated that the rate-controlling step for ion exchange shifted from pore diffusion in the virgin chabazite to dim diffusion in the biofilm-covered chabazite. The diffusion rate of NH4+ inside biofilms is of the same order of magnitude as diffusion rate of NH4+ in water and 3 to 4 orders of magnitude greater than typical pore diffusion rates reported in zeolites. Therefore, the biofilm coverage of the chabazite was originally not expected to affect the ion-exchange rate. In addition, chemical precipitation a as experimentally found not to be the cause for the ion-exchange rate reduction.

It was hypothesised that the rate-limiting factor for ion exchange was caused by the part of the biofilm adjacent to the chabazite which differs from the rest of the biofilm and is characterised by a much higher density which impedes diffusion.

Yan, G.Y. and Viraraghavan, T. (2000), Effect of pretreatment on the bioadsorption of heavy metals on *Mucor rouxii*. *Water SA*, **26** (1), 119-123.

Full Text: [2000\Wat SA26, 119.pdf](2000/Wat%20SA26,%20119.pdf)

Abstract: Different chemicals were used to study the effect of pretreatment of *Mucor rouxii* biomass on bioadsorption of Pb2+. Cd2+; Ni2+; and Zn2+. Pretreatment with detergent and alkali chemicals such as NaOH, Na2CO3, and NaHCO3, were found to improve or maintain the bioadsorption capacity in comparison with live *M. rouxii* biomass. Acid pretreatment using HCl, H2SO4 and C2H4O2 resulted in a significant reduction in the bioadsorption capacity. Pretreatment using CaCl2 and NaCl slightly reduced the bioadsorption capacity. All the pretreatment methods resulted in a reduction in biomass in comparison with autoclaved biomass. In addition, *M. rouxii* biomass pretreated with chemicals without autoclaving was still viable, even after boiling. To improve the bioadsorption capacity for metal ions by dead biomass, alkali pretreatment is an effective method, but the loss of biomass after the pretreatment should be taken into consideration while assessing the bioadsorption performance.

Keywords: Dilute Aqueous-Solutions, *Aspergillus-Niger*, Biosorption, Biomass, Removal, pH, Wastewaters, Mechanisms, Biosorbent, Recovery

Woolard, C.D., Petrus, K. and van der Horst, M. (2000), The use of a modified fly ash as an adsorbent for lead. *Water SA*, **26** (4), 531-536.

Full Text: [2000\Wat SA26, 531.pdf](2000/Wat%20SA26,%20531.pdf)

Abstract: Coal fly ash was modified by hydrothermal treatment with NaOH solutions of varying concentrations. During the modification the zeolites, NaP1 and hydroxysodalite, were synthesised. Increasing base concentration led to hydroxysodalite being the preferred product. Elemental analysis revealed that the modification treatment preferentially leached Si from the fly ash at low base concentrations. Elevated base concentrations, however, resulted in Al being leached as well as the inclusion of Na in the zeolite product. The modification activated the fly ash significantly with respect to specific surface area (SSA) and cation exchange capacity (CEC). SSA increased from 1.0 m2.g-1 to a maximum of 62.7 m2.g-1 while CEC rose from 25 mmol/100 g to a maximum of 300 mmol/100g. Metal sorption studies were performed with lead as the metal choice. Adsorption experiments at pH = 5, revealed that all modified ash samples adsorbed significantly more Pb than the raw ash. The best adsorption was obtained for ash, modified with 3M NaOH. 3M NaOH-modified ash also proved the most effective sorbent when adsorption was determined as a function of pH.

Keywords: Zeolite, Removal, Ions, Clay, Peat

Notes: highly cited

Schmuhl, R., Krieg, H.M. and Keizer, K. (2001), Adsorption of Cu(II) and Cr(VI) ions by chitosan: Kinetics and equilibrium studies. *Water SA*, **27** (1), 1-7.

Full Text: [2001\Wat SA27, 1.pdf](2001/Wat%20SA27,%201.pdf)

Abstract: The ability of chitosan as an adsorbent for Cu(II) and Cr(VI) ions in aqueous solution was studied. The experiments were done as batch processes. Equilibrium studies were done on both cross-linked and non-cross-linked chitosan for both metals. Cr(VI) adsorption behaviour could be described using the Langmuir isotherm over the whole concentration range of 10 to 1000 mg.l-1 Cr. The maximum adsorption capacity for both types of chitosan was found to be 78 mg.l-1 for the non-cross-linked chitosan and 50 mg.l-1 for the cross-linked chitosan for the Cr(VI) removal. For the Cu(II) removal the Freundlich isotherm described the experimental data over the whole concentration range of 10 to 1000 mg.l-1 Cu(II). The maximum adsorption capacity for both types of chitosan can be estimated to be greater than 80 mg.l-1. Cr(VI) removal was the highest at pH 5 but pH did not have a large influence on Cu(II). From these results it is clear that the adsorption of heavy metals is possible with chitosan, but that with this method, end concentrations of below 1 mg.l-1 can hardly be obtained.

Keywords: Metal-Ions, Recovery, Sorption, Chitin

Jaafari, K., Elmaleh, S., Coma, J. and Benkhouja, K. (2001), Equilibrium and kinetics of nitrate removal by protonated cross-linked chitosan. *Water SA*, **27** (1), 9-13.

Full Text: [2001\Wat SA27, 9.pdf](2001/Wat%20SA27,%209.pdf)

Abstract: Nitrate, contained in surface or groundwater, can be removed by sorption on protonated cross-linked chitosan gel beads. The sorption capacity iu pH-dependent and large enough to meet the standard of drinkable water. The isothermal equilibrium curves are straight lines, which implies that the removal is independent of the initial concentration. The main reactive process, which probably depends on the secondary ammonium groups, involves the total bead volume and not only its surface. If required, the sorption capacity is easily recovered by increasing the pH to 12. The main competitor is fluoride but, even in its presence the sorption capacity of nitrate remains significant. The sorption kinetics, which can be represented by a mass transfer equation, is not limited by pore or by film diffusion.

Keywords: Adsorption, Acid

Çeribasi, I.H. and Yetis, Ü. (2001), Iosorption of Ni(II) and Pb(II) by Phanerochaete chrysosporium from a binary metal system: Kinetics. *Water SA*, **27** (1), 15-20.

Full Text: [2001\Wat SA27, 15.pdf](2001/Wat%20SA27,%2015.pdf)

Abstract: The biosorption kinetics of Ni(II) and Pb(II) by the resting cells of a lignolytic white-rot fungus, Phanerochaete chrysosporium. from a binary metal system were investigated. Kinetic studies revealed that biosorption takes place in two stages: a rapid surface adsorption, within the first 30 min, and a slow intracellular diffusion till the end of the 3 h contact time. In the first minutes of contact solution pH decreased sharply, parallel to the fast metal uptake, probably because of the protons released by the biosorbent. As sorption equilibrium was reached, solution pH also reached an equilibrium level. Metal biosorption capacities increased as the initial metal concentrations (Ci) increased. independent of initial pH (pHi) and generally the metal with higher Ci had a higher uptake capacity. The results also show that some portion of the metal. ions sorbed by P. chrysosporium was readily released to solution with a decrease in pH. At equilibrium, the maximum total metal uptake of P. chrysosporium was 109.5 mg/g and was reached at pHi 5. Under these circumstances Ni(II) and Pb(II) uptake capacities were 55.9 mg Ni/g and 53.6 mg Pb/g, respectively.

Keywords: Heavy-Metals, *Saccharomyces-Cerevisiae*, Aqueous-Solutions, Removal, Biomass, Mechanisms, Adsorption, Effluents, Recovery, Copper

? Contreras, E., Bertola, N. and Zaritzky, N. (2001), The application of different techniques to determine activated sludge kinetic parameters in a food industry wastewater. *Water SA*, **27** (2), 169-176.

Full Text: [2001\Wat SA27, 169.pdf](2001/Wat%20SA27,%20169.pdf)

Abstract: In the present work, a continuous-feed system under steady state conditions (classical method) and a respirometric technique based on oxygen consumption measurements, were used to compare microbial parameters using a wastewater model system of a potato processing plant. The effects of the operating conditions in the continuous aerobic reactor on microbial growth and nora composition were also analysed.

Continuous-feed experiments allowed for the calculation of the following biodegradation parameters. maximum substrate consumption specific rate (q(Smax)) = 0.19 mgCOD (mgVSS)-1.h-1, saturation constant (Ks) = 8.3 mgCOD.t(1), biomass yield (Y-X/S) = 0.61 mgVSS (mgCOD) -1, biomass decay constant (kd) = 0.04.h-1 and maximum oxygen consumption specific rate (q(O2max)) = 0.03 mgCOD (mgVSS) -1.h-1.

The respirometric technique als allowed for the calculation of kinetic parameters. However. these parameters depended on dilution rate (D) and/or on dissolved oxygen concentration (DO). Values of q(O2max) and Ks increased with D; q(O2max) ranged between 0.05 and 0.13 mgO(2) (mgVSS) -1.h-1 and Ks between 2 and 26 mgCOD.t(1) for D values varying between 0.01 and 0.15.h-1.

Microscope observations showed that sludge composition was a function of dilution rate. Low D values (low soluble organic matter (Ss) and high DO concentrations) yielded sludges mainly formed by floc-forming bacteria: high D values (high Ss and low DO concentrations) yielded sludges mainly formed by filamentous micro-organisms.

Since the low substrate/biomass ratios used in the respirometric method limit the growth of micro-organisms maintaining the initial physiological state of the original biomass, the observed differences in the respirometric parameters reflected the actual microbial composition.

Keywords: Filamentous Organism Bulking, Model System, Storage, Biodegradability, Nitrification, Water

Dilek, F.B. and Bese, S. (2001), Treatment of pulping effluents by using alum and clay: Colour removal and sludge characteristics. *Water SA*, **27** (3), 361-366.

Full Text: [2001\Wat SA27, 361.pdf](2001/Wat%20SA27,%20361.pdf)

Abstract: The effect of clay addition during alum coagulation, on the removal of colour from pulp-and-paper industry wastewaters, was investigated. Four types of clay, namely beige-and brown-sepiolites, calcium- and sodium-bentonites of different mesh sizes were used, Different quantities of alum and clay were applied, either singly or in combination, to the effluents of the wood-based pulp-and-paper mill. Colour of the treated wastewater, the sludge volume index (SVI) and sludge cake resistance (SCR) of the sludge produced were monitored. It was observed that the clays tested were not efficient in colour removal when they were applied on their own. When clay was added along with alum, a certain increase in colour removal efficiency was obtained as compared to alum alone. When alum was used in conjunction with clay, settling characteristics of the sludge produced improved substantially, in terms of both SVI and SCR. Acid activation of the clays did not improve the colour removal efficiency further. However, acid activation of sodium bentonite caused the SVI and SCR values to improve considerably compared to virgin sodium bentonite. Use of different, mesh sizes of clays did not exert any significant effect on the colour removal. However, it did exert significant effects on SVI and SCR values as such that the increase in mesh size caused the SVI values to decrease and the SCR values to increase.

Keywords: Kraft

Darbi, A., Viraraghavan, T., Butler, R. and Corkal, D. (2002), Batch studies on nitrate removal from potable water. *Water SA*, **28** (3), 319-322.

Full Text: [2002\Water SA28, 319.pdf](2002/Water%20SA28,%20319.pdf)

Abstract: A sulphur/lime stone autotrophic denitrification process was used to achieve the biological removal of nitrate from groundwater. The feasibility of the system was evaluated under anaerobic conditions using laboratory scale batch reactors. The optimum sulphur/limestone ratio was determined to be 1.1 (wt/wt). Different initial nitrate-nitrogen concentrations (94, 57, and 10 mg.NO3 N/l) were used during the batch tests to examine nitrate removal efficiencies. The results showed that the higher the initial concentration, the longer it takes before nitrate removal commences. Both total suspended solid (TSS) and mean size of particles increased with time, which may be related to bacterial growth in the system.

Keywords: Autotrophic Denitrification, Drinking-Water, Sulfur

Krishnan, K.A. and Anirudhan, T.S. (2003), Removal of cadmium(II) from aqueous solutions by steam-activated sulphurised carbon prepared from sugar-cane bagasse pith: Kinetics and equilibrium studies. *Water SA*, **29** (2), 147-156.

Full Text: [2003\Wat SA29, 147.pdf](2003/Wat%20SA29,%20147.pdf)

Abstract: Removal of cadmium(II) from aqueous solutions was studied using steam activated sulphurised carbon (SA-S-C) prepared from bagasse pith (a sugar-cane industry waste). Batch adsorption experiments were performed as a function of solute concentration, contact time, adsorbent dose, pH, temperature and ionic strength. The maximum removal took place in the pH range of 5.0 to 9.0. The maximum adsorption of 98.8 % (24.70 mg/g) took place by SA-S-C with 8.9 % sulphur content at pH 6.0 from an initial Cd(II) concentration of 50 mg/dM3. The sorption process follows pseudo-second-order kinetics. Kinetic parameters as a function of initial concentration and temperature were determined to predict the adsorption behaviour of Cd(II) onto SA-S-C. Decrease in ionic strength of the solution was found to improve the adsorption capacity of the adsorbent. The equilibrium data could be best fitted by the Langmuir adsorption isotherm equation over the entire concentration range (50 to 1000 mg/dm3). The effectiveness of the SA-S-C for Cd(II) removal was examined and compared with other adsorbents reported in the literature, At solution pH of 6.0, the maximum adsorption capacity of SA-S-C calculated by the Langmuir isotherm is 149.93 mg/g at 30degreesC. Acid regeneration was tried for several cycles with a view to recover the sorbed metal ions and also to restore the sorbent to its original state.

Keywords: Adsorption Dynamics, Langmuir Equation, Cd(II) Removal, Sulphurised Carbon, Desorption, Waste-Water, Metal-Ions, Coconut Husk, Adsorption, Sorption, Cd(II), Peat, Lead, Mercury

Thirunavukkarasu, O.S., Viraraghavan, T. and Subramanian, K.S. (2003), Arsenic removal from drinking water using granular ferric hydroxide. *Water SA*, **29** (2), 161-170.

Full Text: [2003\Wat SA29, 161.pdf](2003/Wat%20SA29,%20161.pdf)

Abstract: This paper examines the use of granular ferric hydroxide (GFH) to remove both arsenate [As(V)] and arsenite [As(M)] present in drinking water by conducting batch and column studies. The kinetic studies were conducted as a function of pH, and less than 5 μg/l was achieved from an initial concentration of 100 μg/l for both As(III) and As(V) with GFH at a pH of 7.6, which is in the pH range typically encountered in drinking water supplies. In the isotherm studies, the observed data fitted well with both the Freundlich and the Langmuir models. In continuous column tests (five cycles) with tap water using GFH, consistently less than 5 μg/l of arsenic was achieved in the finished water for 38 to 42 hours of column operation, where the influent had a spiked arsenic concentration of 500 μg/l. High bed volumes (1260 and 1140) up to a breakthrough concentration of 5 μg/l were achieved in the column studies. The adsorptive capacities for GFH estimated from the column studies were higher than that of activated alumina reported in the previous studies. Speciation of a natural water sample with arsenic showed the dominance of As(III) species over As(V). Batch and column studies showed that granular ferric hydroxide (GFH) can be effectively used in small water utilities to achieve less than 5 μg As/l in drinking water.

Keywords: Adsorption, Drinking Water, Arsenic Removal, Granular Ferric Hydroxide, Arsenic Speciation, Amorphous Iron Hydroxide, Oxide-Coated Sand, West-Bengal, Adsorption, Groundwater, Ferrihydrite, Bangladesh, Coagulation, Kinetics

Fu, Y.Z. and Viraraghavan, T. (2003), Column studies for biosorption of dyes from aqueous solutions on immobilised *Aspergillus niger* fungal biomass. *Water SA*, **29** (4), 465-472.

Full Text: [2003\Wat SA29, 465.pdf](2003/Wat%20SA29,%20465.pdf)

Abstract: Biosorption is becoming a promising alternative to replace or supplement the present dye removal processes from dye wastewaters. Based on the results of batch studies on biosorption of the dyes on powdered fungal biomass, *Aspergillus niger*, an immobilised fungal biomass was used in column studies for removal of four dyes, Acid Blue 29, Basic Blue 9, Congo Red and Disperse Red I from aqueous solutions. For each dye, the effectively pretreated powdered fungal biomass was immobilised in a polysulphone matrix in the form of spherical beads. In column studies, adsorption and elution tests were conducted for each dye and the regeneration and reuse for Acid Blue 29 were carried out. The breakthrough data from column studies could be described by the Thomas model. Results of t-tests indicated that the Thomas model constants were statistically significant at 95% confidence level for Acid Blue 29 and Basic Blue 9, but not for Congo Red and Disperse Red 1. The beads had adsorption capacities of 64.7 mg/g for Acid Blue 29, 8.3 mg/g for Basic Blue 9, 1.1 mg/g for Congo Red, and 0.1 mg/g far Disperse Red 1, respectively. In the elution tests, Acid Blue 29 and Basic Blue 9 were easily desorbed from the beads, but Congo Red and Disperse Red I were minimally desorbed. The beads in the column retained a high adsorption capacity (91%) for Acid Blue 29 in the second cycle, which suggested that the system using A. niger biomass can be developed for the removal of certain dyes.

Keywords: *Aspergillus niger*, Immobilisation, Acid Blue 29, Basic Blue 9, Congo Red, Disperse Red 1, Waste-Water, Color Removal, Heavy-Metals, Decolorization, Wastewaters, Mechanism, Effluents

Huang, W.J., Chen, C.Y. and Peng, M.Y. (2004), Adsorption/reduction of bromate from drinking water using GAC: Effects on carbon characteristics and long term pilot study. *Water SA*, **30** (3), 369-375.

Full Text: [2004\Wat SA30, 369.pdf](2004/Wat%20SA30,%20369.pdf)

Abstract: This study investigated the feasibility of using granular activated carbon (GAC) to remove bromate (BrO3-) from drinking water through batch experiments, rapid small-scale column tests (RSSCT) and a pilot-scale study. The results indicated that the GAC capacity for BrO3- removal was dependent on the GAC surface characteristics and empty-bed contact time (EBCT). The GAC with a high number of basic groups and higher pH(pzc) values showed an,increased BrO3- removal capacity. On the other hand, BrO3- removal was improved by increasing EBCT. In the GAC pilot plant, a GAC column (operating with 15 min EBCT) preload for 12 months achieved a BrO3- and assimilable organic carbon (AOC) removal rate ranging between 7 and 96% and between 41 and 85%, respectively. The amount of BrO3- removed was found to be proportional to the influent BrO3- concentration. Based on the results of our long-term experiment, the BrO3- and AOC removal rate during the transition from initial GAC to biological activated carbon (BAC) was calculated as 0.12% w/w and 0.27% w/w, respectively. However, the BrO3- removal rate apparently decreased with increasing operating time (after 3 months). This may be a result of the contribution of the bacterial biomass being adsorbed on the GAC surface which hindered BrO3- reduction by GAC, either by blocking the pores or adsorbing on the activated sites for BrO3- reduction.

Keywords: Granular Activated Carbon, Biological Activated Carbon, Bromate, Assimilable Organic Carbon, Assimilable Organic-Carbon, Removing Bromate, Activated Carbon, Ozonation, Bromide

Demirbas, E., Kobya, M., Senturk, E. and Ozkan, T. (2004), Adsorption kinetics for the removal of chromium(VI) from aqueous solutions on the activated carbons prepared from agricultural wastes. *Water SA*, **30** (4), 533-472.

Full Text: [2004\Wat SA30, 533.pdf](2004/Wat%20SA30,%20533.pdf)

Abstract: The batch removal of Cr(VI) from aqueous solution using low-cost adsorbents such as cornelian cherry, apricot stone and almond shell under different experimental conditions was investigated in this study. The influences of initial Cr(VI) ion concentration (20 to 300 mg·l-1), pH (1 to 4) and particle size (0.63 to 1.60 mm) have been reported. Adsorption of Cr(VI) is highly pH-dependent and the results indicate that the optimum pH for the removal was found to be 1 for all types of carbon. A comparison of kinetic models applied to the adsorption of Cr(VI) ions on the adsorbents was evaluated for the pseudo first-order, the pseudo second-order, Elovich and intraparticle diffusion kinetic models, respectively. Results show that the pseudo second-order kinetic model was found to correlate the experimental data well.

Keywords: Adsorption, Cr(VI), Adsorption Kinetics, Low-Cost Adsorbents, Aqueous Solution

? Goswami, S. and Ghosh, U.C. (2005), Studies on adsorption behaviour of Cr(VI) onto synthetic hydrous stannic oxide. *Water SA*, **31** (4), 597-602.

Full Text: [2005\Wat SA31, 597.pdf](2005/Wat%20SA31,%20597.pdf)

Abstract: Hydrous stannic oxide (HSO) was synthesized in the laboratory and its systematic Cr (VI) adsorption behaviour was studied by means of batch experiments. The particle size of HSO used was in the range of 140 to 290 µm. The variable parameters viz. the effects of pH, concentration of Cr (VI) and time of contact etc. are here reported. The optimum pH and time of contact required for maximum adsorption was found to be 2.0 and nearly 90 min, respectively. The experimental equilibrium adsorption data are tested for the Langmuir, Freundlich, Temkin and Redlich-Peterson equations. Results indicate the following order to fit the isotherms equations: Redlich- Peterson > Temkin > Freundlich > Langmuir. Different kinetic models have been applied to fit the experimental kinetic data. The results are compared, and indicated that the best fit is obtained with the Lagergren or pseudo first-order and the power-function models. A discussion on the adsorption mechanism with respect to the thermodynamic parameters leads to two possible interpretations: One is the exothermic nature of the adsorption process and the other is the ion-ion type electrostatic interaction between the adsorbent and adsorbate ion.

Keywords: Cr(VI), Adsorption Mechanism, Hydrous Stannic Oxide(HSO), Isotherm, Kinetics, Thermodynamic Parameters

? Singh, T.S., Parikh, B. and Pant, K.K. (2006), Investigation on the sorption of aluminium in drinking water by low-cost adsorbents. *Water SA*, **32** (1), 49-54.

Full Text: [2006\Wat SA32, 49.pdf](2006/Wat%20SA32,%2049.pdf)

Abstract: Aluminium is one of the trace inorganic metals present in drinking water. High aluminium concentrations (3.6 to 6 mg/L) may precipitate as aluminium hydroxide affecting aquatic life. Aluminium is also a suspected agent of neurological disorders such as Alzheimer’s disease and senile dementia. The present investigation aims at the sorption of aluminium from drinking water using a low-cost adsorbent. Rice husk char and activated rice husk char were prepared and characterised for various physicochemical properties. The performance of rice husk char (RHC) was compared with other low-cost adsorbents for their aluminium removal capacity. The effect of pH, initial concentration, contact time and temperature was studied for adsorption of aluminium from water under batch conditions. The maximum adsorption capacity was observed with rice husk char at an optimal pH of 4.2. The adsorption of aluminium follows the Freundlich adsorption isotherm. The rate of aluminium adsorption was successfully described by a first-order kinetic model. The thermodynamic study revealed that aluminium adsorption is an exothermic process and the adsorption decreases with an increase in temperature.

Keywords: Aluminium Adsorption, Batch, Kinetics, Thermodynamics, Rice Husk Char

? Salipira, K.L., Mamba, B.B., Krause, R.W., Malefetse, T.J. and Durbach, S.H. (2008), Cyclodextrin polyurethanes polymerised with carbon nanotubes for the removal of organic pollutants in water. *Water SA*, **34** (1), 113-118.

Full Text: 2008\Wat SA34, 113.pdf

Abstract: Organic compounds are some of the major pollutants of water worldwide. They can be toxic or carcinogenic even at low concentrations. The non-reactivity of these species makes it difficult to remove them from water, particularly when present at concentration levels of nanograms per litre (ng center dot l(-1)) or lower. Reasonably inexpensive yet effective methods for the removal of these organic pollutants to below ppb levels are therefore required. Insoluble cyclodextrin polyurethanes have demonstrated the ability to remove organic species from water at concentration levels of nanograms per litre. Carbon nanotubes have also been reported to efficiently adsorb some organic molecules such as dioxins and polychlorinated dibenzo-furans. However, these nanotubes are currently too expensive to be used on their own in water treatment. An investigation into the use of cross-linked cyclodextrin polyurethanes copolymerised with functionalised multiwalled carbon nanotubes as adsorbents for organic pollutants has yielded very useful results which may have an impact in future water treatment applications.

Keywords: Adsorption, Africa, Carbon Nanotubes, Cyclodextrins, Emerging Contaminants, Endocrine Disruptors, Exposure, Impact, Multiwalled Carbon Nanotubes, Polymer Composites, South-Africa, Trichloroethylene, Water

? Brown, R., Mills, A.J. and Jack, C. (2008), Non-rainfall moisture inputs in the Knersvlakte: Methodology and preliminary findings. *Water SA*, **34** (2), 275-278.

Full Text: 2008\Wat SA34, 275.pdf

Abstract: Dew, fog/mist and water vapour adsorption, the 3 vectors by which non-rainfall water can be added to soil water, may play a critical role in ecosystem function in arid zones. This paper explores a methodology for overcoming the challenges of measuring small daily inputs of non-rainfall water in the harsh environment of the Knersvlakte on the West Coast of South Africa. An automatic micro-lysimeter (MLS) - an experimental arrangement of a sensitive electro-mechanical load cell, suitable electronic amplification and signal conditioning, and a microcontroller was developed. A microcomputer was employed for overall system control and data logging. Initial field work took place between late September and November 2006 on Arizona Farm, 30 km north of Vanrhynsdorp. In March 2007, subsequent work began at the Ratelgat BIOTA observatory. Manual soil weight sampling corresponded well with theoretical dew maximums, with measured maximum and minimum dew/fog of 0.4 mm and 0.08 mm (+/- 0.08 mm) (both in September 2006). Measurements from the first prototype MLS were marred by large (+/- 0.24 mm) error figures, signal dropout from the analog to digital converter, and insufficient range at the required resolution. The subsequent prototype (field tested in March 2007 and still in use) provides much smaller errors (+/- 0.05 mm). Calibration testing at Ratelgat indicates maximum overnight dew/fog contributions of 0.35 rum (+/- 0.05 mm), which corresponds with theoretical calculations as well as field measurements in other arid zones. Maximum dew/fog derived soil water occurs between 07:00 and 09:15. Surprisingly, soil weight, as a consequence of dew/fog inputs, starts to increase shortly after 17:20. These are preliminary findings and longer term testing and validation are ongoing at present. The role of quartz pebbles and small succulent plants in the interception of non-rainfall water is still to be explored.

Keywords: Adsorption, Africa, Desert, Dew, Dew Formation, Environment, Evaporation, Fog, Fog, Knersvlakte, Methodology, Micro-Lysimeter, Non-Rainfall Water, Soil, South-Africa, Water, West Coast

? Potgieter, J.H., Bada, S.O. and Potgieter-Vermaak, S.S. (2009), Adsorptive removal of various phenols from water by South African coal fly ash. *Water SA*, **35** (1), 89-96.

Full Text: [2009\Wat SA35, 89.pdf](2009/Wat%20SA35,%2089.pdf)

Abstract: South African coal fly ash (SACFA) was used to effectively remove phenol, 2-nitrophenol and 4-nitrophenol from wastewater. The rate of adsorption follows first-order kinetics before attaining equilibrium with the sorption rate (K(ad)) obtained being the highest for 4-nitrophenol (p-nitrophenol) (7.0 x 10(-3)/h), followed by phenol (1.2 x 10(-3)/h) and 2-nitrophenol (o-nitrophenol) (1.0 x 10(-3)/h). Batch studies were performed to evaluate the adsorption process, and it was found that the Freundlich isotherm effectively fits the experimental data for the adsorbates better than the Langmuir model, with the fly ash having the highest adsorption capacity of 6.51 X 10(-2) mg/g for 4-nitrophenol, 6.00 x 10(-2) mg/g for 2-nitrophenol and 6.31 x 10(-2) mg/g for phenol. The fly ash was found to adsorb 90.2% of phenol, 88.9% of 2-nitrophenol and 92.6% of 4-nitrophenol at an initial concentration of 20 mg/l. The desorption studies suggested that the desorption of 4-nitrophenol was the most difficult of the three adsorbates to be desorbed. The desorption efficiency was 17.9% for phenol, 18.8% for 2-nitrophenol and 10.2% for 4-nitrophenol. This work proved that SACFA can be used as an efficient adsorbent material for removal of phenol from water and wastewater.

Keywords: Activated Carbon, Adsorption, Adsorption-Desorption, Aquatic Systems, Aqueous-Solution, Batch Study, Biosorption, Chlorophenols, England, Fly Ash, Isotherm, Kinetics, Model, Nitrophenols, Organic Pollutants, P-Nitrophenol, Phanerochaete-Chrysosporium, Phenol, Power-Plant, Sorption, South-Africa, Waste-Water, Water

? Schoeman, J.J. (2009), Performance of a water defluoridation plant in a rural area in South Africa. *Water SA*, **35** (1), 97-101.

Full Text: [2009\Wat SA35, 97.pdf](2009/Wat%20SA35,%2097.pdf)

Abstract: The fluoride concentration of a borehole water supply in a rural area (Madibeng Local Municipality, North West Province, South Africa) varies between 5 and 6 mg/l. This water is therefore not suitable for potable purposes because the high fluoride concentration may cause mottling of tooth enamel in children and fluorosis in adults. Therefore, the fluoride concentration should be reduced to less than 1.5 mg/l to make the water suitable for potable purposes. The activated alumina and reverse osmosis processes are both processes that can be very effectively applied for water defluoridation. The activated alumina process, however, is considered to be a more simple and robust process for water defluoridation, especially in a rural area. Therefore, the activated alumina process was selected for water defluoridation. An activated alumina plant was designed, constructed and commissioned in the rural area. Fluoride in the feed water is removed from 6 to 8 mg/l to less than 1.5 mg/l. No reduction in plant output was experienced over 6 service cycles. Therefore, it appears that fouling of the activated alumina should not be a problem. Plant output varied between 940 and 1 296 m(3) to a fluoride breakthrough of approximately 2.0 mg/l. No significant operational problems were experienced during commissioning and the plant is performing satisfactorily. Spent regenerant is disposed of into evaporation ponds. It was demonstrated that a 1(st) world technology could be effectively applied in a rural area with proper training and supervision of the operators. The capital and operational costs of the 200 m(3)/d defluoridation plant are estimated at approximately R1.2m. and R0.7/m(3) treated water.

Keywords: Activated Alumina, Adsorption, Africa, Children, Costs, Drinking-Water, Electrodialysis, Fluoride, Fluoride Removal, Performance, Plant Performance, South-Africa, Training, Water, Water Defluoridation

? Mamba, B.B., Krause, R.W., Malefetse, T.J., Sithole, S.P. and Nkambule, T.I. (2009), Humic acid as a model for natural organic matter (NOM) in the removal of odorants from water by cyclodextrin polyurethanes. *Water SA*, **35** (1), 117-120.

Full Text: [2009\Wat SA35, 117.pdf](2009/Wat%20SA35,%20117.pdf)

Abstract: Current practices in some water-treatment facilities have reported that natural organic matter (NOM) blocks the adsorption sites of activated carbon resulting in lower geosmin and 2-methylisoborneol (2-MIB) removal. Humic acid has been reported to compete with geosmin and 2-MIB removal in the same way. The removal of odour chemicals such as geosmin and 2-MIB is important for potable-water treatment by water supply companies and municipalities. We have previously demonstrated that cyclodextrin polyurethanes are capable of removing a number of organic pollutants from water, but are not able to reduce the levels of NOM significantly. We wished to determine if the polymers would selectively remove geosmin and 2-MIB, despite the presence of NOM. Humic acid was chosen as a model for NOM since NOM constitutes about 70% of humic acid. Results obtained from this study indicate that the presence of humic acids at different concentrations could not affect the removal of geosmin and 2-MIB when cyclodextrin polymers were used since 90% removal was achieved. However the UV-Vis analysis showed a low removal of humic acids (3 to 20%).

Keywords: 2-Methylisoborneol (2-MIB), Activated Carbon, Adsorption, Africa, Cyclodextrin Polymers, Geosmin, Geosmin, Humic Acids, MIB, Model, Simultaneous Adsorption, South-Africa, Water

? Mamba, B.B., Dlamini, N.P. and Mulaba-Bafubiandi, A.F. (2009), *Acidithiobacillus caldus*, *Leptospirillum spp*., *Ferroplasma spp*. and *Sulphobacillus spp*. mixed strains for use in cobalt and copper removal from water. *Water SA*, **35** (3), 301-306.

Full Text: [2009/Wat Sa35, 301.pdf](2009/Wat%20Sa35,%20301.pdf)

Abstract: Bacteria from the genus *Acidithiobacillus*, *Leptospirillum* and *Ferroplasma*, *Sulphobacillus* are often associated with water remediation. In this study a consortium of *Acidithiobacillus caldus*, *Leptospirillum spp*., *Ferroplasma spp*. and *Sulphobacillus spp*. was cultured and used to remove Cu2+ and Co2+ from synthetic aqueous sulphate solutions. The influence of experimental conditions such as pH, temperature, time, volume and metal concentration on the efficiency of the biosorption process was investigated. Biosorption of 54 to 67% Cu (pH 2, 37°C, 24 h) and 23-70% Co (pH 2, 37°C, 24 h) was observed from solutions containing 3.86 g.l-1 Cu2+ ions and 3.36 g.l-1 Co2+ ions. Such findings suggest that if optimal conditions for biosorption of the metals by micro-organisms are achieved, this should afford a cost-effective method of removing metal species from water and aqueous solutions.

Keywords: Adsorption, Adsorption, Aqueous-Solution, *Arrhizus*, Biosorption, Biosorption, Cadmium, Cobalt, Copper, Equilibrium, Ions, Lead(II), Pb(II), Sorption, Synthetic Solution

? Mamba, B.B., Nyembe, D.W. and Mulaba-Bafubiandi, A.F. (2009), Removal of copper and cobalt from aqueous solutions using natural clinoptilolite. *Water SA*, **35** (3), 307-314.

Full Text: [2009\Wat SA35, 307.pdf](2009/Wat%20SA35,%20307.pdf)

Abstract: Southern African clinoptilolite capability as an ion-exchanger with respect to Cu2+ and Co2+ was investigated in order to consider its possible application at removing metals from aqueous solutions. The column method was used in the cation-exchange processes with synthetic solution concentrations of 0.07 M (3.86 g/l), 0.33 M (19.31 g/l) and 0.66 M (38.63 g/l) of Cu2+ solution and 0.07 M (3.34 g/l), 0.33 M (16.69 g/l) and 0.66 M (33.37 g/l) of Co2+ solution. Synthetic non-mixed sulphate solutions of copper and cobalt recorded maximum cation uptakes of 79% and 63% with 0.02 M HCl-activated clinoptilolite respectively. From the Cu/Co mixed solutions, both cobalt and copper recorded a 79% uptake with 0.02 M HCl-activation. The 0.04 M HCl activation gave percentage removals of 79% and 77% for Co2+ and Cu2+ respectively. In the ion-exchange evaluation part of the study, it was found that in every concentration range, the adsorption mass ratio of clinoptilolite to metal concentration conformed to both Langmuir and Freundlich adsorption isotherms. However, the non-mixed aqueous solutions of Cu(2+) and Co(2+) fitted mainly the Langmuir equation. It was found that the adsorption process depends on the hydrated radius of the cation being exchanged, the concentration of the acid that activates the clinoptilolite and the concentration of the targeted cation in solution.

Keywords: Adsorption, Africa, Capacity, Cation Exchange, Cations, Clay, Clinoptilolite, Cobalt, Copper, Evaluation, Heavy-Metals, Ion-Exchange, Isotherms, Selectivity, Sorption, South-Africa, Wastewater, Water, Zeolites

? Bajpai, S.K. and Jain, A. (2010), Removal of copper(II) from aqueous solution using spent tea leaves (STL) as a potential sorbent. *Water SA*, **36** (3), 221-228.

Full Text: [2010\Wat SA36, 221.pdf](2010/Wat%20SA36,%20221.pdf)

Abstract: In this work spent tea leaves were used as a non-conventional, cost-effective sorbent for removal of Cu(II) from aqueous solutions in batch systems. The sorbent was characterised with respect to surface area, pore volume, density, etc. The equilibrium sorption data were applied to various sorption isotherm models, and the order of fitness was: Langmuir > Temkin > Freundlich. The maximum sorption capacity *Q*0 was found to be almost 90.9 and 68.4, as evaluated using Langmuir isotherms at 27ºC and 37ºC respectively. The observed decrease in sorption capacity with temperature indicated the exothermic nature of the uptake process. The kinetic uptake data were best interpreted by a pseudo second-order kinetic model with values of rate constants of adsorption of 1.47×10-2 and 3.01×10-2 g/mg.min, respectively, for the initial sorbate concentrations of 10 and 20 mg. l-1 at 27ºC. The sorption mean free energy was determined from the Dubinin Radushkevich (DR) isotherm model and was found to be 9.91 kJ.mol-1, indicating ion exchange/chemisorption nature of uptake process. The Cu(II) uptake was found to increase with the pH of the sorbate solution and maximum sorption was observed in the pH range of 1.0 to 4.8. Finally, thermodynamic parameters like Δ*G*, Δ*H*, Δ*S* were also evaluated.

Keywords: Adsorbents, Adsorption, Adsorption-Kinetics, Aqueous Solution, Aqueous Solutions, Batch, Biosorption, Capacity, Copper(II), Cost-Effective, Cr(VI), Cu(II), Data, Energy, Equilibrium, Exothermic, Fitness, Freundlich, Industry Waste, Ions, Isotherm, Isotherm Model, Isotherms, Kinetic, Kinetic Model, Langmuir, Langmuir Isotherms, Langmuir Model, Model, Models, Pb(II), pH, Pore Volume, Potential, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Rate Constants, Removal, Sawdust, Second Order, Second-Order, Solution, Solutions, Sorbate, Sorbent, Sorption, Sorption Capacity, Sorption Isotherm, Spent Tea Leaves, Surface, Surface Area, Systems, Temperature, Thermodynamic, Thermodynamic Parameters, Uptake, Volume, Work

? Dlamini, N.P., Mamba, B.B. and Mulaba-Bafubiandi, A.F. (2010), The effect of silica concentration on the biosorption of Cu2+ and Co2+ from aqueous solutions mediated by strains of Bacillus. *Water SA*, **36** (4), 445-450.

Full Text: [2010\Wat SA36, 445.pdf](2010/Wat%20SA36,%20445.pdf)

Abstract: Bacillus strains were isolated from a mine tailings dump in Nigel town, south-east of Johannesburg. These were then grown at 37(+/- 0.5) degrees C in a trace element-agitated liquid media. The effects of pH, contact time, initial ion concentration and the presence of co-cations were studied to ascertain the optimal conditions for biosorption to take place. Test solutions contained 0.002 M, 0.07 M and 0.2 M of either copper or cobalt ions. The Bacillus strains removed the copper and cobalt more efficiently from solutions of low concentration (0.002 M and 0.07 M) than from solutions of high concentration (0.2 M) over a 48 h period. Maximum biosorption was obtained at pH 6.5 and 5.5 for copper and cobalt solutions, respectively. The presence of silica led to an initial increase in both copper and cobalt biosorption, though higher concentrations of silica resulted in a decrease in metal uptake by Bacillus strains.

Keywords: Africa, Bacillus, Binary, Biosorption, Cobalt, Copper, Copper(II), Equilibrium, Ions, Lead(II), Metals, Pb(II), Silica, Single, Sorption, South-Africa, Surfaces, Waste, Water

? Onyango, M.S., Masukume, M., Ochieng, A. and Otieno, F. (2010), Functionalised natural zeolite and its potential for treating drinking water containing excess amount of nitrate. *Water SA*, **36** (5), 655-662.

Full Text: [2010\Wat SA36, 655.pdf](2010/Wat%20SA36,%20655.pdf)

Abstract: An excess level of nitrate in drinking water is responsible for methemoglobinemia, or 'blue baby' disease. Consequently, management of nitrate in drinking water is universally of public health interest. In this study, clinoptilolite functionalised with cationic surfactant hexadecyltrimethyl ammonium (HDTMA) was used for the removal of nitrate from drinking water. The effects of surfactant loading, adsorbent dosage, pH, coexisting ions, temperature and environmental water quality on the adsorption of nitrate were investigated. It was found that adsorption was optimum when the initial concentration of the functionalising surfactant was 3 000 mg.l(-1). An increase in adsorbent dosage raised the percentage removal of nitrate. The valency of the coexisting anion had a major effect on nitrate removal, with the presence of phosphate (a trivalent anion) leading to the lowest removal ability. Temperature and pH had negligible effects on adsorbent performance. Environmental water samples (natural groundwater samples from Limpopo Province, South Africa) were tested and it was found that the World Health Organisation (WHO) regulatory compliance can be achieved even when the initial concentration of nitrate exceeds 300 mg.l(-1). Equilibrium data was modelled using the Freundlich and Langmuir isotherms and the data conformed well to the Freundlich isotherm, indicating the heterogeneous nature of the active sites. Kinetically, nitrate adsorption was best described by the pseudo-second rate equation.

Keywords: Adsorption, Adsorption, Africa, Aqueous-Solution, Capacity, Clinoptilolite, Compliance, Equilibrium, Groundwater, Hdtma-Modified Zeolite, Ion-Exchange, Ions, Isotherm, Isotherms, Kinetics, Natural Zeolite, Nitrate, Public Health, Removal, Reverse-Osmosis, Sorption, South-Africa, Water, Who, Zeolite

? Noubactep, C. (2010), The fundamental mechanism of aqueous contaminant removal by metallic iron. *Water SA*, **36** (5), 663-670.

Full Text: [2010\Wat SA36, 663.pdf](2010/Wat%20SA36,%20663.pdf)

Abstract: Contaminant co-precipitation with continuously generated and transformed iron corrosion products has received relatively little attention in comparison to other possible removal mechanisms (adsorption, oxidation, precipitation) in Fe(0)/H2O systems at near neutral pH values. A primary reason for this is that the use of elemental iron (Fe(0)) in environmental remediation is based on the thermodynamic-founded premise that reducible contaminants are potentially reduced while Fe(0) is oxidised. However, co-precipitation portends to be of fundamental importance for the process of contaminant removal in Fe(0)/H2O systems, as the successful removal of bacteria, viruses and non reducible organic (e.g. methylene blue, triazoles) and inorganic (e.g. Zn) compounds has been reported. This later consideration has led to a search for the reasons why the importance of co-precipitation has almost been overlooked for more than a decade. Three major reasons have been identified: the improper consideration of the huge literature of iron corrosion by pioneer works, yielding to propagation of misconceptions in the iron technology literature; the improper consideration of available results from other branches of environmental science (e.g. CO2 corrosion, electrocoagulation using Fe(0) electrodes, Fe or Mn geochemistry); and the use of inappropriate experimental procedures (in particular, mixing operations). The present paper demonstrates that contaminant co-precipitation with iron corrosion products is the fundamental mechanism of contaminant removal in Fe(0)/H2O systems. Therefore, the 'iron technology' as a whole is to be revisited as the 'know-why' of contaminant removal is yet to be properly addressed.

Keywords: Adsorption, Carbon-Dioxide Corrosion, Co-Precipitation, Corrosion, Elemental Iron, Environmental Science, Granular Iron, Groundwater Remediation, Iron, Iron Corrosion, Iron Oxhydroxides, Literature, Long-Term Performance, Mild-Steel, Natural-Waters, Permeable Reactive Barriers, Plattnerite) Reductive Dissolution, Primary, Review, South-Africa, Water, Zero-Valent Iron, Zerovalent Iron

? Moodley, K.M., Singh, R., Musapatika, E.T., Onyango, M.S. and Ochieng, A. (2011), Removal of nickel from wastewater using an agricultural adsorbent. *Water SA*, **37** (1), 41-46.

Full Text: [2011\Wat SA37, 41.pdf](2011/Wat%20SA37,%2041.pdf)

Abstract: Chemical wastewater streams may contain toxic compounds which are non-biodegradable, and therefore require advanced treatment techniques such as adsorption. However, application of adsorption processes is often limited by the cost of adsorbents. In this study, the adsorption capacity of a low-cost adsorbent (pine sawdust) was investigated by treating wastewater containing nickel (II) and other heavy metal ions. Results were analysed using response surface methodology and a factorial design was employed to determine the interactive effects of the various factors on the adsorption capacity. Furthermore, Langmuir and Freundlich adsorption isotherms were fitted to experimental data to characterise the adsorption of the nickel ions by the pine sawdust. As a result, the highest adsorption capacity was attained at the combined effect of low adsorbent dose, high pH and high initial concentration. On the other hand, the Freundlich isotherm fitted the experimental data better than the Langmuir isotherm. Results of this study indicate that the use of pine sawdust could be a promising solution to the elimination of nickel ions from multi-component aqueous solutions.

Keywords: Activated Carbon, Adsorption, Adsorption, Africa, Aqueous-Solutions, By-Products, Heavy-Metals, Ions, Isotherm, Isotherms, Langmuir Isotherm, Methodology, Nickel Ions, Optimization, Pb(II), Process Variables, Response-Surface Methodology, Sawdust, Sawdust, South-Africa, Wastewater, Water

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? Kumar, P. and Dara, S.S. (1981), Removal of toxic heavy-metal ions from wastewaters using modified agricultural waste materials. *Water Science and Technology*, **13** (7), 353-361.

Full Text: 1981\Wat Sci Tec13, 353.pdf

? Fedorak, P.M. and Hrudey, S.E. (1987), Inhibition of anaerobic degradation of phenolics and methanogenesis by coal coking wastewater. *Water Science and Technology*, **19** (1-2), 219-228.

Full Text: 1987\Wat Sci Tec19, 219.pdf

? Bell, J.P. and Tsezos, M. (1987), Removal of hazardous organic pollutants by adsorption on microbial biomass. *Water Science and Technology*, **19** (3-4), 409-416.

Full Text: [1987\Wat Sci Tec19, 409.pdf](1987/Wat%20Sci%20Tec19,%20409.pdf)

Abstract: Removal of five toxic organic compounds from water by adsorption on microbial biomass was investigated. Lindane, diazinon, malathion, pentachlorophenol, and the PCB 2-chlorobiphenyl were adsorbed onto two types of inactive microbial biomass (a pure strain of Rhizopus arrhizus, and a mixed culture of activated sludge). Desorption and the thermodynamics of the adsorption process were also investigated. With the exception of malathion, the adsorptive uptake data fit the Freundlich equation and were well correlated with the octanol/water partition coefficient, but not as well correlated with water solubility of the compounds. Except for malathion the adsorption was reversible. Malathion showed unusually high apparent uptake and the removal appeared to be irreversible. The experimental evidence suggests that the disappearance of malathion resulted from a chemical reaction, while physical adsorption appears to account for removal of the other compounds.

Keywords: Adsorption, Biosorption, Desorption, Hazardous Organics, Microbial Biomass, PCB, Pesticides

? Hanaki, K. (1987), Inhibition of anaerobic degradation of phenolics and methanogenesis by coal coking wastewater. *Water Science and Technology*, **19** (7), 1072-1074.

Full Text: 1987\Wat Sci Tec19, 1072.pdf

? Davis, A.P. and Huang, C.P. (1989), Removal of phenols from water by a photocatalytic oxidation process. *Water Science and Technology*, **21** (6-7), 455-464.

Full Text: [1989\Wat Sci Tec21, 455.pdf](1989/Wat%20Sci%20Tec21,%20455.pdf)

Abstract: Photocatalyst, CdS, upon irradiation by bandgap energy produces electrons and positive holes. The positive holes are strong oxidizing agents that can render organic compounds such as phenol oxidized. The rate of phenol oxidation depends upon factors such as pH, phenol concentration, photointensity, oxygen concentration and temperature. An increase in the degree of chlorination appears to render phenols more oxidizable. Among the chlorinated phenols studied, the ease in oxidation increases in the order: 2,4,6-trichlorophenol > 2,4-dichlorophenol > 2-chlorophenol > phenol.

Keywords: Phenol, Photo-Oxidation, Photocatalyst, Chlorophenols

Alaerts, G.J., Jitjaturunt, V. and Kelderman, P. (1989), Use of coconut-shell based activated carbon from chromium(VI) removal. *Water Science and Technology*, **21** (12) 1701-1704.

Full Text: [1989\Wat Sci Tec21, 1701.pdf](1989/Wat%20Sci%20Tec21,%201701.pdf)

Azab, M.S. and Peterson, P.J. (1989), The removal of cadmium from water by the use of biological sorbents. *Water Science and Technology*, **21** (12), 1705-1706.

Full Text: [1989\Wat Sci Tec21, 1705.pdf](1989/Wat%20Sci%20Tec21,%201705.pdf)

? Landreth, R.R. (1989), The use of cultured bacteria in a full scale biological system treating coke plant wastewater. *Water Science and Technology*, **21** (12), 1829-1832

Full Text: [1989\Wat Sci Tec21, 1829.pdf](1989/Wat%20Sci%20Tec21,%201829.pdf)

? Yoshida, H., Fukuda, S., Okamoto, A. and Kataoka, T. (1991), Recovery of direct dye and acid dye by adsorption on chitosan fiber: Equilibria. *Water Science and Technology*, **23** (7-9), 1667-1676.

Full Text: [1991\Wat Sci Tec23, 1667.pdf](1991/Wat%20Sci%20Tec23,%201667.pdf)

Abstract: The recovery of direct dye and acid dye from dilute aqueous solution by adsorption on chitosan fiber, which is cheaper than an activated carbon fiber, appeared technically and economically feasible. The amounts of adsorption of Brilliant Yellow (direct dye) and Acid Orange II (acid dye) on the chitosan fiber were much larger than that for the activated carbon fiber, though these dyes were adsorbed well on the activated carbon fiber too. The experimental equilibrium isotherms were correlated by B.E.T. equation for a finite number of layers. The equilibrium isotherm was affected by the initial concentration of the dye and temperature considerably, but was little affected by coexisting salt NaCl. These dyes were desorbed by dilute aqueous solution of caustic soda, e.g. at 20 mol/m3, irreversibly.

Keywords: Water, Adsorption, Chitin, Chitosan, Activated Carbon, Dye, Direct Dye, Acid Dye, Basic Dye, Desorption, External Mass-Transfer, Pore Diffusion-Model, Activated Carbon, Batch Adsorbers, Dyestuffs, Chitin, Peat

? Wen, Y.B., Min, Z. and Yi, Q.A. (1991), Biological treatment of coke-plant waste-water for COD and NH3-N removal. *Water Science and Technology*, **23** (10-12), 1883-1892.

Full Text: [1991\Wat Sci Tec23, 1883.pdf](1991/Wat%20Sci%20Tec23,%201883.pdf)

Abstract: For removing COD and NH3-N from high-strength coke-plant wastewater, studies were conducted in a lab scale, continuous flow system, in which anaerobic, anoxic and oxic units were included. The results have shown that the effluent COD and NH3-N of A-A/O system could be less than 78 mg/L and 4.7 mg/L respectively when the influent COD and NH3-N were higher than 1200 mg/L and 240 mg/L respectively at a total HRT of 36 hrs. Moreover, the total nitrogen of wastewater was removed by 49%. It is concluded that A-A/O system is efficient for coke-plant wastewater treatment and the anaerobic process has played very important role in the system.

Keywords: Anaerobic, Anoxic, Biological Treatment, Coal, Coke Plant, Coke Plant Waste-Water, Coke Plant Wastewater, Coke-Plant Wastewater, Denitrification, Nitrification, Oxic, Treatment, Wastewater, Wastewater Treatment

Tamaura, Y., Katsura, T., Rojarayanont, S., Yoshida, T. and Abe, H. (1991), Ferrite process; heavy metal ions treatment system. *Water Science and Technology*, **23** (10-12) 1893-1900.

Full Text: [1991\Wat Sci Tec23, 1893.pdf](1991/Wat%20Sci%20Tec23,%201893.pdf)

Abstract: The principle of the “Ferrite Process”, heavy metal ions treatment system, and the practically operated systems are presented. In the “Ferrite Process”, the heavy metal ions are incorporated into the lattice points of the ferrites in the course of the formation of the spinel structure by the oxidation of the Fe(II) ions. The ferrite formation reaction proceeds in two paths depending on the reaction pH; 1) the green rust path (pH 7-10), and 2) the γ-FeO(OH) path (pH 10.5-11). The mole ratio of the heavy metal ions incorporated into the lattice points to the Fetotal in the ferrites depends on the reaction pH and the mol ratio of the heavy metal ions in the reaction solution and to the Fe(II) ions added to the reaction solution. Ferrite Process is now practically adopted to the treatment of the laboratory waste waters at the universities and the institutes in Japan, to the treatment of the plating waste waters, and to the treatment of branching mine drainage waters. Since the ferrite sludge has a strong magnetic property, it is reused as a useful magnetic material.

Keywords: Ferrite, Ferrite Process, Waste Waters, Heavy Metal Ions, Mine Drainage Waters, Plating Waste Waters

Arar, A. (1991), Wastewater reuse for irrigation in the near east region. *Water Science and Technology*, **23** (10-12), 2127-2134.

Full Text: [1991\Wat Sci Tec23, 2127.pdf](1991/Wat%20Sci%20Tec23,%202127.pdf)

Abstract: Limited water supplies available in many countries of the Near East has led to a growing interest in the rational use of this increasingly important resource. Because wastewater irrigation ensures the reuse of resources and achieves better treatment of wastewater, plans have recently been formulated for large-scale use of this non-conventional source of water. Consequently, in several countries of the Near East Region, wastewater reuse in agriculture is an accomplished and accepted fact, with a high degree of social and political commitment. Intensive and direct reuse is being practised in Kuwait, Saudi Arabia, Libya, the United Arab Emirates and Tunisia. Direct, but unsupervised reuse is being practised in Yemen Arab Republic, Morocco and Syria. All forms of wastewater reuse is practised in Egypt. Indirect and direct restricted reuse is practised in Jordan. However, given the health and environmental hazards associated with reuse of wastewater, the formalization of wastewater treatment and reuse in all countries is urgent. Furthermore, in most countries poor coordination amongst the different agencies concerned with water supply, wastewater treatment, irrigation, public health and the environment is a key constraint for further wastewater reuse.

Kuribayashi, S. (1991), Reuse of treated wastewater in an artificial stream (Seseragi) in Kawasaki City, Japan. *Water Science and Technology*, **23** (10-12), 2209-2214.

Full Text: [1991\Wat Sci Tec23, 2209.pdf](1991/Wat%20Sci%20Tec23,%202209.pdf)

Abstract: Kawasaki City intends to reuse treated wastewater from a sewage treatment plant as the water source for an artificial stream (called a ‘seseragi’) in the Kawasaki Aqua-promenade which is to be constructed on the riverbed of the dried-up River Egawa. This paper describes the results of a study on the acceptability as the stream source of four types of treated wastewater. Short streams built in the Kase Sewage Treatment Center were used for the experiments. Stream water quality requirements include factors affecting appearance, public health, and existence of aquatic life. In other words, growth of attached algae should be inhibited, pathogenic organisms should be at an acceptable level (as indicated by number of coliform bacteria), and the stream should be a suitable habitat for fish. In this paper, the acceptability of the treated wastewater is discussed from these three points of view. Four types of treated wastewater were investigated, i.e., effluents from a conventional activated sludge process, a biological phosphate removal process, a biological phosphate removal process with post chlorination (addition of sodium hypochlorite), and a biological phosphate removal process with post ozonation. It was concluded that treated wastewater from the biological phosphate removal process with post ozonation was the most suitable as the water source of the artificial stream (‘seseragi’), when the three requirements mentioned above were considered in conjunction with the influence of the disinfection method on the aquatic environment.

? Grau, P. (1991), Textile-industry wastewaters treatment. *Water Science and Technology*, **24** (1), 97-103.

Full Text: [1991\Wat Sci Tec24, 97.pdf](1991/Wat%20Sci%20Tec24,%2097.pdf)

Abstract: Effective water and waste management strategies enable us to decrease water consumption and pollution load of wastewaters. Typical examples of low-waste technologies are lanolin recovery in wool scouring, hydroxide recovery in cotton mercerizing, recovery of synthetic sizes and reuse of dye baths.

Wastewaters are treated by a sequence of physical-chemical and biological processes. Traditionally, coagulation/flocculation (C/F) has been favored as the first treatment step followed by biological treatment as the second step. More recently a reverse sequence of treatment has been utilized in several cases with success.

Novel technologies have been developed such as catalytic oxidation, decoloration by ozone, adsorption/desorption. Their practical use is, however, still rare.

Joint treatment with municipal wastewaters has been favored wherever possible.

Keywords: Water Consumption, Water and Waste-Water Management Strategies, Physical Chemical Treatment, Biological Treatment, Decoloration, Regeneration

? Rose, J.B. and Gerba, C.P. (1991), Use of risk assessment for development of microbial standards. *Water Science and Technology*, **24** (2), 29-34.

Full Text: [1991\Wat Sci Tec24, 29.pdf](1991/Wat%20Sci%20Tec24,%2029.pdf)

Abstract: A single-hit exponential model and a beta-distributed ‘infectivity probability’ model were used to evaluate the potential health risks from drinking water containing low levels of protozoan cysts and viruses, respectively. The models were based on dose response curves developed from human feeding studies and assumed consumption of 2 L/day. The US EPA has suggested that one infection/10,000/year is an acceptable risk for infectious agents acquired through potable water. Based on this risk, acceptable levels of viruses and cysts were determined using the probability models. Thus poliovirus and rotavirus levels should not be more than 0.1 and 0.3 pfu/100L respectively per day. *Giardia* levels should be below 0.2 cysts/100L. To achieve a 1: 10,000 annual risk, the geometric average should not exceed 10-3 organisms/100L. As monitoring treated water for these levels would be difficult, source waters may be monitored. Geometric averages of 1-100 organisms/100L require 3-5 logs of treatment reduction to achieve the 1: 10,000 risk. The risk models for viruses and protozoa can be used to evaluate the occurrence of pathogens in source water and determine the appropriate treatment needed to obtain specific levels of safety for drinking water.

Keywords: Risk Assessment, *Giardia*, Enteric Viruses, Probability of Infection, Drinking Water Treatment

Helmer, R., Hespanhol, I. and Saliba, L.J. (1991), Public health criteria for the aquatic environment: Recent who guidelines and their application. *Water Science and Technology*, **24** (2), 35-42.

Full Text: [1991\Wat Sci Tec24, 35.pdf](1991/Wat%20Sci%20Tec24,%2035.pdf)

Abstract: Over the past Decade, the World Health Organization has developed a series of microbiological guidelines covering different aspects of the aquatic environment. Transmission pathways of human pathogens from their faecal origin back to man via drinking-water, bathing waters, shellfish and sewage-irrigated crops were investigated and epidemiology-based health criteria established. The total and faecal coliform guideline values for drinking-water are generally complied with in urban water supplies but difficult to meet in rural areas of developing countries. The Mediterranean serves as the major study area for assessing health risks from bathing in coastal waters and from the consumption of shellfish eaten uncooked. Wastewater reuse for crop irrigation is rapidly expanding due to water shortages but poses health risks to farm workers and consumers. New guidelines for control of helminths were recently issued by a WHO Scientific Group. A comparative evaluation of the above guidelines follows.

Asano, T. (1991), Planning and implementation of water reuse projects. *Water Science and Technology*, **24** (9), 1-10.

Full Text: [1991\Wat Sci Tec24, 1.pdf](1991/Wat%20Sci%20Tec24,%201.pdf)

Abstract: As the demand for water increases, water reuse has become an increasingly important source of water in many parts of the world, particularly in arid and semi-arid regions. In this paper, categories of water reuse are identified, and planning methodologies and economics for wastewater reclamation and reuse are discussed, emphasizing implementation. Special attention is paid to tertiary treatment systems which produce essentially pathogen-free effluent for variety of uses including irrigation of parks, school yards, and golf courses as well as groundwater recharge in the urban environment.

Takahashi, M. (1991), Guidelines for environmental enhancement in Japan. *Water Science and Technology*, **24** (9), 133-142.

Full Text: [1991\Wat Sci Tec24, 133.pdf](1991/Wat%20Sci%20Tec24,%20133.pdf)

Abstract: New guidelines of water reuse for environmental enhancement have been established in Japan. There are two categories in the guidelines. One is aesthetical setting without public access, the other is limited contact use including shoreline usage, boating and fishing. We do not consider direct contact use such as swimming and bathing. Two groups of guidelines were set. One group comprised basic guidelines which are not site specific, based on public health and visual appeal. We call these ‘Basic Guidelines’. The numerical guidelines for total coliform, BOD, SS, turbidity, and color unit are determined in the Basic Guidelines. On the other hand, hydraulic and biological characteristics of environment enhancement differ according to the site, purposes, climate and so on. Consideration of the characteristic of each site should be paid carefully. We call such considerations as ‘Guidelines Depending on Type of Use’. The site-specific water quality index such as T-P, T-N, foaming substances are discussed here.

Setti, H. (1991), Incinerator of chlorinated hydrocarbons solid wastes. *Water Science and Technology*, **24** (12), 19-24.

Full Text: [1991\Wat Sci Tec24, 19.pdf](1991/Wat%20Sci%20Tec24,%2019.pdf)

Abstract: Fifteen years ago our Company bought an old factory of chlorinated products. Later our Company found that solid chlorinated residues had been thrown in to a completely inadequate soil.

After having determined the sites contaminated several solutions were thought through: artificial deposits, old granite mines, etc., none of them adequate. Finally the incineration process was chosen and approved by authorities. Today the installation is built and operates according to requirements.

Keywords: Incineration, Organochlorinated Residues

D’Avila, J.S., Matos, C.M., Cavalcanti, M.R., Andrade, J. and Marques, J. (1991), A new methodology to obtain a reduction of the heavy metal concentration in waste originated in solid residues, “Chorume”. *Water Science and Technology*, **24** (12), 159-164.

Full Text: [1991\Wat Sci Tec24, 159.pdf](1991/Wat%20Sci%20Tec24,%20159.pdf)

? Maliou, E., Malamis, M. and Sakellarides, P.O. (1992), Lead and cadmium removal by ion exchange. *Water Science and Technology*, **25** (1), 133-138.

Full Text: [1992\Wat Sci Tec25, 133.pdf](1992/Wat%20Sci%20Tec25,%20133.pdf)

Abstract: The ion exchange properties of the zeolites can be used to remove certain ions from the effluents.

In this work a natural clinoptilolite has been examined systematically in order to evaluate whether this low cost mineral can be employed for the removal of the metals lead and cadmium which are very toxic, even at very low concentrations.

Studies were performed under various conditions such as presence of different cations (Pb, Cd, Na), zeolite grain size, solution temperature. The results obtained indicate that the size of the zeolite does not affect the actual metal uptake at the equilibrium point, but the metal removal is greatly affected when the contact of the solid/liquid phases is short, a very essential parameter for the waste water treatment. For a short contact time the metal quantities removed using small grain size is nearly doubled. The same pattern is followed at higher temperatures, though a slight increase is observed for both zeolite grain sizes and both metals, lead and cadmium. At equilibrium half of the theoretical exchange capacity of the zeolite is used, approximately 1.4 meq/g for lead and 1.1 meq/g for cadmium.

The kinetic curves show very clearly the selectivity of the zeolite for the Pb ions but also significant amounts of cadmium are removed as well.

Keywords: Ion Exchange, Zeolite, Clinoptilolite, Heavy Metal Removal, Water Treatment, Clinoptilolite

Diamadopoulos, E., Samaras, P. and Sakellaropoulos, G.P. (1992), The effect of activated carbon properties on the adsorption of toxic substances. *Water Science and Technology*, **25** (1), 153-160.

Full Text: [1992\Wat Sci Tec25, 153.pdf](1992/Wat%20Sci%20Tec25,%20153.pdf)

Abstract: The objectives of this work were to relate the activated carbon properties to its adsorptive capacity. The activated carbon needed was produced in the lab from Greek lignite coal. Subsequently, adsorption studies were performed in order to evaluate the efficiency of the various activated carbons to remove toxic substances from water. Two organic substances were used. These were phenol and fulvic acid. Additionally, the adsorption of arsenic(V) was, also, investigated. It was found that the adsorptive capacity of the activated carbons depended primarily on the ash content and the compound. The capacity of the carbon to remove phenol, expressed as mg of phenol removed per g of activated carbon (carbon loading), decreased linearly as the amount of ash in the activated carbon increased. Ash-free activated carbons could adsorb 4 times as much phenol as the activated carbons with a high ash content. On the other hand, fulvic acid and arsenic adsorbed poorly on the ash-free activated carbons. Even for the high surface area activated carbons (over 1000 m2/g), the quantity of fulvic acid or arsenic adsorbed was significantly less than that exhibited by the high ash activated carbons (maximum surface area measured hardly exceeded 300 m2/g). As the amount of ash in the carbon increased, the carbon loading increased as well, up to a certain level, beyond which the amount of ash played no significant role. The beneficial role of ash was explained by the ability of the fulvic acid and arsenic to interact with metal oxides and metal ions, which constitute a significant fraction of the ash.

Keywords: Adsorption, Activated Carbon, Phenol, Fulvic Acid, Arsenic, Adsorbents, Removal, Water

? McFarland, M.J., Qiu, X.J., Sims, J.L., Randolph, M.E. and Sims, R.C. (1992), Remediation of petroleum impacted soils in fungal compost bioreactors. *Water Science and Technology*, **25** (3), 197-206.

Full Text: [1992\Wat Sci Tec25, 197.pdf](1992/Wat%20Sci%20Tec25,%20197.pdf)

Abstract: The ability of the white rot fungus Phanerochaete chrysosporium to enhance the biotransformation of benzo(a)pyrene (B(a)P) in contaminated soils was evaluated in compost bioreactors. RadiolabelledC-14 and chemical mass balances were used to evaluate: 1) rate of disappearance of test compound; 2) mineralization; 3) formation of bound contaminant residue; and 4) treatment costs.

Mineralization of B(a)P was found to be insignificant over the duration of test period. Moreover, no radioactivity was recovered in volatile organic traps indicating that transformation of B(a)P resulted in chemicals intermediates that remained associated witfi the compost matrix.

Bound contaminant residue formation was found to be the major mechanism of B(a)P removal accounting for nearly 100% of the contaminant loss from the solvent extract (methylene chloride/acetone). A maximum rate of bound contaminant removal of 1.36 mg B(a)P/Kg soil-day was estimated in fungal inoculated system over the first thirty days of treatment. This was significantly different from the maximum rate of bound residue formation estimated in the noninoculated systems (0.83 mg B(a)P/Kg soil-day) over the same time period. After thirty days, the rate of bound residue formation decreased to near zero in the inoculated system while remaining constant in the noninoculated reactors. The decrease in bound residue formation coincided with decline in benzo(a)pyrene removal. Data suggest that fungal activity may have been reduced over time by nutrient limitation.

Keywords: Hazardous Waste, Benzo (a) Pyrene, Soil Remediation, Biotransformation, White Rot Fungus, Phanerochaete-Chrysosporium, Extracellular Ligninases, Veratryl Alcohol, Mycobacterium sp, Radical Cations, Degradation, Benzo(a)Pyrene, Biodegradation, Oxidation

Squires, R.C. (1992), Removal of heavy metals from industrial effluent by crossflow microfiltration. *Water Science and Technology*, **25** (10), 55-67.

Full Text: [1992\Wat Sci Tec25, 55.pdf](1992/Wat%20Sci%20Tec25,%2055.pdf)

Abstract: The performance of Exxflow, a patented form of crossflow microfiltration, treating industrial wastewaters containing mixed heavy metals discharged by two types of industry is quantified and compared with the traditional technologies used for such treatment.

Pilot trial results using Exxflow are shown and compared to the performance of the full scale plants now operating on these effluents.

The operating costs of the Exxflow process are estimated for the two plants. One of which has been operating for 18 months and the other about 4 months.

The Exxflow process is described and improvements which are being developed to lower the operating costs are presented.

It is shown that industrial effluents containing mixed heavy metals are very effectively treated by the Exxflow process and since the installation of the plants the treated effluent has been of a quality suitable for discharge to the River Thames in one case and to a sewage treatment plant in the other.

Unlike other processes, Exxflow has shown that it can successfully treat effluent containing mixed metals and that removal of antimony from mixed metal waste waters is affected by the concentration of sodium sulphate in the wastewater.

Keywords: Mixed Heavy Metal Removal, Cross-Flow Microfiltration, Membrane Separation, Lead-Acid Battery Breaking Effluent, Antimony, Effluent Treatment

Literathy, P. (1992), Environmental consequences of the gulf war in Kuwait: Impact on water resources. *Water Science and Technology*, **26** (1-2), 21-30.

Full Text: [1992\Wat Sci Tec26, 21.pdf](1992/Wat%20Sci%20Tec26,%2021.pdf)

Abstract: As a result of the iraqi occupation and the armed conflict in Kuwait 6 to 8 million barrels of crude oil were spilled into the marine environment, and about 2 to 3 million barrels of crude oil, burnt and unburnt, were being emitted daily during about 300 days into the environment from the burning or gushing oil wells. International efforts of UN agencies and other organizations from, the region and outside started immediately to assess the extent of the environmental pollution and to mitigate the adverse effects. In addition to the public health concerns of the air pollution caused by the burning wells, long-term environmental risk should be considered as a result of the oil spill into the marine and coastal environment, and the atmospheric fall-out, e.g., acid rain and petroleum related compounds associated with airborne particulates, in the marine and terrestrial areas. Particularly serious contamination of the desert ecosystem occurred around the damaged oilfields in Kuwait. The deposited crude oil and airborne particulates in the terrestrial areas may also affect the ground-water aquifer, Air quality, marine and desert soil pollution surveys provided data for a preliminary assessment and helped the formulation of mitigation and rehabilitation programmes, however, implementation of an integrated survey programme will ensure the final impact assessment on the environment, particularly on the marine and subsurface water resources.

? Tare, V., Chaudhari, S. and Jawed, M. (1992), Comparative evaluation of soluble and insoluble xanthate process for heavy metal removal from wastewaters. *Water Science and Technology*, **26** (1-2), 237-246.

Full Text: [1992\Wat Sci Tec26, 237.pdf](1992/Wat%20Sci%20Tec26,%20237.pdf)

Abstract: Insoluble (ISX) and soluble starch xanthate (SSX) were synthesized in the laboratory from corn starch, and were used for metal [Cd(II), Cu(II) and Cr(VI)] removal from aqueous systems. Results indicate that soluble as well as insoluble xanthate processes are capable of meeting various effluent disposal standards. Metal removal by both the processes is maximum in the pH range 4 to 5. Mechanism of Cu(II)-xanthate and Cr(VI)-xanthate interaction is also discussed. From overall comparison of the two processes it appears that the insoluble xanthate process has an edge overthe soluble xanthate process in terms of metal removal capacity. reliability and ease of operation, particularly for cadmium removal. However, soluble xanthate process appears to be relatively less expensive compared to insoluble xanthate.

Keywords: Soluble Starch Xanthate, Insoluble Starch Xanthate, Heavy Metal-Xanthate Interaction, Cd(II), Cu(II), Cr(VI), Sorption, Precipitation, Starch Xanthate

? Meyer, V., Carlsson, F.H.H. and Oellermann, R.A. (1992), Decolourization of textile effluent using a low cost natural adsorbent material. *Water Science and Technology*, **26** (5-6), 1205-1211.

Full Text: [1992\Wat Sci Tec26, 1205.pdf](1992/Wat%20Sci%20Tec26,%201205.pdf)

Abstract: To evaluate their abilities to remove colour from textile-plant effluents, tests were run using several low cost natural adsorbent materials including vermiculite, sawdust, barbecue charcoal, maize stalks, sand, rice husks and peatmoss. With the exception of vermiculite, more than 50% of the colour was removed from the wastewater, with barbecue charcoal and rice husks showing die best adsorptive qualities (67% and 65% respectively). Under simulated industrial conditions on a laboratory scale a fixed-bed reactor was used to investigate the adsorption capacity of barbecue charcoal with respect to colour removal. An average of 28% of colour was removed at a hydraulic retention time (HRT) of 1.6 h over a period of 25 days. The effect of pH on the adsorptive capacity with respect to colour removal and represents a relatively cheap adsorbent material compared to conventionally used granular activated carbon

Keywords: Activated Carbon, Adsorbent, Adsorption, Barbecue Charcoal, Basic-Dyes, Color Removal, Decolourization, Equilibrium, Fly-Ash, Hardwood, pH, Removal, Sawdust, Textile Effluent, Wastewater, Water

? Bailey, R.P., Bennett, T. and Benjamin, M.M. (1992), Sorption onto and recovery of Cr(VI) using iron-oxide-coated sand. *Water Science and Technology*, **26** (5-6), 1239-1244.

Full Text: [1992\Wat Sci Tec26, 1239.pdf](1992/Wat%20Sci%20Tec26,%201239.pdf)

Abstract: A new adsorbent media has been prepared consisting of iron oxide coated onto sand surfaces. The oxide coating is made by adding a solution of a ferric salt and base to a mixture of sand and applying various heating protocols. The iron oxide is an excellent, regenerable adsorbent, and the process of coating it on sand allows the media to be used in a packed column. Depending on solution pH, the media can be made to adsorb either cationic or anionic metals. In this work, the media was used to collect hexavalent chromium from a synthetic waste stream. The influent contained 20 mg/L Cr(VI), and better than 99% removal was achieved consistently. Once breakthrough occurred, the media could be regenerated by exposure to base. The pH of the regenerant solution determined the kinetics and efficiency of the regeneration process. With further development, the process represents an inexpensive and effective method for removal and recovery of metals from industrial waste streams.

Keywords: Water, Chromium, Adsorption, Iron Oxides, Metal Recovery, Regeneration

? Dalmacija, B., Tamaš, Z. and Miškovic, D. (1992), The biosorption of selected pesticides from water by biologically activated carbon. *Water Science and Technology*, **26** (9-11), 1991-1994.

Full Text: [1992\Wat Sci Tec26, 1991.pdf](1992/Wat%20Sci%20Tec26,%201991.pdf)

Abstract: The work describes a study of the possibility of removal of organo-phosphorus insecticide quinalphos and organochlorine herbicide lindane from water by using the biofilm formed on active carbon. It was established that two similtaneous processes took place in the biosorption column - adsorption and microbiological degradation of the adsorbed matter. At the shock concentrations of lindane in the influent, an inhibition of microbiological processes in the biofilm occurred. It was observed that the biosorption system was more efficient in the removal of the organo-phosphorus insecticide than of the organo-chlorine herbicide.

Keywords: Water, Biologically Activated Carbon, Lindane, Quinalphos, Removal

Susarla, S., Bhaskar, G.V. and Rao Bhamidimarri, S.M. (1992), Competitive adsorption of phenoxy herbicide chemicals in soil. *Water Science and Technology*, **26** (9-11), 2121-2124.

Full Text: [1992\Wat Sci Tec26, 2121.pdf](1992/Wat%20Sci%20Tec26,%202121.pdf)

Abstract: A modified Freundlich-type bicomponent adsorption isotherm proposed by Sheindorf et al. (1981) was used to describe the competitive adsorption of 2,4-dichlorophenoxyacetic acid (2,4-d) and 2-methyl-4-chlorophenoxyacetic acid (MCPA) onto volcanic soil. The adsorption capacities of 2,4-d and MCPA reduced in presence of the other component compared to pure component adsorption capacities.

Keywords: Equilibria

Pradhan, A.A. and Levine, A.D. (1992), Role of extracellular components in microbial biosorption of copper and lead. *Water Science and Technology*, **26** (9-11), 2153-2156.

Full Text: [1992\Wat Sci Tec26, 2153.pdf](1992/Wat%20Sci%20Tec26,%202153.pdf)

Abstract: Binding of metal ions to extracellular components of microbial systems plays an important role in biosorption processes. Besides pH and temperature, type of anionic system and concentration of the metallic ions are some of the governing factors determining the maximum uptake capacity of the microbial system. Actinomycetes show an ability to selectively scavenge metals from aqueous systems. A biosorption system was tested using a bimetallic solution containing lead and copper. Uptake of Pb was observed to increase with concentration. Chloride ions had an inhibiting effect on the metal removal capacity of the actinomycetes system.

Keywords: Biosorption, Extracellular Binding, Metal Removal, Actinomycetes, Anionic Systems, Accumulation

D’Avila, J.S., Matos, C.M. and Cavalcanti, M.R. (1992), Heavy metals removal from wastewater by using activated peat. *Water Science and Technology*, **26** (9-11), 2309-2312.

Full Text: [1992\Wat Sci Tec26, 2309.pdf](1992/Wat%20Sci%20Tec26,%202309.pdf)

Abstract: The processes used to remove heavy metals from inorganic wastewater have in general low efficiency. The use of activated peat obtained by using a process similar to a cation exchange reaction increases the removal efficiency up to five times when compared with peat ‘in natura’. The main objective of this work is to show the fundamental mathematical model, governed by diffusion process and the algorithms utilized to design the batch and the continuous feed stirred tank reactors or in some cases a fixed bed reactor. The principal dimensions of these equipments are obtained from the knowledge of the activated peat’s cation exchange capacity used in the process, and the main chemical characteristics of the heavy metal ion contained in the wastewater. Besides, two important parameters are also included: the ion concentration and the efficiency of the process obtained from laboratory kinetics experiments. For example Pb2+ is removed from a wastewater at a concentration of 50g/m3 in five minutes or less, with an efficiency of 98%.

Keywords: Waste-Water Treatment, Activated Peat, Heavy Metals, Pollution Control, Inorganic Waste

? Lee, J., Chen, B., Allen, H.E., Huang, C.P., Sparks, D.L. and Sanders, P. (1992), Trace metal soil quality criteria to protect groundwater. *Water Science and Technology*, **26** (9-11), 2327-2329.

Full Text: [1992\Wat Sci Tec26, 2327.pdf](1992/Wat%20Sci%20Tec26,%202327.pdf)

Abstract: A major problem in site remediation is frequently the lack of appropriate standards for pollutants in soil. Lack of standards for an exposure route can result in subjective judgments regarding the extent of remediation needed. These problems are particularly important when considering the potential for groundwater contamination by inorganic materials. The partitioning of trace metals is highly dependent on the nature of the soil and on the solution pH. The maximum level of metal in soil for which the equilibrium soluble metal does not exceed the drinking water standard can be computed, at any pH, from the measured partition coefficient for any metal and soil.

The sorption of cadmium and lead onto major types of New Jersey soil has been determined as a function of pH. As the pH decreased, the amount of adsorbed metal decreased.

As is conventionally done, we have transformed these data into sorption coefficients (K(d)) which are a function of pH. To apply such data in the decision making process, it is necessary to use the K(d) and appropriate conditions of soil/groundwater in the environment. The calculation determines the maximum concentration of metal which will not result in exceedence of water quality standards. These criteria can be used as a soil standard which will be protective of groundwater quality.

We developed adsorption/desorption relationships in the form of a mathematical model and computed the maximum level of metal in soil for which the equilibrium soluble metal will not exceed the drinking water standards.

Schrale, G., Boardman, R. and Blaskett, M.J. (1993), Investigating land based disposal of bolivar reclaimed water, South Australia. *Water Science and Technology*, **27** (1), 87-96.

Full Text: [1993\Wat Sci Tec27, 87.pdf](1993/Wat%20Sci%20Tec27,%2087.pdf)

Abstract: The Bolivar Sewage Treatment Works (STW) processes the urban and industrial sewage from the northern and eastern suburbs of Adelaide. The treatment capacity is equivalent to the sewage production of 1.1 million people. The disposal of more than 40000 ML of reclaimed water into the sea has caused a progressive degradation of about 950 ha of seagrass beds which threatens the sustainability of the fisheries and marine ecosystems of Gulf St. Vincent. The current practice will no longer be viable to achieve compliance with the SA Marine Environment Protection Act, 1990. A Inter-Departmental Working Party recommended that the Bolivar reclaimed water be disposed by irrigation of suitable land on the coastal plains north of Adelaide. They proposed the construction of two pipelines: a 12 km long pipeline to extend the distribution of reclaimed water in the most intense portion of the 3500 hectares of irrigated horticulture on the Northern Adelaide Plains, and a second, 18 km long pipeline to deliver the remainder to a more northerly site for irrigation of an estimated 4000 hectares of hardwood plantations. The paper summarizes the findings as they relate to public health, environmental, technical and financial aspects of land based disposal. Land based disposal would completely eliminate the marine degradation and also arrest the over-use of the NAP underground water resources for horticulture. The total net costs over thirty years for land bared disposal are about $ 21.8 million. The ‘horticultural’ pipeline of the land based disposal scheme is expected to be commercially viable. A shortfall in revenue from the afforestation component is expected and may need to be considered as an environmental cost of ceasing marine disposal.

? Mann, R.A. and Bavor, H.J. (1993), Phosphorus removal in constructed wetlands using gravel and industrial waste substrata. *Water Science and Technology*, **27** (1), 107-113.

Full Text: [1993\Wat Sci Tec27, 107.pdf](1993/Wat%20Sci%20Tec27,%20107.pdf)

Abstract: The phosphorus removal efficiency of three gravel based constructed wetland systems (CWSs) has been investigated in a two year study in which secondary sewage effluent was treated. The constructed wetlands systems, 100m x 4m x 0.5m with an impervious liner, comprise an unplanted gravel “control” trench and gravel trenches planted with monoculture stands of either Typha orientalis or Schoenoplectus validus. Inlet and outlet phosphorus concentrations and vertical and linear profiles of phosphorus were determined to characterise immobilisation / translocation through the systems. Laboratory phosphorus adsorption experiments were conducted with regional gravels and alternative adsorptive media including industrial slag and ash by-products. Phosphorus adsorption in the large scale gravel systems was variable and ranged from -40% to 40%. Laboratory adsorption capacity studies conducted with the gravel substratum indicated that field adsorption potential could be successfully simulated and modeled. Ion exchange experiments have been used to evaluate gravel and industrial conglomerates, with a view to improving phosphorus immobilisation through substratum selection and effluent flow management. Langmuir and Freundlich isotherms characterised phosphorus adsorption and the maximum adsorption capacity of regional gravels ranged from 25.8 to 47.5 mug P/g compared to blast furnace slag 160 to 420 mug P/g and fly ash 260 mug P/g. These results indicate that further investigations into the inclusion of industrial waste substrata in a CWS are warranted.

Keywords: Phosphorus Removal, Constructed Wetlands, Gravel Adsorption, Industrial Wastes, Ion Exchange, Langmuir Isotherm, Freundlich Isotherm, Phosphate Adsorption, Water, Soils, Slag

Edzwald, J.K. (1993), Coagulation in drinking water treatment: Particles, organics and coagulants. *Water Science and Technology*, **27** (11), 21-35.

Full Text: [1993\Wat Sci Tec27, 21.pdf](1993/Wat%20Sci%20Tec27,%2021.pdf)

Abstract: A review of coagulation in drinking water treatment is presented. The paper emphasizes the importance of raw water chemistry, natural organic matter (NOM) concentration and type, and the chemistry of coagulants. Mineral and organic particles may be stable in water due to electrostatic charge interactions, hydrophilic effects, or to steric interactions from adsorbed macromolecules. NOM rather than particles initially in water supplies can control coagulant dosages and selection. NOM consists of a mixture of various organic compounds including hydrophobic (humic and fulvic acids) and hydrophilic fractions. The negative charge and chemical structure of the hydrophobic acids affect chemical reactions with coagulants, particularly metal based coagulants. The removal of NOM with Al coagulants can involve hydrolysis, complexation, precipitation, and adsorption reactions. Specific ultraviolet absorbance (SUVA) can be used to estimate whether the NOM of a water is high or low in hydrophobic acids and to estimate removals of DOC by coagulation. Preozonation of water supplies containing algae may lead to microflocculation or impair coagulation depending on algae type, concentration and molecular weight of extracellular organic matter (EOM), and ozone dose.

Keywords: Coagulation, Drinking Water, Aluminum Coagulants, Natural Organic Matter, Particle Stability, Algae, Ozone, Polyaluminum Chloride, Chemical Aspects, Aluminum Salts, Matter, Destabilization

Orhan, Y. and Büyükgüngör, H. (1993), The removal of heavy metals by using agricultural wastes. *Water Science and Technology*, **28** (2), 247-255.

Full Text: [W\Wat Sci Tec28, 247.pdf](W/Wat%20Sci%20Tec28,%20247.pdf)

Abstract: The removal of heavy metals from wastewater using adsorbants such as waste tea, Turkish coffee, exhausted coffee, nut and walnut shells has investigated. Batch studies were conducted at room temperature and adsorption experiments were carried out by shaking 0.3 g of adsorbent with 100 ml synthetic wastewater containing Cr(VI), Cd(II) and Al(III) metal ions. The remaining concentration of heavy metals in each samples after adsorption at various time intervals was determined spectrophotometrically. Batch studies showed that these adsorbents exhibit a good adsorption potential for Al(III) metalions. The adsorption ratios of Al(III) were as 98, 99, 96, 99.5 and 96% for waste tea, Turkish coffee, exhausted coffee, nut and walnut shells, respectively. These results were compared with those obtained using activated carbon as adsorbent. The batch adsorption kinetics and adsorption equilibria were examined and described by a first order reversible reaction and Freundlich isotherm, respectively. The first order rate and isotherm constants have been calculated.

Keywords: Adsorption, Agricultural Wastes, Metal Ions, Equilibrium Isotherms

Lo, K.S.L. and Leckie, J.O. (1993), Kinetic studies of adsorption-desorption of Cd and Zn onto Al2O3/solution interfaces. *Water Science and Technology*, **28** (7), 39-45.

Full Text: [1993\Wat Sci Tec28, 39.pdf](1993/Wat%20Sci%20Tec28,%2039.pdf)

Abstract: The effects of external and internal mass transport limitations on zinc and cadmium adsorption onto the porous amorphous aluminium oxide/solution interfaces were studied. A modified two-stage rate model was used to interpret the experimental results. The rapid stage results from external surface film diffusion and internal diffusion into the near surface pores. The slow stage results from internal mass transport and extends over several days. The mass transfer-adsorption coefficients of the rapid stage are almost two orders of magnitude larger than those of the slow stage. The external mass transfer coefficients show an increasing trend with increasing pH, and appear to be affected by the charge/potential condition of the oxide/solution interface. The internal mass transfer coefficients indicate a uniform trend for both the zinc and cadmium results. The desorption rates and final metal ion solution concentrations are affected by the bulk solution pH. Film diffusion and internal diffusion are affected by the higher relative ratio of metal ion concentration to adsorbent concentration.

Keywords: Heavy Metal, Adsorption, Metal Oxide, Amorphous Aluminum Oxide, Internal Mass Transport

Mino, T. (1993), Comparison of legislation for water pollution control in Asian countries. *Water Science and Technology*, **28** (7), 251-255.

Full Text: [1993\Wat Sci Tec28, 251.pdf](1993/Wat%20Sci%20Tec28,%20251.pdf)

Abstract: Information on legislative and administrative water pollution control systems in ten Asian countries was collected through direct contact or mail correspondence with relevant government officials or engineers. Effluent concentration control is the most common system to control water pollution. Effluent standard values in the countries examined are compiled and the structural differences of the effluent control systems are discussed. Japan has relatively lenient standards, but because of its supporting measures for the implementation of the effluent standard system it has achieved satisfactory water pollution control.

Keywords: Water Pollution Control, Effluent Concentration Control, Effluent Standards, Asian Countries

Tam, N.F.Y. and Wong, Y.S. (1994), Nutrient and heavy metal retention in mangrove sediment receiving wastewater. *Water Science and Technology*, **29** (4), 193-200.

Full Text: [1994\Wat Sci Tec29, 193.pdf](1994/Wat%20Sci%20Tec29,%20193.pdf)

Abstract: Soil column studies were carried out to examine the capacity of mangrove sediments in retaining wastewater nutrients and heavy metals. Synthetic wastewater of three different concentrations, namely diluted sewage (DW), medium sewage (MW) and concentrated sewage (CW), were applied to the columns daily over a period of 54 days. Leachate from each column was collected and analyzed. The study revealed that the concentrations of ammonium in the leachates from all sewage treatments decreased dramatically in the first week with a pattern similar to the control. After this initial decrease, ammonium contents increased rapidly especially in the column treated with CW, then remained at a steady level. At the end of the experimental period, the concentrations of ammonium found in the leachate were in the declining order of CW > MW > DW > control. Organic nitrogen, nitrites and nitrates were not detected in the leachates from all sewage treatments. This suggested that denitrification might have occurred and some of the nitrogen from sewage might have been retained in the mangrove sediment. The changes in leachate K concentration were similar to that of NH4+-N content. On the other band, the soluble phosphorus and heavy metal contents of leachates from sewage treated columns were similar to those of the control. Most of the heavy metals, including Cu, Zn and Cd, were not detected in the leachate. The sediment data showed that NH4+-N, ortho-P, and heavy metals were accumulated on the top layer of the soil column and their contents decreased with the depth of the soil column. The highest metal content was found in the column treated with concentrated sewage. It is clear that mangrove sediments acted as a good filter/trap for phosphorus and metals, but were less efficient for ammonium nitrogen.

Keywords: Mangrove Sediment, Wetland, Waste-Water Treatment, Nutrients and Heavy Metal Retention, Sphagnum Peat, Water

? Suschka, J., Morel, J., Mierzwinski, S. and Januszek, R. (1994), Full scale treatment of phenolic coke coking waste water under unsteady conditions. *Water Science and Technology*, **29** (8), 69-79.

Full Text: [1994\Wat Sci Tec29, 69.pdf](1994/Wat%20Sci%20Tec29,%2069.pdf)

Abstract: Phenolic waste water from the largest coke coking plant in Poland is treated at a full technical scale. From the very beginning it became evident that very high qualitative variations in short and long periods are to be expected. For this purpose, the biological treatment giant based on activated sludge is protected through preliminary physical-chemical treatment and the results are secured by a final chemical stage of treatment. Nevertheless, improvements in the performance of the treatment plant have been found necessary to introduce. The experienced gained over the last five years has been described and developed improvements have been presented. At the preliminary stage the importance and necessity of preparation was evaluated. It was found essential to use dissolved air flotation, instead of a simple pressured air flotation system. Even with an average relatively high retention in the aeration tanks, there was an uneven distribution of load, dissolved oxygen concentration and oxygen uptake. Dissolved iron or highly dispersed hydroxide particulates in the over flow of the first chemical treatment stage has had a beneficial effect on activated sludge flocs. As a result not only the physical properties but also the overall effect of treatment.

Keywords: Activated Sludge, Biodegradation, Coke Waste, Complex Treatment, Dissolved Oxygen, Flotation, Phenols, Treatment

? Delanghe, B., Nakamura, F., Myoga, H., Magara, Y. and Guibal, E. (1994), Drinking water denitrification in a membrane bioreactor. *Water Science and Technology*, **30** (6), 157-160.

Full Text: [1994\Wat Sci Tec30, 157.pdf](1994/Wat%20Sci%20Tec30,%20157.pdf)

Abstract: Drinking water denitrification was studied on a membrane bioreactor pilot plant. The nitrate removal yields remained constant at 99 %. The specific denitrification activities averaged 0.16 kg N-NO3.kg-1MLSS.d-1 at 20°C and pH 8, The permeation flux was about 0.5 m3.m-2.d-1 throughout the study and did not vary with an increase in the suspended solids concentration. The dependence of the process efficiency on temperature and pH was put into equation, The specific denitrification activity decreased by a factor 1.9 with a temperature decrease of 10°C, The optimal pH was found to be 8 - 8.5. The ethanol consumption was 1.4 g C.g-1N-NO3. The membrane bioreactor technique seems to be a promising answer for the nitrate problem of drinking waters.

Keywords: Denitrification, Drinking Water, Ethanol Consumption, Membrane Separation, Nitrate Removal, Plants, Temperature, Ultrafiltration, Water

Lai, J.L., Lo, S.L. and Lin, C.F. (1994), Effects of hydraulic and medium characteristics on solute transfer to surface runoff. *Water Science and Technology*, **30** (7), 145-155.

Full Text: [W\Wat Sci Tec30, 145.pdf](W/Wat%20Sci%20Tec30,%20145.pdf)

Abstract: A two-stage scouring-based model including two parameters for each stage, the ultimate scoured depth and rate of change of scoured depth, was developed to describe solute transfer to surface runoff. While the first stage is a quick decrease of mass loss of solute to surface runoff, the second stage is a slow one. An experimental flume with a medium packed bed was designed. Four different sizes of glass beads were chosen to be the media and saturated with uniform concentration (20000 ppm) of potassium chloride solution before runoff occurred. In a series of experiments, runoff was passed at varied flow rate, velocities, and depths over the medium bed. Runoff samples were taken at the end of flume and the concentration of potassium chloride analysed. By use of this model, the dimensionless ultimate scoured depth and the dimensionless rate of change of each stage were investigated. The results showed that the Reynolds number within media and the relative length were two important factors affecting mass loss of chemicals.

Keywords: Nonpoint-Source Pollution, Solute Transfer, Scouring-Based Model, Overland Flow, Surface Runoff, Pesticide Runoff, Soil Solution, Water, Chemicals, Interflow, Model

Lai, C.H., Lo, S.L. and Lin, C.F. (1994), Evaluating an iron-coated sand for removing copper from water. *Water Science and Technology*, **30** (9), 175-182.

Full Text: [W\Wat Sci Tec30, 175.pdf](W/Wat%20Sci%20Tec30,%20175.pdf)

Abstract: In drinking water treatment systems, the conventional process (coagulation, sedimentation and filtration units) cannot remove trace metals efficiently. Iron oxide is an excellent, regenerable adsorbent, and often controls free metals through adsorption. The utilization of heating process for coating iron oxide on sand surface allowed the media to be used in a packed column. The adsorbent media were investigated for removing copper ions from water using both batch and column experimental methods. A one-dimensional convective-dispersive transport model with a combination of second-order kinetic adsorption equation was adopted for predicting copper retention in a 80 cm depth filter bed. The concentration of copper ions in influent ranged from 0.64 to 3.2 mg/l. The experimental results indicated that the copper could be removed completely until the breakpoint. Once breakthrough occurred, the regeneration of the media could be achieved by soaking with acid solution (pH = 3.0). The simulation results of the transport-adsorption equation fit experimental data quite well. Consequently, the coated sand can be applied for the conventional rapid filtration process to remove copper ions from water.

Keywords: Iron Oxide, Adsorption, Filtration, Regeneration, Metal, Copper, Coating, Metal-Bearing Wastes, Drinking-Water, Oxide, Magnetite, Sorption, Ions

Guibal, E., Saucedo, I., Jansson-Charrier, M., Delanghe, B. and Le Cloirec, P. (1994), Uranium and vanadium sorption by chitosan and derivatives. *Water Science and Technology*, **30** (9), 183-190.

Full Text: [W\Wat Sci Tec30, 183.pdf](W/Wat%20Sci%20Tec30,%20183.pdf)

Abstract: The modification of chitosan, by grafting of oxo-2-glutaric acid, allows its sorption performance to be increased. This enhancement of uptake ability is observed in overall sorption capacity and specificity in sorbing particular metals. This work focuses on the sorption of uranium(VI) and vanadium(V). The sorption isotherms are studied. The experimental results are described according to the Langmuir and Freundlich models. It was shown that uranium sorption is best described by the Freundlich model, while vanadium sorption is difficult to model. The influence of the particle size, significant in the case uranium, but not for vanadium, shows that the sorption mechanism is not the same for the two metals: surface control is predominant in the case of uranium, due to the poor porosity of the sorbents. The control of overall sorption capacity is related to the chemistry of the metal and polymer: the appearance of hydrolyzed species and protonation of the polymer.

Keywords: Chitosan, Modified Chitosan, Sorption, Uranium, Vanadium, Waste-Water Treatment, Glutamate Glucan, Metal-Ions, *Rhizopus-arrhizus*, Equilibrium, Removal, Wastes, Adsorption

Sobsey, M.D., Hall, R.M. and Hazard, R.L. (1995), Comparative reductions of hepatitis-a virus, enteroviruses and coliphage MS2 in miniature soil columns. *Water Science and Technology*, **31** (5-6), 203-209.

Full Text: [W\Wat Sci Tec31, 203.pdf](W/Wat%20Sci%20Tec31,%20203.pdf)

Abstract: The reduction of viruses in wastewater and other contaminated waters in the subsurface or soil environment is an important public health consideration for land disposal of wastes and the use of ground sources as water supplies. Because of the lack of information on the comparative reductions of different viruses in soils receiving wastes, we determined the reductions of hepatitis A virus (HAV), poliovirus 1, echovirus 1 and the indicator virus MS2 in 10-cm deep, miniature soil columns dosed twice weekly with 2.5 cm of water or wastewater and incubated at 5 or 25°C for 16 weeks. The soils studied were coarse sand loamy sand, clay loam and organic muck. By examination of column effluents, few or no viruses were detected in clay loam column effluents, with >99.98% virus reductions under all conditions tested. In organic muck columns virus reductions ranged from 30-98%, with greater reductions at 25°C than at 5°C and greater reductions of enteroviruses than either HAV or MS2. In the sandy soil columns viruses were retained generally better in loamy sand than in coarse sand. Overall, poliovirus was reduced the most and echovirus the least. In coarse sand mean virus reductions ranged from a low of about 50% for echovirus at 5 degrees to a high of about 99.4% for poliovirus at 25 degrees. In loamy sand, mean virus reductions ranged from a low of about 60% for echovirus at 5 degrees to a high of 99.997% for poliovirus at 25 degrees. Virus reductions were greater in sandy soil columns dosed with groundwater than with wastewater. The appreciable breakthroughs of viruses in column effluents of organic muck and coarse sand soils indicate that these soil types may be unsuitable for land application of wastewater under some hydrogeological conditions.

Reynolds, K.A., Gerba, C.P. and Pepper, I.L. (1995), Detection of enteroviruses in marine waters by direct RT-PCR and cell culture. *Water Science and Technology*, **31** (5-6), 323-328.

Full Text: [W\Wat Sci Tec31, 323.pdf](W/Wat%20Sci%20Tec31,%20323.pdf)

Abstract: Sewage outfalls and storm water runoff introduces pathogenic human enteric viruses into marine coastal waters, which may pose a potential public health risk. Although members of the enterovirus group have been suggested as possible indicators of sewage pollution in marine waters, the lack of rapid, sensitive and cost effective methods have prevented routine monitoring in the United States. This study compared traditional cell culture and direct RT-PCR. (reverse transcriptase-polymerase chain reaction) amplification for detection of an enterovirus. Poliovirus could be recovered from 100 L of artificial seawater with an average efficiency of 77%, using adsorption and elution from electronegative filters. Viruses were eluted from the filters with 1.5% beef extract for viruses (BEV) adjusted to pH 9.5 and reconcentrated by organic flocculation to a volume of 30 mt. Substances which interfered with detection by RT-PCR were removed by treatment of the concentrates with sephadex and chelex resins. Direct RT-PCR could detect 2.5 and 0.025 PFU (plaque forming units) for single (25 cycles) and double PCR (2×25 cycles) in 10 µL of pure culture poliovirus samples, respectively, These methods are currently being applied to assess the occurrence of enteroviruses at marine bathing beaches influenced by sewage discharges.

Keywords: Polymerase Chain-Reaction, Marine Water, Storm Water, Sewage, Enteroviruses, Polymerase Chain Reaction, Cell Culture

Notes: highly cited

? Hsu, K.L., Gupta, H.V. and Sorooshian, S. (1995), Artificial neural-network modeling of the rainfall-runoff process. *Water Science and Technology*, **31** (10), 2517-2530.

Full Text: 1995\Wat Sci Tec31, 2517.pdf

Abstract: An artificial neural network (ANN) is a flexible mathematical structure which is capable of identifying complex nonlinear relationships between input and output data sets. ANN models have been found useful and efficient, particularly in problems for which the characteristics of the processes are difficult to describe using physical equations. This study presents a new procedure (entitled linear least squares simplex, or LLSSIM) for identifying the structure and parameters of three-layer feed forward ANN models and demonstrates the potential of such models for simulating the nonlinear hydrologic behavior of watersheds. The nonlinear ANN model approach is shown to provide a better representation of the rainfall-runoff relationship of the medium-size Leaf River basin near Collins, Mississippi, than the linear ARMAX (autoregressive moving average with exogenous inputs) time series approach or the conceptual SAC-SMA (Sacramento soil moisture accounting) model. Because the ANN approach presented here does not provide models that have Physically realistic components and parameters, it is by no means a substitute for conceptual watershed modeling. However, the ANN approach does provide a viable and effective alternative to the ARMAX time series approach for developing input-output simulation and forecasting models in situations that do not require modeling of the internal structure of the watershed.

Keywords: Multilayer Feedforward Networks, Back-Propagation, Global Optimization, Approximation, Convergence, Derivatives, Uncertainty, Algorithm, Mappings, Systems

? Oldenburg, M. and Sekoulov, I. (1995), Multipurpose filters with ion-exchanger for the equalization of ammonia peeks. *Water Science and Technology*, **32** (7), 199-206.

Full Text: [1995\Wat Sci Tec32, 199.pdf](1995/Wat%20Sci%20Tec32,%20199.pdf)

Abstract: In this study the use of zeolites as ion-exchangers for equalization of ammonia peak loadings in aerated biological activated filters was investigated For this use zeolites were mixed with a filter medium and the nitrifying filter was loaded with ammonia peaks for two hours at different flow rates. It could be demonstrated that during the phase of higher inflow concentrations the zeolite was collecting ammonia. When the influent concentration decreased ammonia was desorbed from the zeolite and could be nitrified by the bacteria growing on the biter medium. It was shown that additional zeolites can equalize variations of ammonia, especially in filter units which are working at a high nitrification rate and which are very sensitive to varying influent conditions. During the operation time of the filter no separation of the zeolite by higher hydraulic loading or by backwashing could be recognized. So the upgrading of nitrifying filters with zeolite represents an additional security for effluents containing oscillating ammonia concentrations.

Keywords: Ammonia Peak-Loadings, Filtration, Ion-Exchanger, Nitrification, Zeolites

Zouboulis, A.I., Solari, P., Matis, K.A. and Stalidis, G.A. (1995), Toxic metals removal from dilute solutions by biosorptive flotation. *Water Science and Technology*, **32** (9-11), 211-220.

Full Text: [W\Wat Sci Tec32, 211.pdf](W/Wat%20Sci%20Tec32,%20211.pdf)

Abstract: Toxic metal ions (cadmium, nickel and zinc), considered as priority pollutants, were removed from dilute aqueous solutions by sorption onto non-living (sterilized) anaerobically digested sewage sludge. The desorption of cadmium from metal-laden sludge was also examined. Flotation was subsequently applied as an effective solid/liquid separation process. The dissolved-air flotation technique was applied for the generation of fine bubbles and, in parallel, electrokinetic measurements were carried out. Promising results were succeeded from the combined process of biosorption/flotation (termed biosorptive flotation).

Nassar, M.M., Hamoda, M.F. and Radwan, G.H. (1995), Adsorption equilibria of basic dyestuff onto palm-fruit bunch particles. *Water Science and Technology*, **32** (11), 27-32.

Full Text: [W\Wat Sci Tec32, 27.pdf](W/Wat%20Sci%20Tec32,%2027.pdf)

Abstract: Particles prepared from palm-fruit bunch have been used for the adsorption of a basic dye (BR 18) over range of initial dye concentrations and varying adsorbent particle size in the range of 106 to 300 musing batch tests. The results revealed the potential for palm-bunch particles as low cost adsorbents. Uptake of the basic dye was higher at smaller adsorbent particle size. The adsorption isotherm follows both the Langmuir and Freundlich models. Values of the separation factor, R, indicate favourable adsorption for the basic dye palm fruit bunch particles system, that is, 0 < R <1 and Freundlich constant n > 1.

Keywords: Aqueous-Solutions, Bagasse Pith, Removal, Hardwood Palm-Fruit Bunch, Basic Dyes, Particle Size, Adsorption Isotherms

Wahaab, R.A., Lubberding, H.J. and Alaerts, G.J. (1995), Copper and chromium(III) uptake by duckweed. *Water Science and Technology*, **32** (11), 105-110.

Full Text: [W\Wat Sci Tec32, 105.pdf](W/Wat%20Sci%20Tec32,%20105.pdf)

Abstract: The duckweed Lemna minor was cultivated under laboratory conditions with the amount of incident light as limiting growth factor. The fronds were found to double every 3 days under the highest radiation intensity. The plants were exposed to Cu and Cr(III) solutions of 0.25 and 1.0 mg l-1 during 10 days. The plants needed to adapt for app. 8 days before attaining maximal, steady state removal. Cr(III) was removed more efficiently from the solution (75-100% in terms of concentration or load reduction) than Cu (35-40%), the higher efficiencies pertaining to the more dilute solutions. Uptake rates were 80-333 and 250-667 mg d-1 m-2 for Cu and Cr(III), respectively. The plants accumulated 1-2 g metal kg-1 plant (dry weight) when exposed to the high concentration. Cu seemed toxic at 1.0 mg l-1, resulting in plant mortality after 8 days. (C) 1996 IAWQ. Published by Elsevier Science Ltd.

Keywords: Duckweeds, Lemnaceae, Heavy Metal, Chromium, Copper, Uptake, Sewage Treatment, Cadmium

Tünay, O., Kabdasli, I., Orhon, D. and Ates, E. (1995), Characterization and pollution profile of leather tanning industry in Turkey. *Water Science and Technology*, **32** (12), 1-9.

Full Text: [W\Wat Sci Tec32, 1.pdf](W/Wat%20Sci%20Tec32,%201.pdf)

Abstract: Leather tanning industry as a significant polluting source is exposed to stringent effluent limitations. On the other hand leather processing has a very complex structure in terms of both production and waste streams. A systematic subcategorization approach is required to assess the pollution characteristics and control measures, In this study, a procedure is defined for the development of subcategories for the industry. Results of a detailed review on the amount and the quality of wastewaters originating from the industry are given and six different subcategories are defined to reflect the structure of the leather processing industry in Turkey, Solid and hazardous waste profiles are also given. Copyright (C) 1996 IAWQ. Published by Elsevier Science Ltd.

Keywords: Agro-Industries, Industrial Pollution, Leather Tanning Industry, Pollution Profile, Subcategorization, Tannery Wastewater Characterization

? Cintoli, R., Di Sabatino, B., Galeotti, L. and Bruno, G. (1995), Ammonium uptake by zeolite and treatment in UASB reactor of piggery wastewater. *Water Science and Technology*, **32** (12), 73-81.

Full Text: [1995\Wat Sci Tec32, 73.pdf](1995/Wat%20Sci%20Tec32,%2073.pdf)

Abstract: A treatment plant of pre-screened piggery wastewater is tested at lab-scale using Italian zeolites (of very low cost) to strongly reduce the NH4+ from 1500 mg/l to 300-400 mg/l and anaerobic digestion in UASB and UASB-AF reactors to remove organics. The ion-exchange pre-treatment by zeolite leads to a reduction of toxicity of wastewater towards anaerobic microbial population and improves the UASB and UASB-AF reactors yields in organics reduction and gas production, The laboratory plant in this configuration reaches a COD removal range of 60-80% and a good reduction of effluent nutrients concentration whereas the use of a anaerobic second stage gave modest results in organics removal because of low applied organic load. A treatment cycle composed of a pre-treatment with zeolites, anaerobic digestion in UASB-AF reactor and a final treatment in an aerobic activated sludge plant is giving very good preliminary results.

Keywords: Piggery Wastewater, Anaerobic Treatment, Upflow Anaerobic Sludge Blanket, Upflow Anaerobic Sludge Blanket Anaerobic Filter, Zeolites, Nutrients Removal, Design

Lee, S.M., Mathews, A.P. and Nassar, R. (1996), Stochastic modeling of multicomponent adsorption kinetics with non-linear isotherm. *Water Science and Technology*, **33** (8), 135-143.

Full Text: [W\Wat Sci Tec33, 135.pdf](W/Wat%20Sci%20Tec33,%20135.pdf)

Abstract: A Markov process coupled with the Langmuir adsorption isotherm is developed to simulate bisolute adsorption kinetics. Estimates of all model parameters were obtained from a single-solute experiment for the adsorption of 1,1,1-trichloroethane (TCEA) and trichloroethylene (TCE) from dilute aqueous solutions onto granular activated carbon (GAC). The model verifications indicate that the representation of the rate mechanisms are adequate. The solution of the resultant model equations, which are ordinary differential equations, is simpler than the solution of the partial differential equations involved in the deterministic formulations. This model approach can be extended for the modeling of multicomponent adsorption in fixed-beds.

Gupta, K. and Saul, A.J. (1996), Suspended solids in combined sewer flows. *Water Science and Technology*, **33** (9), 93-99.

Full Text: [W\Wat Sci Tec33, 93.pdf](W/Wat%20Sci%20Tec33,%2093.pdf)

Abstract: Many studies have identified the first flush phenomenon as being the relatively high concentration of pollutants in the initial phases of combined sewer flow following a storm. One way of controlling the first flush is by the provision of a storage tank such that the effluent can be discharged in a controlled manner. To optimise the storage volume, both the total pollutant load discharged and the temporal variation in pollutant concentration within an event need to be predicted. Sophisticated models to predict the pollutant concentrations in urban sewer flows, for example QSIM and MOUSETRAP are already available. However, the data requirements for these models are extensive, which usually limit their application to major or environmentally sensitive schemes. This paper describes attempts to relate the peak concentration of suspended solids in combined sewer flows to observed storm characteristics. In this study, it was hypothesised that the peak concentrations of suspended solids could be related to the hydrological parameters of maximum rainfall intensity, storm duration and antecedent dry weather period prior to the storm which are commonly used as the basic parameters for urban sewer design. Data from two sites at Great Harwood and Clayton-le-Moors in the North-west of England has been used in the study and an attempt has been made to define an upper limit of the first flush concentration of suspended solids corresponding to storms which have been categorised into bands defined by their peak rainfall intensity.

Anderson, M., Skerratt, R.G., Thomas, J.P. and Clay, S.D. (1996), Case study involving using fluidised bed incinerator sludge ash as a partial clay substitute in brick manufacture. *Water Science and Technology*, **34** (3-4), 507-515.

Full Text: [W\Wat Sci Tec34, 507.pdf](W/Wat%20Sci%20Tec34,%20507.pdf)

Abstract: Earlier work at Staffordshire University revealed encouraging results when sewage sludge ash from a fluidised bed incinerator was added to a series of common commercial brickclays used in the United Kingdom. The results of this work led a United Kingdom brick manufacturer to the identification of this material as a possible replacement for the sand addition to the bricks produced at one of their factories. As a result, an experimental programme was formulated at Staffordshire University’s Ceramic Technology Laboratory which used the factory’s current mix-design as a control standard against a mix-design in which the sand component was replaced weight-for-weight with sewage sludge ash. Comparative bodies were fabricated and both laboratory and factory firings undertaken. Physical testing results have revealed that the experimental mix-design containing the sewage sludge ash contributes positively to the ceramic properties of the control product in bath the unfired and fired condition. Moreover, the fired colour of this experimental product has also been found to be indistinguishable from the central. Copyright (C) 1996 IAWQ. Published by Elsevier Science Ltd.

Keywords: Ash, Brickmaking, Construction Materials, Fluidised Bed, Incineration, Sludge, Sewage-Sludge, Disposal

Zhang, B. and Yamamoto, K. (1996), Seasonal change of microbial population and activities in a building wastewater reuse system using a membrane separation activated sludge process. *Water Science and Technology*, **34** (5-6), 295-302.

Full Text: [W\Wat Sci Tec34, 295.pdf](W/Wat%20Sci%20Tec34,%20295.pdf)

Abstract: The seasonal change of microbial population and activities in an existing building wastewater reuse system using membrane separation activated sludge process (MSAS) were investigated, and they were also compared with those in a municipal wastewater treatment plant using conventional activated sludge (CAS) process. The operating conditions of MSAS process, such as sludge retention time, biomass concentration, the ratio of food to microorganism () and so on, are much different from CAS process. Acridine orange direct count (AODC), plate count of heterotrophic bacteria (HPC), MPN of ammonia oxidizing bacteria (MPNa) and microfauna were measured. In the MSAS process, the AODC and MPNa/HPC were high, but the HPC/AODC was low. This means that the MSAS process tended to maintain a high ratio of ammonia oxidizing bacteria and also tended to keep dead cells. The microfauna in the MSAS process was unstable and changed a lot seasonally, but it wouldn’t affect the treatment efficiency. Moreover, the specific activities of nitrification, denitrification and organic removal fluctuated largely and seasonally, and were lower than those in the CAS process. However, their volumetric activities were higher than those in the CAS process because the MSAS process could maintain very high biomass concentration. Dehydrogenase activity, ATP content and oxygen utilization rate were measured to estimate the bacterial activities and viability. The OUR and ATP has different relationship in the both processes. Polysaccharides were also determined as metabolic products.

Keywords: Membrane Separation, Activated Sludge, Bacterial Population, Bacterial Activity, Microfauna

Lawrence, A. and Poulter, C. (1996), The potential role of the estuarine amphipod *Gammarus duebeni* in sub-lethal ecotoxicology testing. *Water Science and Technology*, **34** (7-8), 93-100.

Full Text: [W\Wat Sci Tec34, 93.pdf](W/Wat%20Sci%20Tec34,%2093.pdf)

Abstract: The aim of this study was to assess the suitability of Gammarus duebeni as an indicator of estuarine pollution. This involved the development of sub-lethal pollution bioassays monitoring respiration rate, swimming efficinecy and precopula pairing; assessment of the sensitivity of the assays to copper pollution and comparison of the suitability of the assays. Significant impairment of respiration rate, as measured by changes in pleopod beat, was determined at a copper concentration of 600 µgl-1. Significant impairment to swimming ability was determined after exposure to copper pollution at a concentration of 600 µgl-1 and precopula pairing was significantly reduced at a concentration of 600 µgl-1. of the assays, swimming efficiency and pleopod beat frequency appear to offer the most potential for further development. The lower limit of sensitivity of the bioassays developed in this study is yet to be determined. However, the levels of copper shown to induce an effect can be experienced in the natural environment. The study has shown that Gammarus duebeni can be used in sub-lethal pollution assays, at relatively high Cu concentrations and indicates that it is potentially a useful species with which to assess estuarine water and sediment pollution.

Tkalitch, P.V., Chen, W. and Tay, J.H. (1996), Modeling of heavy metals in a reservoir with diffusive bottom layer. *Water Science and Technology*, **34** (7-8), 117-123.

Full Text: [W\Wat Sci Tec34, 117.pdf](W/Wat%20Sci%20Tec34,%20117.pdf)

Abstract: A model of heavy metal kinetics in the well mixed reservoir with respect to vertical diffusion in the active bottom layer is presented. The model incorporates the mechanisms of a heavy metal reaction process between ‘overlying water-suspended sediments-interstitial water-bottom sediment’. Application of longterm modeling is provided to simulate the self-cleaning abilities of the Kranji Reservoir. The adsorption rate of Zn on bottom sediments was determined by a modified batch test. The analytical results demonstrate the high retention and concentration of Zn in the interstitial water, which indicates the importance of including the interstitial water quality in the assessment of potential ecological effects. The numerical simulations show the influence of the bottom diffusive layer on Zn long-term dynamics in the aquatic system. Copyright (C) 1996 IAWQ.

Keywords: Bottom Diffusive Layer, Distribution and Diffusion Coefficients, Interstitial Water, Kinetic Model, Sediments, Tropical Reservoir, Zinc

Matheickal, J.T. and Yu, Q. (1996), Biosorption of lead from aqueous solutions by marine algae *Ecklonia radiata*. *Water Science and Technology*, **34** (9), 1-7.

Full Text: [W\Wat Sci Tec34, 1.pdf](W/Wat%20Sci%20Tec34,%201.pdf)

Abstract: Experimental studies showed that brown marine algae, Ecklonia radiata, can be used for the development of an efficient biosorbent material for heavy metal removal from wastewater. E. radiata exhibited high uptake capacities for lead, cadmium and copper. In particular, lead sorption was very marked. The equilibrium data fitted well to the Langmuir isotherm model. Within a pH range of 4.5 to 5.5, the uptake capacity of E. radiata for lead is 1.36 mM/g (282 mg/g), which is much higher than those of powdered activated carbon and natural zeolite. Studies indicated that sorption of lead increases as pH increases and reaches a plateau at pH 5. The lead uptake process was rapid, with 60% of me sorption completed within 10 minutes. Presence of light metal ions in solution did not affect lead sorption significantly. Breakthrough curves of fixed bed operations were obtained to illustrate the process of lead removal in a continuous flow system.

Keywords: Heavy-Metals, Accumulation, Biosorbents, Recovery, Removal, Uranium, Biosorbent, Biosorption, Ecklonia Radiata, Heavy Metal Removal, Lead Removal, Marine Algae, Wastewater

Booker, N.A., Cooney, E.L. and Priestly, A.J. (1996), Ammonia removal from sewage using natural Australian zeolite. *Water Science and Technology*, **34** (9), 17-24.

Full Text: [W\Wat Sci Tec34, 17.pdf](W/Wat%20Sci%20Tec34,%2017.pdf)

Abstract: A rapid adsorption process, which utilises the ammonium ion selectivity of a natural Australian zeolite, is being developed for removal of ammonia from sewage. The study reported in this paper claims not to have invented nor discovered this technique of ammonia removal from wastewater, but aims to realise the value of this natural Australian resource as an efficient alternative to existing treatment processes. An understanding of the equilibrium and kinetic behaviour of this material provided insight into its expected capacity as an adsorption media. Favourable results led to pilot scale trials, which revealed excellent performance of the zeolite under continuous column operation. The zeolite adsorption process has proved effective, at pilot scale, in reducing ammonium ions in sewage from concentrations ranging from 25 to 50 mgNH4-N/L down to levels below 1 mgNH4-N/L. Under optimised operating conditions, the adsorption capacity of the zeolite for this range of influent ammonium concentrations was about 4.5 mgNH4-N/g. The rate of treatment by the pilot zeolite column makes it ideally suited as a retrofit to high rate secondary sewage treatment processes, for removal of the soluble ammonium component.

Keywords: Ammonia, Ammonium, Nutrient Removal, Sewage Treatment, Sirofloc, Zeolite

Kongsricharoern, N. and Polprasert, C. (1996), Chromium removal by a bipolar electrochemical precipitation process. *Water Science and Technology*, **34** (9), 109-116.

Full Text: [W\Wat Sci Tec34, 109.pdf](W/Wat%20Sci%20Tec34,%20109.pdf)

Abstract: This research was conducted in laboratory to investigate an alternative for Cr removal from an electroplating wastewater using the electro-chemical precipitation (ECP) process. The ECP unit, operated in the bipolar mode, had six steel plates including the anode and cathode and was supplied with DC power, The electroplating wastewater used in the experiments contained Cr concentrations in the range of 570-2100 mg/l. The Cr removal efficiencies in the bipolar ECP units were higher than 99% and the Cr concentrations in the treated effluent were less than 0.5 mg/l. The acceptable conditions of the bipolar ECP unit treating the electroplating wastewater were found to be: I-1.0 amp (or i-6.70 amp/m2) and initial pH (pHi) of 4.5. At these acceptable conditions, the electric power and steel electrode plate consumptions were 20.0 kWh/m3 and 1.1-2.8 kg-Fe/kg Cr removed, respectively, X-ray fluorescence and X-ray diffractometric analysis performed on the precipitated sludge revealed the main compounds to be maghemite (Fe2O3) and chromite. The percent Fe2O3 and FeCr2O4 contents of the dried ECP sludge were 68% and 25%, respectively. From the mass balance analysis, the percent of Cr removal by precipitation in the ECP unit and adsorption on the ECP sludge were 85.1 and 14.8%, respectively.

Keywords: Water, Electroplating Wastewater, Chromium, Electrochemical Precipitation, Heavy Metal Removal, Sludge

Brasquet, C., Roussy, J., Subrenat, E. and Le Cloirec, P. (1996), Adsorption of micropollutants onto fibrous activated carbon: Association of ultrafiltration and fibers. *Water Science and Technology*, **34** (9), 215-222.

Full Text: [W\Wat Sci Tec34, 215.pdf](W/Wat%20Sci%20Tec34,%20215.pdf)

Abstract: The adsorption of polluted solutions is performed by different kinds of activated carbon: grains, powder and fibers (cloth or felt). The adsorption is carried out in a batch reactor. Classic models are applied and kinetic constants are calculated. Results showed that the performance of fiber activated carbon (FAC) is significantly higher than that of granular activated carbon (GAG). Moreover, FAC’s adsorption capacities of phenol are greater than GAC’s. Therefore the application of FAC adsorbers may lead to smaller adsorption reactors. The breakthrough curves obtained with FAC adsorbers are particularly steep, suggesting a smaller mass transfer resistance than GAG. The adsorption zone in the FAC bed is about 3.4 mm and is not dependent on the flow rate within the range 0.67-2.07 mh-1. The selectivity of the FAC between different size of soluble molecules is shown. Then, an Ultrafiltration (UF) membrane is coupled with FAC to remove successively macromolecules (humic substances) and phenols present together in an aqueous solution. This new and original approach to a water treatment compact process successfully put to use. Industrial developments are put forward.

Keywords: Adsorption, Fibrous Activated Carbon, Humic Substances, Phenol, Organic Matter, Ultrafiltration, Water Treatment, Removal, PAC

? Liu, J.X., Wang, B.Z., Li, W.G., Jin, C.J., Cao, X.D. and Wang, L. (1996), Removal of nitrogen from coal gasification and coke plant wastewaters in A/O submerged biofilm-activated sludge (SBF-AS) hybrid system. *Water Science and Technology*, **34** (10), 17-24.

Full Text: [1996\Wat Sci Tec34, 17.pdf](1996/Wat%20Sci%20Tec34,%2017.pdf)

Abstract: Experimental research involving both laboratory and full-scale studies has been carried out to evaluate the nitrification-denitrification process carried out in a submerged biofilm (in anoxic zone)-activated sludge (in oxic zone) (SBF-AS) hybrid system for nitrogen removal from coal gasification and coke plant wastewaters. The anoxic reactor in the system was packed with fibrous carriers fixed on plastic plates of circular form for the attached growth of submerged biofilm with facultative denitrifying bacteria as dominant species to carry out denitrification, and the activated sludge process was used in the aerobic reactor for nitrification. As the denitrifying and nitrifying bacteria live under anoxic and aerobic conditions respectively in the hybrid system, the process was tested under the conditions of high organic and ammonia loading rates and short hydraulic retention time(HRT). The experimental results show that ammonia nitrogen, NH3-N removal is between 94% and 99.9% and COD removal between 80% and 95%. Copyright (C) 1996 IAWQ.

Keywords: A/O Submerged Biofilm-Activated Sludge Hybrid System, Activated Sludge, Ammonia, Ammonia-Nitrogen, Anoxic, Biological Removal of Nitrogen, Coal Gasification Wastewater, Cod Removal, Coke Plant, Coke Plant Wastewater, Denitrification, NH3-N Removal, Nitrification, Nitrification-Denitrification, Oxic

Mittal, A.K. and Gupta, S.K. (1996), Biosorption of cationic dyes by dead macro fungus *Fomitopsis carnes*: Batch studies. *Water Science and Technology*, **34** (10), 81-87.

Full Text: [W\Wat Sci Tec34, 81.pdf](W/Wat%20Sci%20Tec34,%2081.pdf)

Abstract: Application of dead macrofungus, Fomotopsis carnea for the sorption of three cationic dyes viz., Orlamar Red BC (ORBG), Orlamar Blue G (OBG) and Orlamar Red GTL (ORGTL) has been investigated. This study mainly focuses on the effect of various sorption kinetic parameters for the uptake of ORBG. Fomitopsis carnea shows excellent sorption potential for all the dyes studied. Saturation capacities for ORBG, OBG and ORGTL are 503.1, 545.2 and 643.9 mgg-1 respectively. Biosorption in the batch adsorber can be described by first-order reaction kinetics. Sorption decreases with decrease in pH.

Hu, T.L. (1996), Removal of reactive dyes from aqueous solution by different bacterial genera. *Water Science and Technology*, **34** (10), 89-95.

Full Text: [W\Wat Sci Tec34, 89.pdf](W/Wat%20Sci%20Tec34,%2089.pdf)

Abstract: The use of biomass for the removal of reactive dyes from an aqueous solution with different bacterial genera has been investigated. Three Gram-negative bacteria: Aeromonas sp., P. luteola and E. coli and two Gram-positive bacteria: B. subtilis and S. aureus and a mixed biomass of activated sludge are the tested biosorbents. Dead cells of Gram-negative bacteria have a higher specific adsorption capacity than the living cells. The dye removal is in the order of *Aeromonoas* sp. > *P. luteola* > *E. coli*. The adsorption equilibrium can be reached within one hour. Due to the positively charged cells at acidic pH, the removal of reactive dyes increases with decreasing pH. Evaluating the adsorption parameters, bacterial biomass exhibits stable adsorption characteristics, which makes it a suitable adsorbent for different dye compounds.

Keywords: Hazardous Organic Pollutants, Fly-Ash, Adsorption, Biosorption, Sorption, Biomass, Sludge, Azo, Reactive Dyes, Adsorption, Biomass, Specific Adsorption Capacity

Jansson-Charrier, M., Guibal, E., Roussy, J., Surjous, R. and Le Cloirec, P. (1996), Dynamic removal of uranium by chitosan: Influence of operating parameters. *Water Science and Technology*, **34** (10), 169-177.

Full Text: [W\Wat Sci Tec34, 169.pdf](W/Wat%20Sci%20Tec34,%20169.pdf)

Abstract: New wastewater treatments involving biosorption processes are being developed This work focuses on the dynamic removal of uranium using chitosan in fixed-bed reactors and investigates the main operating parameters: particle size, column size, flow velocity and metal ion concentration. The results confirm the predominant effect of diffusion on the control rate. The optimization of the process should take into account both sorption performances and hydrodynamic behaviour. The process is successfully applied to the treatment of leachates at an abandoned mine site. This study shows that chitosan is an effective sorbent for the treatment and recovery of uranium from dilute effluents.

Keywords: Glutamate Glucan, Uranyl Ions, Sorption, Derivatives, Performances, Biosorption, Equilibrium, Adsorption, Polymers, Waters, Adsorption, Chitosan, Column Size Effect, Concentration Effect, Desorption, Pilot Scale Application, Fixed Bed Reactor, Flow Velocity Effect, Particle Size Effect, Uranyl Ions

Tünay, O., Kabdasli, I., Eremektar, G. and Orhon, D. (1996), Color removal from textile wastewaters. *Water Science and Technology*, **34** (11), 9-16.

Full Text: [W\Wat Sci Tec34, 9.pdf](W/Wat%20Sci%20Tec34,%209.pdf)

Abstract: The requirement of color removal has promoted the research in this field. However, there is still a lack of understanding of colour problems. In this paper a literature review is made to assess the information on color removal and need for systematic evaluation of the results is emphasized. Experimental studies are conducted on the textile dyeing wastewaters applying chemical precipitation, chemical oxidation, adsorption and their combination. Results of the study are evaluated and discussed within the context of a systematic approach.

Keywords: Industry Wastewaters, Adsorption, Chemical Oxidation, Chemical Precipitation, Color Removal, Textile Wastewater

Baes, A.U., Umali, S.J.P. and Mercado, R.L. (1996), Ion exchange and adsorption of some heavy metals in a modified coconut coir cation exchanger. *Water Science and Technology*, **34** (11), 193-200.

Full Text: [W\Wat Sci Tec34, 193.pdf](W/Wat%20Sci%20Tec34,%20193.pdf)

Abstract: Potentiometric titration experiments were carried out to determine the relative ability of sodium and different heavy metal cations in replacing protons from ionogenic sites of a modified coconut coir cation exchanger. The relative preference for the cations follow the sequence: Na << Ca(II) < Mn(II) < Ni(II) < Cu(II) < Pb(II). This preferential series was confirmed by determining the concentrations of the divalent cations and sodium which were adsorbed by the materiAl-During the titration process. Adsorption isotherms at pH 4 and pH 6 were obtained to determine the Langmuir adsorption constants for the heavy metal cations. The adsorbent material adsorbed high amounts of Pb(II), Cu(II) and Ni(II) (in decreasing order) from solutions whose concentrations were comparable to those of wastewaters. Our results show that the modified coconut coir cation exchanger has good potential as an adsorbent of heavy metals in industrial wastewaters.

Keywords: Adsorption, Cation Exchanger, Heavy Metals, Modified Coconut Coir, Potentiometric Titration

Kueh, C.S.W. and Chui, H.K. (1996), Integrated catchment management of Deep Bay, Hong Kong. *Water Science and Technology*, **34** (12), 1-8.

Full Text: [W\Wat Sci Tec34, 1-8.pdf](W/Wat%20Sci%20Tec34,%201-8.pdf)

Abstract: Deep Bay contains one of the most important wetlands in southern China It is located at the border of Hong Kong and the Shenzhen Special Economic Zone (SEZ). Over 50,000 birds rely on this wetland as a breeding, feeding, resting and refuelling station in winter. The Deep Bay catchment is also one of Asia’s fastest developing areas. Its population has doubled since 1984. The rapid population increase and economic development have exerted considerable pressure on the wetland environment. Efforts have been made to reduce the pollution loads by both the Hong Kong and Shenzhen Governments to protect this ecologically important wetland. Through the implementation of a series of environmental programmes, including: sewerage master plans, the livestock waste control scheme and enforcement of the Water Pollution Control Ordinance, the pollution loads arising from Hong Kong decreased from 125,000 to 45,000 kgBOD5/day between 1988 and 1994 and are expected to further reduce to around 3,000 kgBOD5/day by the year 2000. To protect the wetland community while promoting sustainable development in the catchment, Hong Kong initiated a study in 1995 to develop a mathematical model for the bay and a water quality management strategy for the future.

Burrows, R. (1996), A sewage disposal strategy for the Isle of Man. *Water Science and Technology*, **34** (12), 119-126.

Full Text: [W\Wat Sci Tec34, 119.pdf](W/Wat%20Sci%20Tec34,%20119.pdf)

Abstract: The Isle of Man sits in the middle of the Irish Sea, surrounded by the United Kingdom (UK) coasts of England, Scotland, Wales and Northern Ireland. It is, however, independently governed by its own Parliament, Tynwald and is not part of the European Union (formerly the European Community, EC). A radical scheme for the integrated sewerage provision of the whole of the Island, of population approximately 65,000, involving centralised treatment and re-use of sewage sludges, has been accepted in principle. The policy adopted, as realised in the so-called ‘IRIS’ scheme, goes beyond the level of provision called for by the recent EC Directive on Urban Wastewater Treatment, yet the threat posed by the Isle of Man to the waters of the Irish Sea is negligible in comparison to the major inputs from its more populous neighbours. The geographic separation of the Island from the major pollution inputs from the British and Irish mainlands should ensure unobstructed assimilation of its releases by the marine environment. In many instances the coastal communities of the island, through their small size, would be without the statutory responsibility for land based treatment provision, even if bound by the EC legislation. This article, based on evidence presented to Public Inquiry on a first phase of the scheme’s implementation, expresses the view that the strategy for future sewerage provision should be re-evaluated in the light of the flexibilities in implementation which would be afforded to the Isle of Man under the EC legislation. More fundamentally, however, it is suggested that the ‘marine treatment’ option using long-sea outfalls should be incorporated in the range of scheme options to be evaluated against achievement of a ‘best environmental solution’. The argument developed herein draws extensively on the background leading to the UK Water Industry’s reluctant adoption of the EC legislation. These circumstances are considered worthy of report in their own right and the Isle of Man provides an ideal case study.

Keywords: Sewage Disposal, Outfalls, Marine Treatment, Environmental Impacts, Legislation, Harmonisation

? Bally, D., Asano, T., Bhamidimarri, R., Chin, K.K., Grabow, W.O.K., Hall, E.R., Ohgaki, S., Orhon, D., Milburn, A., Purdon, C.D. and Nagle, P.T. (1996), Water quality international 96.4. environmental contaminants health related water microbiology coastal pollution and eutrophication environmental restoration, groundwater contamination and management solid waste disposal selected proceedings of the 18th biennial conference of the international association on water quality, held in Singapore, 23-28 June 1996 preface. *Water Science and Technology*, **34**, R9-R9.

Holmes, P.R. (1996), Measuring success in water pollution control. *Water Science and Technology*, **34** (12), 155-164.

Full Text: [W\Wat Sci Tec34, 155.pdf](W/Wat%20Sci%20Tec34,%20155.pdf)

Abstract: Ambient water quality is much used to show progress in water pollution control. The state of the environment is not easy to measure reliably and may be subject to very many factors other than the impact of polluting discharges and those who seek to control them. Even measured trends in water quality do not prove that the pollution control activity is being managed to the best standards of efficiency and effectiveness. So managers may have great difficulty in measuring their success or in correctly attributing change in the environment to their action. On the other hand, owners of pollution control systems, both public and private, make little allowance for scientific scruples in their demands for objective measures of effectiveness. The paper examines the theory behind these contradictions and uses the recent development of performance indicators for environmental management in Hong Kong to consider how theory and practice differ. It concludes that effectiveness is relative, but pollution control managers can help themselves if they integrate into their organizations a constant alertness to fundamental goals.

Notes: highly cited

? Brix, H. (1997), Do macrophytes play a role in constructed treatment wetlands? *Water Science and Technology*, **35** (5), 11-17.

Full Text: [1997\Wat Sci Tec35, 11.pdf](1997/Wat%20Sci%20Tec35,%2011.pdf)

Abstract: The larger aquatic plants growing in wetlands are usually called macrophytes. These include aquatic vascular plants, aquatic mosses and some larger algae. The presence or absence of aquatic macrophytes is one of the characteristics used to define wetlands, and as such macrophytes are an indispensable component of these ecosystems. As the most important removal processes in constructed treatment wetlands are based on physical and microbial processes, the role of the macrophytes in these has been questioned. This paper summarizes how macrophytes influence the treatment processes in wetlands.

The most important functions of the macrophytes in relation to the treatment of wastewater are the physical effects the presence of the plants gives rise to. The macrophytes stabilise the surface of the beds, provide good conditions for physical filtration, prevent vertical flow systems from clogging, insulate the surface against frost during winter, and provide a huge surface area for attached microbial growth. Contrary to earlier belief, the growth of macrophytes does not increase the hydraulic conductivity of the substrate in soil-based subsurface flow constructed wetlands. The metabolism of the macrophytes affects the treatment processes to different extents depending on the type of the constructed wetland. Plant uptake of nutrients is only of quantitative importance in low-loaded systems (surface flow systems). Macrophyte mediated transfer of oxygen to the rhizosphere by leakage from roots increases aerobic degradation of organic matter and nitrification. The macrophytes have additional site-specific values by providing habitat for wildlife and making wastewater treatment systems aesthetically pleasing. (C) 1997 IAWQ.

Keywords: Hydraulic Conductivity, Biochemical Oxygen Demand, Rhizosphere, Oxygen Transport, Root Oxygen Release, Aeration, Nutrient Uptake, Potamogeton-Perfoliatus L, Trin Ex Steudel, Phragmites-Australis, Oxygen Release, Aquatic Macrophytes, Flood Tolerance, Water-Flow, Roots, Plants, Soil

Wittgren, H.B. and Mæhlum, T. (1997), Wastewater treatment wetlands in cold climates. *Water Science and Technology*, **35** (5), 45-53.

Full Text: [W\Wat Sci Tec34, 155.pdf](W/Wat%20Sci%20Tec34,%20155.pdf)

Abstract: The best prospects for successful wetland treatment should be in the warmer regions of the world, but studies in North America and Scandinavia show that wetland treatment may be feasible also in cooler regions. A review shows that the number of wetlands of different types (free water surface, FWS; horizontal and vertical subsurface flow, SSF), treating different kinds of wastewater, is steadily increasing in most parts of the cold temperate regions of the world. The major wetland engineering concerns in cold climates, which are discussed in this paper, are related to: (1) ice formation, and its implications for hydraulic performance; (2) hydrology and hydraulic issues besides ice formation; and (3) the thermal consequences for biologically or microbiologically mediated treatment processes. Energy-and water-balance calculations, as well as thermal modeling, are useful tools for successful design and operation of treatment wetlands, but the shortage of data makes it necessary to adopt a conservative approach. The treatment processes often appear less temperature sensitive in full-scale wetlands as compared to laboratory incubations. Several possible explanations are discussed in the paper: (1) sedimentation playing a significant role, (2) overdimensioning in relation to some constituents, (3) seasonal adsorption (cation exchange) of ammonium, and (4) temperature adaptation of the microbial community. Experience shows that cold climate wetlands can meet effluent criteria for the most important treatment parameters. To gain wide acceptance, however, we need to become more specific about design and construction, and also about operation, maintenance and cost-effectiveness. These goals require detailed knowledge about processes in full-scale wetlands, including long-term changes and response to maintenance.

Keywords: Nutrient Removal, Water, Cold Climate, Design, Geographical Distribution, Hydrology, Operation, Plant Uptake, Purification Processes, Nutrient Removal, Treatment Wetlands, Treatment Performance, Wastewater

Suzuki, M. (1997), Role of adsorption in water environment processes. *Water Science and Technology*, **35** (7), 1-11.

Full Text: [W\Wat Sci Tec35, 1.pdf](W/Wat%20Sci%20Tec35,%201.pdf)

Abstract: Aqueous phase adsorption isotherms and adsorption rates are reviewed. Among numbers of isotherm equations, A. combination of adsorption potential and solvophobic concept was applicable to interpreting adsorption equilibrium data obtained for agrochemicals on activated carbon fiber. Intraparticle diffusion becomes the rate-limiting step in liquid phase adsorption on granular activated carbons. Correlation of diffusion coefficients based on surface diffusion mechanisms is introduced. As topics related to adsorption, sediment water partition, biological activated carbon, removal of volatile organics and nutrient removal are briefly reviewed. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Activated Carbon-Fibers, Aqueous-Solutions, Coefficient, Adsorption Equilibrium, Adsorption Potential, Adsorption Rate, Biological Activated Carbon, Drinking Water, Nutrient Removal, Regeneration, Surface Diffusion

Yoshida, H. and Takemori, T. (1997), Adsorption of direct dye on cross-linked chitosan fiber: Breakthrough curve. *Water Science and Technology*, **35** (7), 29-37.

Full Text: [W\Wat Sci Tec35, 29.pdf](W/Wat%20Sci%20Tec35,%2029.pdf)

Abstract: The recovery of direct dye by adsorption on cross-linked fiber (ChF-D), which we have developed, appeared technically feasible. The concentration of amino group fixed in the adsorbent phase was 3.30 mol/kg dry fiber. A typical direct dye, Brilliant Yellow (M.W. = 625, divalent anion) was used in this experimental study. The breakthrough curves for adsorption of the dye were measured for different flow rates, bed heights, influent concentrations of the dye, and temperatures. The experimental breakthrough curves showed that ChF-B recovered the dye efficiently even from the hot dye solution. Axial dispersion coefficient E-z (m2/s) in fibrous bed was measured and the following correlation for the dispersion coefficient was obtained: Ez = 5.4×10-6 Re’ (1.1) (epsilon = 0.698) Ez = 4.7×10-6 Re’ (1.2) (epsilon = 0.813) where epsilon denotes void fraction of the bed. The theoretical breakthrough curve obtained by considering the effect of axial dispersion was close to that obtained from the analytical solution for rectangular isotherm system without considereing the axial dispersion in Re’ > 0.46. The experimental breakthrough curves in pH less than or equal to 4 agreed well with the analytical solution. The intrafiber effective phase diffusivity of the dye at 323 K was about two times larger than that at 298 K and the bed capacity at 323 K was almost the same as that at 298 K.

Keywords: External Mass-Transfer, Pore Diffusion-Model, Activated Carbon, Batch Adsorbers, Acid Dye, Dyestuffs, Equilibria, Chitin, Peat, Adsorption, Chitosan Fiber, Direct Dye, Wastewater Treatment, Breakthrough Curve, Axial Dispersion, Fibrous Bed, Rectangular Isotherm

Hano, T., Takanashi, H., Hirata, M., Urano, K. and Eto, S. (1997), Removal of phosphorus from wastewater by activated alumina adsorbent. *Water Science and Technology*, **35** (7), 39-46.

Full Text: [W\Wat Sci Tec35, 39.pdf](W/Wat%20Sci%20Tec35,%2039.pdf)

Abstract: The adsorption characteristics of activated alumina treated with aluminum sulfate were studied to develop a new removal process for low concentration phosphorus in the waters of rivers and lakes. The equilibrium study showed that the adsorption capacity was enhanced about 1.7-fold by treating with aluminum sulfate. The effective intraparticle diffusion coefficients, determined by the Boyd’s method based on batch runs, were hardly affected by such a low phosphorus concentration as observed in the water of rivers and lakes under investigation. The temperature dependence of the intraparticle diffusion coefficients based on the concentration in solid showed the activation energy of 29.7kJ.mol-1, which was a little higher than that in usual pore diffusion. The maximum continuous operation term (regeneration cycle) of the present phosphorus adsorption system was estimated. Under the conditions of influent phosphorus concentration of 0.1g.m-3, removal extent of 90%, particle size of 2×10-3m, temperature of 298K and space velocity of 1.39×10-3s-1 (5h-1), the present removal system remained effective for about 500 days.

Keywords: Recovery, Water, Activated Alumina, Adsorption, Closed Water Area, Eutrophication, Phosphorus Removal

Weng, C.H., Wang, J.H. and Huang, C.P. (1997), Adsorption of Cr(VI) onto TiO2 from dilute aqueous solutions. *Water Science and Technology*, **35** (7), 55-62.

Full Text: [W\Wat Sci Tec35, 55.pdf](W/Wat%20Sci%20Tec35,%2055.pdf)

Abstract: Cr(VI) adsorption onto TiO2 (anatase) particles was performed in batch equilibrium experiments. Results showed that pH was the key factor affecting the adsorption characteristics. The marked adsorption was observed under acidic condition and the adsorption capacities decreased with increasing pH, temperature, and ionic strength. The adsorption obeyed the Langmuir adsorption isotherm and the maximum adsorption capacities were determined at specific pH values. A surface complex formation model was proposed to describe the adsorption reaction between aqueous chromates and TiO2 solid surface. Because the magnitude of electrostatic energy, the adverse solvation, and lateral interaction energy which contribute to the total adsorption are relatively small in comparison with the specific chemical energy, we conclude that the specific chemical interaction is the major mechanism responsible for the adsorption process. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Oxide-Water Interface, Ions, Adsorption, Cr(VI), Surface Complex Formation Model, TiO2

? Lo, S.L., Jeng, H.T. and Lai, C.H. (1997), Characteristics and adsorption properties of iron-coated sand. *Water Science and Technology*, **35** (7), 63-70.

Full Text: [1997\Wat Sci Tec35, 63.pdf](1997/Wat%20Sci%20Tec35,%2063.pdf)

Abstract: This study was conducted to develop a process for coating hydrated iron oxide on the surface of quartz sand to utilize the adsorbent properties of the coating and the filtration properties of the sand, Three coating parameters were investigated: pH, Fe concentration at which iron oxide was prepared, and the coating temperature. A Scanning Electron Microscope (SEM) and X-Ray Diffractometer (XRD) were used to observe the surface properties of the coated layer. Acid resistance was used to evaluate the attachment strength of the coated layer. Batch adsorption tests were performed to compare the effects of each coating parameter on the adsorption of heavy metals on the coated layer. Energy Dispersive Analysis of X-ray (EDAX) was used for characterizing metal adsorption sites on the iron-coated sand. The results indicated that the coated sand had more pores and higher specific surface area because of the attachment of iron oxide. The coated sand produced at higher pH((coating)) had better adsorption efficiencies of metals but had worse acid resistance. A high-temperature coating process enhanced the stability of the oxide coatings. Comparing heavy metal removal by adsorption on iron-coated sand and chemical precipitation, adsorption was shown to be capable of removing heavy metals over a wider pH range and to much lower levels than precipitation. The results from EDAX analysis showed that copper ions were chemisorbed on the surface of iron-coated sand. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Adsorption, Coatings, Goethite, Heavy Metal, Hematite, Hydrated Iron Oxide, Sand, Metal-Bearing Wastes

Tokunaga, S., Wasay, S.A. and Park, S.W. (1997), Removal of arsenic(V) ion from aqueous solutions by lanthanum compounds. *Water Science and Technology*, **35** (7), 71-78.

Full Text: [W\Wat Sci Tec35, 71.pdf](W/Wat%20Sci%20Tec35,%2071.pdf)

Abstract: A new adsorption process for the removal of As(V) ion from aqueous solutions has been studied using lanthanum hydroxide (LH), lanthanum carbonate (LC) and basic lanthanum carbonate (BLC). These La compounds were effective in removing As ion to decrease the concentration down to < 0.001 mM. Dissolution of these La compounds was measured in the pH range of 2 to 12. The dissolution was appreciable at initial pH < 4.3, < 4.3 and < 4.0 for LH, LC and BLC, respectively. Kinetic study showed that the As removal was a first-order reaction in the neutral pH range and the rate constants were in the order of LH > LC > BLC. The As removal was highly pH-dependent. The optimum pH range was 3-8, 4-7 and 2-4 for LH, LC and BLC, respectively. The following two mechanisms are proposed: (i) adsorption by exchange of CO3 and/or OH group with As ions in the neutral to alkaline pH range where La does not dissolve and (ii) precipitation of insoluble lanthanum arsenate, LaAsO4, in the acid pH range. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Adsorption, Arsenic(V), Basic Lanthanum Carbonate, Dissolution, Kinetics, Lanthanum Carbonate, Lanthanum Hydroxide, Precipitation, Drinking-Water, Adsorption, Cerium

Fujie, K., Hu, H.Y., Lim, B.R. and Xia, H. (1997), Effect of biosorption on the damping of influent fluctuation in activated sludge aeration tanks. *Water Science and Technology*, **35** (7), 79-87.

Full Text: [W\Wat Sci Tec35, 79.pdf](W/Wat%20Sci%20Tec35,%2079.pdf)

Abstract: To describe the organic removal performance in an activated sludge process, the effect of biological adsorption (biosorption, hereinafter) of both soluble and particulate organic substances (SOS and POS, respectively, hereinafter) on the rate of organic removal must be taken into account. This study quantitatively investigated the biosorption of organic pollutants in the domestic wastewater by tile activated sludge. The capability of biosorption and the rate of bio-oxidation of organic pollutants were formulated based on the experimental results as functions of both COD concentration and temperature. The biosorption capacity of activated sludge was proportional to COD concentration in the mixed liquor originated from the influent. The kinetic expressions were combined with the equation of longitudinal liquid mixing to set up the mathematical model to predict the effluent COD, and thus to clarify the effect of biosorption on the damping of influent fluctuations of both COD concentration and the inflow rate. The model was also successfully applied to assessing the effectiveness of MLSS control strategies in equalizing the effluent water quality.

Keywords: Wastewater Treatment, Activated Sludge Process, Biosorption, Bio-Oxidation, MLSS Control, Longitudinal Liquid Mixing, Mathematical Model Simulation, Damping of Influent Fluctuation, Aeration Tank

Baes, A.U., Okuda, T., Nishijima, W., Shoto, E. and Okada, M. (1997), Adsorption and ion exchange of some groundwater anion contaminants in an amine modified coconut coir. *Water Science and Technology*, **35** (7), 89-95.

Full Text: [W\Wat Sci Tec35, 89.pdf](W/Wat%20Sci%20Tec35,%2089.pdf)

Abstract: The adsorption of nitrate, chromium (VI), arsenic (V) and selenium (VI) anions in an amine modified coconut coir (MCC-AE : with secondary and tertiary amine functionality) were studied to determine the capability of this easily prepared and low-cost material in removing typical groundwater anion contaminants.

Batch adsorption-ion exchange experiments were conducted using 200 mg MCC-AE, initially containing chloride as the resident anion, and 50 ml of different anion-containing water of varying concentrations. It is presumed, at this low pH, that only SeO42- remained as a divalent anion, while monovalent species H2AsO4- and HCrO4- predominated in their respective exchanging ion solutions. The adsorption data were fitted using the Freundlich equation and maximum adsorption fbr each anion was estimated using their respective Freundlich equation constants. MCC-AE exhibited preference for divalent Cr(VI) and Se(VI) anions compared with the Cl- resident ion. Maximum As(V) adsorption was 0.086 mmol/g, while maximum adsorption of Cr(VI), NO3- and Se(VI) anions was 0.327 mmol/g, 0.459 mmol/g, and 0.222 mmol/g, respectively. The ion exchange capacity of MCC-AE is estimated, based on its exchange capacity for nitrate, to be within 0.46 mmol of positive charges per gram. Similar adsorption experiments were conducted for comparison using commercial chloride-form Amberlite IRA-900 strong base (quaternary amine functionality) anion exchanger, with an exchange capacity of 4.2 meq/g. Maximum adsorption of the different ions in IRA-900 was about 3 times higher for NO3-, 9 times higher for Se(VI), 10 times higher for As(V) and 9 times higher for Cr(VI), than that in MCC-AE. Differences in the ion exchange behavior of MCC-AE and IRA-900 were probably due to the different amine functionalities in the two exchangers. The results suggest that MCC-AE may be used as a low-cost alternative adsorbent/ion exchanger for treatment of anion contaminants in groundwater. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Adsorption, Anion Exchange, Arsenate, Chromate, Coconut Coir, Nitrate, Selenate

Sakoda, A., Sakai, Y., Hayakawa, K. and Suzuki, M. (1997), Adsorption of viruses in water environment onto solid surfaces. *Water Science and Technology*, **35** (7), 107-114.

Full Text: [W\Wat Sci Tec35, 107.pdf](W/Wat%20Sci%20Tec35,%20107.pdf)

Abstract: Recently the contamination of water environment involving rivers, lakes, the sources of drinking water. etc. by viruses has been paid attention to as a new threat. The behavior of the viruses found in water environment is not well understood so far. However, it is suspected in general that the viruses are adsorbed onto solid surfaces such as suspended solids and sediment and keep their activities for a long time. Most likely, it is true that the adsorption of the viruses onto solid surfaces is one of the major factors controlling their transport and survival in water environment. In this work, the adsorption equilibrium relations of model viruses in water environment and their activities on solid surfaces were investigated. The E. coil phage such as Qss, fr, MS2 and T4 were employed for experiments as model viruses, and cellulose and its derivatives, kaolin, carbon black, etc. were chosen as model solid surfaces. All the adsorption isotherms of model viruses on model surfaces were successfully written as the linear expression by the Henry equation in the concentration range of 102-107 [PFU/ml]. The resultant Henry constants were correlated with the total acidity of the solid surfaces. Stability of the model viruses was completely different when they were adsorbed on the solid surfaces and when they were suspended in water. The viruses adsorbed on the solid surfaces were significantly stable compared with the suspended ones regardless of the surface properties. It is suggested that the shrinkage of the virus is one of the important survival factors and the adsorption onto solid surfaces enhances their activities. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Coliphage-Q-Beta, Waste-Water, Removal, Inactivation, Survival, Minerals, Biomass, Soils, Virus, E. Coli Phage, Adsorption, Desorption, Inactivation, Suspended Solid, Sediment

Chu, K.H., Hashim, M.A., Phang, S.M. and Samuel, V.B. (1997), Biosorption of cadmium by algal biomass: Adsorption and desorption characteristics. *Water Science and Technology*, **35** (7), 115-122.

Full Text: [W\Wat Sci Tec35, 115.pdf](W/Wat%20Sci%20Tec35,%20115.pdf)

Abstract: The adsorption and desorption characteristics of a biosorption process comprising the biomass of the marine alga *Sargassum* baccularia, cadmium ions and desorbing agents hydrochloric acid and ethylenediaminetetraacetic acid (EDTA) were investigated using a batch reactor system. Both desorbents were effective in stripping adsorbed cadmium from the biomass. It was found that HCl at pH 2 could desorb 80% of the cadmium initially loaded onto the biomass. Almost complete recovery of cadmium was achieved by a 3.24 mM EDTA solution. The reusability of the biomass was tested in five consecutive adsorption-desorption cycles. The quantity of cadmium desorbed over the five cycles with either HCl or EDTA as desorbent corresponded well to the quantity loaded, indicating that complete desorption was readily achieved. However, the cadmium uptake capacity of the biomass deteriorated with repeated use of HCl or EDTA. HCl was found to have reduced cadmium uptake by 56% while the reduction for EDTA was nearly 40% over the five adsorption-desorption cycles. EDTA thus emerged as a slightly better desorbing agent compared with HCl. After completion of the five cycles it was found that 30% of the original biomass weight had been lost with HCl as the desorbent. EDTA exhibited desorption behaviour similar to that of HCl by causing a biomass loss of 16%. The loss of biomass indicates that some dissolution of biomass components containing cadmium binding sites apparently occurred, reducing the cadmium uptake capacity of the biomass in multiple cycles of adsorption-desorption.

Keywords: Marine-Algae, Biosorbent, Metals, Adsorption, Algae, Biosorption, Cadmium, Desorption, Heavy Metals, Seaweed, Wastewater

Lin, T.F. (1997), Diffusion and sorption of water vapor and benzene within a dry model soil organic matter. *Water Science and Technology*, **35** (7), 131-138.

Full Text: [W\Wat Sci Tec35, 131.pdf](W/Wat%20Sci%20Tec35,%20131.pdf)

Abstract: The sorption behavior of water vapor and benzene within a dry model soil organic matter (SOM), peat, was studied. An electrobalance system was employed to determine both the equilibrium sorption isotherm and sorption-desorption kinetics. The sorption isotherm for water vapor was found to resemble that previously reported for this sample, while the sorption isotherm for benzene could not be determined, due to a failure to obtain reproducible sorption capacity. In the kinetic study, strong asymmetries between sorption and desorption rates were observed for both water vapor and benzene. Two diffusion models, accounting for either gas-phase pore diffusion within peat grains or solid-phase diffusion within microspheres of SOM, were used to interpret the asymmetric sorption rate data. Considering gas-phase pore diffusion only, the model resolved the asymmetry of sorption rates and described the experimental data very well for water vapor at three different concentrations. However, the pore diffusion model failed to capture the dominant feature of the experimental data for benzene. As a refinement, a model assuming that solid-phase intra-SOM diffusion is the rate-limiting mechanism produced a better description of the experimental data. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Sorption, Sorption Kinetics, Volatile Organic Compounds, Water Vapor, Soil Organic Matter, Feat, Long-Term Sorption, Aquifer Material, Natural Sediments, Partition, Peat, Resistance, Equilibria, Adsorption, Chemicals, Rates

Kameya, T., Hada, T. and Urano, K. (1997), Changes of adsorption capacity and pore distribution of biological activated carbon on advanced water treatment. *Water Science and Technology*, **35** (7), 155-162.

Full Text: [W\Wat Sci Tec35, 155.pdf](W/Wat%20Sci%20Tec35,%20155.pdf)

Abstract: Several problems such as unpleasant odor, taste and toxic halogenated organic compounds which are produced by the reaction of organic substances with chlorine that is used for disinfection have occurred in water purification plant for drinking water. Advanced water treatment with biological activated carbon (BAG) has been focused on, but there are few papers about pore volume decrease of activated carbon in BAG. In this study, the changes in cumulative TOC removal and pore volume distribution for two types of activated carbon from a bench-scale apparatus and a mini-column apparatus, to which river water was supplied after coagulation-sedimentation for a period of over 1200 days, were investigated. Adsorption abilities decreased considerably after ca 1000 days and the activated carbons became like sand. The cumulative TOC removals by the adsorption effect were asymptotic to constant values for each empty bed contact time. Though the removal efficiencies for both the activated carbons were approximately equivalent, the pore volume decreases were not uniform. The volume of smaller pores under 2 nm in diameter mainly decreased. Accumulations of minerals such as aluminium and calcium were small, and the pore volume decreases were mainly caused by the accumulation of organic substances. Almost all of the organic substances that accumulated in the activated carbon could be extracted by sodium hydroxide solution. The mean density of the organic substances that accumulated in the activated carbon was estimated to be 0.91 g/ml. Since the pore volume decrease of the activated carbon was small compared with the removal amounts by the adsorption effect, A. large amount of organic substances that had adsorbed once disappeared and the pore volume of the activated carbon was regenerated. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: GAC, biological activated carbon, pore volume, pore distribution, advanced water treatment, drinking-water

Takeuchi, Y., Mochidzuki, K., Matsunobu, N., Kojima, R., Motohashi, H. and Yoshimoto, S. (1997), Removal of organic substances from water by ozone treatment followed by biological activated carbon treatment. *Water Science and Technology*, **35** (7), 171-178.

Full Text: [W\Wat Sci Tec35, 171.pdf](W/Wat%20Sci%20Tec35,%20171.pdf)

Abstract: As an advanced water treatment, A. combination of ozonation and biological activated carbon (BAG, hereafter) treatment is being applied to purify raw water for municipal use in some cases. The authors examined effects of ozonation on water quality in a batch system, using water samples containing organic substances fractionated to several molecular weight ranges. Also, A. flow test of laboratory-scale was performed to study on the capability of the treatment in terms of removal efficiency of the dissolved organic substances, e.g., fumic substances, which preoxidized with ozone, As a result, the changes in equilibrium adsorption and in the biodegradability of organic substances dissolved in water before and after oxidation with ozone were made clear, (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Adsorption, Adsorption, Advanced Treatment, Biodegradation, Biological Activated Carbon, Drinking Water Purification, Fumic Substances, Molecular Weight Fractionation, Ozonation

Leyva-Ramos, R., Rangel-Mendez, J.R., Mendoza-Barron, J., Fuentes-Rubio, L. and Guerrero-Coronado, R.M. (1997), Adsorption of Cadmium(II) from aqueous solution onto activated carbon. *Water Science and Technology*, **35** (7), 205-211.

Full Text: [W\Wat Sci Tec35, 205.pdf](W/Wat%20Sci%20Tec35,%20205.pdf)

Abstract: The adsorption isotherm of cadmium on activated carbon was measured in a batch adsorber. Effects of temperature and solution pH on the adsorption isotherm were investigated by determining the adsorption isotherm at temperatures of 10, 25, and 40°C and at initial pH values from 2 to 8. Langmuir isotherm better fitted the experimental data since the average percent deviation was lower than with the Freundlich isotherm. It was noticed that the amount of Cd2+ adsorbed was reduced about 3 times by increasing the temperature from 10 to 40°C. it was found that Cd2+ was not adsorbed on activated carbon at pH of 2 or lower and that Cd2+ was precipitated out as Cd(OH)2 at pH values above 9. Maximum adsorption capacity was observed at pH of 8 and the adsorption capacity was decreased about 12 times by reducing the initial pH from 8 to 3. According to the cadmium speciation diagram the predominant species below pH of 8 is Cd2+. Thus, cadmium was adsorbed on the activated carbon surface as Cd2+. It was concluded that the adsorption capacity is a strong function of pH and temperature.

Keywords: Adsorption, Cadmium, Isotherm, pH Effect, Temperature Effect

Hand, D.W., Crittenden, J.C., Hokanson, D.R. and Bulloch, J.L. (1997), Predicting the performance of fixed-bed granular activated carbon adsorbers. *Water Science and Technology*, **35** (7), 235-241.

Full Text: [W\Wat Sci Tec35, 235.pdf](W/Wat%20Sci%20Tec35,%20235.pdf)

Abstract: Granular Activated Carbon (GAG) adsorption is an effective treatment technology for the removal of Synthetic Organic Chemicals (SOCs) from drinking water supplies. This treatment process can be expensive if not properly designed. Application of mathematical models is an attractive method to evaluate the impact of process variables on process design and performance. In this study, A. mathematical modeling methodology incorporating the pore and surface diffusion model (PSDM) is proposed for known mixtures in fixed-bed adsorbers. Thermodynamic correlations for estimation of equilibrium parameters and empirical correlations for estimation of mass transfer parameters are presented. The PSDM was successfully compared to a 6-component mixture for empty bed contact times (EBCTs) of 2.4, 4.9, and 9.56 minutes. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Mixtures, Adsorption, Granular Activated Carbon, Adsorbers, Computer Software, Water Supply, Water Treatment

Hwa, T.J. and Jeyaseelan, S. (1997), Conditioning of oily sludges with municipal solid wastes incinerator fly ash. *Water Science and Technology*, **35** (8), 231-238.

Full Text: [W\Wat Sci Tec35, 231.pdf](W/Wat%20Sci%20Tec35,%20231.pdf)

Abstract: Conditioning of sludges improves dewatering characteristics and reduces the quantity of sludge to be handled. Anaerobic digested sludge collected from a sewage treatment plant contained 1.8% to 8% oil. The increase of specific resistance and capillary suction time (CST) with increasing oil content observed in these samples indicates the interference of oil in dewatering. It has been found that addition of municipal solid wastes incinerator fly ash decreases the specific resistances and capillary suction times of oily sludges rapidly up to 3% dosage. Beyond 3% fly ash, the decrease is less significant and the solids content in the sludge cake increases. This optimum dosage remains the same for sludges with varying oil contents from 1.8% to 12%. The total suspended solids of filtrate decreases with fly ash dosage but the toxic concentrations of heavy metals increases considerably. However at the optimum dosage of 3%, concentrations of heavy metals are within the limits for discharging into the sewers. The correlations of CST with the dewatering characteristics such as specific resistance, filter yield and corrected filter yield are established. These correlations can be used to obtain a quick prediction on dewaterability. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Sludge Dewatering, Oily Sludges, Sludge Conditioning, Capillary Suction Time, Specific Resistance To Filtration, Dewaterability, Municipal Solids Waste Incinerator Fly Ash, Particle-Size

Butler, D. and Parkinson, J. (1997), Towards sustainable urban drainage. *Water Science and Technology*, **35** (9), 53-63.

Full Text: [W\Wat Sci Tec35, 53.pdf](W/Wat%20Sci%20Tec35,%2053.pdf)

Abstract: The issue of sustainable development is now high on the global agenda, but there is still a considerable degree of uncertainty in its definition, let alone implementation. The aim of this paper is to reappraise the provision of urban drainage services in the light of this current debate. The approach advocated is not to strive far the unattainable goal of completely sustainable drainage, rather to actively promote ‘less unsustainable’ systems. To do this requires both an understanding of the long-term and widespread impacts of continuing current practices and an understanding of the implications of making changes. Sustainable urban drainage should: maintain a good public health barrier, avoid local or distant pollution of the environment, minimise the utilisation of natural resources (e.g. water, energy, materials), and be operable in the long-term and adaptable to future requirements. Three strategies are proposed that can be carried out immediately, incrementally and effectively and these are to reduce potable water ‘use’, to reduce and then eliminate the mixing of industrial wastewater with domestic waste, and to reduce and then eliminate the mixing of stormwater and domestic wastewater. A number of techniques are described which may allow adoption of these strategies, many of them small-scale, source control technologies. An incremental approach containing both high-tech and low-tech answers to appropriate problems is the most likely to be implemented but each case must be decided on its merits. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Charlton, J. (1997), Application of waste stabilisation ponds in Bhutan-Lessons within a sustainable development context. *Water Science and Technology*, **35** (9), 199-208.

Full Text: [W\Wat Sci Tec35, 199.pdf](W/Wat%20Sci%20Tec35,%20199.pdf)

Abstract: The Danish International Development Assistance agency has funded a project in Bhutan which includes a water supply component in six urban centres, a sewerage component in the two largest cities plus associated institutional development. The project includes the implementation of an extensive water-home sewerage system and associated wastewater treatment. The treatment process adopted was waste stabilisation pond technology due to the low associated construction, operations and maintenance costs and low requirements for technical skills hence contributing to financial and O&M sustainability of the project, as well as meeting the water quality requirements for the receiving waters. Since essentially all available land is utilised in the country, the locations of the treatment plants are adjacent to rivers which are fast flowing, leading to a risk of severe erosion conditions during the monsoon season. In order to protect the treatment plant structure, river training was necessary. The high elevation of the country also has consequences for the design and operation of the plants. The wastewater treatment process includes a train of anaerobic, secondary facultative and maturation ponds, lined with a high density polyethylene liner. This paper describes the project as implemented, focusing on the wastewater treatment plants and the hurdles required to be overcome to ensure sustainable operation of the waste stabilisation pond treatment plants, in particular overall design of the system, the re-design required due to the lass of land occasioned by the intense monsoon rains in the south of the country prior to construction of river training works, the training required for the local staff from the operations and maintenance authorities and the financial aspects of the project The project is discussed within a broader framework of Danish development aid in the country which covers the health, environment and the public health infrastructure sectors. Lessons learnt from the project are discussed. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Bornhardt, C., Drewes, J.E. and Jekel, M. (1997), Removal of organic halogens (AOX) from municipal wastewater by powdered activated carbon (PAC)/activated sludge (AS) treatment. *Water Science and Technology*, **35** (10), 147-153.

Full Text: [W\Wat Sci Tec35, 147.pdf](W/Wat%20Sci%20Tec35,%20147.pdf)

Abstract: The effectiveness of different treatments with powdered activated carbons (PAC) to reduce the AOX-levels in municipal wastewater was investigated in a bench-scale activated sludge (AS) treatment plant. The PAC was added either directly to the aerated basin (simultaneous PAC-treatment), or to a partial stream of clarified effluent, which was treated with PAC in an agitated tank and recirculated to the aerated basin (subsequent PAC-treatment with recirculation). The standard advanced biological treatment reduced the AOX-content by 24%. In the pilot-plant, three types of powdered activated carbons were tested for a simultaneous treatment. The treatment with 100 mg/l PICA PCO Super produced an additional reduction of AOX by 20%, whereas a dosage of 50 mg/l NORIT W-20 showed no enhancement effect, and W-35 led to an additional AOX-removal of about 9%. Also, an improved removal of DOG, NH4-N and PO4-P was observed. In all cases, the PAC addition caused a significantly improved settling of the AS, reducing the sludge-volume-index, and increasing the content of volatile solids of the PAC-sludge. In general, no evidence of a synergistic effect of the PAC addition to activated sludge, nor bioregeneration of the activated carbon, could be observed. This suggests, that the observed effects probably are caused only by simple adsorption.

Keywords: Activated Sludge, Adsorbable Organic Halogens (AOX), Advanced Wastewater Treatment, Dissolved Organic Carbon (DOG), Municipal Wastewater, Pact-Process, Powdered Activated Carbon (PAC), Wastewater Treatment Plant

Wiedenmann, A., Braun, M. and Botzenhart, K. (1997), Evaluation of the disinfection potential of low chlorine concentrations in tap water using immobilised *Enterococcus* *faecium* in a continuous flow device. *Water Science and Technology*, **35** (11-12), 77-80.

Full Text: [W\Wat Sci Tec35, 77.pdf](W/Wat%20Sci%20Tec35,%2077.pdf)

Abstract: A simple continuous now device in which bacteria were immobilised on membrane filters and flushed with tap water with free chlorine residuals of 0.05, 0.1, 0.2 and 0.4mg/L at pH 7.7 and 10°C, has been used for disinfection experiments with faecal streptococci. A 99.99% reduction of *Enterococcus* *faecium* was observed between 3.4-5.2min (0.05mg/L), between 2.8-4.1min (0.1mg/L), between 1.7-3.1min (0.2mg/L) and between 0.8-2.1min (0.4mg/L). CT-products covered a range of 0.17 (0.05mg/L, lower limit) up to 0.85mg/L/min (0.4mg/L, upper limit). The test system is suggested as a more reliable alternative to batch experiments when the disinfection potential of low chlorine concentrations acting for several minutes has to be evaluated. The system cannot be used to demonstrate exact reduction kinetics but it allows the calculation of CT values and the evaluation of the disinfection potential of chlorinated water at any point of a distribution system where initial chlorine concentrations may have already remarkably declined. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Drinking Water, Disinfection, Chlorine, Faecal Streptococci, CT-Values, Distribution System

Meier, H., Koob, C., Ludwig, W., Amann, R., Frahm, E., Hoffmann, S., Obst, U. and Schleifer, K.H. (1997), Detection of enterococci with rRNA targeted DNA probes and their use for hygienic drinking water control. *Water Science and Technology*, **35** (11-12), 437-444.

Full Text: [W\Wat Sci Tec35, 437.pdf](W/Wat%20Sci%20Tec35,%20437.pdf)

Abstract: Enterococci are useful indicators of faecal contamination with their high abundance in faeces and long survival in the environment and the possibility of indicating the source of contamination by species identification has lead to discussion of whether enterococci would be more reliable faecal indicators than E. coli. In an attempt to facilitate rapid and accurate identification of enterococci, 16S rRNA targeted oligonucleotide probes were designed by computer-aided analysis of more than 4,000 rRNA sequences. Probes were labelled non-isotopically with digoxigenin and fluorescent dyes. Conditions for specific hybridisation were optimised for dot blot hybridisation and whole cell hybridisation for all probes. With a combination of two probes, all hygienically important enterococci could be detected and 24 biochemically identified environmental isolates also hybridised with one of these probes. A quantitative detection method with a high sensitivity was developed based on filtration of water samples through polycarbonate filters, a short incubation on agar and microcolony filter hybridisation with fluorescently labelled probes followed by epifluorescence microscopy. Within 8-20h sampling a specific identification of enterococcal microcolonies was possible. With this method 15/32 well- and tap-water sources from the Mainz area were identified as being of substandard quality. The proposed method detects faecal contamination significantly earlier than conventional methods and could be helpful in the hygienic monitoring of drinking water. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Keywords: Enterococci, Drinking Water, Hygienic Monitoring, Hybridisation, DNA Probes, rRNA, Microscopy, Oligonucleotide Probes, Genus Enterococcus, *Escherichia*-Coli, Microbial-Cells, Identification, RNA, Differentiation, Lactococci, Bacteria

Lambert, S.D., Graham, N.J.D., Sollars, C.J. and Fowler, G.D. (1997), Evaluation of inorganic adsorbents for the removal of problematic textile dyes and pesticides. *Water Science and Technology*, **36** (2-3), 173-180.

Full Text: [W\Wat Sci Tec36, 173.pdf](W/Wat%20Sci%20Tec36,%20173.pdf)

Abstract: This paper evaluates three inorganic adsorbents (activated bauxite, fullers earth and a synthetic clay), relative to activated carbon, for the removal of several representative contaminants of major concern and frequent occurrence in UK textile industry effluents; reactive dyes, pentachlorophenol and Propetamphos. The results indicate that, for the removal of reactive dyes, the synthetic clay was the most effective adsorbent over the pH range from pH 5.5 to pH 8.5 and temperature range from 20 to 40°C, although comparable dye removals were exhibited by activated carbon under neutral and alkaline conditions. Under acidic conditions activated bauxite was as effective as activated carbon. Fullers; Earth was largely ineffective. With regard to the removal of pesticides activated carbon was highly effective, whereas the three inorganic adsorbents showed negligible removals.

Keywords: Dissolved Organic-Matter, Potable Water-Supplies, Adsorption, Activated Bauxite, Activated Carbon, Adsorption, Fullers Earth, Macrosorb, Pentachlorophenol, Propetamphos, Reactive Dyes, Textile Effluents

Ramakrishna, K.R. and Viraraghavan, T. (1997), Dye removal using low cost adsorbents. *Water Science and Technology*, **36** (2-3), 189-196.

Full Text: [W\Wat Sci Tec36, 189.pdf](W/Wat%20Sci%20Tec36,%20189.pdf)

Abstract: Dyestuff production units and dyeing units have always had a pressing need for techniques that allow economical pretreatment for color in the effluent. The effectiveness of adsorption for dye removal from wastewaters has made it an ideal alternative to other expensive treatment options. The current paper deals with an investigation on four low-cost adsorbents locally available in Saskatchewan, Canada for dye removal. Feat, steel plant slag, bentonite clay and fly ash were utilized for this study and their performance evaluated against that of granular activated carbon. Batch kinetic and isotherm studies, and column studies were undertaken, and the data evaluated for compliance with the Langmuir, Freundlich and BET isotherm models. Synthetic dye wastewaters prepared from commercial grade acid, basic and disperse dyes were used in this study and the results showed high removals of acid dyes by fly ash and slag while peat and bentonite exhibited high basic dye removals. For the acid and basic dyes, the removals were comparable with that of granular activated carbon, while for the disperse dyes, the performance was much better than that of granular activated carbon. The results obtained point towards viable adsorbents which are both effective as well as economically attractive for color removal from wastewaters.

Keywords: Peat, Adsorption, Ions, Adsorption, Bentonite, Dyes, Fly Ash, Peat, Slag

Notes: highly cited

? McArthur, J.M., Ravenscroft, P., Safiulla, S. and Thirlwall, M.F. (2001), Arsenic in groundwater: Testing pollution mechanisms for sedimentary aquifers in Bangladesh. *Water Science and Technology*, **37** (1), 109-117.

Full Text: [2001\Wat Sci Tec37, 109.pdf](2001/Wat%20Sci%20Tec37,%20109.pdf)

Abstract: In the deltaic plain of the Ganges-Meghna-Brahmaputra Rivers, arsenic concentrations in groundwater commonly exceed regulatory limits (>50 mug L(-1)) because FeOOH is microbially reduced and releases its sorbed load of arsenic to groundwater. Neither pyrite oxidation nor competitive exchange with fertilizer phosphate contribute to arsenic pollution. The most intense reduction and so severest pollution is driven by microbial degradation of buried deposits of peat. Concentrations of ammonium up to 23 mg L(-1) come from microbial fermentation of buried peat and organic waste in latrines. Concentrations of phosphorus of up to 5 mg L(-)1 come from the release of sorbed phosphorus when FeOOH is reductively dissolved and from degradation of peat and organic waste from latrines. Calcium and barium in groundwater come from dissolution of detrital land possibly pedogenic) carbonate, while magnesium is supplied by both carbonate dissolution and weathering of mica. The (87)Sr/(86)Sr values of dissolved strontium define a two-component mixing trend between monsoonal rainfall (0.711 +/- 0.001) and detrital carbonate (<0.735).

Keywords: Ganges Delta, West-Bengal, Lacustrine Sediments, Sulfate Reduction, Himalayan Rivers, United-States, Water, Carbon, Mineralization, Geochemistry

? Dong, Q.H., Springeal, D., Schoeters, J., Nuyts, G., Mergeay, M. and Diels, L. (1998), Horizontal transfer of bacterial heavy metal resistance genes and its applications in activated sludge systems. *Water Science and Technology*, **37** (4-5), 465-468.

Full Text: [1998\Wat Sci Tec37, 465.pdf](1998/Wat%20Sci%20Tec37,%20465.pdf)

Abstract: The bacterial nickel (Ni) resistance determinant ncc-nre of Alcaligenes 31A strain cloned to an IncQ broad-host-range plasmid pKT240 gave rise to pMOL222. The plasmid was subsequently mobilized into various Eubacteria and found to confer an increased Ni resistance on these recipients. An increase of Ni resistance was also observed after the transfer of pMOL222 into activated sludge bacteria by plate mating. The dissemination of pMOL222 into an activated sludge pilot stabilized the system during a heavy metal shock loading with 0.25 mM Ni. (C) 1998 IAWQ. Published by Elsevier Science Ltd.

Keywords: Activated Sludge; Gene Transfer; Heavy Metal Resistance, Plasmid

Richardson, M. (1998), Pesticides: Friend or foe? *Water Science and Technology*, **37** (8), 19-25.

Full Text: [W\Wat Sci Tec37, 19.pdf](W/Wat%20Sci%20Tec37,%2019.pdf)

Abstract: Pesticides, where used correctly, can save up to 40% in crop losses; however, when pesticides are mal-, mis-or over-used the environmental and public health consequences can be very considerable. The United Nations has issued a list of chemicals that are banned or severely restricted in use; many of the chemicals on this list are pesticides. Whilst the use of highly persistent pesticides such as DDT has proved very effective in the eradication of diseases such as malaria, the adverse effects to the natural environment have been devastating-whole populations of birds have been eliminated. Within the former Soviet Union, the use of highly persistent pesticides was widespread; this has resulted in contamination of both crops, with pesticide residues well in excess of internationally acceptable maximum residue limits, and water resources to such high level that remediation through natural processes will take decades, or by xenobiotic or physicochemical precesses will be extremely costly. This is an extraordinary situation as the former Soviet Union had one of the most stringent of environmental regulation-the GOST regulations; unfortunately these were not pragmatic and rarely applied. When in the Ukraine in 1994, I heard that farmers where paid for every application made; the result was crops, soil, water and the environment were highly contaminated, and in some cases the land became barren. Currently, the situation in some countries is that no pesticides are being applied because under the new market conditions farmers cannot afford to purchase pesticides. In Armenia in July 1995, one could not purchase fruit which was not diseased. The effects of mis-use of pesticides are known to cause very serious adverse effects to human health: in some countries children are exhibiting excessive cancer incidences; crops found to be highly contaminated with up to five different pesticides are being condemned, often being burnt in the fields. As these crops in all probability contained now banned and highly persistent pesticides, mere burning at low temperatures is producing even more toxic dioxins, furans, etc. This leads to both air and soil contamination. One answer would be for the farmer to be obliged to pay for high-temperature incineration in a high-tech incinerator in a developed country, which, subject to prior informed consent, could cost US $ 5000/tonne. However, the application of modem pesticides in accordance with manufacturers’ specifications can incur none of these problems; this presentation will outline how pesticides can be used judiciously. (C) 1998 IAWQ. Published by Elsevier Science Ltd.

Martin, J.C., Hoggart, C. and Matisa, A. (1998), Improvement priorities for sewage treatment in Latvian small and medium sized Towns. *Water Science and Technology*, **37** (8), 137-144.

Full Text: [W\Wat Sci Tec37, 137.pdf](W/Wat%20Sci%20Tec37,%20137.pdf)

Abstract: This paper describes the development of a strategy to identify the priorities for investment in sewage treatment in the rural areas in Latvia. The strategy is developed from the baseline conditions ascertained for the present quality of the many receiving waters (rivers, lakes, ground water and the Baltic Sea) and from the condition of the 800 Plus sewerage systems which serve all of the small and medium sized towns in the country. Technical solutions are developed consistent with Latvian policy goals and the priorities established for improvement to the environment and public health. An investmeni strategy has been prepared to optimise the use of the available funds, to achieve the best value for money. It has been agreed in consultation with interested parties at national, regional and local levels, to produce a plan with wide acceptance. The strategy is known in Latvia as ‘800 Plus’. (C) 1998 IAWQ. Published by Elsevier Science Ltd.

Adin, A. and Asano, T. (1998), The role of physical-chemical treatment in wastewater reclamation and reuse. *Water Science and Technology*, **37** (10), 79-90.

Full Text: [W\Wat Sci Tec37, 79.pdf](W/Wat%20Sci%20Tec37,%2079.pdf)

Abstract: Amid the heightened public health concerns for emerging microorganisms such as *Cryptosporidium* and enteropathogenic *E. coli* in the water environment, there have been many instances where optimization of chemical coagulation-flocculation processes and filtration of wastewater was not achieved in practice, resulting in waste of coagulant chemicals and breach of the multiple barriers to pathogen removal and inactivation; thus, unnecessarily endangering public health. In addition, lack of information on the optimization of these processes has hampered the establishment of alternative and more cost-effective wastewater reclamation methods for tertiary and advanced wastewater treatment. Thus, the purpose of this paper is to evaluate the basic factors affecting the optimization of chemical coagulation-flocculation and filtration processes in municipal wastewater reclamation and reuse, based on the theoretical developments and practical applications. Reference is also made to the wastewater treatment processes and operations that can produce reclaimed water with an extremely small probability of enteric virus contamination. (C) 1998 Published by Elsevier Science Ltd. All rights reserved

Yuasa, A. (1998), Drinking water production by coagulation-microfiltration and adsorption-ultrafiltration. *Water Science and Technology*, **37** (10), 135-146.

Full Text: [W\Wat Sci Tec37, 135.pdf](W/Wat%20Sci%20Tec37,%20135.pdf)

Abstract: Microfiltration (MF) and ultrafiltration (UF) pilot plants were operated to produce drinking water from surface water from 1992 to 1996. Microfiltration was combined with pre-coagulation by polyaluminium chloride and was operated in a dead-end mode using hollow fiber polypropylene and monolith type ceramic membranes. Ultrafiltration pilot was operated in both cross-flow and dead-end modes using hollow fiber cellulose acetate membrane and was combined occasionally with powdered activated carbon (PAC) and granular activated carbon (GAC) adsorption. Turbidity in the raw water varied in the range between 1 and 100 mg/L (as standard Kaolin) and was removed almost completely in all MF and UF pilot plants to less than 0.1 mg/L. MF and UF removed metals such as iron, manganese and aluminium well. The background organics in the river water measured as KMnO4 demand varied in the range between 3 and 16 mg/L. KMnO4 demand decreased to less than 2 mg/L and to less than 3 mg/L on the average by the coagulation-MF process and the sole UF process, respectively. Combination of PAC or GAC adsorption with UF resulted in an increased removal of the background organics and the trihalomethanes formation potential as well as the micropollutants such as pesticides. Filtration flux was controlled in the range between 1.5 and 2.5 m/day with the trans-membrane pressure less than 100 kPa in most cases for MF and UF. The average water recovery varied from 99 to 85%. (C) 1998 Published by Elsevier Science Ltd

Keywords: Removal, PAC, Adsorption, Coagulation, Drinking Water, Membrane, Microfiltration, Ultrafiltration

? Lee, B.K., Sung, S.W., Chun, H.D. and Koo, J.K. (1998), Automatic control for DO and pH in the activated sludge process in a coke wastewater treatment plant. *Water Science and Technology*, **37** (12), 141-148.

Full Text: [1998\Wat Sci Tec37, 141.pdf](1998/Wat%20Sci%20Tec37,%20141.pdf)

Abstract: The objective of this study is to develop an automatic control system for dissolved oxygen (DO) and pH of the activated sludge process in a coke wastewater treatment plant. A discrete type autotuned proportional-integral (PI) controller using an auto-regressive exogenous (ARX) model as a process model was developed to maintain the DO concentration in aerators by controlling the speed of surface aerators. Also a nonlinear pH controller using the titration curve was used to control the pH of influent wastewater. This control system was tested in a pilot scale plant During this pilot plant experiment, there was small deviation of pH and the electric power consumption of surface aerators was reduced up to 70% with respect to the full operation when the DO set point was 2 mg/l. For real plant operation with this system, the discrete PI controller showed good tracking for set point change. The electricity saving was more than 40% of the electricity consumption when considering surface aerators. As a result of maintaining the DO constantly at the set point by the automatic control system, the fluctuation of effluent quality was decreased and overall improvement of the effluent water quality was achieved. (C) 1998 Published by Elsevier Science Ltd All rights reserved.

Keywords: Activated Sludge, ARX Model, Autotuned PI Controller, Coke Wastewater, Dissolved Oxygen, Dissolved Oxygen Control, Identification, Online, pH Control, PID Controller, Wastewater, Wastewater Treatment

Ito, A., Umita, T., Aizawa, J. and Kitada, K. (1998), Effect of inoculation of iron oxidizing bacteria on elution of copper from anaerobically digested sewage sludge. *Water Science and Technology*, **38** (2), 63-70.

Full Text: [W\Wat Sci Tec38, 63.pdf](W/Wat%20Sci%20Tec38,%2063.pdf)

Abstract: The effect of inoculation of iron oxidizing bacteria on elution of Cu from anaerobically digested sewage sludge was investigated without adding ferrous sulfate as a substrate. The inoculation of iron oxidizing bacteria to the sludge brought about the effective elution of Cu at pH 2 and 3. Ferric ion produced by the biological oxidation of ferrous ion which was eluted from the sludge or ferric ion eluted directly from the sludge and iron oxidizing bacteria caused the elution of Cu. Furthermore, both chemical and biological leachings of Cu from CuS were studied at pH 2, 3 and 4. It was found that both ferric ion and iron oxidizing bacteria could elute Cu. The elution rate of Cu with ferric ion decreased as the pH increased and two moles of Fe(III) eluted I mole of Cu. The biological leaching by iron oxidizing bacteria eluted Cu more effectively than the chemical one with sulfuric acid or ferric sulfate at pH 2, 3 and 4. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobically Digested Sewage Sludge, Copper Sulfide, Elution of Copper, Iron Oxidizing Bacteria, pH, Municipal Sludge, Metals Removal, Heavy-Metals, Recovery, Acid

Lo, I.M.C. and Mak, R.K.M. (1998), Transport of phenolic compounds through a compacted organoclay liner. *Water Science and Technology*, **38** (2), 143-150.

Full Text: [W\Wat Sci Tec38, 143.pdf](W/Wat%20Sci%20Tec38,%20143.pdf)

Abstract: The transport of phenolic compounds through a compacted liner improved with organically modified bentonite (organoclay BE-40) was studied. Organoclay BE-40 is one of the manufactured products of Biomin International, Inc. and is modified with 40 lb of dicetyldimethylammonium per 100 lb of clay. The adsorption of phenolic compounds onto organoclay BE-40 is found to be significant, which could be attributed to the formation of hydrophobic bending. The hydraulic conductivities of organoclay BE-40 are 1.98×10-7, 2.28×10-7 and 5.49×10-7 cm/sec for the phenol cell, a-chlorophenol cell and 2,4,6-trichlorophenol cell, respectively. The experimental results of adsorption tests and hydraulic conductivity tests were input into the computer program ‘Pollute v9’ to simulate the transport of phenolic compounds through a compacted organoclay liner material. The simulation result was then compared with phenol transport through the conventional soil liner (90% silty sand and 10% natural clay mineral). It indicates that the retardation of the transport of phenolic compounds using organoclay as a liner material is more significant than using the conventional soil liner, particularly for higher hydrophobic organics. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Hydraulic Conductivity, Landfill Liners, Organoclay, Pollutant Transport, Waste

Liu, J.C. and Huang, J.G. (1998), Using iron-coated spent catalyst as an alternative adsorbent to remove Cr(VI) from water. *Water Science and Technology*, **38** (4-5), 155-162.

Full Text: [W\Wat Sci Tec38, 155.pdf](W/Wat%20Sci%20Tec38,%20155.pdf)

Abstract: The feasibility of utilizing iron-coated spent catalyst to adsorb Cr(VI) from aqueous solution was studied. Various factors, such as types and concentrations of iron salt, pH, and Initial Cr(VI) concentration were investigated. A significant increase in Cr(VI) removal capacity can be achieved through iron-coating. The maximum adsorption was found at pH of 3.0-4.0. The presence of chloride and sulfate ions were found to suppress Cr(VI) adsorption. Langmuir adsorption isotherm was utilized to describe the adsorption reaction. Results from zeta potential measurement indicate that Cr(VI) is adsorbed largely through electrostatic interaction onto iron-coated spent catalyst. This study shows that spent catalyst can be converted to a useful adsorbent for Cr(VI) removal. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Cr(VI), pH, Spent Catalyst, Zeta Potential Chromium

Chang, J.S., Huang, J.C., Chang, C.C. and Tarn, T.J. (1998), Removal and recovery of lead fixed-bed biosorption with immobilized bacterial biomass. *Water Science and Technology*, **38** (4-5), 171-178.

Full Text: [W\Wat Sci Tec38, 171.pdf](W/Wat%20Sci%20Tec38,%20171.pdf)

Abstract: Fixed-bed columns packed with immobilized biomass of *Pseudomonas aeruginosa* PU21 were utilized to remove lead (Pb) from the contaminated water. Effects of the immobilization method, bed length, flow rate, and the particle size on the performance of Pb removal by the biosorption columns were systematically investigated. Calcium alginate-immobilized cells were found to bold better Pb capacity than polyacrylamide (PAA)-entrapped cells. Typical saturation capacity of calcium alginate (CA)-immobilized cells was 280 mgPb/g, and 31 mgPb/g for PAA-immobilized cells. Results of fixed-bed biosorption showed that the breakthrough time (tb) appeared to increase with the bed length, but decreased with the flow rate. The typical overall adsorption efficiency (Q) was within 50-60%, and did not appreciably fluctuate with changes in the operation conditions or the particle size. The initial rate of adsorption was facilitated nearly 40% as the size of immobilized cells was reduced from 3.5 mm to 2 mm, whereas the particle sim did not affect the equilibrium adsorption of the immobilized biomass. The length of unused bed (LUB) remained constant with different bed length, while it slightly increased with the raising of the Pb loading rate. The metal-laden column was regenerated by elution of HCl solution (pH 2.0). For up to four adsorption/desorption (A/D) cycles, the metal recovery efficiency of each cycle was over 98%, and the recovery ratio was 8: 1 and 27: 1 for PAA and CA-immobilized cells, respectively. The regenerated beds were able to restore over 66% of their original adsorption capacity after four successive ND cycles.

Keywords: *Pseudomonas-Aeruginosa* PU21, Cadmium, Copper, Metals, Immobilized Cells, Biosorption, Alginate, Polyacrylamide, Fixed-Bed Reactor, Lead, *Pseudomonas aeruginosa*

Beydilli, M.I., Pavlostathis, S.G. and Tincher, W.C. (1998), Decolorization and toxicity screening of selected reactive azo dyes under methanogenic conditions. *Water Science and Technology*, **38** (4-5), 225-232.

Full Text: [W\Wat Sci Tec38, 225.pdf](W/Wat%20Sci%20Tec38,%20225.pdf)

Abstract: The objective of this research was to generate technical background for the development of a fixed-film anaerobic reactor to renovate reactive textile dyebaths and reuse the high salt-containing mixture in the dyeing process. Six commercial reactive azo dyes (Black-5; Red-2 and 120; Yellow-3, 15 and 17) were chosen for this study. Using an anaerobic, methanogenic culture enriched from municipal sewage sludge, batch assays were performed to evaluate potential toxicity of the selected dyes to the anaerobic microorganisms as well as to determine the anaerobic biodegradability of these dyes. Total gas and methane production were monitored. No significant toxic effects were observed at 300 mg/L concentration for all dyes tested. At the end of three consecutive feeding cycles all dyes exhibited overall color removals in the range of 77.8 and 97.1%. An assay intended to determine the toxic limit and kinetics of color removal of Red-2 revealed that up to 300 mg/L, this dye was not toxic and contributed to increased total gas and methane production over that of a control. However, higher concentrations of Red-2 (500, 1000 and 2000 mg/L) depressed gas production despite continued decolorization. These results suggest that color removal under the low redox conditions maintained by the methanogenic culture occurs irrespective of the culture activity level. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Azo Dyes, Biotransformation, Color Removal, Methanogenesis, Reactive Dyes, Textiles, Microbial Consortium, Degradation

Wang, Y.X. and Yu, J. (1998), Adsorption and degradation of synthetic dyes on the mycelium of *Trametes versicolor*. *Water Science and Technology*, **38** (4-5), 233-238.

Full Text: [W\Wat Sci Tec38, 233.pdf](W/Wat%20Sci%20Tec38,%20233.pdf)

Abstract: Adsorption and degradation of three synthetic dyes with representative chromophores (azo, anthraquinone and indigo) were investigated on living mycelium of white rot fungus, *Trametes versicolor*. The maximum adsorption capacity (Qmax) and adsorption affinity (K) of the dead and living fungal mycelia to the three dyes were measured and estimated by using the Langmuir model; Qmax has a range from 50 to 105 mgdye/g dry mycelium and K from 17 to 120 mgdye/L. The adsorbed dye molecules could be degraded by the extracellular and/or intracellular enzymes that were produced by a 10-day old fungal mycelium after the essential nitrogen nutrient (NH4+) had been consumed completely. Fungal mycelium was saturated by the dyes in one hour and its adsorption capacity was regenerated at different rates depending on dye structure and enzymes. Compared to the enzymatic regeneration of dye-saturated living mycelium (8-19 mgdye/g dry mycelium. h), physical desorption of adsorbed dye molecules was consistent ranging from 2-3 mgdye/g dry mycelium. h.

Keywords: Decolorization, Dye Adsorption, Dye Degradation, *Trametes versicolor*, Wastewater Treatment

Guiot, S.R., Stephenson, R.J., Frigon, J.C. and Hawari, J.A. (1998), Single-stage anaerobic/aerobic biotreatment of resin acid-containing wastewater. *Water Science and Technology*, **38** (4-5), 255-262.

Full Text: [W\Wat Sci Tec38, 255.pdf](W/Wat%20Sci%20Tec38,%20255.pdf)

Abstract: The present study compares the coupled anaerobic/aerobic integrated system (CANOXIS) operated at different aeration and liquid recycle rates to the conventional upflow anaerobic sludge bed (UASB) system for the laboratory scale treatment of a resin acid-containing effluent. Dehydroabietic and abietic acids were added in equal proportions to a sucrose-based feed stock. Even under oxygenation conditions, methane was formed, indicating that the aerobic and facultative microorganisms consumed oxygen fast enough to maintain a reduced microenvironment essential to the methanogens. Eight weeks of resin acid loading at 100 mg/L exerted no significant effects on the high efficiency and stable performance of UASB reactors. The CANOXIS systems showed with time a reduced discharge of residual resin acids in the effluent and a decrease of the amount of resin acids adsorbed onto the biomass when compared to the UASB reactor. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Anaerobic, Aerobic, Coupling, Resin Acid, Abietic Acid, Dehydroabietic Acid, Pulp and Paper, CTMP Effluent, Paper-Mill, Toxicity, Pulp, Reactor, Removal, Scale, Batch, Water

Butter, T.J., Evison, L.M., Hancock, I.C. and Holland, F.S. (1998), The kinetics of metal uptake by microbial biomass: Implications for the design of a biosorption reactor. *Water Science and Technology*, **38** (6), 279-286.

Full Text: [W\Wat Sci Tec38, 279.pdf](W/Wat%20Sci%20Tec38,%20279.pdf)

Abstract: The kinetics of copper ion biosorption by free cell suspensions of inactivated *Penicillium* biomass was investigated. During the first 15 seconds of the metal uptake reaction copper biosorption was extremely rapid, becoming progressively slower until equilibrium was achieved. At a biomass concentration of 5.48 g dry weight/l, the copper biosorption reaction reached approximately 90% of the equilibrium position in one minute. This is in contrast with biosorption onto immobilised biomass which is known to take up to 24 hours or longer to reach equilibrium. However, the conventional reactor design for free cell suspensions, the stirred tank, may make inefficient use of the equipment and process due to the extended retention time. A plug-flow biosorption reactor with a limited retention time has been developed and demonstrated in the laboratory. The biomass and metal solution were mixed together using static in-line mixers and pumped along a length of pipe before discharging the mixed liquor into a settling tank to achieve phase separation. Desorption of the bound copper ions was achieved by drawing an eluant solution through metal-loaded biomass immobilised as a filter cake. The combination of metal uptake using free cells, and desorption using immobilised cells, optimises the kinetic and mass transfer effects for both processes and minimises the equipment requirements. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Biosorption Kinetics, Copper, Heavy Metals, *Penicillium Chrysogenum*, Wastewater Treatment

Vagliasindi, F.G.A. and Benjamin, M.M. (1998), Arsenic removal in fresh and NOM-preloaded ion exchange packed bed adsorption reactors. *Water Science and Technology*, **38** (6), 337-343.

Full Text: [W\Wat Sci Tec38, 337.pdf](W/Wat%20Sci%20Tec38,%20337.pdf)

Abstract: Arsenic speciation and removal in continuous-flow packed bed adsorption reactors was investigated using a strong base anion exchange resin as the adsorbent. Preloading of the media was investigated passing arsenic-free Lake Washington water through columns packed with the resin prior to feeding influent spiked with arsenic. NOM preloading did not affect the systems, but sulfate adsorbed during the preloading and the subsequent adsorption steps caused chromatographic displacement of the adsorbed arsenic. Significant arsenic speciation changes occurred in the arsenic-spiked feeding solution that need further investigation. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Arsenic, Adsorption, Natural Organic Matter, Preloading, Arsenic Speciation, Ion Exchange, Dissolved Organic-Matter

Wiebusch, B., Ozaki, M., Watanabe, H. and Seyfried, C.F. (1998), Assessment of leaching tests on construction material made of incinerator ash (sewage sludge): Investigations in Japan and Germany. *Water Science and Technology*, **38** (7), 195-205.

Full Text: [W\Wat Sci Tec38, 195.pdf](W/Wat%20Sci%20Tec38,%20195.pdf)

Abstract: Heavy metal release from bricks or blocks made of sewage sludge considerably decreases by sintering or cement consolidation. With such treatment, the enviromnental compatibility of recycled material can be ensured. In the framework of joint German-Japanese research, two types of leaching tests were introduced to develop a standardized test for construction material made of sewage sludge. One type is considered as a worst-case-test with low pH-values of 4-5 which describes the leaching availability under strong natural conditions (e.g. acid rain). The other type is a standardized test without pH-control. Both types of tests are investigated by using crushed samples of blocks.

Generally, there are two different ways for a sustainable assessment of the enviromnental compatibility. One way is to use a test with a low pH-value like the worst-case-tests. The other way is to crush the sample in small particles to produce large surfaces when using a standardized test. The smaller the particle size is, the higher is the concentration of heavy metals in the eluate. From the Japanese point of view, blocks are usually utilized in original shape, small particles are not appropriate as samples. That is why medium-sized particles are used for the leaching tests. But using ‘bigger’ particles, lower pH-values can be used. Therefore, a modified Swiss method is assumed to be suitable as a new standardized test for the effect of acid rain. This method is discussed from the point of view of sample diameter. From the German point of view, crushed samples with diameter <10 mm are used in combination with a standardized test. The heavy metal release from Japanese re-products is very low, and it has a close relationship with the release of the alkaline and alkaline earth metals. This effect can be shown on ash bricks from Germany also. Considering recommended limits in Germany, higher firing temperatures of >1100°C should be used. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Sewage Sludge, Construction Material, Sludge Ash, Sludge Reuse, Leaching Test, Environmental Compatibility, Sample Preparation, Sludge Ash Bricks

Wang, Y.T. and Chirwa, E.M. (1998), Simultaneous removal of Cr(VI) and phenol in chemostat culture of *E. coli* ATCC 33456 and *P. putida* DMP-1. *Water Science and Technology*, **38** (8-9), 113-119.

Full Text: [W\Wat Sci Tec38, 113.pdf](W/Wat%20Sci%20Tec38,%20113.pdf)

Abstract: A chemostat coculture consisting of a phenol-degrading organism, P. putida, and a Cr(VT)-reducing strain, E. coil ATCC 33456, was evaluated for its potential to simultaneously remove phenol and Cr(VI). Steady-state operating conditions were obtained with near complete removal of phenol and Cr(VI) under a range of influent concentration of phenol (233-2541 mg/l), influent Cr(VI) (1-10.3 mg/l), and liquid detention time (2-6.7 days). (C) 1998 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Chromium, Phenol, Biological Reduction, Coculture, E-Coli, P-Putida, Hexavalent Chromium Reduction, *Escherichia*-Coli, Enzymatic Reduction, ATCC-33456, Chromate

Lee, S.Z., Chang, L.Z., Chen, C.M., Liu, M.C. and Tsai, L.J. (1998), Development of soil metal criteria to preserve groundwater quality. *Water Science and Technology*, **38** (11), 131-139.

Full Text: [W\Wat Sci Tec38, 131.pdf](W/Wat%20Sci%20Tec38,%20131.pdf)

Abstract: The principal impediment in the remediation of contaminated sites and in the protection of groundwater quality is the lack of appropriate and reasonable standards for heavy metals in soils. There are no standards applicable to predict the potential for groundwater contamination by heavy metals in Taiwan. Lack of these soil standards may result in subjective judgment regarding the remediation needed. The migration of heavy metals through the unsaturated zone to groundwater is controlled by sorption to the soil, A. highly pH-dependent process, and the hydrological regime. Soil sorption behavior is the criterion upon which to establish a standard based on a maximum permissible concentration in groundwater. The maximum level of metal in soil for which the equilibrium soluble metal does not exceed the Drinking Water Standard can be computed, at ally pH, from the measured adsorption coefficient for any metal and soil. These metal criteria can be used as soil standards that will be protective of groundwater quality. Criteria for soil remediation are based on specific soil types and the effect of pH on metal sorption because the partitioning of trace metals is highly dependent on the solution pH and the chemical nature of the soil. (C) 1998 IAWQ. Published by Elsevier Science Ltd. All rights reserved.

Keywords: Cadmium, Adsorption, Sorption, Copper, Zinc, Adsorption Coefficient, Groundwater, Heavy Metal, Soil, Soil Standard

Adelman, D.D., Stansbury, J. and Tabidian, M.A. (1998), A risk/cost analysis to manage viral contamination of groundwater. *Water Science and Technology*, **38** (12), 1-6.

Full Text: [W\Wat Sci Tec38, 1.pdf](W/Wat%20Sci%20Tec38,%201.pdf)

Abstract: Under the proposed groundwater disinfection rule of the 1986 Safe Drinking Water Act, municipal water systems have four options to demonstrate that natural disinfection of viruses occurs between the virus source and the municipal well. One option is to demonstrate that the necessary set-back distance exists between these facilities. The objective of this research was to evaluate the risk that virus concentrations at a municipal well would exceed recommended levels even though the virus source was separated from the well by the setback distance recommended by the EPA. Groundwater transport modeling was used to evaluate this risk and compute the necessary distance upgradient from each Nebraska municipal well for sufficient virus die-off to occur. The number of wells with computed die-off distances greater than the regulatory set-back distances were divided by the total number of wells. The results of this research show that the potential risk for virus concentrations will exceed recommended virus levels in municipal wells using EPA’s set-back distances. (C) 1998 IAWQ published by Elsevier Science Ltd. All rights reserved.

Keywords: Adsorption, Advection, Die-Off, Groundwater, Risk, Cost, Set-Back Distances

Notes: highly cited

? Gujer, W., Henze, M., Mino, T. and van Loosdrecht, M. (1999), Activated sludge model No. 3. *Water Science and Technology*, **39** (1), 183-193.

Full Text: [1999\Wat Sci Tec39, 183.pdf](1999/Wat%20Sci%20Tec39,%20183.pdf)

Abstract: The Activated Sludge Model No. 3 (ASM3) can predict oxygen consumption, sludge production, nitrification and denitrification of activated sludge systems. It relates to the Activated Sludge Model No. 1 (ASM1) and corrects for some defects of ASM I. In addition to ASM1, ASM3 includes storage of organic substrates as a new process. The lysis (decay) process is exchanged for an endogenous respiration process. ASM3 is provided as a reference in a form which can be implemented in a computer code without further adjustments. Typical kinetic and stoichiometric parameters are provided for 10°C and 20°C together with the composition of a typical primary effluent in terms of the model components. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: Activated Sludge, Activated Sludge Model No.1, Activated Sludge Model No. 3, ASM1, ASM3, Computer, Consumption, Denitrification, Effluent, Elsevier, Kinetic, Kinetics, Mathematical Modeling, Model, Nitrification, Oxygen Consumption, Primary, Science, Sludge, Sludge Production, Stoichiometry, Storage, Storage of Organic Substrates

Gromaire-Mertz, M.C., Garnaud, S., Gonzalez, A. and Chebbo, G. (1999), Characterisation of urban runoff pollution in Paris. *Water Science and Technology*, **39** (2), 1-8.

Full Text: [W\Wat Sci Tec39, 1.pdf](W/Wat%20Sci%20Tec39,%201.pdf)

Abstract: Runoff was collected from 4 roofs, 3 courtyards and 6 streets on an experimental catchment in central Paris, and analysed for SS, VSS, COD, BOD5, hydrocarbons, heavy metals both as regards dissolved and particle fractions. Whereas street runoff showed important SS, COD and hydrocarbon loads, roof runoff was noticeable for its high concentration of heavy metals. These concentrations in comparison with water quality standards enhance the importance of runoff pollution. The use of sample settling for runoff treatment is discussed on the basis of data concerning the distribution between dissolved and particle bound pollution loads, along with settling velocity measurements. Runoff particles were found to be highly contaminated with heavy metals and hydrocarbons, which raised the problem of sludge disposal.

Stefanova, R.Y. (1999), Kinetics of removal of zinc ions from aqueous solutions by a modified acrylnitrile copolymer. *Water Science and Technology*, **39** (8), 139-146.

Full Text: [W\Wat Sci Tec39, 139.pdf](W/Wat%20Sci%20Tec39,%20139.pdf)

Abstract: The kinetics of removal of zinc ions from aqueous solutions by a modified acrylnitrile copolymer containing carboxyl and amino groups has been investigated. The dependence of the rate of removal on the intensity of stirring, the size of the sorbent’s particles, the initial concentration of metal ions and the temperature of the solution have been established. Attempts have been made to identify the rare limiting step and to determine the batch kinetic parameters. The limiting conditions of the transition from external to intraparticle diffusion step of mass transfer in a sorption system have been determined. The coefficients of intraparticle diffusion and the energy of activation of the sorption process have been established. The data obtained in this work show that the modified polymer with a high sorption capacity and very good kinetic characteristics can be successfully used for removal of heavy metal ions from water solutions and industrial wastewaters. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Acrylnitrile Copolymer, Mass Transfer, Sorption Kinetics, Zinc Removal

Ouki, S.K. and Kavannagh, M. (1999), Treatment of metals-contaminated wastewaters by use of natural zeolites. *Water Science and Technology*, **39** (10-11), 115-122.

Full Text: [W\Wat Sci Tec39, 115.pdf](W/Wat%20Sci%20Tec39,%20115.pdf)

Abstract: This paper assesses the potential of natural zeolite utilization as a low-cost in exchange material for heavy metals removal. Two natural zeolites, clinoptilolite and chabazite, have been evaluated with respect to their selectivity and removal performance for the treatment of effluents contaminated with mixed heavy metals (Pb, Cd, Cu, Zn, Cr, Ni and Co). The effects of relevant parameters such as chemical treatment, metals concentration, pH, and presence of competing ions were examined. The results showed that the received zeolites contained exchangeable K, Ca and Na ions, bur exposing them to concentrated NaCl solutions converted them to a homoionic state in the Na form which improved their exchange capacity. Clinoptilolite and chabazite exhibited different selectivity profiles for all metals studied except for Pb for which both zeolites performed exceptionally well.

The results also showed that chabazite exchange capacity is superior to that of clinoptilolite mainly due to the higher Al substitution of Si which provides chabazite with a negative framework favourable to higher exchange capability. The pH was found to have an effect on metal removal as it can influence both the character of the exchanging ions and die zeolite itself. Overall, the removal mechanism was controlled by ion exchange and precipitation was proven negligible. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: Natural Zeolites, Heavy Metals, Removal Efficiency, Ion Exchange, Effluent Treatment, Heavy-Metals, Removal

Bux, F., Atkinson, B. and Kasan, H.C. (1999), Zinc biosorption by waste activated and digested sludges. *Water Science and Technology*, **39** (10-11), 127-130.

Full Text: [W\Wat Sci Tec39, 127.pdf](W/Wat%20Sci%20Tec39,%20127.pdf)

Abstract: Biological matter is known for its ability to biosorb solubilised heavy metal ions to its surface. Experiments were therefore conducted to assess the biosorptive capacity of two waste products of the wastewater treatment industry ie., waste activated and waste digested sludge. Surface charge of each was determined in order to relate electronegativity with biosorptive potential. Activated sludge was found to be more effective than digested sludge for removal of zinc from a metal plating effluent, viz., 5.9 mg Zn/(g sludge)-1 as opposed to 4.0 mg/g, respectively, as well as producing a higher net negative charge. It was also noted that as initial zinc concentrations in solution increased there was a concomitant increase in sludge biosorption capacity. Activated and digested sludges were capable of biosorbing zinc from a metal plating effluent although activated sludge showed better potential for industrial application. (C) 1999 Published by Elsevier Science Ltd on behalf of the LAWQ. All rights reserved.

Keywords: Biosorption, Electronegativity, Industrial Effluent, Wastewater Sludge, Zinc Metal, Biomass

Charerntanyarak, L. (1999), Heavy metals removal by chemical coagulation and precipitation. *Water Science and Technology*, **39** (10-11), 135-138.

Full Text: [W\Wat Sci Tec39, 135.pdf](W/Wat%20Sci%20Tec39,%20135.pdf)

Abstract: Synthetic wastewater of pH 1.9, consisted of Zn, Cd, Mn and Mg at concentrations of 450, 150, 1,085 and 3,154 mg/l respectively. It was found that the optimum pH for chemical coagulation and precipitation by lime treatment was more than 9.5, which could decrease the concentration of heavy metals pertinent to the Wastewater Standard of the Ministry of Industry. Moreover, if 0.5 mg/l of polymer was added, it could decrease the concentration of heavy metals further. In addition when sodium sulphide solution was used in secondary treatment, it was also found that the optimum pH by lime in primary treatment was more than 9.5 and the optimum concentration of sodium sulphide was more than 250 mg/l. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Heavy Metals, Zinc, Cadmium, Manganese, Magnesium, Coagulation, Precipitation, Polymer

Lee, C.L., Wang, T.C., Lin, C.K. and Mok, H.K. (1999), Heavy meatals removal by a promising locally available aquatic plant, *Najas graminea* Del., in Taiwan. *Water Science and Technology*, **39** (10-11), 177-181.

Full Text: [W\Wat Sci Tec39, 177.pdf](W/Wat%20Sci%20Tec39,%20177.pdf)

Abstract: This study uses an aquatic plant, *Najas graminea* Del., to treat man-made wastewater containing single and/or binary components of copper, lead, cadmium and nickel. Adsorption experiments demonstrate that the adsorption process correspond to the Lagergren kinetic model with the rare constant close to 0.01 min-1; meanwhile, the equilibrium results corresponds to the Langmuir adsorption isotherm. Notably, the rate constants of metals are not significantly different between each other. Competitive effect on the adsorption kinetics of cadmium is insignificant with the background solute (lead) concentration up to 10 mg/l; while significant deviation observed with concentration of lead reached 100 mg/l. In addition the maximum adsorption density of cadmium is reduced by around 50% in the presence of 100 mg/l of lead. A simulated copper plating wastewater is also treated by *Najas graminea* Del, to demonstrate its efficiency in removing metals from wastewater with multi-cations/anions. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Bio-Remediation, Aquatic Plant, Heavy Metals, Sustainable Technology, Hyacinth Eichhornia-Crassipes, Accumulation, Water, Cadmium, Metals, Azolla

Brasquet, C., Subrenat, E. and Le Cloirec, P. (1999), Removal of phenolic compounds from aqueous solution by activated carbon cloths. *Water Science and Technology*, **39** (10-11), 201-205.

Full Text: [W\Wat Sci Tec39, 201.pdf](W/Wat%20Sci%20Tec39,%20201.pdf)

Abstract: Granular activated carbon (GAC) is easily used in water or wastewater treatment in order to remove organic micropollutants. Recently, a new presentation of activated carbon has been developed: fibrous activated carbon in the form of cloth or felt. This work investigates the adsorption onto activated carbon cloths (ACC) of various phenolic compounds from aqueous solution. Experiments were carried out in batch reactors with two ACCs (called CS 1501 and RS 1301) and their performances were compared with those of GAG. Initial adsorption kinetic coefficients were higher with fibers than with granules due to the direct connection of micropores to the external surface of fibers. Adsorption isotherms were also performed and modelized by Langmuir and Freundlich equations. Adsorption capacities were similar or higher with ACCs than with GAG. The behaviour of the ACC CS 1501 was also studied in a dynamic reactor. The breakthrough curves allowed the determination of high maximum adsorption capacities, 117 mg.g-1 for phenol. Pressure drops in ACC beds were measured and the influence of various parameters was shown: the activation step, the number of fabric layers, the space between two layers. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: Activated Carbon Cloth, Adsorption, Batch Reactor, Dynamic Reactor, Phenolic Compounds, Pressure Drops, Water-Treatment, Adsorption, Fibers

Ricou, P., Lécuyer, I. and Le Cloirec, P. (1999), Removal of Cu2+, Zn2+ and Pb2+ by adsorption onto fly ash and fly ash/lime mixing. *Water Science and Technology*, **39** (10-11), 239-247.

Full Text: [W\Wat Sci Tec39, 239.pdf](W/Wat%20Sci%20Tec39,%20239.pdf)

Abstract: Disposal of a growing amount of fly ash creates environmental problems due to the leachability of their heavy metal content. Elsewhere, desulfurization treatment in power plants induces pollution by their heavy metals. In this paper, removal of Cu, Zn and Pb by fly ash and fly ash/lime mixing was studied. In the first part of the study, isotherms at different pH were carried out at room temperature. Results show increasing removal with increasing pH. In the second part, experimental design methodology was used. The objectives were to determine the influential parameters among the seven studied for adsorption of copper, zinc and lead, then to study their interactions. Results indicate greater removal by using 100 g.l-1 of adsorbent with 20% mass of lime at pH 5. However, the preparation of the adsorbent must be modified to increase the role of lime in the removal mechanism.

Keywords: Cd, pH, Experimental Design, Fly Ash/Lime Mixing, Influential Parameters, Interactions, Metallic Ions, Removal

Veeken, A.H.M. and Hamelers, H.V.M. (1999), Removal of heavy metals from sewage sludge by extraction with organic acids. *Water Science and Technology*, **40** (1), 129-136.

Full Text: [W\Wat Sci Tec40, 129.pdf](W/Wat%20Sci%20Tec40,%20129.pdf)

Abstract: Waste water treatment in activated sludge plants results in the production of large amounts of surplus sludge. After composting the sludge can be reused as fertiliser and soil conditioner in agriculture. Compared to landfilling and incineration, utilisation of sludge-compost is a more sustainable treatment because it recycles both nutrients and organic matter. However the high levels of heavy metals in sludge frequently prevent the reuse of sludge compost in agriculture. The extraction of heavy metals from the sludge before composting is therefore a necessary step to achieve a more sustainable sludge treatment. Extraction of heavy metals by inorganic acids and complexing agents has severe drawbacks. Organic acids could be an attractive extracting agent because the extraction can be performed at mildly acidic conditions (pH 3-5) and they are biologically degradable. The extraction was studied for heavy metals Cu and Zn and for competing metals Ca and Fe. The rate of extraction increases for increasing temperature and citric acid concentration. Cu can be extracted for 60-70% and Zn for 90-100% by citric acid at pH 3-4. A first economic valuation of the extraction and subsequent composting process showed that the total costs of the treatment process are below the costs of incineration. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Compost Utilisation, Cu, Heavy Metal Removal, Sewage Sludge Treatment, Zn

Nicolet, L. and Rott, U. (1999), Recirculation of powdered activated carbon for the adsorption of dyes in municipal wastewater treatment plants. *Water Science and Technology*, **40** (1), 191-198.

Full Text: [W\Wat Sci Tec40, 191.pdf](W/Wat%20Sci%20Tec40,%20191.pdf)

Abstract: The use and recirculation of powdered activated carbon (PAC) as an advanced treatment for colour removal in municipal wastewater treatment plants is presented. Studied wastewaters consist of domestic effluents with a high portion of dyehouse residual waters. The particularity of the treatment is that PAC is not disposed of before being recirculated several times. Therefore, it enables the use of a great part of the total adsorption capacity of the PAC. A positive side effect is that halogenated and refractory organic compounds, which are not degraded by micro-organisms in a conventional municipal wastewater treatment plant, are removed too. This paper describes results which were obtained in batch experiments and in a pilot plant during two years of observation, and concludes with advantages and drawbacks of this technology.

Keywords: Adsorption, Flocculation (Coagulation), Dye Removal, Powdered Activated Carbon, Wastewater

Viraraghavan, T., Subramanian, K.S. and Aruldoss, J.A. (1999), Arsenic in drinking water: Problems and solutions. *Water Science and Technology*, **40** (2), 69-76.

Full Text: [W\Wat Sci Tec40, 69.pdf](W/Wat%20Sci%20Tec40,%2069.pdf)

Abstract: The current United States maximum contaminant level for arsenic in drinking water is set at 50 µg/l. Because of the cancer risks involved, Canada has already lowered the maximum contaminant level to 25 µg/l; the United States Environmental Protection Agency is reviewing the current allowable level for arsenic with a view of lowering it significantly. Various treatment methods have been adopted to remove arsenic from drinking water. These methods include 1) adsorption-coprecipitation using iron and aluminum salts, 2) adsorption on activated alumina, activated carbon, and activated bauxite, 3) reverse osmosis, 4) ion exchange and 5) oxidation followed by filtration. Because of the promise of oxidation-filtration systems, column studies were conducted at the University of Regina to examine oxidation with KMnO4 followed by filtration using manganese greensand and iron-oxide coated sand to examine the removal of arsenic from drinking water; these results were compared with the data from ion exchange studies. These studies demonstrated that As(III)could be reduced from 200 µg/l to below 25 µg/l by the manganese greensand system. In the case of manganese greensand filtration, addition of iron in the ratio of 20: 1 was found necessary to achieve this removal.

Keywords: Ground-Water, Affected People, 6 Districts, West-Bengal, Removal, India, Urine, Contamination, Adsorption, Calamity, Arsenic Removal, Drinking Water, Manganese Greensand, Iron-Oxide Coated Sand

? Weber, Jr., W.J. and LeBoeuf, E.J. (1999), Processes for advanced treatment of water. *Water Science and Technology*, **40** (4-5), 11-19.

Full Text: [1999\Wat Sci Tec40, 11.pdf](1999/Wat%20Sci%20Tec40,%2011.pdf)

Abstract: A case-oriented approach is used to illustrate developments and applications of biological and physicochemical technologies, either alone or in sequenced arrays, for advanced treatment to facilitate reuse of water in a range of environmental scenarios. Examples cited include chemical oxidation processes for removal of color and oxygen demand from textile mill effluents, sequential anaerobic, aerobic biological treatment of recalcitrant and inhibitory organic compounds in ammunition plant wastewaters, separation and recovery of organic solvents from mixed industrial waste streams, remediation of contaminated subsurface waters, membrane treatment of effluents from secondary biological wastewater treatment plants, and integrated bio-membrane treatment of industrial and municipal wastewaters. The paper provides an overview of methods and applications for source waters of various qualities. It concludes with a generalized guide to technology selection based upon specific water characteristics. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: 2,4-Dinitrotoluene, Adsorption, Adsorption, Anaerobic, Aerobic Sequenced Bio-Processes, Bio-Membrane Processes, Biodegradation, Chemical Oxidation, Contaminants, GAC, Membrane Bioreactors, Membrane Processes, Organic-Matter, Sorption, TCE, Water Treatment for Reuse

Drewes, J.E. and Fox, P. (1999), Behavior and characterization of residual organic compounds in wastewater used for indirect potable reuse. *Water Science and Technology*, **40** (4-5), 391-398.

Full Text: [W\Wat Sci Tec40, 391.pdf](W/Wat%20Sci%20Tec40,%20391.pdf)

Abstract: The scope of this study was to compare the behavior and character of dissolved organic carbon (DOC) during soil-aquifer treatment at different field sites in Arizona and California. To determine biodegradable and residual organic carbon, biodegradability studies using batch tests and a laboratory soil-column system were examined, combined with additional examinations for further characterization (ultrafiltration, adsorption analysis). Based on this comparison, soil-columns in series seemed to be more appropriate to simulate SAT as compared to batch-tests since this test system indicated continuous structural changes of generally poorly degradable organic compounds during SAT. This ongoing change of organic matter was confirmed by field measurements indicating biodegradation as the dominant removal process for DOC during SAT. The level of residual DOC after short-term SAT was similar although wastewater treatment processes differed at the investigated sites. However, increasing source water DOC led to an increase of residual DOG. In general, source water quality, drinking water and wastewater treatment should be viewed as one system in indirect potable reuse projects. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: Water-Quality Changes, Groundwater Recharge, Biodegradability, Effluents, Groundwater Recharge, Indirect Potable Reuse, Natural Organic Matter (Nom), Refractory DOC, Soluble Microbial Products (SMP), Soil-Aquifer Treatment (SAT)

Karcher, S., Kornmüller, A. nad Jekel, M. (1999), Removal of reactive dyes by sorption/complexation with cucurbituril. *Water Science and Technology*, **40** (4-5) 425-433.

Full Text: [W\Wat Sci Tec40, 425.pdf](W/Wat%20Sci%20Tec40,%20425.pdf)

Abstract: Color removal is an important task in textile wastewater treatment. Cucurbituril, a cyclic hexamer with internal hydrophobic cavity, has been studied as sorbent for removal of reactive dyes. Loadings as high as 1 g/g and more were obtained, making the method seem interesting for technical application. A minimum of 1 to 5 mmol/L calcium is needed for efficient sorption. However, salt concentrations of 100 mmol/L and above decrease sorption efficiency due to increased solubility of cucurbituril in salt solutions. The pH has little influence between 4 and 7.5, higher pH-values can result in decreased sorption, The salt influences are similar for most of the tested dyes whereas the pH-effect differs from dye to dye. (C) 1999 IAWQ Published by Elsevier Science Ltd. All rights reserved.

Keywords: Reactive Dyes, Cucurbituril, Sorption, Complexation, Textile Wastewater, Textile Dyes, Cations, Ion

Ansari, M.H., Deshkar, A.M., Kelkar, P.S., Dharmadhikari, D.M., Hasan, M.Z. and Paramasivam, R. (1999), Mercury removal from wastewater by steamed hoof powder. *Water Science and Technology*, **40** (7), 109-116.

Full Text: [W\Wat Sci Tec40, 109.pdf](W/Wat%20Sci%20Tec40,%20109.pdf)

Abstract: Steamed Hoof Powder (SHP), size < 53 µm, was observed to have high adsorption capacity for Hg(II) with >95% removal from a solution containing 100 mg/L of Hg(II) with only 0.1% (W/V) concentration of SHP. The SHP has good sealing properties and gives clear and odour free effluent. Studies indicate that pH values between 2 and 10 have no effect on the adsorption of Hg(II) on SHP. Light metal ions like Na+, K+, Ca2+ and Mg2+ up to concentrations of 500 mg/L and heavy metals like Cu2+, Zn2+., Cd2+, Co2+, Pb2+, Ni2+, Mn2+, Cr3+, Cr6+, Fe2+ and Fe3+ up to concentrations of 100 mg/L do not interfere with the adsorption process. Anions like sulphate, acetate and phosphate up to concentrations of 200 mg/L do not interfere. Chloride interferes in the adsorption process when Hg(II) concentration is above 9.7 mg/L. The adsorption equilibrium was established within two hours. Studies indicate that adsorption occurs on the surface sites of the adsorbent.

Keywords: Adsorption Equilibrium, Biomagnification, Mercury-Chloride Complex, Methylmercury, Steamed Hoof Powder, Sulfur-Mercury Bond

Nassar, M.M. (1999), Intraparticle diffusion of basic red and basic yellow dyes on palm fruit bunch. *Water Science and Technology*, **40** (7), 133-139.

Full Text: [W\Wat Sci Tec40, 133.pdf](W/Wat%20Sci%20Tec40,%20133.pdf)

Abstract: Rate of intraparticle diffusion was studied for adsorption of two basic dyes, basic red and basic yellow, on particles of palm fruit bunch. The rate process was expressed in terms of square root of time (t0.5). Discussion of the obtained relationship of equilibrium isotherm and t0.5 was given. The intraparticle rate diffusion ‘k’ was determined experimentally and the correlation at different dye concentrations and different temperatures was found to follow the form: k = A (variable) (B). The adsorption process was found to be a diffusion controlled process.

Keywords: Aqueous-Solutions, Natural Adsorbents, Textile Effluents, Color Removal, Bagasse Pith, Adsorption, Adsorption Isotherm, Basic Dye, Intraparticle Diffusion, Palm-Fruit Bunch

Fettig, J. (1999), Removal of humic substances by adsorption/ion exchange. *Water Science and Technology*, **40** (9), 173-182.

Full Text: [W\Wat Sci Tec40, 173.pdf](W/Wat%20Sci%20Tec40,%20173.pdf)

Abstract: This paper gives an overview over the ability of four different sorbent media, activated carbon, anion exchange resins, carbonaceous resins and metal oxides, for the removal of humic sustances. Both sorbent characteristics and solution parameters that affect the ultimate capacities are discussed, and approaches developed in order to describe sorption equilibria and rate of uptake are reported. In addition, successes and failures of predictive models are described. Some general conclusions about favorable conditions for the removal of humic substances by sorption processes are given. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Activated Carbon, Activated Alumina, Adsorption, Humic Substances, Ion Exchange, Predictive Models, Activated Carbon Adsorption, Natural Organic-Matter, Water-Treatment, Gac, Kinetics, Oxygen, Acids, Tests

Heijman, S.G.J., van Paassen, A.M., van der Meer, W.G.J. and Hopman, R. (1999), Adsorptive removal of natural organic matter during drinking water treatment. *Water Science and Technology*, **40** (9), 183-190.

Full Text: [W\Wat Sci Tec40, 183.pdf](W/Wat%20Sci%20Tec40,%20183.pdf)

Abstract: For the removal of DOC (and colour) several treatment steps are suggested. If it is also necessary to remove hardness nanofiltration is probably the first choice. For colour removal without softening a number of adsorbents are suggested in the literature. In order to estimate the costs of these treatment steps a dynamic column model based on batch experiments was used to predict the service time of the columns filled with different adsorbents. Also the (on site) regeneration of the different adsorbents was investigated in batch experiments. Especially the ion exchange resin was very promising. The costs of the treatment of one m3 water with a column filled with an ion exchange resin was estimated for the investigated case at 0.05 Euro. (C) 1999 published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved.

Keywords: Chemical Regeneration, Activated Carbon, Colour, DOC, Removal, Column Model, Costs, Adsorption

Gerlach, M. and Gimbel, R. (1999), Influence of humic substance alteration during soil passage on their treatment Behaviour. *Water Science and Technology*, **40** (9), 231-239.

Full Text: [W\Wat Sci Tec40, 231.pdf](W/Wat%20Sci%20Tec40,%20231.pdf)

Abstract: Humic substances are nor major objectives of water treatment in drinking water supply. But, as they often influence the treatment efficiency or participate in treatment reactions, their behaviour in the treatment process can significantly determine the process design. A very effective pretreatment step can be achieved by soil passage (e. g. bank filtration or slow sand filtration) which is usually involved in German surface water treatment processes. In this study transport phenomena of humic matter during underground passage are investigated with special attention to the alteration of their treatment behaviour. In a fundamental a work the deposition of humic substances was studied in a model system. Transport phenomena could mathematically be described by a filtration theory of colloidal transport. From the results of these calculations the collision efficiencies of humic substances on clean and coated surfaces can be derived. The humic substance deposition on subsurfaces is accompanied by a classification based on molecular weight. An additional alteration of dissolved humic matter due to microbiological degradation and partial resolvation of deposited humic matter was observed by passage of river water through columns containing actual soil. The alteration of dissolved organic matter during soil passage is finally characterized by its adsorption and chlorination precursor behaviour. All results confirm that bank filtration is an effective pretreatment step particulary due to the decrease in connection with improvement in treatability of humic matter. (C) 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. An rights reserved.

Keywords: Deposition, Humic Substances, Dissolved Organic Matter, Bank Filtration, Adsorption, THM Precursor

Leung, W.C., Wong, M.F., Chua, H., Lo, W., Yu, P.H.F. and Leung, C.K. (2000), Removal and recovery of heavy metals by bacteria isolated from activated sludge treating industrial effluents and municipal wastewater. *Water Science and Technology*, **41** (12), 233-240.

Full Text: [W\Wat Sci Tec41, 233.pdf](W/Wat%20Sci%20Tec41,%20233.pdf)

Abstract: A total of nineteen metal-resistant and non-resistant bacteria from activated sludge treating both metal-contaminated industrial effluents and municipal wastewater were isolated and identified. These included both Gram-positive (e.g. Micrococcus) and Gram-negative (e.g. *Pseudomonas*) bacteria. The biosorption capacity of these strains for five different heavy metals (copper, nickel, zinc, lead and chromium) was determined at pH 5 and initial metal concentration 100 mg/L. *Pseudomonas* pseudoalcaligenes and Micrococcus luteus were found to be capable of removing significant amounts of copper and lead. Hence, they were selected for further investigations. Langmuir adsorption isotherms adequately represented the distribution of copper and lead for both species. The study of pH effect on metal removal for both species indicated that the metal biosorption increased with increasing pH from 2 to 6. The effect of competing cations on biosorption of P. pseudoalcaligenes was studied. Sulphuric acid (0.05 M) was the most efficient desorption medium among the eleven reagents tested. Over 90% of copper sorbed on the cells of M, luteus could be recovered by washing with 0.05 M sulphuric acid within five minutes. The biosorbent was used for at least five biosorption and desorption cycles without loss of copper removal capacity. Immobilization of M. luteus in 2% calcium alginate and 10% polyacrylamide gel beads increased copper uptake by 61%.

Keywords: Adsorption, Bioremediation, Biosorption, Desorption, Heavy Metals, Wastewater Treatment, Aqueous-Solutions, Accumulation, Biosorption

? Wang, L., Chua, H., Wong, P.K., Lo, W.H., Yu, P.H.F. and Zhao, Y.G. (2000), An optimal magnetite immobilized *Pseudomonas-putida* 5-x cellsystem for Cu2+ removal from industrial waste effluent. *Water Science and Technology*, **41** (12), 241-246.

Full Text: [2000\Wat Sci Tec41, 241.pdf](2000/Wat%20Sci%20Tec41,%20241.pdf)

Abstract: An optimal magnetite immobilized *Pseudomonas putida* 5-x cell system was developed to remove Cu2+ from industrial waste affluent. Cu2+ adsorption capacity of P. putida 5-x cultured in sulphate-limiting medium (SLM) was minimum in early log growth phase, and reached maximum in late stationary growth phase or early death phase. Pretreated cells by 0.6 N HCl could greatly enhance the adsorption capacity of biomass up to 85.6 mg, g and had no significant effect for the loss of P. putida 5-x cells during the pretreatment. In a semi-continuous biosorption system, the removal efficiency of Cu2+ from wastewater reached 96%, and recovery efficiency of Cu2+ was 95%, and the concentration in the recovery solution was 1.4 g, L using 0.6 N HCl as eluant. The mechanism of Cu2+ adsorption by this type of biomass was studied by using the technique of transmission electron microscopy (TEM). Degradation of a peptidoglycan layer on the cell surface was observed after acidic pretreatment, but no further degradation appeared after the adsorption-desorption cycle. TEM and X-ray analysis also showed that Cu2+ was mainly accumulated on the cell surface, so it was effectively desorpted by acidic treatment in the desorption process. The process of adsorption obeyed the Freundlich isotherm.

Keywords: Adsorption, Biomass, Biosorption, Copper, Cu(II), Cu2+ Adsorption, Growth Phase, Heavy-Metals, Ions, Magnetite-Immobilized Cells, Peptidoglycan Layer, *Pseudomonas putida*, Ramigera, Sorption And Desorption, Strain, Tem Analysis

Brion, G.M., Mao, H.H. and Lingireddy, S. (2000), New approach to use of total coliform test for watershed management. *Water Science and Technology*, **42** (1-2), 65-69.

Full Text: [W\Wat Sci Tec42, 65.pdf](W/Wat%20Sci%20Tec42,%2065.pdf)

Abstract: This study monitored surface water quality around a reservoir for a P-year period. It was found that the total coliform test could be used in new ways, and in conjunction with other bacterial and viral indicators. to provide valuable information on the sources of fecal inputs and their potential impact on water quality. Two new approaches to the use of total coliforms were developed. Specifically, it was found that atypical colonies (AC) from the total coliform, membrane filtration test were invaluable input parameters for neural network models that could be trained to recognize and predict potentially hazardous fecal sources from agricultural activities. AC counts were also used in conjunction with total coliphage (TP) concentrations to create a reference index relative to domestic sewage to rank the level of fecal contamination at sites within the watershed. Atypical colonies isolated from total coliform tests of surface water samples were further classified with the API 20E system. The classification showed that the heterogeneous group known as atypicals consisted of three main groups of bacteria: modified coliforms, Aeromonas, and a mix of predominantly Vibrio and Samonella.

Keywords: Coliforms, Atypicals, Coliphage, Watershed Management, Indicators, Neural Networks, *Cryptosporidium*, *Giardia*

Lai, C.H., Chen, C.Y., Shih, P.H. and Hsia, T.H. (1999), Competitive adsorption of copper and lead ions on an iron-coated sand from water. *Water Science and Technology*, **42** (3-4), 149-154.

Full Text: [W\Wat Sci Tec42, 149.pdf](W/Wat%20Sci%20Tec42,%20149.pdf)

Abstract: Iron oxides are good adsorbents for some metal ions. However, the adsorbent properties of these oxides are not fully exploited in water or wastewater operations because of difficulties associated with their separation from the aqueous phase. An oven process with agitators for applying an iron oxide coating onto the sand surface to utilize the adsorbent properties of the coating and filtration properties of the sand media was developed. The competitive adsorption of iron-coated sand for copper and lead ions from water was investigated by batch and column experiments. Among the two metal ions studied, the coated sand has greater affinity for the removal of lead ions compared to copper ions at a concentration of 5×10-5M, 1×10-4M and an interval of pH = 2.5 similar to 6.5. Adsorption behaviors of copper and lead ions at the iron oxide/water interface could be proved to form chemisorption through the SEM/EDAX analysis. From the column experiment results, both copper and lead ions could be removed simultaneously by the iron-coated sand in a continuous treatment unit.

Keywords: Adsorption, Coating, Copper, Iron Oxide, Lead, SEM/EDAX, Drinking-Water, Oxide, Filtration, Sorption, Cadmium, Wastes

Ricou-Hoeffer, P., Hequet, V., Lecuyer, I. and Le Cloirec, P. (1999), Adsorption and stabilization of nickel ions on fly ash/lime mixing. *Water Science and Technology*, **42** (5-6), 79-84.

Full Text: [W\Wat Sci Tec42, 79.pdf](W/Wat%20Sci%20Tec42,%2079.pdf)

Abstract: Experimental design methodology was used to define conditions for the adsorption and the stabilization of nickel ions (initial concentration of 500 mg.L-1) on coal fly ash/lime sorbent. This type of sorbent allows the reuse of by-products and increases the stabilization of metallic ions by lime addition. It was shown that tho solution pH, the metal/adsorbent mass ratio, the type of fly ash used as sorbent, and the fly ash/lime mass ratio are the most influential factors. A set of parameters was finally obtained (pH 5, metal/adsorbent ratio of 0.01 g.g-1, fly ash/lime ratio of 4 g.g-1, fly ash with the lowest content of iron oxide) for which the removal of Ni2+ is 96% and the leaching 0.03% by permuted water and 0.2% by acid solution of pH 2.

Keywords: Adsorption, Coal Fly Ash/Lime Sorbent, Experimental Design Methodology, Leaching, Nickel Ions, Ash, Removal

Texier, A.C., Andrès, Y. and Le Cloirec, P. (2000), Selective biosorption of lanthanide (La, Eu, Yb) ions by an immobilized bacterial biomass. *Water Science and Technology*, **42** (5-6), 91-94.

Full Text: [W\Wat Sci Tec42, 91.pdf](W/Wat%20Sci%20Tec42,%2091.pdf)

Abstract: The removal of metallic ions La3+, Eu3+ and Yb3+ from aqueous solution by immobilized biomass of Pseudomonas aeruginosa was investigated in batch and column reactors. Batch studies consisted in kinetic measurements for lanthanum adsorption by biomass-chitosan beads. Results did not show a significant effect of the presence of bacteria into chitosan matrix on the lanthanum uptake. Then, laboratory scale fixed-bed column experiments were carried out using biomass-entrapped polyacrylamide gel beads, which contained approximately 48% (dry weight basis) of biomass. The lanthanum sorption was dependent on the superficial liquid velocity based on empty column in the range 0.76-2.29 m.h-1. The removal of lanthan decations (2 mM) at pH 5.0 and 0.76 m, h was 198 μmol.g-1 (dry biomass) for lanthanum, 167 μmol.g-1 for europium and 192 μmol.g-1 for ytterbium (+, -10%). These results are of the order of 1.7-2 times lower than those observed in batch systems with free bacterial cells. Column experiments with mixed-cation solutions showed the following sequence of preferential biosorption: Eu3+ > Yb3+ > La3+.

Keywords: Adsorption, Biosorption, Chitosan, Column, Column Adsorption, Fixed Bed, Fixed Bed Column, Fixed-Bed, Fixed-Bed Column, Immobilized Biomass, Immobilized Cells, Lanthanides, Pseudomonas Aeruginosa, Removal, Selectivity, Sorption, Water

Gelover, S., Leal, T., Bandala, E.R., Roman, A., Jimenez, A. and Estrada, C. (2000), Catalytic photodegradation of alkyl surfactants. *Water Science and Technology*, **42** (5-6), 101-106.

Full Text: [W\Wat Sci Tec42, 101.pdf](W/Wat%20Sci%20Tec42,%20101.pdf)

Abstract: An attempt to identify intermediate and final products of photocatalytic degradation of sodium dodeylbenzensulfonate (DBSNa) in aqueous solution was carried out. Synthetic samples of DBSNa containing TiO2 as catalyst were treated in a solar concentrator device. Samples were taken at regular intervals and analyzed by GC/MS. Two main types of signal were observed in the total ion chromatograms. The first group includes signals absent in the untreated sample that appeared during the first phases of the experiment and decreased toward the end. The second group comprised species already present in the untreated sample. There were signals in both groups probably because of stable oxygenated molecules that were accumulated to the ene of treatment, indicating partial mineralization. Results clearly showed that degradation dynamic is complex. The detergent is fragmented into other products that undergo further reactions. The species distribution towards the end of the process is difficult to predict since it depends on a large number of variables including adsorption, reaction rates and the nature of the intermediate products. It is necessary to continue the study to determinate if these molecules are destroyed within the system for longer illumination times.

Keywords: Alkyl Surfactants, Dbsna, Photocatalysis, Photodegradation, Solar Detoxification, TiO2, Photocatalytic Degradation, Hydrogen-Peroxide, Waste-Water, P-Dioxin, Suspensions, Dyes

Toumi, A., Nejmeddine, A. and El Hamouri, B. (2000), Heavy metal removal in waste stabilisation ponds and high rate ponds. *Water Science and Technology*, **42** (10-11), 17-21.

Full Text: [W\Wat Sci Tec42, 17.pdf](W/Wat%20Sci%20Tec42,%2017.pdf)

Abstract: Heavy metals, zinc (Zn), copper (Cu) and lead (Pb) removal in two wastewater treatment units were compared. One of the systems consisted of a train of Waste Stabilisation Ponds (WSP) including one anaerobic, three facultative in series and two maturation ponds, also in series. The other system, called High Rate Ponds (HRP) consisted of one anaerobic, one High Rate Algal Pond (HRAP) and two maturation ponds in series. The two treatment systems were located on the same site and received the same wastewater. Data collected from the two treatment systems, for a period of three consecutive months (May, June and July, 1995) show that the content of the three elements in the crude wastewater of the city of Ouarzazate varied from 210 to 340 mg/l for Zn; 35 to 55 for Cu and 30 to 25 for Pb. The removal rate for the three elements reached 91, 92 and 71% respectively for Zn, Gu and Pb in the WSP train. The corresponding values in the HRP train were, respectively 89, 88 and 51%. However, since the two trains were not receiving the same Row, the use of specific removal rate expressed as mg removed m-1 d-1 showed that the HRAP was 1.3, 10 and 2 times more efficient respectively for Zn, Cu and Ph removal than the three facultative ponds in series of the WSP. Also, the collected data showed that the content of the sediment of the anaerobic pond was high for all the three elements. However, the recorded concentrations 613, 99 and 78 mg/kg, respectively for Zn, Cu and Pb did not exceed the EEG recommended limits.

Keywords: Wastewater Treatment, Waste Stabilisation Ponds, High Rate Ponds, High Rate Algal Pond, Heavy Metals, Rate Algal Pond

Jodra, Y. and Mijangos, F. (2001), Ion exchange selectivities of calcium alginate gels for heavy metals. *Water Science and Technology*, **43** (2), 237-244.

Full Text: [W\Wat Sci Tec43, 237.pdf](W/Wat%20Sci%20Tec43,%20237.pdf)

Abstract: An equilibrium model has been proposed and verified, based on the conditions in the gel phase and Donnan equilibrium theory, for the analysis of the experimental data on the recovery of lead, copper, cadmium, cobalt, nickel and zinc from synthetic, nonmetallic aqueous solutions on calcium alginate gels. This equilibrium model considers that the system behaves as an ion-exchange process between the calcium in the gets and the divalent metals in solution, and that the metallic portion enclosed in gel fluid is supposed an important quantitative contribution to the total amount of metal uptake by gels. According to the equilibrium constants calculated, it is deduced that the selectivity order is: Pb>Cu>Cd>Ni>Zn>Co.

Keywords: Calcium Alginate, Heavy Metals, Ion Exchange Equilibrium, Metal Distribution, New Ion Exchangers, Donnan Model, Equilibrium

Graham, N., Chen, X.G. and Jayaseelan, S. (2001), The potential application of activated carbon from sewage sludge to organic dyes removal. *Water Science and Technology*, **43** (2), 245-252.

Full Text: [W\Wat Sci Tec43, 245.pdf](W/Wat%20Sci%20Tec43,%20245.pdf)

Abstract: The objective of this research work was to study the potential application of activated carbon from sewage sludge to organic dye removal. Methylene blue and crystal violet were the two dyes investigated in the present study. Three activated carbons were produced from the exclusive sewage sludge (referred to as DS), the sludge with the additive of coconut husk (DC) and sludge with the additive of peanut shell (DP) respectively. They were characterized by their surface area and porosity and their surface chemistry structure. Adsorption studies were performed by the batch technique to obtain kinetic and equilibrium data. The results show that the three sludge derived activated carbons had a developed porosity and marked content of surface functional groups. They exhibited a rapid three-stage adsorption process for both Methylene blue and crystal violet. Their adsorption capacities for the two dyes were high, the carbon DP performed best in the adsorption whereas the carbon DC performed worst. It is therefore concluded that the activated carbons made from sewage sludge and its mixtures are promising for dye removal from aqueous streams.

Keywords: Activated Carbon, Adsorption, Dyes, Coconut Husk, Peanut Shell, Sewage Sludge, Adsorbents, Waste

Wagner, M. and Nicell, J.A. (2001), Peroxidase-catalyzed removal of phenols from a petroleum refinery wastewater. *Water Science and Technology*, **43** (2), 253-260.

Full Text: [W\Wat Sci Tec43, 253.pdf](W/Wat%20Sci%20Tec43,%20253.pdf)

Abstract: The phenol content of a petroleum refinery wastewater was reduced below the discharge limit following treatment with horseradish peroxidase and H2O2. Approximately 58% of GOD, 78% of BOD5, and 95% of toxicity were removed along with the phenols. As a result of treatment, phenols were transformed into less biodegradable compounds which could be removed by subsequent coagulation and precipitation. Optimization of the peroxide concentration led to 20% enzyme savings. The use of PEG and chitosan as protective additives resulted in 4 and 25-fold reductions in enzyme requirements, respectively. Phenol removal did not appear to be adversely affected by the presence of other hydrocarbons that are frequently present in refinery wastewaters.

Keywords: Enzymatic Treatment, Horseradish Peroxidase, Phenol Removal, Petroleum Refinery Wastewater, Toxicity, Pollutants

? Hu, T.L. (2001), Kinetics of azoreductase and assessment of toxicity of metabolic products from azo dyes by *Pseudomonas luteola*. *Water Science and Technology*, **43** (2), 261-269.

Full Text: [2001\Wat Sci Tec43, 261.pdf](2001/Wat%20Sci%20Tec43,%20261.pdf)

Abstract: This is a continuous study on a decolorization strain, Pseudomonas luteola, which involves treating seven azo dyes with different structures. This study focuses mainly on determining both the mechanism of decolorization by P, luteola and the activity of azoreductase from P. luteola as well as identifying and assessing the toxicity of metabolic products of azo dyes.

The growth of P. luteola reached the stationary phase after shaking incubation for 24 hours. Then, while being kept static, the color of seven tested azo dyes (100 mg/l) could be removed. The proportion of color removal was between 59-99%, which figure is related to the structure of the dye. Monoazo dyes (RP2B, V2RP and Red 22) showed the fastest rate of decolorization, i.e, from 0.23-0.44 mg dye-mg cell-1 hr(-1). P. luteola could remove the color of V2RP and a leather dye at a concentration of 200 mg/l, and as to the rest of the azo dyes, it could remove at a concentration of up to 100 mg/l.

Decolorization of RP2B and Red 22 required activation energy of 7.00 J/mol and 6.63 J/mole, respectively, indicating that it was easier for azoreductase to decolorize structurally simple dyes. The kinetics of azoreductase towards seven azo dyes suggested a competitive inhibition model be applied.

Microtox(R) was used to analyze the toxicity of the metabolic products of azo dyes. ECS, showed differences in toxicity before and after the azo dyes had been metabolized. Analysis revealed significant differences between the results obtained by EC50 with Blue 15 and those obtained with the feather dye, indicating that the toxicities of the metabolic products were increased. The differences obtained by EC50 with Red 22, RP2P and V2RP were small, and Black 22 showed no such difference Sulfanic acid and orthanilic acid may be the intermediate products of Violet 9 and RP2B, respectively. However, according to FT-IR analysis, aromatic amines were present in the metabolic product.

Keywords: Azoreductase, Competitive Inhibition, EC50, Microtox (R), Degradation, Decolorization, Biodegradation, Purification, Bacteria

Tiehm, A., Kohnagel, I. and Neis, U. (2001), Removal of chlorinated pollutants by a combination of ultrasound and biodegradation. *Water Science and Technology*, **43** (2), 297-303.

Full Text: [W\Wat Sci Tec43, 297.pdf](W/Wat%20Sci%20Tec43,%20297.pdf)

Abstract: Chlorinated organic compounds are hazardous pollutants found in waste water, surface water, and ground water. Our study shows that a combination of ultrasonic pretreatment and biodegradation effectively removes the solvent chlorobenzene and the disinfectant 2,4-dicblorophenol, also reduces Adsorbable Organic Halogens (AOX) and Chemical Oxygen Demand (COD). In our experiments, the ultrasonic dechlorination was not influenced by the presence of other soluble organic compounds like acetate or glucose. Dechlorination of chlorobenzene by ultrasound did not lead to toxic or inhibiting reaction products. More than that, the ultrasonic pretreatment significantly reduced the toxicity of 2,4-dichlorophenol and biological activity was initiated after sonication. Residual organic pollutants after ultrasonic pretreatment were eliminated by biodegradation.

Keywords: Aox, Biodegradation, Chlorinated Pollutants, Ultrasonic Dehalogenation, Ultrasound, Aqueous-Solution, 2-Chlorophenol, Destruction, Water

Yang, X.J., Fane, A.G. and MacNaughton, S. (2001), Removal and recovery of heavy metals from wastewaters by supported liquid membranes. *Water Science and Technology*, **43** (2), 341-348.

Full Text: [W\Wat Sci Tec43, 341.pdf](W/Wat%20Sci%20Tec43,%20341.pdf)

Abstract: The removal and recovery of Cu, Cr and Zn from plating rinse wastewater using supported liquid membranes (SLM) are investigated. SLMs with specific organic extractants as the liquid membrane carriers in series are able to remove and concentrate heavy metals with very high purity, which is very promising for recycling of heavy metals in the electroplating industry. A technical comparison between the membrane process and the conventional chemical precipitation process was made.

Keywords: Heavy Metals, Removal, Wastewaters, Supported Liquid Membranes, Chromium

Jang, A., Kim, S.M., Kim, S.Y., Lee, S.G. and Kim, I.S. (2001), Effect of heavy metals (Cu, Pb, and Ni) on the compositions of EPS in biofilms. *Water Science and Technology*, **43** (6), 41-48.

Full Text: [W\Wat Sci Tec43, 41.pdf](W/Wat%20Sci%20Tec43,%2041.pdf)

Abstract: A series of batch adsorption tests to estimate the biofilm capacity for removal of the heavy metals (Cu, Pb, and Ni) in wastewater were carried out. The metal sorption results were fitted to the Freundlich isotherm model to compare their sorption capacity. The change of the composition of EPSs (extracellular polymeric substances) was simultaneously represented by the ratio of carbohydrate to protein (C/P) when the biofilm was exposed to the heavy metals. EPS composed of slime loosely bound to the cell and capsular materials was extracted by the four general extraction methods including regular centrifugation, regular centrifugation with formaldehyde, EDTA extraction and steam extraction. Although the various extraction methods showed different results, CIP ratio of biofilm exposed to copper and lead metal ions was generally lower than that of control.

Keywords: Adsorption, Biofilm, Extraction Method, EPS, Extracellular Polymeric Substances, Heavy Metal Activated-Sludge Cultures, Extracellular Polymers, Extraction Methods, Removal

Liu, Y., Lam, M.C. and Fang, H.H.P. (2001), Adsorption of heavy metals by EPS of activated sludge. *Water Science and Technology*, **43** (6), 59-66.

Full Text: [W\Wat Sci Tec43, 59.pdf](W/Wat%20Sci%20Tec43,%2059.pdf)

Abstract: Extracellular polymeric substances (EPSs) were extracted by high-speed centrifugation at 20,000 G for 30 min from an activated sludge treating municipal wastewater. Each gram of sludge, as measured in volatile suspended solids (VSS), contained 7.3 mg of EPS, including 6.5 mg of protein (EPSp) and 0.8 mg of carbohydrate (EPS,). The EPS, had a mean MW of 2.0×105; about 18% of EPSp had MW over 5×104 and 16% below 5×103. For heavy metal concentrations ranging 10-100 mg/l, EPS on average removed 99% of Zn2+, 98% of Cu2+, 97% of Cr3+, 85% of Cd2+, 69% of Co2+, 37% of Ni2+, and 26% of CrO42-. The relative degrees of metal removals were inconsistent with those reported for the activated sludge process. Each mg of ESP had the capacity to remove up to 1.48 mg of Zn2+, 1.12 mg of Cu2+, 0.83 mg of Cr3+, 0.90 mg of Cd2+, 1.10 mg of Co2+, 0.25 mg each of Ni2+ and CrO42-. Results suggest the feasibility of recovering ESP from waste sludge for use as adsorbent. Freundlich isotherm correlated satisfactorily with the adsorption data of Ni2+, Cu2+. Cd2+, and CrO42- (R2 ranging 0.39-0.97), whereas Langmuir isotherm correlated satisfactorily with those of Zn2+, Cr3+ and Ni2+ (R2 ranging 0.93-0.96). Both correlated poorly for those of Co2+.

Keywords: Activated Sludge, Adsorption, Eps, Extracellular Polymeric Substances, Heavy Metals, Bacterial Extracellular Polymers, *Z-Ramigera*, *Zoogloea-Ramigera*, Ions, Extraction, Culture, Removal

? Yoo, C.K., Cho, J.H., Kwak, H.J., Choi, S.K., Chun, H.D. and Lee, I. (2001), Closed-loop identification and control application for dissolved oxygen concentration in a full-scale coke wastewater treatment plant. *Water Science and Technology*, **43** (7), 207-214.

Full Text: [2001\Wat Sci Tec43, 207.pdf](2001/Wat%20Sci%20Tec43,%20207.pdf)

Abstract: The objective of this paper is to apply a closed-loop identification to actual dissolved oxygen control system in the coke wastewater treatment plant. It approximates the dissolved oxygen dynamics to a high order model using the integral transform method and reduces it to the first-order plus time delay (FOPTD) or second-order plus time delay (SOPTD) for the PID controller tuning. To experiment the process identification on the real plant, a simple set-point change of the speed of surface aerator under the closed-loop control without any mode change was used as an activation signal of the identification. The full-scale experimental results show a good identification performance and a good tracking ability for set-point change. As a result of improved control performance, the fluctuation of dissolved oxygen concentration variation has been decreased and the electric power saving has been accomplished.

Keywords: Autotuning, Closed-Loop Identification, Dissolved Oxygen, FOPTD Model, PID Controller, PID Controllers, SOPTD Model, Wastewater, Wastewater Treatment

Zouboulis, A.I., Matis, K.A., Rousou, E.G. and Kyriakidis, D.A. (2001), Biosorptive flotation for metal ions recovery. *Water Science and Technology*, **43** (8), 123-129.

Full Text: [W\Wat Sci Tec43, 123.pdf](W/Wat%20Sci%20Tec43,%20123.pdf)

Abstract: The solid/liquid separation of suspended. metals-loaded biomass was studied extensively by successfully applying flotation. Industrial non-living biomass samples of different origin have been tried in the laboratory as sorbents of metal ions, with the main stress on Streptomyces rimosus, an effective actinomyces. Flotation was used as the harvesting technique downstream, following the biosorption stage. Important parameters of the investigation were the solution pH, the surfactant type and concentration, the applied modification of biomass, etc. The reuse and recycling of biosorbent following elution was proved possible. As a result cleaned water was produced as underflow of the flotation process.

Keywords: Biomass, Biosorption, Copper, Harvesting, Nickel, Zinc, Removal, Cadmium

Beccari, M., Majone, M., Papini, M.P. and Torrisi, L. (2001), Enhancement of anaerobic treatability of olive oil mill effluents by addition of Ca(OH)2 and bentonite without intermediate solid/liquid separation. *Water Science and Technology*, **43** (11), 275-282.

Full Text: [W\Wat Sci Tec43, 275.pdf](W/Wat%20Sci%20Tec43,%20275.pdf)

Abstract: Previous work on the anaerobic treatment of olive oil mill effluents (OME) have shown: (a) lipids, even if more easily degraded than phenols, were potentially capable of inhibiting methanogenesis more strongly; (b) a pretreatment based on addition of Ca(OH), and bentonite removed lipids almost quantitatively; (c) preliminary biotreatability tests performed on the pretreated OME showed high bloconversion into methane at very low dilutions ratios, especially when the mixture (OME, Ca(OH), and bentonite) was fed to the biological treatment without providing an intermediate phase separation. This paper was directed towards two main aims: (a) to optimize pretreatment: the best results in terms of methane production were obtained by addition of Ca(OH)2 UP to pH 6.5 and of 10 g L-1 of bentonite; (b) to evaluate the enhancement of anaerobic treatability of OME pretreated under optimized conditions in a lab-scale continuous mathanogenic reactor fed with the substrate without intermediate solid/liquid separation: very satisfactory performances were obtained (at an organic load of 8.2 kg COD m-3 d-1 and at a dilution ratio of 1: 1.5 total COD removal was 91%, biogas production was 0.80 g CH4 (as COD)/g tot. COD, lipids removal was 98%, phenols removal was 63%). The results confirm the double role played by bentonite (adsorption of the inhibiting substances and release of the adsorbed biodegradable matter in the methanogenic reactor).

Keywords: Anaerobic Digestion, Olive Oil Mill Effluents, Integration of Chemico-Physical and Biological, Processes, Bentonite, Fatty-Acids, Digestion

de Victorica, J. and Galvan, M. (2001), *Pseudomonas aeruginosa* as an indicator of health risk in water for human consumption. *Water Science and Technology*, **43** (12), 49-52.

Full Text: [W\Wat Sci Tec43, 49.pdf](W/Wat%20Sci%20Tec43,%2049.pdf)

Abstract: During an outbreak of gastroenteritis in 28 children living in a small neighbourhood of Cuernavaca city (Mexico), a survey was performed to evaluate the confidence in coliform bacteria as sole indicators of potability of drinking waters. A primary infection by E coli and a secondary by *Pseudomonas aeruginosa* was diagnosed in five of the children and the drinking water provided by a well was suspected as a transmission source. General and household distribution systems, household filters and bottled waters were evaluated for total and faecal coliforms, family Enterobacteriaceae, P aeruginosa and residual chlorine. In every sample, pathogenic/opportunistic bacteria were isolated even in the absence of coliforms and in the presence of residual chlorine. Arbitrarily assigned ‘pollution/risk levels’ indicated that the most elevated risk was most frequently associated with storage in tanks and with bacterial colonisation in the pipeline system and commercial household filters where high levels of P aeruginosa were determined. A probability of correspondence between the presence of this bacterium and the secondary gastrointestinal infection diagnosed was found pointing towards a need for the inclusion of other microorganisms, one of which may be P aeruginosa, as indicators of health risk associated with drinking waters in Mexico.

Keywords: Coliform Indicators, Drinking Water, Drinking Water Standards, Health Risk, *Pseudomonas aeruginosa*

Notes: highly cited

? van Dongen, U., Jetten, M.S.M. and van Loosdrecht, M.C.M. (2001), The SHARON®-Anammox® process for treatment of ammonium rich wastewater. *Water Science and Technology*, **44** (1), 153-160.

Full Text: [2001\Wat Sci Tec44, 153.pdf](2001/Wat%20Sci%20Tec44,%20153.pdf)

Abstract: The treatment of ammonium rich wastewater, like sludge digester effluent, can be significantly improved when new biotechnological processes are introduced. In this paper, the combination of a partial nitrification process (SHARON (R)) and anoxic ammonium oxidation (Anammox (R)) process for the treatment of ammonia rich influents is evaluated. Herein the combined process has been studied with sludge recycle liquor from the WWTP Rotterdam-Dokhaven. The SHARON process was:operated stably for more than 2 years in a 10 l CSTR under continuous aeration with a HRT of 1 day. The ammonia in the sludge liquor was converted by 53% to nitrite only. During the test period no formation of nitrate was observed. The effluent of the SHARON process was ideally suited as influent for the Anammox reactor. The Anammox process was operated as a granular sludge SBR-process. More than 80% of the ammonia was converted into dinitrogen gas at a load of 1.2 kgN/m(3) per day. Planctomycete-like bacteria dominated the mixed community of the Anammox reactor, and only a small percentage of the population consisted of aerobic ammonium-oxidizing bacteria. This showed that the ammonium-oxidizers in the effluent of the SHARON process did not accumulate in the SBR. The test period showed that the combined SHARON-Anammox system can work stably over long periods and the process is ready for full-scale implementation.

Keywords: Partial Nitrification, Nitrite, Aerobic And Anaerobic Ammonium Oxidation, Sludge Liquor, Sharon, Anammox, Nitrogen Removal, Oxidation, Reactor, System, Diversity, Sludge, Water

? Awuah, E., Anohene, F., Asante, K., Lubberding, H. and Gijzen, H. (2001), Environmental conditions and pathogen removal in macrophyte- and algal-based domestic wastewater treatment systems. *Water Science and Technology*, **44** (6), 11-18.

Full Text: [2001\Wat Sci Tec44, 11.pdf](2001/Wat%20Sci%20Tec44,%2011.pdf)

Abstract: The environmental conditions and pathogen removal in macrophyte (Pistia stratiotes and Lemna paucicostata) and algal-based wastewater treatment systems were determined over a period of 29 days under tropical conditions. The experiment was conducted on a batch scale in 4.5 plastic containers immersed in moist sand beds. A control of raw sewage stored under dark conditions was included. Environmental conditions such as pH, temperature DO and conductivity and heterotrophic and faecal enterococci populations were monitored five times a week at 8, 12 and 20 GMT. BOD was monitored once a week for five weeks. Average temperatures within the systems ranged between 28.3 degreesC in the control to 30.6 degreesC In the algal-based system. Low pH levels of pH of 4.5 and DO levels of 3 mg/L were recorded in the water lettuce treatment systems. High pH levels around 10.5 and DO levels of about 20 mg/L were observed in the algal-based system. The control and duckweed system remained neutral. All treatment systems performed equally well fn pathogen removal and BOD reduction. The BOD decreased from 130mg/L to 5.0, 7.5, 10 and 15 mg/L in the duckweed, water lettuce, control and algal based treatment systems respectively. The faecal enterococci population decreased from 1.18×105 /ml to values below 100/ml in all treatment systems.

Keywords: Duckweed, Faecal Enterococci, Macrophytes, Pathogen Removal, Pistia, Pistia Stratiotes, Stabilization Ponds, Wastewater, Wastewater Treatment, Water Treatment

Haytoglu, B., Demirer, G.N. and Yetis, U. (2001), Effectiveness of anaerobic biomass in adsorbing heavy metals. *Water Science and Technology*, **44** (10), 245-252.

Full Text: [W\Wat Sci Tec44, 245.pdf](W/Wat%20Sci%20Tec44,%20245.pdf)

Abstract: This study focuses on the effectiveness of waste anaerobic dead biomass (AIDE) in adsorbing heavy metals, namely Pb(II), Cr(VI), Cu(II), Ni(II) and Zn(II). The metal uptake capacity of ADB was investigated and compared with the values for various biomass types from the literature. The biomass, which was grown under laboratory conditions using a synthetic wastewater, was used throughout the study after sterilization. The maximum metal adsorptive capacities were evaluated by running isotherm tests at 25 degreesC and initial pH of 4. It was observed that Pb(II) was adsorbed with the highest capacity. The maximum adsorptive capacity of ADB for Pb(II), Zn(II), Cu(II), Ni(II) and Cr(VI) was determined as 1250, 625, 357, 227 and 384 mg/g dry biomass, respectively. These values were significantly higher than the corresponding capacities reported in the literature for other types of biomass. In describing the adsorption equilibrium, both the Langmuir and Freundlich isotherm models were examined. The experimental data for Pb(II), Zn(II), Cr(VI), and Ni(II) fitted both the Langmuir and Freundlich models with correlation coefficients of 0.80-0.99 while Cu(II) only fitted the Langmuir model with a correlation coefficient of 0.99. Therefore, different and distinct aspects of the interactions between the cell surfaces and the metal ions might have occurred for Cu(II) and the rest of the metals. The equilibrium pH values attained were all higher than the initial pH value of 4.0, and this indicated that both the type and the initial concentration of the metal influenced the equilibrium pH. Furthermore, there was a decrease in equilibrium pH with increasing initial metal concentration at varying levels.

Keywords: Anaerobic Sludge, Binding Capacity, Biosorption, Heavy Metals, pH, Immobilized Fungal Biomass, Aqueous-Solutions, Activated-Sludge, Marine-Algae, Cell-Walls, Biosorption, Removal, Adsorption, Digestion, Cadmium

Weng, C.H., Chang, E.E. and Chiang, P.C. (2001), Characteristics of new coccine dye adsorption onto digested sludge particulates. *Water Science and Technology*, **44** (10), 279-284.

Full Text: [W\Wat Sci Tec44, 279.pdf](W/Wat%20Sci%20Tec44,%20279.pdf)

Abstract: The adsorption characteristics of an anionic azo dye (new coccine) onto digested sludge have been studied. Results show that the dye can effectively be removed by sludge. It was found that the adsorption rate is very rapid and the equilibrium can be reached in 10 min. The adsorption kinetics can be expressed by the modified Freundlich equation. Also, the solution pH, ionic strength, and temperature are the key factors affecting the adsorption. The effect of electrical double layer thickness on the adsorption was also discussed. The adsorption standard free energy, enthalpy, and entropy were determined. The adsorption follows a nonlinear multilayer adsorption isotherm. The specific surface area of sludge was determined as 82 similar to 150 m2/g on the basis of its monolayer dye adsorption capacity.

Keywords: Adsorption, Dye, Sludge, Specific Surface Area, Activated-Sludge, Surface-Area

Dierks, S. (2001), Investigation of copper adsorption to peat using the simple metal sorption model. *Water Science and Technology*, **44** (11-12), 477-483.

Full Text: [W\Wat Sci Tec44, 477.pdf](W/Wat%20Sci%20Tec44,%20477.pdf)

Abstract: The Simple Metal Sorption (SiMS) equilibrium model was used to simulate the proton/cation exchange behavior of peat with dissolved copper. The SiMS model represents proton binding and metal binding as cation exchange for heterogeneous sorbents as a function of pH, salt concentration, total metal concentration and total ligand concentration. The SiMS model uses fewer parameters than other cation exchange models for multidimensional datasets and can be executed on a standard spreadsheet. The cation exchange selectivity coefficient, K-Me, K-app, is represented as K-Me, K-app = K-Me(H+)(alpha)(L-T/Me-T)I-beta(phi). The model is similar to standard surface complexation approaches, with an intrinsic relationship described by mass action laws (K-Me = metal equilibrium constant) and variable terms that are expressed as simple power functions of proton concentration, ligand to metal ratio (L-T/Me-T), and ionic strength (I). The model successfully simulated the proton exchange behavior of acid-washed, Sphagnum peats over a range of 4 to 8 pH units with ionic strength differing by three orders of magnitude (I = 0.001 to 0.1). Simulation of copper binding on five peat data sets and the dried biomass of Potamogeton lucens was also successful (0.94 < r2 < 0.99). However, there was no apparent relationship between model parameters and peat characteristics. Incorporation of the SiMS model into a framework for predicting metals removals in wetlands will require more work.

Keywords: Cation Exchange Selectivity Coefficient, Ion-Exchange, Peat, Surface Complexation Model, Ions, Moss

? Kao, C.M., Wang, J.Y., Lee, H.Y. and Wen, C.K. (2001), Application of a constructed wetland for non-point source pollution control. *Water Science and Technology*, **44** (11-12), 585-590.

Full Text: [2001\Wat Sci Tec44, 585.pdf](2001/Wat%20Sci%20Tec44,%20585.pdf)

Abstract: In Taiwan, non-point source (NPS) pollution is one of the major causes of impairment of surface waters. The main objective of this study was to evaluate the efficacy of using constructed wetlands on NPS pollutant removal and water quality improvements. A field-scale constructed wetland system was built inside the campus of National Sun Yat-Sen University (located in southern Taiwan) to remove (1) NPS pollutants due to the stormwater runoff, and (2) part of the untreated wastewater from school drains. The constructed wetland was 40 m (L) x 30 m (W) x 1 m (D), which received approximately 85 m(3) per day of untreated wastewater from school drainage pipes. The plants grown on the wetland included floating (*Pistia stratiotes* L.) and emergent (Phragmites communis L.) species. One major storm event and baseline water quality samples were analyzed during the monitoring period. Analytical results indicate that the constructed wetland removed a significant amount of NPS pollutants and wastewater constituents. More than 88% of nitrogen, 81% of chemical oxygen demand (COD), 85% of heavy metals, and 60% of the total suspended solids (TSS) caused by the storm runoff were removed by the wetland system before discharging. Results from this study may be applied to the design of constructed wetlands for NPS pollution control and water quality improvement.

Keywords: Constructed Wetland, Constructed Wetlands, Non-Point Source Pollutants, *Pistia Stratiotes*, Pollution, Wastewater Treatment, Water Quality, Wetland

Pinisakul, A., Polprasert, C., Parkpian, P. and Satayavivad, J. (2002), Arsenic removal efficiency and mechanisms by electro-chemical precipitation process. *Water Science and Technology*, **46** (9), 247-254.

Full Text: [W\Wat Sci Tec46, 247.pdf](W/Wat%20Sci%20Tec46,%20247.pdf)

Abstract: This research was conducted to investigate the efficiency and mechanisms of arsenic (As) removal from a contaminated water by using the electro-chemical precipitation (ECP) process, with the operating conditions as follows: initial As concentration of 0.5-5 mg/L, 0.1 M KCl, electrical gradient of 200 V/m and initial pH higher than 3. The laboratory-scale ECP unit was able to reduce As to within the WHO drinking water standard of 0.01 mg/L in 20 min. The Cl- salt was found to yield better As removal efficiencies than the NO3- salt probably because NO3- ions interfered with the production of OH- and Fe(OH)3 important for As removal. X-ray fluorescence and X-ray diffractometric analysis revealed maghemite (Fe2O3) and angelellite (Fe4As2O11,) to be the major compounds present in the precipitated sludge. The percent Fe2O, and Fe4AS2O11 contents of the dried ECP sludge were 98.29% and 0.26%, respectively. From a mass balance analysis, As removal in the ECP process was due to: incorporation in and adsorption on the ECP sludge - 64.9-94.9%, conversion to arsine (AsH3) gas - 10.5-15.6%, adsorption on the electrode plates and reactor walls - 0.03-1.1 %, residual in the supernatant - 0.2-0.4%, and unaccounted for 1.2-19.8%.

Keywords: Arsenic Removal, Electrochemical Precipitation, Electrolysis, Heavy Metal Removal, Electrochemical Precipitation, Water, Groundwater

? Salim, M.R., Othman, F., Ali, M.I., Patterson, J. and Hardy, T. (2002), Application of locally available materials for the treatment of organic polluted water. *Water Science and Technology*, **46** (9), 339-346.

Full Text: [2002\Wat Sci Tec46, 339.pdf](2002/Wat%20Sci%20Tec46,%20339.pdf)

Abstract: Several types of water treatment technologies including adsorption are how being used to treat polluted water. In this paper the removal of phenol by adsorption will be discussed. Activated carbons are successfully applied for purification of potable water and the removal of organic pollutants in wastewater. This paper is concerned with a low cost approach to treating waste water that is significant especially for those countries where oil palm is an available agricultural product like Malaysia, Ivory Coast, Nigeria, Thailand, Papua New Guinea. In the coastal region coconut is an available agricultural product and activated carbon prepared using coconut shell is also an economical method of water treatment. The materials used in this study were Commercial Activated Carbon (CAC), prepared from coconut shell and Modified Oil Palm Shell (MOPAS) of 1 to 2 mm diameters. The surface area of CAC and MOPAS was 38.5 m2/g and 38.2 m2/g respectively and the iodine number was determined as 674 and 454 for CAC and MOPAS, respectively. From the study the result shows above 70% removal efficiency for 5 mg/L and 40% removal efficiency for 20 mg/L of phenol solution. The performance efficiency will be discussed based on batch test, following Freundlich adsorption isotherm. The results indicate that CAC exhibits a higher adsorptive capacity (K-f of 0.079) as compared to MOPAS (K-f of 0.048). Hence a better removal efficiency for CAC at lower concentration of phenol. Results from column tests show a better adsorptive capacity for CAC (2.73) as compared to MOPAS (2.48).

Keywords: Adsorption, Adsorption Kinetic, Breakthrough Time, Freundlich Isotherm, Modified Oil Palm Shell, Phenol, Treatment, Wastewater

Annadurai, G., Juang, R.S. and Lee, D.J. (2003), Adsorption of heavy metals from water using banana and orange peels. *Water Science and Technology*, **47** (1), 185-190.

Full Text: [W\Wat Sci Tec47, 185.pdf](W/Wat%20Sci%20Tec47,%20185.pdf)

Abstract**:** Liquid-phase adsorption removal of Cu2+, Co2+, Ni2+, Zn2+, and Pb2+ in the concentration range of 5-25 mg/L using low-cost banana and orange peel wastes was examined at 30 °C. Under comparable conditions, the amount of adsorption decreased in the order Pb2+ > Ni2+ > Zn2+ > Cu2+ > Co2+ for both adsorbents. The adsorption isotherms could be better described by the Freundlich equation. The amount of adsorption increased with increasing pH and reached a plateau at pH > 7, which was confirmed by the variations of zeta potentials. The application potential of such cellulose-based wastes for metal removal (up to 7.97 mg Pb2+ per gram of banana peel at pH 5.5) at trace levels appeared to be promising.

Keywords: Adsorption, Adsorption Removal, Aqueous-Solution, Carbon, Copper, Fruit Peels, Heavy Metals, Ions, Isotherms, Orange Peel, Peel, Removal, Waste-Water, Zeta Potentials

? Lee, K.M. and Lim, P.E. (2003), Treatment of phenolic wastewater using agricultural wastes as an adsorbent in a sequencing batch reactor. *Water Science and Technology*, **47** (10), 41-47.

Full Text: [2003\Wat Sci Tec47, 41.pdf](2003/Wat%20Sci%20Tec47,%2041.pdf)

Abstract: The objective of this study is to investigate the potential of the activated rice husk to be used as an alternative adsorbent to powdered activated carbon (PAC) in the simultaneous adsorption and biodegradation processes under sequencing batch reactor (SBR) operation to Treat synthetic wastewater containing phenol; p-methylphenol, p-ethylphenol and p-isopropylphenol. The rice husk (PRH) was activated by pyrolysis at 600 C for 5 hours in a nitrogen atmosphere. Using the Langmuir model the limiting. adsorption capacities of PRH for the phenols were found to vary from 0.015-0.05 of those of PAC. The SBR reactors with and without adsorbent addition were operated with fill, react, settle, draw and idle periods in the ratio of 4:6:1:0.75:0.25 for a cycle time of 12 hours. For phenolic wastewater containing, 1,200 mg/L phenol, 1,200 mg/L p-methylphenol, 800 mg/L p-ethylphenol and 650 mg/L p-isopropylphenol, it was found that the biodegradation process alone was unable to produce effluent of quality which would satisfy the discharge standards of COD less than or equal to 100 mg/L and phenol concentration (\_)less than or equal to 1 mg/L. The Addition of PAC in the ratio of PAC/phenolic compound at 0.095 g/g for phenol, 0.119 g/g for p-methylphenol, 0.179 g/g for p-ethylphenol and 0.220 g/g for p-isopropylphenol, can improve the effluent quality to satisfy the discharge standards. Equivalent treatment performance was achieved with the use of PRH at dosages of 2-3 times higher than those of PAC for all the phenolic wastewater studied. The increased adsorption capacity of PRH shown in the treatment indicates bioregeneration of the adsorbed surface during the treatment process.

Keywords: Adsorption, Agricultural Wastes, Powdered Activated Carbon, SBr, Sequencing Batch Reactor, Sludge, Treatment, Wastewater

Rae, I.B. and Gibb, S.W. (2003), Removal of metals from aqueous solutions using natural chitinous materials. *Water Science and Technology*, **47** (10), 189-196.

Full Text: [W\Wat Sci Tec47, 189.pdf](W/Wat%20Sci%20Tec47,%20189.pdf)

Abstract: Four naturally derived chitinous materials, commercial cryogenically milled carapace (CCMC), mechanically milled carapace (MMC), chitin and chitosan, were assessed for their ability to remove a range of alkali, alkaline earth, transition and heavy metals from aqueous media in flow-through column trials. The materials showed a poor affinity for the alkali metals and alkaline earth metals but significantly greater affinity for transition and heavy metals: an: general, chitin was the least efficient material for removal of transition and heavy metals (similar to35%) while chitosan was most effective (>99%). CCMC and MMC; both removed >90% of transition and heavy metals tested from solution. Batch studies conducted using copper as a reference metal demonstrated that removal was dependent on a number of variables including pH, contact time, particle size, metal concentration, metal type and the physic-chemical characteristics of the materials. Detailed analysis of the results from these studies indicate that removal is a complex process and that metals can be sequestered from solution by a number-of mechanisms including adsorption, absorption and precipitaion.

Keywords: Biosorbents, Chitin, Chitosan, Crabshell, Heavy Metals Transition Metals, Cancer-Pagurus L, Heavy-Metals, Waste-Water, Crab Shell, Lead, Precipitation, Biosorption, Adsorption, Copper, Mineralization

Bianchi, A., Papini, M.P., Corsi, A., Behra, P. and Beccari, M. (2003), Competitive transport of cadmium and lead through a natural porous medium: Influence of the solid/liquid interface processes. *Water Science and Technology*, **48** (3), 9-16.

Full Text: [W\Wat Sci Tec48, 9.pdf](W/Wat%20Sci%20Tec48,%209.pdf)

Abstract: Contaminated groundwater typically contains different metal contaminants which may compete with each other for the same adsorption sites. Understanding the fate of these micro-pollutants is of primary importance for the assessment of the risk associated with their dispersion in the environment and for the evaluation of the most appropriate remediation technology. In this regard, column techniques can be considered as useful tools both to perform transport experiments and to obtain equilibrium adsorption data without any perturbation of the actual solid/liquid interface. Cd and Pb monocomponent step column experiments were used to obtain adsorption isotherms on a natural aquifer material. A General Composite approach was used to define the equilibrium adsorption model characterized by two types of sites (ion-exchange and surface complexation sites). Coupling the adsorption model with the Advection-Dispersion equation (by IMPACT code) allowed us to well represent the monocomponent step experiments. The model was successfully used to predict the competitive Cd and Pb transport behaviour. Cd peaks of concentration due to Pb competition were experimentally observed and simulated by the model. This behaviour can be described only by an accurate modelling of the interaction and cannot be predicted by simple isotherms (such as Langmuir or Freundlich type).

Keywords: Adsorption, Competition, Heavy Metals, Modelling, Transport, Adsorption, Soil

Braskerud, B.C. and Haarstad, K. (2003), Screening the retention of thirteen pesticides in a small constructed wetland. *Water Science and Technology*, **48** (5), 267-274.

Full Text: [W\Wat Sci Tec48, 267.pdf](W/Wat%20Sci%20Tec48,%20267.pdf)

Abstract: When pesticides are used in arable watersheds, residues are usually found in the recipients. However, small constructed wetlands (CWs) in first and second order streams can reduce the loss of pesticides, since water purification processes are stimulated. This paper presents the results of adding 13 pesticides to a CW in Norway. The relative retention increased between 0 and 67% for the, pesticides fluroxypyr, bentazone, dicamba, mecoprop, propiconazole, MCPA, dichlorprop, linuron, fenpropimorph, metalaxyl, metribuzin, metamitron and propachlor. In many cases, the CW reduced the peak concentrations to values regarded as non-toxic for aquatic life, even though the wetland covered less than 0.4% of the watershed surface area, and the average hydraulic load often was above 0.8 m d-1. Possible retention factors were adsorption to soil particles and organic matter, sedimentation of particles, low or high redox-potential, and biodegradation of nitrogen-rich pesticides. However, the retention processes are complex, and are not fully understood.

Keywords: Constructed Wetland, Diffuse Pollution, Fungicide, Herbicide, Nonpoint-Source Pollution, Atrazine, Removal, Water

Reddad, Z., Gerente, C., Andres, Y. and Le Cloirec, P. (2004), Lead removal by a natural polysaccharide in membrane reactors. *Water Science and Technology*, **49** (1), 163-170.

Full Text: [W\Wat Sci Tec49, 163.pdf](W/Wat%20Sci%20Tec49,%20163.pdf)

Abstract: Industrial wastewaters often contain heavy metal ions that are toxic to many living species. Therefore, economic treatment methods are investigated, involving the sorption of metal ions onto wastes or natural materials. In the present work, the ability of sugar beet pulp, a common waste of the sugar industry, to remove Pb2+ polluted waters is investigated. The kinetic and equilibrium experiments were performed in batch reactor in order to determine the Pb2+ adsorption mechanisms onto the polysaccharide. The dynamic studies of Pb2+ fixation onto the natural polysaccharide involve an adsorption reactor coupled with microfiltration membrane in order to confine the adsorbent particles. A mass balance model based on the Langmuir equilibrium isotherm was used to describe the Pb2+ breakthrough curves. This model successfully simulated the entire breakthrough curves whatever the operating conditions used. It provides a useful tool for process simulation and optimisation.

Keywords: Adsorption, Metal Ions, Microfiltration, Modelling, Polysaccharides, Sugar-Beet Pulp, Metal-Ions, Aqueous-Solution, Sorption, Binding, Cations

? Bathe, S., Mohan, T.V.K., Wuertz, S. and Hausner, M. (2004), Bioaugmentation of a sequencing batch biofilm reactor by horizontal gene transfer. *Water Science and Technology*, **49** (11-12), 337-344.

Full Text: [2004\Wat Sci Tec49, 337.pdf](2004/Wat%20Sci%20Tec49,%20337.pdf)

Abstract: Bioaugmentation by introduction of catabolic genes residing on mobile genetic elements into the microbial community of a soil or wastewater environment might be an alternative to bioaugmentation by addition of bacterial cells with chromosomally encoded catabolic genes. This study investigates the possibility to enhance degradation of the xenobiotic model compound 2,4-dichlorophenoxyacetic acid in a sequencing batch biofilm reactor (SBBR) by using the conjugative plasmid pJP4 carrying genes for 2,4-D degradation. After introduction of a plasmid donor strain to a lab-scale SBBR operated without 2,4-D, the number of plasmid-carrying cells first dropped, and then increased after switching to 2,4-D as the sole carbon source. The donor cells were unable to grow in the applied synthetic wastewater with 2,4-D as the sole carbon source. Transconjugants could be detected both by culture-dependent and culture-independent methods in the 2,4-D degrading biofilm. In contrast to 90% 2,4-D degradation in the bioaugmented reactor within 40 h, a control reactor which had not received the plasmid still contained 60% of the initial 2,4-D concentration after 90 h. This experiment clearly demonstrates the introduction of 2,4-D degradative genes into a microbial biofilm and indicates that horizontal gene transfer is a promising tool for bioaugmentation of reactors treating wastewater.

Keywords: Bioaugmentation, Catabolic Plasmid PJP4, Conjugation, 2,4-Dichlorophenoxyacetic Acid (2,4-D), PCR-DGGE, Sequencing Batch Biofilm Reactor (SBBR), 2,4-Dichlorophenoxyacetic Acid Degradation, Comamonadaceae, Plasmids, Sludge, PJP4

? Acuna-Askar, K., Villarreal-Chiu, J.F., Gracia-Lozano, M.V., Garza-Gonzalez, M.T., Chavez-Gomez, B., Rodiguez-Sanchez, I.P. and Barrera-Saidana, H.A. (2004), BTE-OX biodegradation kinetics with MTBE through bioaugmentation. *Water Science and Technology*, **50** (5), 85-92.

Full Text: [2004\Wat Sci Tec50, 85.pdf](2004/Wat%20Sci%20Tec50,%2085.pdf)

Abstract: The biodegradation kinetics of BTE-oX and MTBE, mixed all together, in the presence of bioaugmented bacterial populations as high as 880 mg/L VSS was evaluated. The effect of soil in aqueous samples and the effect of Tergitol NP-10 on substrate biodegradation rates were also evaluated. Biodegradation kinetics was evaluated for 36 hours, every 6 hours. Benzene and o-xylene biodegradation followed a first-order one-phase kinetic model, whereas toluene and ethylbenzene biodegradation was well described by a first-order two-phase kinetic model in all samples. MTBE followed a zero-order removal kinetic model in all samples. The presence of soil in aqueous samples retarded BTE-oX removal rates, with the highest negative effect on o-xylene. The presence of soil enhanced MTBE removal rate. The addition of Tergitol NP-10 to aqueous samples containing soil had a positive effect on substrate removal rate in all samples. Substrate percent removals ranged from 95.4-99.7% for benzene, toluene and ethylbenzene. O-xylene and MTBE percent removals ranged from 55.9-90.1% and 15.6-30.1%, respectively.

Keywords: Eioaugmentation, Biodegradation, Bioremediation, BTEX, MTBE, Tergitol NP-10, Utyl Ether MTBE, Groundwater, Reactors, Isomers, Xylene, Batch

? Xu, H., Tay, J.H., Foo, S.K., Yang, S.F. and Liu, Y. (2004), Removal of dissolved copper(II) and zinc(II) by aerobic granular sludge. *Water Science and Technology*, **50** (9), 155-160.

Full Text: [2004\Wat Sci Tec50, 155.pdf](2004/Wat%20Sci%20Tec50,%20155.pdf)

Abstract: This study investigated the adsorption kinetics of dissolved copper(II) and zinc(II) by aerobic granular sludge. Two series of batch experiments were conducted at different initial copper(II), zinc(II) concentrations (C-o) and initial granule concentrations (X-o). Results showed that the biosorption kinetics of individual copper(II) and zinc(II) by aerobic granules were closely related to C-o and X-o. The maximum biosorption capacity of individual copper(II) and zinc(II) by aerobic granules was 246.1 mg g-1 and 180 mg g-1 respectively. In order to theoretically interpret the results obtained, two kinetic models previously developed for biosorption were employed and compared in this study. It was found that the model proposed by Liu et al. (2003) could fit the experimental data very well, but the second-order model failed to fit the data in some cases. It appears that aerobic granules would be potential biosorbent with high efficiency for the removal of dissolved copper(II) and zinc(II) from wastewater.

Keywords: Aerobic Granules, Biosorption Kinetics, Copper(II), Initial Conditions, Zinc(II), Aqueous-Solutions, Biosorption, Biomass, Cadmium

? Acuna-Askar, K., Gracia-Lozano, M.V., Villarreal-Chiu, J.F., Marmolejo, J.G., Garza-Gonzalez, M.T. and Chavez-Gomez, B. (2005), Effect of soil and a nonionic surfactant on BTE-oX and MTBE biodegradation kinetics. *Water Science and Technology*, **52** (8), 107-115.

Full Text: [2005\Wat Sci Tec52, 107.pdf](2005/Wat%20Sci%20Tec52,%20107.pdf)

Abstract: The biodegradation kinetics of BTE-oX and MTBE, mixed all together, in the presence of 905 mg/L VSS of BTEX-acclimated biomass was evaluated. Effects of soil and Tergitol NP-10 in aqueous samples on substrate biodegradation rates were also evaluated. Biodegradation kinetics was evaluated for 36 hours, every 6 hours. MTBE biodegradation followed a first-order one-phase kinetic model in all samples, whereas benzene, toluene and ethylbenzene biodegradation followed a first-order two-phase kinetic model in all samples. O-xylene biodegradation followed a first-order two-phase kinetic model in the presence of biomass only. Interestingly, o-xylene biodegradation was able to switch to a first-order one-phase kinetic model when either soil or soil and Tergitol NP-10 were added. The presence of soil in aqueous samples retarded benzene, toluene and ethylbenzene removal rates. O-xylene and MTBE removal rates were enhanced by soil. The addition of Tergitol NP-10 to aqueous samples containing soil had a positive effect on substrate removal rate in all samples. Substrate percent removals ranged 77-99.8% for benzene, toluene and ethylbenzene. O-xylene and MTBE percent removals ranged 50.1-65.3% and 9.9-43.0%, respectively.

Keywords: Biodegradation, BTEX, MTBE, Butyl Ether MTBE, Substrate Interactions, Mixtures, Reactors, Isomers, Toluene, Xylene, Batch

? Den, W. and Huang, C. (2006), Parameter optimization and design aspect for electrocoagulation of silica nano-particles in wafer polishing wastewater. *Water Science and Technology*, **53** (6), 187-194.

Full Text: [2006\Wat Sci Tec53, 187.pdf](2006/Wat%20Sci%20Tec53,%20187.pdf)

Abstract: A systematic procedure has been proposed for the design of a multi-channel, continuous-flow electrocoagulation reactor of mono-polar configuration for the removal of sub-micron particles from wastewater. Using the chemical-mechanical-planarization (CMP) process as the target source of wastewater, a series of laboratory-scale studies were conducted to determine the required operating conditions for the efficient removal of the ultrafine particles. These operating criteria included charge loading (> = 8 F m-3), current density (> = 5.7 A m-2), hydraulic retention time (> = 60 min), as well as the initially operational pH (7 similar to 10). Furthermore, a steady-state transport equation with second-order reaction kinetics was employed to describe the rate of coagulation as the rate-limiting factor, The actual kinetic constant determined from the laboratory-scale experiments was approximately 1.2×10-21 m3 s-1, which was three orders of magnitude smaller than that calculated based on Brownian diffusion during the coagulation. The model was subsequently validated with a series of experiments using a pilot-scale electro-coagulation reactor geometrically similar to the laboratory-scale reactor with nearly twenty times volumetric scale-up.

Keywords: CMP, Electrocoagulation, Nano-Particle, Silica Colloids, Slurry, Wafer Polishing, Electroflotation

? Jiang, J.Q., Xu, Y., Simon, J., Quill, K. and Shettle, K. (2006), Removal of boron (B) from waste liquors. *Water Science and Technology*, **53** (11), 73-79.

Full Text: [2007\Wat Sci Tec53, 73.pdf](2007/Wat%20Sci%20Tec53,%2073.pdf)

Abstract This paper explores the use of electrocoagulation to remove boron from waste effluent in comparison with alum coagulation. In treating model test wastes, greater boron removals were achieved with electrocoagulation at low doses than conventional alum coagulation when reaction was undertaken for the same conditions (pH 8.5, and initial boron concentration was 500 mg/L). Al electrocoagulation can achieve good boron removal performance (68.3%) at a dose of 2.1 (as molar ratio of Al:B, and for current density of 62.1 A/m2), while alum coagulation can only achieve the maximum boron removal of 56% at a dose of 2.4. Also, Al electrocoagulation can remove 15–20% more boron than alum coagulation for the same dose compared in the treatment of both model test wastes and industry effluent. The estimation of running costs shows that to achieve 75% boron removal from industry waste effluent, i.e. removing 150 g of boron from 1 m3 of effluent, electrocoagulation was 6.2 times cheaper than alum coagulation. The economic advantage of electrocoagulation in the treatment of boron-containing waste effluent is thus significant.

Keywords: Boron, Electrocoagulation, Waste Treatment

? Yang, Y., Tomlinson, D., Kennedy, S. and Zhao, Y.Q. (2006), Dewatered alum sludge: A potential adsorbent for phosphorus removal. *Water Science and Technology*, **54** (5), 207-213.

Full Text: [2006\Wat Sci Tec54, 207.pdf](2006/Wat%20Sci%20Tec54,%20207.pdf)

Abstract: Alum sludge refers to the by-product from the processing of drinking water in water treatment works. In this study, groups of batch experiments were designed to identify the characteristics of dewatered alum sludge for phosphorus adsorption. Air-dried alum sludge (moisture content 10.2%), which was collected from a water treatment works in Dublin, was subjected to artificial P-rich wastewater adsorption tests using KH2PO4 as a model P source. Adsorption behaviours were investigated as a function of amount and particle size of alum sludge, pH of solution and adsorption time. The results have shown that pH plays a major role not only in the adsorption process but also in the adsorption capacity. With regard to adsorption capacity, this study reveals the Langmuir adsorption isotherm being the best fit with experimental data (R-2 = 0.98-0.99). The maximum adsorption capacities range from 0.7 to 3.5 mg-P/g when the pH of the synthetic P solution was varied from 9.0 to 4.3, accordingly. The outcome of this study indicated that alum sludge is suitable for use as an adsorbent for removal of phosphate from wastewater.

Keywords: Adsorption, Alum Sludge, Phosphorus, Reuse, Wastewater Treatment, Waste-Water, Aqueous-Solution, Adsorption, Phosphate, Oxide, Media

? Deng, S., Ting, Y.P. and Yu, G. (2006), Chromate sorption and reduction kinetics onto an aminated biosorbent. *Water Science and Technology*, **54** (10), 1-8.

Full Text: [2006\Wat Sci Tec54, 1.pdf](2006/Wat%20Sci%20Tec54,%201.pdf)

Abstract: A novel biosorbent, was prepared by chemically grafting of polyethylenimine (PEI) onto the fungal biomass of Penicillium chrysogenum through a two-step reaction. The modified biosorbent is favorable for the removal of anionic Cr(VI) species from aqueous solution due to the protonation of amine groups on the biomass surface. The sorption capacity for Cr(VI) increased by 7.2-fold after surface modification. Sorption kinetics results show that the pseudo-second-order kinetic model described the experimental data well. During the sorption process, X-ray photoelectron spectroscopy (XPS) was used to analyze the chromium species on the biosorbent surface and the results indicate that part of the Cr(VI) ions were reduced to Cr(III) ions which can be chelated with the amine groups on the biomass surface. The reduced Cr(III) ions formed some aggregates on the surface at higher solution pHs.

Keywords: Aminated Biosorbent, Cr(VI) Removal, Sorption Kinetics, XPS Spectra, Hexavalent Chromium, Modified Biomass, Biosorption, Removal, Enhancement, Cu(II), Cr(VI), Ions, Lead

? Vinitnantharat, S. Rattanasirisophon, W. and Ishibashi, Y. (2007), Modification of granular activated carbon surfaceby chitosan coating for geosmin removal: Sorption performances. *Water Science and Technology*, **55** (5), 145-152.

Full Text: [2007\Wat Sci Tec55, 145.pdf](2007/Wat%20Sci%20Tec55,%20145.pdf)

Abstract: This study presents the results of the sorption performances for geosmin removal by sorption onto granular activated carbons (GAC) manufactured from different raw materials of coconut shell and bituminous coal. The surface of GAC was modified by chitosan coating. The 90% deacetylated chitosan flakes were used for coating on GAC with the GAC: chitosan ratio of 5:1. The surface of GAC was characterised by scanning electron microscope (SEM) analysis, Fourier transform infrared spectroscopy and measurement of the pH solution of GAC samples. The sorption of geosmin onto the chitosan for both uncoated and coated GACs could be described by the Freundlich adsorption model. Data revealed that the sequence of Freundlich constant (KF) was chitosan coated bitominous coal (CB) > uncoated bituminous coal (UB) > chitosan coated coconut shell (CC) ≅ uncoated coconut shell (UC). The bituminous coal based GAC with chitosan coating had a maximum capacity of 23.57 mg/g which was approximately two-fold of uncoated bituminous coal based GAC. Two simplified kinetic models, pseudo-first order and pseudo-second order, were tested to investigate the sorption mechanisms. It was found that the intraparticle diffusion was a rate controlling step for the sorption and followed the pseudo-second order equation.

Keywords: Adsorption, Chitosan, GAC, Geosmin, Odour Removal

? Wong, K.S., Wong, K.H., Ng, S., Chung, W.K. and Wong, P.K. (2007), Adsorption of copper ion on magnetite-immobilised chitin. *Water Science and Technology*, **56** (7), 135-143.

Full Text: [2007\Wat Sci Tec56, 135.pdf](2007/Wat%20Sci%20Tec56,%20135.pdf)

Abstract: The adsorption of Cu2+ from aqueous solution by magnetite-immobilised chitin (MC) was studied in batch mode. Two conventional adsorbents, cation exchange resin (CER) and activated carbon (AC) were used for the comparison. The physicochemical parameters including pH, concentration of adsorbent, temperature and initial Cu2+ concentration were optimised. Under the optimised conditions, the removal efficiencies of Cu2+ for MC, CER and AC were 91.67, 93.36 and 89.16%, respectively. In addition, the removal capacities of Cu2+ for MC, CER and AC were 56.71, 74.84 and 6.55 mg/g, respectively. The adsorption isotherm studies indicated that the adsorptive behaviour of Cu2+ on three adsorbents could be well described by the Langmuir model. The maximum adsorption capacities (q(max)) for MC, CER and AC were 53.19, 89.29 and 5.82 mg/g, respectively. The applicability of the kinetic model has been investigated for MC. Experimental results indicated that a pseudo-second-order reaction model provided the best description of the data with a correlation coefficient 0.999 for different initial Cu2+ concentrations. The rate constants were also determined. Various thermodynamic parameters such as standard free energy (Delta G(0)), enthalpy (Delta H-0) and entropy (Delta S-0) were calculated for predicting the adsorption nature of MC. The results indicated that this system was a spontaneous and endothermic process.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption Isotherm, Aqueous Solution, Aqueous-Solutions, Carbon, Cation, Cation Exchange, Cells, Chitin, Comparison, Copper, Cu2+, Equilibrium, Isotherm, Kinetic, Kinetics, Kinetics, Langmuir, Magnetite-Immobilised Chitin, pH, Recovery, Removal, Shell, Solution, Temperature, Thermodynamic Parameters, Thermodynamics, Waste, Zinc Biosorption

? Yin, C.Y., Aroua, M.K. and Daud, W.M.A.W. (2007), Modification of granular activated carbon using low molecular weight polymer for enhanced removal of Cu2+ from aqueous solution. *Water Science and Technology*, **56** (9), 95-101.

Full Text: [2007\Wat Sci Tec56, 95.pdf](2007/Wat%20Sci%20Tec56,%2095.pdf)

Abstract: Palm shell activated carbon was modified via surface impregnation with polyethyleneimine (PEI) to enhance removal of Cu2+ from aqueous solution in this study. The effect of PEI modification on batch adsorption of Cu2+ as well as the equilibrium behavior of adsorption of metal ions on activated carbon were investigated. PEI modification clearly increased the Cu2+ adsorption capacities by 68% and 75.86% for initial solution pH of 3 and 5 respectively. The adsorption data of Cu2+ on both virgin and PEI-modified AC for both initial solution pH of 3 and 5 fitted the Langmuir and Redlich-Peterson isotherms considerably better than the Freundlich isotherm.

Keywords: Activated Carbon, Adsorption, Adsorption, Batch, Carbon, Chelating Polymer, Copper, Copper(II), Cu2+, Cu2+ Adsorption, Equilibrium, Freundlich, Freundlich Isotherm, Granular Activated Carbon, Impregnation, Ions, Isotherm, Isotherms, Langmuir, Membranes, Metal Ions, Models, Modification, Nickel(II), Palm Shell, Palm Shell Activated Carbon, Ph, Polyethyleneimine, Polymer, Removal, Sorption, Surface Sites, Water, Weight

? Paradelo, R., Moldes, A.B. and Barral, M.T. (2009), Treatment of red wine vinasses with non-conventional substrates for removing coloured compounds. *Water Science and Technology*, **59** (8), 1585-1592.

Full Text: [2009\Wat Sci Tec59, 1585.pdf](2009/Wat%20Sci%20Tec59,%201585.pdf)

Abstract: Vinasses from the wine industry were treated with different materials to remove colour as a first step for treatment. Peat, several composts and red mud from bauxite refining were evaluated as adsorbents for coloured compounds, and their performances compared to that of activated charcoal. Among the materials assayed, grape marc vermicompost gave the best results, followed by peat. A sharp decrease of absorbance between 400-800 nm took place in vinasses after the treatments with these two materials, whereas the other substrates did not reduce the colour of the vinasses as did activate charcoal, grape marc vermicompost and peat. Moreover, grape marc vermicompost and peat were activated on high temperatures or grinding, producing better results in colour removal, although with negative effects on the electrical conductivity and nutrient concentration in the wastewater. The results of the treatment of vinasses with activated charcoal were reproduced and even overcame, in the case of the reduction of the optical density of vinasses at 665 nm, using grape marc vermicompost.

Keywords: Adsorption, Coloured Compounds, Degradation, Dye, Dye Removal, Grape Marc, Sorption, Vermicompost, Vinasses, Waste-Water

? Aksakal, Ö., Ucun, H. and Kaya, Y. (2009), Application of Eriobotrya japonica (Thunb.) Lindley (Loquat) seed biomass as a new biosorbent for the removal of malachite green from aqueous solution. *Water Science and Technology*, **59** (8), 1631-1639.

Full Text: [2009\Wat Sci Tec59, 1631.pdf](2009/Wat%20Sci%20Tec59,%201631.pdf)

Abstract: A new biosorbent, Eriobotrya japonica (loquat) seed biomass, has been investigated in order to remove malachite green (MG) from aqueous solutions. The factors affecting the biosorption process such as adsorbent dosage, pH of the solution and contact time were studied. The results showed that as the dose of loquat seed increased, the percentage of MG biosorption decreased accordingly. The experimental data suggested that the maximum pH for efficient biosorption of MG was 5.0. The biosorption process was relatively fast and equilibrium was achieved after about 60 min. Freundlich and Langmuir adsorption isotherm models were used for adsorption equilibrium data and based on the Langmuir isotherm plots the maximum bisorption capacity (qmax) value was calculated to be 57.47 mg/g at 20°C. The biosorption kinetics was determined by fitting pseudo-first-order and pseudo-second-order kinetic models to the experimental data, with the second-order model providing the best description of MG biosorption onto loquat seed. Various thermodynamic parameters such as free energy change ΔG°, enthalpy of sorption ΔH° and entropy ΔS° were estimated. The positive value of ΔH° and negative values of ΔG° show the sorption process is endothermic and spontaneous. The positive value of ΔS° shows the increased randomness at the solid-liquid interface during the biosorption of dyes onto loquat seed.

Keywords: Adsorption, Agricultural Waste, Biosorption, Biosorption, Cone Biomass, Equilibrium, Eriobotrya Japonica Seed Biomass, Isotherm, Isotherm, Kinetics, Kinetics, Malachite Green, Mg, Reactive Dyes, Sorption, Thermodynamic, Water

? Jin, S., Cui, K.P., Fallgren, P.H., Urynowicz, M.A. and Jian, J.Z. (2009), Removal of guar and humus from water by layered double hydroxides. *Water Science and Technology*, **59** (8), 1641-1647.

Full Text: [2009\Wat Sci Tec59, 1641.pdf](2009/Wat%20Sci%20Tec59,%201641.pdf)

Abstract: Natural organic matter such as guar and humus are recalcitrant to conventional pretreatment technologies and can potentially foul processes such as membranes during water treatment. An innovative method of using synthetic layered double hydroxides (LDH) was investigated for removing common natural organic matter in the form of guar gum (GG) and humic acid (HA) from water. Adsorption isotherms were evaluated with Langmuir and Freundlich models. Results show the affinity of GG and HA to LDH to be 11.31 and 9.33 mg g-1 LDH, respectively. Kinetic isotherms indicate that the sorbing rates of LDH to GG and HA increase with initial GG and HA concentrations, fitting a pseudo-second order model. This study demonstrate that LDH may be an effective material in removing GG and HA from waters and offer an alternative to conventional pretreatment technologies for the mitigation fouling of membrane and other systems in water treatment.

Keywords: Adsorption, Adsorption Mechanism, Exchange, Guar, Gum, Humic Acid, Humic-Acid, Humus, Hydrotalcites, Layered Double Hydroxide, LDH, Membrane Fouling, Membranes, Natural Organic-Matter, Substances

? Módenes, A.N., Pietrobelli, J.M.T.D. and Espinoza-Quiñones, F.R. (2009), Cadmium biosorption by non-living aquatic macrophytes *Egeria densa*. *Water Science and Technology*, **60** (2), 293-300.

Full Text: [2009\Wat Sci Tec60, 293.pdf](2009/Wat%20Sci%20Tec60,%20293.pdf)

Abstract: In this work the removal potential on Cd2+ by the non-living Egeria densa biomass has been studied. The influence of the metal solution pH, the plant drying and the metal solution temperature, and biosorbent grain size was previously studied in batch systems. The cadmium adsorption rate has increased when the pH was increasing, but at pH 5, the cadmium precipitation has begun to occur, avoiding such high pH values in other tests. The cadmium removal was around 70% at 30°C biomass dried and solution temperatures, assuming as the best temperature conditions. No significant influence was observed in cadmium removal due to the grain size effect. The biosorption kinetic data were well fitted by a pseudo-second order model. The equilibrium time in experiments was around 45 min with a 70% Cd removal. The equilibrium data at pH 5 were described rather better by the Langmuir isotherm than the Freundlich one, with an adsorption rate and maximum metal content values of 0.40 L g-1 and 1.28 meq g-1, respectively, for Langmuir model. The kinetic parameter values are near to other biosorbents, indicating that the macrophytes E. densa could be used as biosorbent material in industrial effluent treatment system.

Keywords: Adsorption, Adsorption Rate, Aquatic Macrophytes, Aqueous-Solutions, Batch, Biomass, Biosorbent, Biosorbents, Biosorption, Biosorption Kinetic, Cadmium, Cadmium Adsorption, Cd, Cd2+, Cu(II), Data, Egeria Densa, Equilibrium, Experiments, Freundlich, Heavy-Metals, Industrial Effluent, Ions, Isotherm, Kinetic, Kinetic Parameter, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Model, Macrophytes, Metal, Model, Non-Living, Ph, Plant, Potential, Precipitation, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second Order Model, Pseudo-Second-Order, Removal, Size, Solution, Sorption, Systems, Temperature, Treatment, Work

? Lv, K.L., Du, Y.L. and Wang, C.M. (2009), Synthesis of carboxylated chitosan and its adsorption properties for cadmium (II), lead (II) and copper (II) from aqueous solutions. *Water Science and Technology*, **60** (2), 467-474.

Full Text: [2009\Wat Sci Tec60, 467.pdf](2009/Wat%20Sci%20Tec60,%20467.pdf)

Abstract: Carboxylated chitosan (CKCTS) was prepared for the removal of Cd(II), Pb(II), and Cu(II) from aqueous solutions. The effects of experimental parameters such as pH value, initial concentration, contact time and temperature on the adsorption were studied. From the results we can see that the adsorption capacities of Cd(II), Pb(II), and Cu(II) increase with increasing pH of the solution. The kinetic rates were best fitted to the pseudo-second-order model. The adsorption equilibrium data were fitted well with the Langmuir isotherm, which revealed that the maximum adsorption capacities for monolayer saturation of Cd(II), Pb(II), and Cu(II) were 0.555, 0.733 and 0.827 mmol/g, respectively. The adsorption was an exothermic process.

Keywords: Adsorption, Adsorption Capacities, Adsorption Equilibrium, Adsorption Properties, Aqueous Solutions, Ash, Biopolymers, Cadmium, Carboxylated, Carboxymethyl Chitosan, Cd(II), Chitosan, Concentration, Copper, Cu(II), Cu(II) Ions, Data, Derivatives, Equilibrium, Exothermic, Experimental, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Lead, Metal Ion, Metal-Ions, Model, Monolayer, Ni(II), Pb(II), pH, pH Value, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Rates, Removal, Saturation, Solution, Solutions, Synthesis, Temperature, Value

? Long, C., Lu, J.D., Li, A.M. and Zhang, Q.X. (2009), Removal of endocrine disrupting chemicals from aqueous phase using spherical microporous carbon prepared from waste polymeric exchanger. *Water Science and Technology*, **60** (6), 1607-1614.

Full Text: [2009\Wat Sci Tec60, 1607.pdf](2009/Wat%20Sci%20Tec60,%201607.pdf)

Abstract: A spherical microporous carbon adsorbent (CR-1), which was developed by carbonization and activation of the waste polysulfonated cation-exchanger, was used to remove Dimethyl phthalate (DMP) and 2,4-dichlorophenol (2,4-DCP) as the model compounds of EDCs from the aqueous solution. Four adsorption isotherm models, Langmuir, Freundlich, Toth and Polanyi-Dubinin-Manes equations were tested to correlate the experimental data, Toth and Polanyi-Dubinin-Manes isotherms models provided the best correlation. The Henry’s law constants calculated from Toth equation were found to be 705.957 and 6,724.713 L g-1 for 2, 4-DCP and DMP at 298 K, respectively, and the larger exponents n of the Freundlich model were 9.011 and 9.93 for 2, 4-DCP and DMP at 298 K, respectively. The values of Henry’s law constants and exponent n of the Freundlich suggested that CR-1 was an effective adsorbent for removal of low concentrations of DMP and 2,4-DCP from aqueous solution. Moreover, the adsorption kinetics results showed that adsorption of 2,4-DCP and DMP on CR-1 was a pseudo-second-order process controlled by intra-particle diffusion and that adsorption uptake reached quickly half of equilibrium capacities within 20 min.

Keywords: 2,4-Dichlorophenol, 2,4-Dichlorophenol, Acid, Activated Carbon, Activation, Adsorbent, Adsorption, Adsorption, Adsorption Isotherm, Adsorption Isotherm Models, Adsorption Kinetics, Agricultural Waste, Aqueous Phase, Aqueous Solution, Carbon, Carbonization, Cation Exchanger, Chemicals, Correlation, Data, Diffusion, Dimethyl Phthalate, Equilibrium, Experimental, Freundlich, Freundlich Model, Intra Particle Diffusion, Intra-Particle Diffusion, Intraparticle Diffusion, Isotherm, Isotherm Models, Isotherms, Kinetics, Langmuir, Law, Model, Models, Phenols, Phthalate, Polymeric, Pseudo Second Order, Pseudo-Second-Order, Removal, Resin, Solution, Sorbents, Uptake, Waste, Waste Ion Exchange Resin, Water

? Chakrabarti, S., Dutta, B.K. and Apak, R. (2009), Active manganese oxide: a novel adsorbent for treatment of wastewater containing azo dye. *Water Science and Technology*, **60** (12), 3017-3024.

Full Text: [2009\Wat Sci Tec60, 3017.pdf](2009/Wat%20Sci%20Tec60,%203017.pdf)

Abstract: A new variety of active manganese oxide was prepared, characterized, and tested for its potential of adsorbing Congo Red, a dis-azo dye, from aqueous solutions. Both equilibrium and kinetics were investigated over different values of process parameters such as temperature (25-45ºC), adsorbent loading (0.4-0.6%), initial dye concentration (50-500 mg/L), presence of salts (sodium sulphate, 500 mg/L) and the oxygen content (MnOx, x 1.2, 1.33 and 2) of the adsorbent. The equilibrium adsorption data were fitted to Langmuir and Freundlich isotherms. Langmuir adsorption capacity of the sorbent (x - 1.33) for Congo Red was 38.6 mg/g at room temperature which is substantially higher than those for commercial manganese dioxide, red mud, coir pith, activated carbon, and fly ash. The kinetic data were best interpreted using a pseudo-second order model. The results show that the active manganese oxide used in this work removes the dye by reversible adsorption and has the potential for practical use for remediation of textile industry effluents.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption, Adsorption Capacity, Aqueous Solutions, Aqueous-Solutions, Azo Dye, Basic-Dyes, Capacity, Carbon, Coir Pith, Concentration, Congo Red, Congo Red, Data, Dioxide, Dye, Dye Removal, Effluent Treatment, Effluents, Equilibrium, Fly Ash, Fly-Ash, Freundlich, Isotherms, Kinetic, Kinetics, Langmuir, Langmuir and Freundlich Isotherms, Loading, Manganese, Manganese Dioxide, Manganese Oxide, Model, Oxidation, Oxide, Oxygen, Pith, Potential, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second Order Model, Pseudo-Second-Order, Red Mud, Remediation, Removal, Room Temperature, Salts, Sodium, Solutions, Sorbent, Temperature, Treatment, Wastewater, Work

? Tawabini, B., Al-Khaldi, S., Atieh, M. and Khaled, M. (2010), Removal of mercury from water by multi-walled carbon nanotubes. *Water Science and Technology*, **61** (3), 591-598.

Full Text: [2010\Wat Sci Tec61, 591.pdf](2010/Wat%20Sci%20Tec61,%20591.pdf)

Abstract: The removal of mercury (Hg2+) ions from contaminated water using multiwalled carbon nanotubes (MWCNTs) was investigated in this study. Results of the study showed that MWCNTs slurry was very efficient in removing as high as 1.0 mg/L of Hg2+ from aqueous solutions via the adsorption mechanism. This removal efficiency was found to be a function of the aqueous pH level, dosage of CNTs, mixing rate, and contact time. The study showed that the Hg uptake by MWCNTs increased to 100% with an increase in pH from pH 4 to 8. The results also showed that higher dosage of MWCNTs, showed higher removal of Hg2+. In a 50mL water sample, 10 mg of MWCNTs was needed to remove all of the 0.1 mg/L of Hg2+ ions. On the other hand, increasing the mixing rate from 50 to 150 rpm improved the removal efficiency. The experimental results also showed that mercury adsorption by MWCNTs follow a pseudo second-order reaction with a rate (k) of 0.018 and it is well described by the Langmuir isotherm model with maximum adsorptive capacity (*q*max) of 13.16.

Keywords: Adsorption, Adsorption Mechanism, Aqueous Solutions, Aqueous-Solution, Capacity, Carbon, Carbon Nanotubes, Carbon Nanotubes (CNTs), Copper, Diameter, Efficiency, Experimental, Function, Heavy Metals, Ions, Isotherm, Isotherm Model, Langmuir, Langmuir Isotherm, Langmuir Isotherm Model, Lead, Mechanism, Mercury, Mercury Adsorption, Metal-Ions, Mixing, Model, Multiwalled Carbon Nanotubes, Mwcnts, Nanotubes, pH, Pseudo Second Order, Pseudo Second-Order, Pseudo-Second-Order, Reaction, Removal, Removal Efficiency, Second Order, Second-Order, Solutions, Time, Uptake, Waste-Water, Water, Water Treatment

? Elwakeel, K.Z. and Yousif, A.M. (2010), Adsorption of malathion on thermally treated egg shell material. *Water Science and Technology*, **61** (4), 1035-1041.

Full Text: [2010\Wat Sci Tec61, 1035.pdf](2010/Wat%20Sci%20Tec61,%201035.pdf)

Abstract: Thermally treated egg shell materials were prepared at different temperatures. The samples were investigated by means of FT-IR and thermogravimetric analysis (TGA) The adsorption. behaviour of malathion on egg shell and its thermally treated samples was studied using batch method and gave uptake capacities up to 0.964 mmol/g. Adsorption kinetics as well as the adsorption isotherms were discussed. Regeneration of the loaded adsorbent beads towards the successive cycles was also clarified The adsorption of malathion is maintained untill the third. cycle without a significant activity loss.

Keywords: Adsorbent, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Analysis, Batch, Batch Method, FT-IR, FTIR, Isotherms, Kinetics, Regeneration, TGA, Uptake

? Goh, K.H., Lim, T.T. and Dong, Z.L. (2010), Removal of arsenate from aqueous solution by nanocrystalline Mg/Al layered double hydroxide: Sorption characteristics, prospects, and challenges. *Water Science and Technology*, **61** (6), 1411-1417.

Full Text: [2010\Wat Sci Tec61, 1411.pdf](2010/Wat%20Sci%20Tec61,%201411.pdf)

Abstract: Removal of arsenate (As(V)) from aqueous solution using both nanocrystalline and coprecipitated Mg/Al layered double hydroxides (LDHs) was examined under different sorption/desorption conditions. The surface area, pore volume, and pore size of the nanocrystalline LDH were significantly higher than those of the coprecipitated LDH, thus resulting in a higher As(V) sorption maximum than the coprecipitated LDH. The calculated activation energy (Ea) value was 24.7 kJ/mol, suggesting the occurrence of anion exchange process for As(V) removal by the nanocrystalline LDH. The predominance of anion exchange process was further supported by the investigation of ionic strength effect, and XRD and FTIR analyses. The effect of aqueous matrix on As(V) sorption by the nanocrystalline LDH was found to increase in the order of nitrate < silica, sulfate, carbonate, phosphate. Regeneration study showed that a secondary sorption mechanism might occur concurrently for the As(V) sorption by nanocrystalline LDH besides the predominant anion exchange process. Prospects and challenges for practical application of the nanocrystalline LDH were also discussed in the latter part of this study.

Keywords: Activation, Activation Energy, Adsorption, Analyses, Application, Aqueous Solution, Arsenate, As(V), As(V) Removal, Carbonate, Characteristics, Double Hydroxide, Energy, Ftir, Hydrotalcite, Investigation, Ionic Strength, Kinetics, Layered Double Hydroxide, Layered Double Hydroxides, LDH, Matrix, Mechanism, Nanocrystalline, Nitrate, Phosphate, Pore Volume, Regeneration, Removal, Silica, Size, Solution, Sorption, Sorption Mechanism, Sorption, Desorption, Strength, Sulfate, Surface, Surface Area, Value, Volume, Water, XRD

? Sun, G.Z., Chen, X.G., Zhang, J., Feng, C. and Cheng, X.J. (2010), Adsorption characteristics of residual oil on amphiphilic chitosan derivative. *Water Science and Technology*, **61** (9), 2363-2374.

Full Text: [2010\Wat Sci Tec61, 2363.pdf](2010/Wat%20Sci%20Tec61,%202363.pdf)

Abstract: In this study, a novel chitosan-based polymeric surfactant, H-Oleoyl-Carboxymethyl chitosan was used as a coagulation agent for cleaning residual oil. The characteristics of H-Oleoyl-Carboxymethyl chitosan were investigated by FTIR and XRD. And the adsorption capacities of chitosan and H-O-CMCS for removing the residue oil from the wastewater of oil extraction have been investigated. H-O-CMCS exhibited a greater rate than chitosan in cleaning the residual oil from the wastewater of oil extraction at the optimum conditions. Equilibrium study, Langmuir/Freundlich adsorption models and the pseudo first- and second-order kinetic models were applied to describe the mechanism of adsorption experiments. The experimental data fitted well with the Langmuir model and the second-order kinetic model. Regeneration studies, using by the roasting and rinsing method, were undergone for three successive adsorption/desorption processes. H-O-CMCS still retained the residual oil removal capacity after regeneration.

Keywords: Adsorption, Adsorption Capacities, Adsorption, Desorption, Air Flotation, Biosorption, Capacity, Characteristics, Chitin, Chitosan, Coagulation, Data, Equilibrium, Experimental, Experiments, Extraction, First, FTIR, H-O-CMCS, Heavy-Metals, Kinetic, Kinetic Model, Kinetic Models, Langmuir, Langmuir Model, Mechanism, Mechanism of Adsorption, Mill Effluent, Model, Models, Oil Removal, Phenol, Polymeric, Regeneration, Removal, Residual Oil, Second Order, Second-Order, Sorbents, Surfactant, Wastewater, XRD

? Dos Santos, V.C.G., Tarley, C.R.T., Caetano, J. and Dragunski, D.C. (2010), Assessment of chemically modified sugarcane bagasse for lead adsorption from aqueous medium. *Water Science and Technology*, **62** (2), 457-465.

Full Text: [2010\Wat Sci Tec62, 457.pdf](2010/Wat%20Sci%20Tec62,%20457.pdf)

Abstract: This study evaluated the adsorption capacity of chemically modified sugarcane bagasse with citric acid (B-CA), sodium hydroxide (B-S) and citric acid and sodium hydroxide (B-CAS) for Pb2+ ion adsorption in aqueous medium. Infrared spectroscopy (FT-IR) was used to characterise the materials, where the chemical modification was confirmed by the presence of carboxylate groups created at 1,730cm-1 peak. All assays related to Pb2+ ion adsorption onto adsorbent, i.e. equilibrium time between Pb2+ ions and adsorbate (24 h), as well as Pb2+ ion concentration, were performed in batch system. The initial and final Pb2+ ion concentration after shaking time was determined by Flame Atomic Absorption Spectrometry (FAAS). Isotherm adsorptions were applied to Langmuir and Freundlich linear models and maximum adsorption capacity (MAC) of materials towards Pb2+ ions was calculated in function of modifications. A significant improvement regarding Pb2+ ion adsorption after the bagasse treatment with citric acid, in which MAC was 52.63 mg g-1, was observed. The adsorptions followed the behaviour described by the Langmuir linear model and its kinetics follow the behaviour described by the pseudo-second-order equation.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Aqueous Medium, Bagasse, Batch, Batch System, Behaviour, Biosorption, Capacity, Cd(II), Chemical, Chemical Modification, Citric Acid, Concentration, Cu(II), EDTA Dianhydride EDTAD, Equilibrium, FAAS, Freundlich, FT-IR, FTIR, Function, Heavy-Metals, Improvement, Ions, Isotherm, Kinetics, Langmuir, Lead, Mac, Mercerized Cellulose, Model, Models, Modification, Modified, Pb2+, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Equation, Removal, Single Metal Solutions, Sodium, Spectroscopy, Sugarcane, Sugarcane Bagasse, Treatment, Waste

? Weng, C.H., Lin, Y.T., Yeh, C.L. and Sharma, Y.C. (2010), Magnetic Fe3O4 nanoparticles for adsorptive removal of acid dye (new coccine) from aqueous solutions. *Water Science and Technology*, **62** (4), 844-851.

Full Text: [2010\Wat Sci Tec62, 844.pdf](2010/Wat%20Sci%20Tec62,%20844.pdf)

Abstract: The ability of magnetic Fe3O4 nanoparticles (MFN) to remove new coccine (NC), an acidic dye, from aqueous solutions was studied Parameters including ionic strength, pH, and temperature were evaluated MFN, prepared by precipitation method, exhibits an average particle size of 12 5 nm, specific surface area of 85 5 m(2)/g, and pH(zpc) of 5 9 Results of kinetic adsorption experiments indicated that the pseudo-second-order rate of adsorption increased with increasing initial NC concentration Findings also revealed that the equilibrium data could be fitted into Langmuir adsorption isotherm The adsorption is favored at low pH, high temperature, and low ionic strength, whereupon a maximum adsorption capacity of 1 11×10-4 mol/g was determined for NC Thermodynamic functions indicated that the adsorption process is spontaneous and exothermic in nature Tests of regeneration showed that after 5 regeneration cycles the adsorption capacity of NC decreased to 35% to its original capacity.

Keywords: Acid Dye, Acidic Dye, Adsorption, Adsorption Capacity, Adsorption Isotherm, Aqueous Solutions, Capacity, Concentration, Data, Dye, Equilibrium, Exothermic, Experiments, Fe3O4, Functions, Ionic Strength, Iron, Isotherm, Kinetic, Kinetic Adsorption, Langmuir, Langmuir Adsorption Isotherm, Magnetic, Magnetite, Nanoparticles, New Coccine, Particle Size, pH, pH(zpc), Precipitation, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Rate, Regeneration, Removal, Size, Solutions, Specific Surface, Specific Surface Area, Strength, Surface, Surface Area, Temperature, Thermodynamic, Waste

? Zhao, Y.F., Zhang, B., Zhang, X.A., Wang, J.H., Liu, J.D. and Chen, R.F. (2010), Ammonium removal from aqueous solution by zeolite X synthesized from halloysite mineral. *Water Science and Technology*, **62** (4), 937-946.

Full Text: [2010\Wat Sci Tec62, 937.pdf](2010/Wat%20Sci%20Tec62,%20937.pdf)

Abstract: Zeolite X was successfully synthesized from natural halloysite mineral by hydrothermal method The synthesized zeolite X was characterized by XRD, SEM, TEM and HRTEM The characterization indicated that zeolite X had high crystallinity together with symmetrical and uniform pore channels Ammonium (NH4+) adsorption properties of zeolite X were studied using batch experiments. The results revealed that high initial concentration and low temperature favored NH4+ adsorption on zeolite X Both Langmuir and Freundlich isotherms fit well with the equilibrium data Kinetic studies showed that the adsorption followed pseudo-second-order model Intra-particle diffusion analysis demonstrated that Nit; diffused quickly among the particles at the initial 20 min of the adsorption process, and then the diffusion slowed down and stabilized Thermodynamic parameters such as change in free energy (ΔG(0)), enthalpy (ΔH-0) and entropy (ΔS-0) indicated that the adsorption was spontaneous and exothermic at ambient conditions The reusable ability of zeolite X was also evaluated Due to its low cost, high adsorption capacity and fast adsorption rate, zeolite X synthesized from halloysite could be used as an effective and environmental-friendly adsorbent for NH4+ removal.

Keywords: Adsorbent, Adsorption, Adsorption, Adsorption Capacity, Adsorption Properties, Adsorption Rate, Ammonium, Ammonium Removal, Analysis, Aqueous Solution, Batch, Batch Experiments, Capacity, Characterization, Clinoptilolite, Concentration, Cost, Crystallinity, Data, Diffusion, Energy, Enthalpy, Entropy, Equilibrium, Exothermic, Experiments, Freundlich, Halloysite Mineral, Hrtem, Hydrothermal Method, Intra Particle Diffusion, Intra-Particle Diffusion, Intraparticle Diffusion, Ion-Exchange, Isotherms, Kinetic, Kinetic Studies, Langmuir, Langmuir And Freundlich Isotherms, Low Cost, Low Temperature, Model, Natural, Particles, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Removal, SEM, Solution, Tem, Temperature, Thermodynamic, Thermodynamic Parameters, Waste-Water, XRD, Zeolite, Zeolite X

? Ibrahim, S., Fatimah, I., Ang, H.M. and Wang, S.B. (2010), Adsorption of anionic dyes in aqueous solution using chemically modified barley straw. *Water Science and Technology*, **62** (5), 1177-1182.

Full Text: [2010\Wat Sci Tec62, 1177.pdf](2010/Wat%20Sci%20Tec62,%201177.pdf)

Abstract: An agricultural waste derived adsorbent was prepared by chemically modified barley straw with NaOH and a cationic surfactant hexadecylpyridinium chloride monohydrate (CPC). The prepared adsorbent, BMBS, was used for removal of anionic dyes; Acid Blue (AB40) and Reactive Blue 4 (RB4) from aqueous solution in a batch adsorption system. The adsorbent was characterized by FT-IR and elemental composition. The stability of CPC adsorbed on straw surface was also evaluated by exposing to aqueous solution. In adsorption tests, influence of operation parameters such as contact time, initial concentration and pH of solution on AB40 and RB4 uptake were investigated and discussed. The CPC was observed strongly attached to straw surface and removal percentage of AB40 and RB4 was increased with increasing in contact time. The adsorption of dyes on modified straw surface was favorable at high acidic condition and desorption was found relatively low upon exposing to the desorption agent (i.e water). Dynamic experiment revealed that the kinetic data fitted well to the pseudo-second-order model for both of the dyes. The isotherm study also indicated that RB4 and AB40 adsorption suited well with the Langmuir model, The maximum adsorption capacity determined from the Langmuir isotherm at 25ºC was 51.95 mgg-1 and 31.5 for AB40 and RB4, respectively.

Keywords: Ab40, Acid, Activated Carbon, Adsorbent, Adsorption, Adsorption Capacity, Agricultural, Agricultural Waste, Anionic Dyes, Aqueous Solution, Barley Straw, Batch, Batch Adsorption, Capacity, Cationic Surfactant, Chloride, Coconut Coir Pith, Composition, Concentration, Data, Desorption, Dyes, Equilibrium, Experiment, Fly-Ash, FT-IR, FTIR, Isotherm, Kinetic, Kinetics, Langmuir, Langmuir Isotherm, Langmuir Model, Model, Modified, Modified Barley Straw, NaOH, Operation, Parameters, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Model, Reactive Blue 4, Removal, Solution, Sorption, Stability, Straw, Surface, Surfactant, Uptake, Waste, Waste-Water, Water

? Pratt, C. and Shilton, A. (2010), Active slag filters-simple and sustainable phosphorus removal from wastewater using steel industry byproduct. *Water Science and Technology*, **62** (8), 1713-1718.

Full Text: [2010\Wat Sci Tec62, 1713.pdf](2010/Wat%20Sci%20Tec62,%201713.pdf)

Abstract: Active filtration, where effluent is passed through a reactive substrate such as steel slag, offers a simple and cost-effective option for removing phosphorus (P) from effluent This work summarises a series of studies that focused on the world's only full-scale active slag filter operated through to exhaustion The filter achieved 75% P-removal during its first 5 years, reaching a retention capacity of 1 23g P/kg slag but then its performance sharply declined Scanning electron microscopy, X-ray diffraction, X-ray fluorescence, and chemical extractions revealed that P sequestration was primarily achieved via adsorption onto iron (Fe) oxyhydroxides on the slag's surface It was concluded that batch equilibrium tests; whose use has been repeatedly proposed in the literature, cannot be used as an accurate predictor of filter adsorption capacity because Fe oxyhydroxides form via chemical weathering in the field, and laboratory tests don't account for this Research into how chemical conditions affect slag's P retention capacity demonstrated that near-neutral pH and high redox are optimal for Fe oxyhydroxide stability and overall filter performance However, as Fe oxyhydroxide sites fill up, removal capacity becomes exhausted. Attempts to regenerate P removal efficiency using physical techniques proved ineffective contrary to dogma in the literature Based on the newly-developed understanding of the mechanisms of P removal, chemical regeneration techniques were investigated and were shown to strip large quantities of P from filter adsorption sites leading to a regenerated P removal efficiency. This raises the prospect of developing a breakthrough technology that can repeatedly remove and recover P from effluent.

Keywords: Active Filters, Adsorption, Equilibrium, Industry, Iron, Literature, Microscopy, pH, Phosphorus, Phosphorus Removal, Regeneration, Research, Retention, Slag, Steel Slag, Systems, Wastewater

? Chen, N., Zhang, Z.Y., Feng, C.P., Li, M.A., Chen, R.Z. and Sugiura, N. (2010), Removal of fluoride from aqueous solution by adsorption onto Kanuma mud. *Water Science and Technology*, **62** (8), 1888-1897.

Full Text: [2010\Wat Sci Tec62, 1888.pdf](2010/Wat%20Sci%20Tec62,%201888.pdf)

Abstract: Kanuma mud, a geomaterial, is used as an adsorbent for the removal of fluoride from water The influences of contact time, solution pH, adsorbent dosage, initial fluoride concentration and co-existing ions were investigated by batch equilibration studies The rate of adsorption was rapid with equilibrium being attained after about 2h, and the maximum removal of fluoride was obtained at pH 5 0-8 0 The Freundlich isotherm model was found to represent the measured adsorption data well The negative value of the thermodynamic parameter Delta G suggests the adsorption of fluoride by Kanuma mud was spontaneous, the endothermic nature of adsorption was confirmed by the positive Delta H value The negative Delta S value for adsorbent denoted decreased randomness at the solid/liquid interface The adsorption process using Kanuma mud followed the pseudo-second-order kinetic model Fluoride uptake by the Kanuma mud was a complex process and intra-particle diffusion played a major role in the adsorption process It was found that adsorbed fluoride could be easily desorbed by washing the adsorbent with a solution of pH 12 This indicates the material could be easily recycled.

Keywords: Adsorbent, Adsorption, Adsorption Isotherms, Adsorption Kinetics, Alumina, Batch, Cement, Complex, Contact Time, Data, Diffusion, Earth, Equilibrium, Fluoride, Fluoride Removal, Freundlich, Freundlich Isotherm, Intra Particle Diffusion, Intra-Particle Diffusion, Intraparticle Diffusion, Isotherm, Kanuma Mud, Kinetic, Kinetic Model, Kinetics, Model, pH, Process, Pseudo Second Order, Pseudo-Second-Order, Red Mud, Removal, Sorption, Thermodynamic, Uptake, Waste-Water, Water

? Chai, L.Y., Wang, Q.W., Li, Q.Z., Yang, Z.H. and Wang, Y.Y. (2010), Enhanced removal of Hg(II) from acidic aqueous solution using thiol-functionalized biomass. *Water Science and Technology*, **62** (9), 2157-2166.

Full Text: [2010\Wat Sci Tec62, 2157.pdf](2010/Wat%20Sci%20Tec62,%202157.pdf)

Abstract: Spent grain, the low-cost and abundant biomass produced in the brewing industry, was functionalized with thiol groups to be used as an adsorbent for Hg(II) removal from acidic aqueous solution. The adsorbents were characterized by the energy-dispersive X-ray analysis (EDAX) and Fourier transform infrared (FTIR) spectroscopy. Optimum pH for Hg(II) adsorption onto the thiol-functionalized spent grain (TFSG) was 2.0. The equilibrium and kinetics of the adsorption of Hg(II) onto TFSG from acidic aqueous solution were investigated. From the Langmuir isotherm model the maximum adsorption capacity of TFSG for Hg(II) was found to be 221.73 mg g(-1), which was higher than that of most various adsorbents reported in literature. Moreover, the adsorption of Hg(II) onto TFSG followed pseudo-second-order kinetic model.

Keywords: Activated Carbon, Adsorbent, Adsorbents, Adsorption, Adsorption, Adsorption Capacity, Analysis, Biomass, Biosorption, Capacity, Cd(II), Equilibrium, Equilibrium, Fourier Transform Infrared, FTIR, Heavy-Metals, Hg(II), Infrared, Ion, Isotherm, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir Isotherm, Literature, Mercury(II), Model, pH, Pseudo Second Order, Pseudo-Second-Order, Removal, Sludge, Thiol-Functionalized Spent Grain, Waste, X-Ray

? Malarvizhi, R., Venkateswarlu, Y., Babu, V.R. and Begum, S.S. (2010), Studies on removal of chromium(VI) from water using chitosan coated *Cyperus pangorei*. *Water Science and Technology*, **62** (10), 2435-2441.

Full Text: [2010\Wat Sci Tec62, 2435.pdf](2010/Wat%20Sci%20Tec62,%202435.pdf)

Abstract: Environmental contamination by toxic heavy metals is a significant universal problem. The main objective of the study is to use a biodegradable materials like Cyperus pangorei and Chitosan as a composite biosorbent for the removal of Cr(VI) from water. The newly prepared biosorbent is characterized and the capacity of Cr(VI) removal of the biosorbent is carried out systematically by batch mode operations. The adsorption capacity of the biosorbent is examined by changing the parameters like biosorbent dose, varying the initial contact time, varying initial concentration of metal ion and pH of the metal ion solution to know the actual mechanism taking place during the initial sorption process. The experimental data obtained were fitted with the Freundlich, Langmuir and Redlich-Peterson isotherm models and the pseudo first order and the pseudo second order kinetic models. Equilibrium data were fitted very well to the Langmuir Isotherm model and pseudo second order kinetic model. Desorption of the metal ion is also carried out using different concentration of NaOH.

Keywords: Adsorption, Adsorption Capacity, Aqueous-Solutions, Batch, Batch Mode, Biosorbent, Biosorption, Capacity, Chitosan, Chromium, Composite, Contact Time, Cr(VI), Cr(VI) Removal, Crab Shells, Cyperus Pangorei, Data, Desorption, Equilibrium, Freundlich, Heavy Metals, Ions, Isotherm, Isotherm Models, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Langmuir, Langmuir Model, Mechanism, Metals, Model, Models, pH, Process, Pseudo Second Order, Pseudo-Second-Order, Redlich-Peterson, Removal, Second-Order, Sorption, Sorption Isotherm, Toxic, VI, Waste-Water, Wastewaters, Water

? Norouzi, Sh., Badii, Kh. and Ardejani, F.D. (2010), Activated bauxite waste as an adsorbent for removal of Acid Blue 92 from aqueous solutions. *Water Science and Technology*, **62** (11), 2491-2500.

Full Text: [2010\Wat Sci Tec62, 2491.pdf](2010/Wat%20Sci%20Tec62,%202491.pdf)

Abstract: Bauxite waste, known as red mud, is produced in some industrial processes, such as aluminum production process. In this process, the waste material is produced from leached bauxite as a by product. In this research, the removal of Acid Blue 92 (AB92) dye was investigated from aqueous solution onto the activated bauxite waste (red mud) in a batch equilibration system. Besides, the influences of pH, adsorbent dosage, contact time, initial concentration of dye and temperature have been considered. It was found that the OH group is an effective functional group for the adsorption process. The intensity of the peaks correspond to OH group has been significantly climbed after the activation process. The adsorption kinetics of AB92 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 process better than the Freundlich and Brunauer-Emmett-Teller (BET) models.

Keywords: Acid Blue 92 (Ab92), Activation, Adsorbent, Adsorption, Adsorption, Adsorption Kinetics, Aqueous Solutions, Arsenate, Batch, Bet, Concentration of Dye, Congo Red, Contact Time, Data, Dye, Dyes, Equilibrium, Fly-Ash, Freundlich, Industrial, Isotherm, Kinetics, Kinetics Model, Langmuir, Langmuir Model, Model, Models, Neutralized Red Mud, Oil, pH, Process, Processes, Production, Pseudo Second Order, Pseudo-Second-Order, Red Mud, Removal, Research, Sorption, System, Temperature, Waste Red Mud, Water

? Deng, L.Y., Xu, G.R., Yan, Z.C., Liu, Q.H. and Li, G.B. (2010), Removal effect of Cr(VI) by adsorbent made from sewage sludge. *Water Science and Technology*, **62** (12), 2961-2969.

Full Text: [2010\Wat Sci Tec62, 2961.pdf](2010/Wat%20Sci%20Tec62,%202961.pdf)

Abstract: Adsorbent made from sewage sludge is used to remove the Cr (VI) in wastewater. In this paper, the adsorption capacity, adsorption mechanism and regeneration of the adsorbent are studied. A systematic research is carried out to investigate the influence of adsorption capacities in various conditions, such as contact time, pH and initial dosage of adsorbent. The results show that: the equilibrium time is 6 h; the optimal pH is 2.5. The adsorption capacity increases as the initial concentration increase and as the dosage of activated carbon decrease. The data of adsorption capacity are more fit in Langmuir isotherms. The adsorption follows a pseudo-second-order kinetic model perfectly. From this research, the adsorption rate controlling step is film diffusion when the Cr (VI) concentration is low; otherwise, the adsorption rate controlling step is the diffusion among particles. The results of regeneration of saturated adsorbent show that the saturated adsorbent can be perfectly regenerated using alkali treatment. The regeneration ratio of the saturated adsorbent can reach more than 90% with proper concentration of alkali.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption, Adsorption Capacities, Adsorption Capacity, Adsorption Mechanism, Adsorption Rate, Aqueous-Solution, Capacity, Carbon, Chromium(VI), Concentration, Cr(VI), Data, Diffusion, Equilibrium, Film Diffusion, Isotherms, Kinetic, Kinetic Model, Langmuir, Langmuir Isotherms, Mechanism, Model, Particles, pH, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Regeneration, Removal, Research, Sewage, Sewage Sludge, Sludge, Treatment, Wastewater

? Martins, R.J.E. and Boaventura, R.A.R. (2011), Modelling of lead removal by an aquatic moss. *Water Science and Technology*, **63** (1), 136-142.

Full Text: [2011/Wat Sci Tec63, 136.pdf](2011/Wat%20Sci%20Tec63,%20136.pdf)

Abstract: Aquatic bryophytes are frequently used as biomonitors for trace metals in aquatic ecosystems. Nevertheless, their special characteristics also allow using them as biosorbents to clean industrial wastewaters. As biosorption is a low cost and effective method for treating metal-bearing wastewaters, understanding the process kinetics is relevant for design purposes. In this study, the ability of the aquatic bryophyte Fontinalis antipyretica to remove lead from simulated wastewaters was evaluated. Three kinetic models (pseudo-first order, pseudo-second order and Elovich) were fitted to the experimental data and compared by the F-test. Previously, the effect on biosorption of parameters such as the initial solution pH, contact time and initial metal ion concentration was investigated. The initial pH of the solution was found to have an optimum value is in the range 4.0-6.0. The equilibrium sorption capacity of lead by Fontinalis antipyretica increased with the initial metal concentration. For an initial metal concentration of 10 mgL(-1), the uptake capacity at equilibrium was 4.8 mgg(-1). Nevertheless, when the initial concentration increased up to 100 mgL(-1), the uptake of lead was 10 times higher. The pseudo-second order biosorption kinetic model provided the better correlation with the experimental data (R-2=1.00). The applicability of the Langmuir and Freundlich adsorption isotherms to the present system was also assessed. The maximum lead sorption capacity by Fontinalis antipyretica was 68 mgg(-1).

Keywords: Adsorbents, Adsorption, Adsorption Isotherms, Aquatic Ecosystems, Aquatic Moss, Aquatic Mosses, Aqueous-Solutions, Biomonitors, Biosorbents, Biosorption, Biosorption, Biosorption Kinetic, Cadmium, Capacity, Characteristics, Concentration, Correlation, Cost, Data, Design, Ecosystems, Elovich, Equilibrium, Experimental, Fontinalis Antipyretica, Freundlich, Isotherms, Kinetic, Kinetic Model, Kinetic Models, Kinetics, Kinetics, Langmuir, Lead, Lead Removal, Low Cost, Metal, Metal-Ions, Metals, Model, Modelling, Models, Pb(II), pH, Pseudo First Order, Pseudo Second Order, Pseudo-First Order, Pseudo-First-Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Solution, Sorption, Sorption Capacity, Trace Metals, Understanding, Uptake, Value, Wastewaters

? Aber, S., Salari, D. and Feiz, B.A. (2011), The sorption of copper on almond shell: Optimization and kinetics. *Water Science and Technology*, **63** (7), 1389-1395.

Full Text: [2011\Wat Sci Tec63, 1389.pdf](2011/Wat%20Sci%20Tec63,%201389.pdf)

Abstract: Batch sorption studies using almond shell as an sorbent for the removal of Cu (II) from aqueous solutions, showed that copper removal decreased from 74.9% to 45.6% with increasing its concentration from 10 to 70 ppm. The removal increased with increasing sorbent dose and pH, respectively. Copper removal was obtained equal to 63.7%, 69.6% and 58.6% at 26ºC, 40ºC and 55ºC. The sorption of Cu (II) on almond shell was also optimized by Taguchi method. The optimized conditions were the sorbent mass of 4 g, the ion initial concentration of 10 ppm, pH 7, the temperature of 40ºC and contact time equal to 60 min. The pH and initial Cu (II) concentration with respectively 32.75% and 31.20% contribution had more influence on the removal of Cu (II). The kinetic data fit pseudo-second-order model with correlation coefficients greater than 0.99 and rate constants in the range of 0.26-7.87 g mg-1 min-1.

Keywords: Adsorbent, Adsorption, Almond Shell, Aqueous-Solution, Batch, Copper, Cu(II), Equilibrium, Ions, Kinetic, Kinetics, Optimization, pH, Removal, Sorption, Taguchi, Waste-Water

? Senevirathna, S.T.M.L., Tanaka, S., FujII, S., Kunacheva, C., Harada, H., Shivakoti, B.R., Dinh, H. and Ariyadasa, T. (2011), Adsorption of four perfluorinated acids on non ion exchange polymer sorbents. *Water Science and Technology*, **63** (10), 2106-2113.

Full Text: [2011\Wat Sci Tec63, 2106.pdf](2011/Wat%20Sci%20Tec63,%202106.pdf)

Abstract: Perfluorinated compounds (PFCs) have attracted global concern due to their ubiquitous distribution and properties of persistence, bio accumulation and toxicity. The process of adsorption has been identified as an effective technique to remove PFCs in water. Different non ion-exchange polymeric adsorbents were tested with regard to their sorption kinetics and isotherms at low PFCs concentrations. Selected PFCs were perfluorobutanoic acid (PFBA), perfluoroheptanoic acid (PFHpA), perfluorooctanoic acid (PFOA) and perfluorodecanoic acid (PFDA) and the tested polymers were three types of Dowex optopores (V-493, V503, and L493), Amberlite XAD-4, and Filtrasorb 400 (Granular Activated Carbon-GAC). We observed the selective adsorption of PFCs on synthetic polymers. For PFDA, Amberlite XAD-4 gave the Freundlich adsorption constant of 2,965 (mu g PFCs, g sorbent)(mu g PFCs, L)(-n), which was higher than that of GAC (121.89 (mu g PFCs, g sorbent) (mu g PFCs, L)(-n)). In the case of PFBA, GAC showed better performance (13.36) (mu g PFCs, g sorbent) mu g PFCs, L)(-n) than synthetic polymers (0.62-5.23) (mu g PFCs, g sorbent) (mu g PFCs, L)(-n). Adsorption kinetics of all adsorbents were well described (R2 = 0.85-1) by pseudo-second order kinetic model. Sorption capacity was influenced by initial PFCs concentration for all adsorbents. GAC reached the equilibrium concentration within 4 hours, Amberlite XAD 4 reached it within 10 hours and other polymers took more than 70 hours.

Keywords: Adsorption, Adsorption Kinetics, Decomposition, Isotherms, Kinetics, Model, Non Ion-Exchange Polymers, Perfluorooctane Sulfonate, PFCS, Pseudo-Second Order, Pseudo-Second-Order, Sorption, Sorption Isotherm, Sorption Kinetics, Water

? Zhou, Q., Gong, W.Q., Li, Y.B., Chen, S.H., Yang, D.J., Bai, C.P., Liu, X.F. and Xu, N. (2011), Biosorption of Methylene Blue onto spent corncob substrate: Kinetics, equilibrium and thermodynamic studies. *Water Science and Technology*, **63** (12), 2775-2780.

Full Text: [2011\Wat Sci Tec63, 2775.pdf](2011/Wat%20Sci%20Tec63,%202775.pdf)

Abstract: This study focuses on the possible use of the spent corncob substrate (SCS), an agricultural waste used after the cultivation of white rot fungus *Pleurotus ostreatus*, to adsorb Methylene Blue (MB) from aqueous solutions. A batch adsorption study was carried out with variable solution pH, adsorption time, temperature and initial MB concentration. It was found that MB uptake was favorable at pH ranging from 4.0 to 12.0 and the equilibrium adsorption capacity can be reached promptly within about 180 min. The biosorption data were also calculated by the pseudo-second-order kinetic model and Langmuir isotherm model. Thermodynamic parameters show that the adsorption is a spontaneous and endothermic process. The study highlighted a new pathway to develop potential low-cost biosorbent for the removal of dye pollutants from wastewater.

Keywords: Adsorption, Aqueous-Solution, Basic Dye, Biomass, Biosorption, Cationic Dye, Equilibrium, Isotherm, Isotherms Thermodynamics, Kinetics, Langmuir Isotherm, Low-Cost Adsorbent, Methylene Blue, Model, pH, Pseudo-Second-Order, Red, Removal, Sorption, Spent Corncob Substrate, Thermodynamic, Thermodynamic Parameters, Waste, Wastewater

? Chen, Y., Jiang, W.J., Jiang, L. and Ji, X.J. (2011), Adsorption behavior of activated carbon derived from pyrolusite-modified sewage sludge: Equilibrium modeling, kinetic and thermodynamic studies. *Water Science and Technology*, **64** (3), 661-669.

Full Text: [2011\Wat Sci Tec64, 661.pdf](2011/Wat%20Sci%20Tec64,%20661.pdf)

Abstract: Activated carbon was developed from sewage sludge using pyrolusite as an additive. It was demonstrated that the removal efficiency of two synthetic dyes (Tracid orange GS and Direct fast turquoise blue GL) by the produced adsorbent was up to 97.6%. The activated carbon with pyrolusite addition had 38.2% higher surface area, 43.8% larger micropore and 54.4% larger mesopore production than ordinary sludge-based activated carbons. Equilibrium adsorption isotherms and kinetics were also investigated based on dyes adsorption tests. The experimental data were analyzed by the Langmuir and Freundlich models of adsorption, and the results fitted well to the Langmuir isotherm. The kinetic data have been analyzed using pseudo-first-order, pseudo-second-order and intraparticle diffusion equation. The experimental data fitted very well with pseudo-second-order kinetic model. Activation energies for the adsorption processes ranged between 8.7 and 19.1 kJ mol-1. Thermodynamic parameters such as standard free energy (ΔG(0)), standard enthalpy (ΔH(0)) and standard entropy (ΔS(0)) were evaluated. The adsorption of these two dyes on the activated carbon was found to be a spontaneous and endothermic process in nature.

Keywords: Activated Carbon, Adsorbent, Adsorption, Adsorption Isotherms, Aqueous-Solutions, Basic Dye, Degradation, Diffusion, Diffusion Equation, Dyes, Equilibrium, Freundlich, Industrial-Waste, Isotherm, Isotherms, Kinetic, Kinetic Model, Kinetics, Langmuir, Langmuir And Freundlich Models, Langmuir Isotherm, Low-Cost Adsorbent, Modeling, Pyrolusite, Removal, Sewage Sludge, Thermodynamic, Thermodynamic Parameters, Thermodynamics, Waste-Water

? Módenes, A.N., Espiñoza-Quinones, F.R., Borba, C.E., Trigueros, D.E.G., Lavarda, F.L., Abugderah, M.M. and Kroumov, A.D. (2011), Adsorption of Zn(II) and Cd(II) ions in batch system by using the *Eichhornia crassipes*. *Water Science and Technology*, **64** (9), 1857-1863.

Full Text: [2011\Wat Sci Tec64, 1854.pdf](2011/Wat%20Sci%20Tec64,%201854.pdf)

Abstract: In this work, the displacement effects on the sorption capacities of zinc and cadmium ions of the *Eichornia crassipes*-type biosorbent in batch binary system has been studied. Preliminary single metal sorption experiments were carried out. An improvement on the Zn(II) and Cd(II) ions removal was achieved by working at 30 degrees C temperature and with non-uniform biosorbent grain sizes. A 60 min equilibrium time was achieved for both Zn(II) and Cd(II) ions. Furthermore, it was found that the overall kinetic data were best described by the pseudo second-order kinetic model. Classical multi-component adsorption isotherms have been tested as well as a modified extended Langmuir isotherm model, showing good agreement with the equilibrium binary data. Around 0.65 mequiv./g maximum metal uptake associated with the *E. crassipes* biosorbent was attained and the E. crassipes biosorbent has shown higher adsorption affinity for the zinc ions than for the cadmium ones in the binary system.

Keywords: Activated Carbon, Adsorption, Aqueous-Solution, Biomass, Biosorbent, Biosorption, Cadmium(II), Cd(II), Egeria-Densa, Heavy-Metal Biosorption, Isotherm, Isotherm Models, Isotherms, Kinetic, Kinetics, Langmuir, Macrophytes, Metals, Sorption

# Title: Water Science and Technology: Water Supply

Full Journal Title: [Water Science and Technology: Water Supply](http://www.iwapublishing.com/template.cfm?name=iwaphome)

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Ouvrard, S., Simonnot, M.O. and Sardin, M. (2001), Removal of arsenate from drinking water with a natural manganese oxide in the presence of competing anions. *Water Science and Technology: Water Supply*, **1** (2), 167-173.

Full Text: [W\Wat Sci Tec Wat Sup1, 167.pdf](W/Wat%20Sci%20Tec%20Wat%20Sup1,%20167.pdf)

Abstract: The efficiency of arsenic removal from drinking water in adsorption processes using natural oxides may be influenced by the presence of other adsorbable anions. The present paper focuses on the study of arsenate adsorption by a natural manganese oxide. The objective is to determine which of the anions usually present in drinking water may be adsorbed: hydrogen carbonate, sulfate, chloride, nitrate, phosphate and arsenate. A kinetic batch experiment was conducted with a natural drinking water, leading to a first qualitative selection: nitrate and chloride have little interaction with the adsorbent, sulfate and hydrogen carbonate are adsorbed while phosphate and arsenate are strongly adsorbed. Then column experiments were run with aqueous solutions containing either chloride, sulfate, etc. The previous trends were confirmed and the equilibrium isotherms of the adsorbable anions were built by integration of the breakthrough curves. The isotherms fitted with a Langmuir model showed that the capacitieswere low (a few μmol.g-1). The affinity order was determined from the isotherm initial slopes: arsenate &Gt, phosphate > hydrogen carbonate &bcong, sulfate. Given the strong affinity of the adsorbent for arsenate and the low arsenate concentration in drinking water, the process selectivity for As traces from drinking water is ensured.

Karschunke, K. and Jekel, M. (2002), Arsenic removal by iron hydroxides, produced by enhanced corrosion of iron. *Water Science and Technology: Water Supply*, **2** (2), 237-245.

Full Text: [W\Wat Sci Tec Wat Sup2, 237.pdf](W/Wat%20Sci%20Tec%20Wat%20Sup2,%20237.pdf)

Abstract: Results of lab-scale experiments for arsenic removal from drinking water are presented. Arsenate(V)-ions were adsorbed on ferric hydroxides which were formed in-situ by corrosion of elemental iron in oxygenated water. Natural corrosion of fine iron wool was suitable to remove effectively high but realistic arsenic concentrations of 500 μg/L from drinking water. As the corrosion rate decreased significantly in time, two different methods to enhance the corrosion were tested and evaluated: galvanic corrosion using iron-copper contact elements and the application of an external voltage. The iron-copper contact elements showed promising results (a high and stable corrosion rate) but were bearing the risk of copper release when the contact broke down. The application of voltage led to an enhanced release of iron-ions but was coupled with a cathodic formation of hydrogen from water. The generation of hydrogen is a very undesirable effect for any practical application. Irrespective of the mode of corrosion, a post-treatment step (sand filtration) was required to remove the arsenic loaded rust particles from the effluent. In the final effluent, drinking water quality was reached by all the methods.

Sublet, R., Boireau, A., Yang, V.X., Simonnot, M.O. and Autugelle, C. (2002), Lead removal from drinking water - development and validation of point-of-use treatment devices. *Water Science and Technology: Water Supply*, **2** (5-6), 209-216.

Full Text: [W\Wat Sci Tec Wat Sup2, 209.pdf](W/Wat%20Sci%20Tec%20Wat%20Sup2,%20209.pdf)

Abstract: Two lead removal water filters were developed to lower lead levels in drinking water below 10 μg.L-1 in order to meet the new regulation given by the European Directive 98-83, applicable in December 2013. An appropriate adsorbent was selected through a stringent research program among a wide range of media, and is composed of a synthetic zeolite and an activated carbon. Two prototypes were developed: the first is a faucet-mounted filter which contains a fixed bed of the adsorbent and a hollow fiber bundle, while the second is an under-sink cartridge made of a porous extruded block of carbon and adsorbent. Both are able to treat at least 1,000 litres of any water containing on average 100 to 150 μg Pb.L-1, by lowering the lead concentration below 10 μg.L-1. Once their safety considerations were addressed by an independent laboratory according to the French Ministry of Health recommendations, 20 prototypes were installed at consumers’ taps in northeastern France. Their performance in terms of lead removal, HPC control and bad taste and odor reduction was followed for 6 months. This field testing program resulted in the validation of both prototypes which meet the new French Ministry of Health recommendations and assures that the filtered water is fully ED 98-83 compliant. Their commercialization will be launched first in France in middle 2002.

Reddad, Z., Gérente, C., Andrès, Y. and Le Cloirec, P. (2002), Comparison of the fixation of several metal ions onto a low-cost biopolymer. *Water Science and Technology: Water Supply*, **2** (5-6), 217-224.

Full Text: [W\Wat Sci Tec Wat Sup2, 217.pdf](W/Wat%20Sci%20Tec%20Wat%20Sup2,%20217.pdf)

Abstract**:** In the present work, sugar beet pulp, a common waste from the sugar refining industry, was studied in the removal of metal ions from aqueous solutions. The ability of this cheap biopolymer to sorb several metals namely Pb2+, Cu2+, Zn2+, Cd2+ and Ni2+ in aqueous solutions was investigated. The metal fixation capacities of the sorbent were determined according to operating conditions and the fixation mechanisms were identified. The biopolymer has shown high elimination rates and interesting metal fixation capacities. A pseudo-second-order kinetic model was tested to investigate the adsorption mechanisms. The kinetic parameters of the model were calculated and discussed. For 8×10-4 M initial metal concentration, the initial sorption rates (v0) ranged from 0.063 mmol.g-1.min-1 for Pb2+ to 0.275 mmol.g-1.min-1 for Ni2+ ions, with the order: Ni2+ > Cd2+ > Zn2+ > Cu2+ > Pb2+. The equilibrium data fitted well with the Langmuir model and showed the following affinity order of the material: Pb2+ > Cu2+ > Zn2+ > Cd2+ > Ni2+. Then, the kinetic and equilibrium parameters calculated qm and v0 were tentatively correlated to the properties of the metals. Finally, equilibrium experiments in multimetallic systems were performed to study the competition of the fixation of Pb2+, Zn2+ and Ni2+ cations. In all cases, the metal fixation onto the biopolymer was found to be favourable in multicomponent systems. Based on these results, it is demonstrated that this biosorbent represents a low-cost solution for the treatment of metal-polluted wastewaters.

# Title: Water Services

(Water serv.)

McKay, G. (1980), Peat: An adsorbent/filtration medium for wastewater treatment. *Water Services*, **84**, 357-359.

# Title: Water & Sewage Works

Full Journal Title: Water & Sewage Works

ISO Abbreviated Title:

JCR Abbreviated Title: Water Sewage Work

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? Rosfjord, R.E., Trattner, R.B. and Cheremisinoff, P.N. (1976), Phenols: A water pollution control assessment. *Water & Sewage Works*, **123** (3), 96-99.

Abstract: That phenols EM DASH monohydroxy derivates of benzene EM DASH are an environmental problem has been recognized for some time. Standards for potable water advise that phenols not exceed concentrations of 0.001 mg/l. At 0.002 mg/l phenols are usually detectable by a medicinal taste and odor in waters treated with chlorine (as in water treatment works). Even at such low, ‘safe’ concentrations, there are some questions of possible long-term effects. Several biological, chemical and physical methods have been used to treat waters containing phenols. A review of these processes will yield information on the mechanism, applications, and limitations of a number of these methods.

Keywords: Industrial Wastes, Sewage Treatment, Environmental Protection

? Rowe, D.R. and Johnston, S. (1978), Computer speeds adsorption-isotherm analysis. *Water & Sewage Works*, **125** (11), 68-69.

# Title: Water and Sewage Works

(Water Sew. Works)

Full Journal Title: Water Science and Technology: Water Supply

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Publisher:

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: Impact Factor

Montgomery, Jr., A.H. (1972), Water pollution control: A history. *Water and Sewage Works*, **Feb.**, 60-65.

Full Text: [W\Wat Sew Wor, 60.pdf](W/Wat%20Sew%20Wor,%2060.pdf)

# Title: Water Supply: The Review Journal of the International Water Supply Association

Full Journal Title: Water Supply: The Review Journal of the International Water Supply Association

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sancha, A.M. (2000), Removal of arsenic from drinking water supplies: Chile experience. in *Water Supply: The Review Journal of the International Water Supply Association* (Edited by Nagle, P.), **18** (1-2), 621-625.

Abstract: In the north of Chile arsenic occurs naturally in surface water resources, principally in inorganic and pentavalent form As(V). In this zone 400 000 people live and for their drinking water supply treatment utilities for arsenic removal have been operating since the 1970s. The process used in Chile for arsenic removal is coagulation. Addition of coagulants to raw water facilitates the conversion of soluble As species into insoluble reaction products which are termed through adsorption mechanisms on to coagulated floc, which are then separated by filtration. The efficiency of arsenic removal by this process depends on the formation of insoluble products, arsenic adsorption on to particulates and separation of the resulting particulate As. Any problem arising in these processes decrease the efficiency of the arsenic removal process. Recent studies have shown that with an improvement of the current coagulation process (optimising raw water pH and dosage of chemical agents) the arsenic removal may be increased to 92.5-95.0%.

# Title: Water Treatment and Examination

Full Journal Title: Water Treatment and Examination

ISO Abbreviated Title: Wat. Treat. Exam.

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Rook, J.J., (1974), Formation of haloforms during chlorination of natural waters. *Water Treatment and Examination*, **23** (2), 234-243.

Full Text: Wat Tre Exa23, 234.pdf

Abstract: Based on results of routine quality control of water treatment at the Berenplaat water works, using gas chromatographic headspace analysis, the formation of haloforms during chlorination of natural waters containing humic substances is discussed, and some caution in the application of chlorine to such waters is advocated in view of possible physiological effects. The possible removal of haloforms by volatilization by intensive aeration of the treated water discussed.

# Title: Water and Waste Treatment

(Water Treatment J.)

McKay, G. (1979), Coloured effluents: Environmental and legal aspects. *Water and Waste Treatment*, **March**, 37-41.

# Title: Web of Knowledge - A Festschrift in Honor of Eugene Garfield

Full Journal Title: Web of Knowledge - A Festschrift in Honor of Eugene Garfield

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Russell, J.M. (2000), Publication indicators in Latin America revisited. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 233-250.

Abstract: This chapter discusses the implications of the structure and communication patterns of the Latin American scientific communities for the validity of publication indicators based exclusively on mainstream journal publication. Studies have suggested that scientists whose research is aimed toward advancing universal knowledge rather than the solution of local problems play a dominant role in science policy and funding decisions and in the construction of scientific excellence in the region. Mainstream publication, considered characteristic of quality scientific work, is highly favored by Latin American evaluation committees. For this reason, there is an urgent need to generate output indicators of quality work published in national and regional journals to give a more balanced picture of overall scientific achievements. Efforts made toward achieving this goal are discussed along with the need for further studies of the context and characteristics of science and technology in Latin America necessary for the generation of reliable and accurate indicators of regional activity.

Keywords: Citation Behavior, Developed-Countries, Information, Journals, Mainstream Science, Periphery, Perspective, Place, Scientific Activity, Strategies

Lewison, G. (2000), Citations as a means to evaluate biomedical research. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 361-372.

Abstract: Eugene Garfield developed the concept of citation of earlier papers as a means of evaluating those papers and made it not only into a science but also into a business. Despite doubts about what conventional citation analysis really means, it has been accepted worldwide as an impartial source of quantitative data on research outputs. However, founders of biomedical research are interested in innovations and in health improvements, not just the minutiae of the research method. They can now use citations on patents to the scientific literature, and citations on clinical guidelines, as proxy indicators of the utility of published papers. Some recent findings in these areas, and the beginnings of a new database of citations in newspapers, are described. However, further indicators of research utility are still needed: they will probably also depend in some way on citations, but of a different kind from those considered so far.

Keywords: Citation, Citations, Linkage, Literature, Research, Science, Technology

? Ingwersen, P., Larsen, B. and Wormell, I. (2000), Applying diachronic citation analysis to research program evaluations. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 373-387.

Abstract: Diachronic versus synchronous citation analysis methods are discussed in relation to research evaluation. Using selected results from an online midterm evaluation of nine research centers funded by the Danish Strategic Environmental Research Program (1993-1998), this paper illustrates and discusses the application of five diachronic scientometric indicators. Publication activity, center and program impact factors, impact factors for journals applied by the centers, international knowledge export, and the paper-journal impact factor correlation are all shown to be well understood by the scientists involved. In an informetric sense, the indicators afford robust tools for providing fair and reliable information on publication behavior and performance. In particular, the paper-journal impact factor correlation, applying the Pearson coefficient, may contribute to further understanding of the probabilities involved in achieving high impact when scientists succeed in publishing in high impact journals. The ISI databases, Science Citation Index and Social Sciences Citation Index, were used in their online versions (SciSearch and Social SciSearch) provided by Dialog Knight Ridder Information Service.

Keywords: Journal Impact, Science

? Braun, T., Glänzel, W. and Schubert, A. (2000), How balanced is the Science Citation Index’s journal coverage? - A preliminary overview of macrolevel statistical data. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 251-277.

? Lewison, G. (2000), Citations as a means to evaluate biomedical research. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 361-372.

Abstract: Eugene Garfield developed the concept of citation of earlier papers as a means of evaluating those papers and made it not only into a science but also into a business. Despite doubts about what conventional citation analysis really means, it has been accepted worldwide as an impartial source of quantitative data on research outputs. However, founders of biomedical research are interested in innovations and in health improvements, not just the minutiae of the research method. They can now use citations on patents to the scientific literature, and citations on clinical guidelines, as proxy indicators of the utility of published papers. Some recent findings in these areas, and the beginnings of a new database of citations in newspapers, are described. However, further indicators of research utility are still needed: they will probably also depend in some way on citations, but of a different kind from those considered so far.

Keywords: Citation, Citations, Linkage, Literature, Research, Science, Technology

? Ingwersen, P., Larsen, B. and Wormell, I. (2000), Applying diachronic citation analysis to research program evaluations. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 373-387.

Abstract: Diachronic versus synchronous citation analysis methods are discussed in relation to research evaluation. Using selected results from an online midterm evaluation of nine research centers funded by the Danish Strategic Environmental Research Program (1993-1998), this paper illustrates and discusses the application of five diachronic scientometric indicators. Publication activity, center and program impact factors, impact factors for journals applied by the centers, international knowledge export, and the paper-journal impact factor correlation are all shown to be well understood by the scientists involved. In an informetric sense, the indicators afford robust tools for providing fair and reliable information on publication behavior and performance. In particular, the paper-journal impact factor correlation, applying the Pearson coefficient, may contribute to further understanding of the probabilities involved in achieving high impact when scientists succeed in publishing in high impact journals. The ISI databases, Science Citation Index and Social Sciences Citation Index, were used in their online versions (SciSearch and Social SciSearch) provided by Dialog Knight Ridder Information Service.

Keywords: Analysis, Application, Behavior, Citation, Citation Analysis, Correlation, Databases, Evaluation, Export, Impact, Impact Factor, Impact Factors, Indicators, Information, International, ISI, Journals, Knowledge, Methods, Performance, Publication, Publishing, Research, Research Evaluation, Science Citation Index, Scientometric, Understanding

? Koenig, M.E.D. and Westermann-Cicio, M. (2000), Scientometrics, cybermetrics, and firm performance. *Web of Knowledge - A Festschrift in Honor of Eugene Garfield*, 389-404.

Keywords: Company, Flows, Impact, Indicators, Industry, Information, Productivity Paradox, Scientometrics, Services, Technological Innovation

# Title: 24th WEDC Conference Sanitation and Water for All

Muhammad, N., Parr, J., Smith, M.D. and Wheatley, A.D. (1998), Adsorption of heavy metals in slow sand filters. *24th WEDC Conference Sanitation and Water for All*, Islamabad, Pakistan, 346-349.

Full Text: [24th WEDC Conference](Thesis/24th%20WEDC%20Conference.pdf)

# Title: Weed Research

Full Journal Title: [Weed Research](http://www.blackwell-synergy.com/servlet/useragent?func=showIssues&code=wre)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Burns, I.G., Hayes, M.H.B. and Stacey, M. (1973), Some physico-chemical interactions of paraquat with soil organic materials and model compounds. II. Adsorption and desorption equilibria in aqueous suspensions. *Weed Research*, **13**, 79-90.

Beltran, E., Fenet, H., Cooper, J.F. and Coste, C.M. (2002), Influence of the physical and chemical properties of soil on the retention process of isoxaflutole and its two main derivatives. *Weed Research*, **42** (5), 385-393.

Full Text: [W\Wee Res42, 385.pdf](W/Wee%20Res42,%20385.pdf)

Abstract: Isoxaflutole is a new pre-emergence herbicide for use in maize and sugarcane. Its two main derivatives are a diketonitrile derivative, the 2-cyano-3-cyclopropyl-1-(2-methanesulfonyl-4-trifluoromethylphenyl)propan-1,3-dione, named DKN, and a benzoic acid derivative, the 2-methanesulfonyl-4-trifluoromethylbenzoic acid, named BA. The adsorption/desorption processes have never been studied for isoxaflutole (IFT) at high concentrations nor for BA, and the present work aimed at completing the knowledge of the behaviour of these three molecules in conditions close to those encountered in the context of agricultural use. The adsorption/desorption study was conducted on seven soils of different physical and chemical properties, using the batch equilibrium technique. During the experiments, IFT was chemically converted into DKN in a continuous manner. This reaction appeared to be dependent on the pH of the soil and was taken into account in the calculations of the adsorbed and desorbed amounts. The adsorption isotherms obtained were predominantly C-shaped for IFT and DKN and S-shaped for BA, but some differences appeared on a few soils. They fitted well the Freundlich equation, and the values of the Freundlich coefficient *K*fa showed that, whatever the soil, IFT was more adsorbed than its two derivatives. The main parameter influencing the adsorption of IFT appeared to be the organic matter content, whereas this effect was not evident for DKN and BA. No correlation was found between the extent of adsorption and either clay content or pH of the soil, for the three molecules.

Khoury, R., Geahchan, A., Coste, C.M., Cooper, J.F. and Bobe, A. (2003), Retention and degradation of metribuzin in sandy loam and clay soils of Lebanon. *Weed Research*, **43** (4), 252-259.

Full Text: [W\Wee Res43, 252.pdf](W/Wee%20Res43,%20252.pdf)

Abstract: The retention and degradation of metribuzin herbicide were studied under two environmental conditions. Field studies were carried out on two soils, a sandy loam soil (soil A)-1 a clay soil (soil B). Metribuzin was applied with a jet sprayer at 1060 g a.i. ha-1 and 1960 g a.i. ha-1 on soils A and B respectively. Reconstituted soil columns were used to study the herbicide movement and metabolism in the two soils. Analyses of metribuzin and its metabolites were carried out using standardized methods. The results indicated a very weak capacity of adsorption of metribuzin in the two soils, and the weak adsorbed fraction is easily desorbed. Degradation and mobility of metribuzin in the field and laboratory soil columns were very intense and rapid. Soil A favoured reductive deamination whereas soil B favoured oxidative desulphuration and the respective metabolites deaminometribuzin and diketometribuzin yield the same product deaminodiketometribuzin. Both leaching by rainfall and degradation were important in the disappearance of metribuzin from the soils.

Keywords: Herbicide, Metribuzin, Mobility, Adsorption-Desorption, Metabolism, Soils, Degradation, Mobility, Atrazine, Adsorption, Rates, Fate, Metazachlor, Persistence, Dissipation, Herbicides, Metamitron

# Title: Weed Science

Full Journal Title: Weed Science

ISO Abbreviated Title: Weed Sci.

JCR Abbreviated Title: Weed Sci

ISSN: 0043-1745

Issues/Year: 6

Journal Country/Territory: United States

Language: English

Publisher: Weed Sci Soc Amer

Publisher Address: 810 East 10th St, Lawrence, KS 66044-8897

Subject Categories:

Agriculture Plant Sciences: Impact Factor

Schroeder, J. (1994), Chlorimuron and imazaquin persistence in selected southern soils under controlled conditions. *Weed Science*, **42** (4), 635-640.

Full Text: [1994\Wee Sci42, 635.pdf](1994/Wee%20Sci42,%20635.pdf)

Abstract: Growth chamber research was conducted to compare the persistence of chlorimuron or imazaquin in soils from 11 locations in the southern United States at 25°C. Chlorimuron at 30 ngg-1 or imazaquin at 60 ngg-1 of soil was incorporated throughout each soil and soils were watered to the water holding capacity and incubated in the dark. Soil samples were taken 0, 7, 14, 28, 60 and 90 d after treatment. Amount of chlorimuron or imazaquin remaining in each soil was quantified by sicklepod or corn root length bioassay, respectively. First order regression generally fit the concentration data for each herbicide. Bioactivity and persistence of chlorimuron in the soils was related primarily to soil organic matter content. Bioactivity and persistence of imazaquin was similar among the soils. Nomenclature: Chlorimuron, 2-[[[[ (4-chloro-6-methoxy-2-pyrimidinyl)amino] carbonyl] amino] sulfonyl] benzoic acid, imazaquin, 2-[4, 5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-quinolinecarboxylic acid, sicklepod, Cassia obtusifolia L.#3 CASOB, corn, Zea mays L. ‘Pioneer 3369A.

# Title: Welding Journal

Full Journal Title: Welding Journal

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? [Anon]. (2010), High employee turnover cited for faulty pipe welds at northrop grumman shipbuilding. *Welding Journal*, **89** (3), 4.

# Title: West Indian Medical Journal

Full Journal Title: [West Indian Medical Journal](http://caribbean.scielo.org/scielo.php?script=sci_issues&pid=0043-3144&lng=en&nrm=iso)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hickling, F.W. (1999), Medical research at the Faculty of Medical Sciences, UWI, Mona Campus 1960-1990. *West Indian Medical Journal*, **48** (4), 183-187.

Full Text: Wes Ind Med J48, 183.pdf

Abstract: The objective of this study was to evaluate research output in relation to undergraduate teaching output of the Faculty of Medical Sciences, Mend Campus, University of the West Indies between 1960 and 1990 The Departmental Reports published by the University of the West Indies were examined using a successive independent sample design with sentinel years at ten-year intervals for the 30-year period under review The numbers of reported peer-reviewed publications for each department were disaggregated and analysed. Ten of the fourteen departments (10/14, 72%) of the Mona Faculty showed a decline in output of peer-reviewed publications of up to 100% between 1960 and 1990 (p < 0.001). The number of academic staff had risen from 41 in 1960 to 143 in 1990 (249% while the publication/staff ratio had fallen from 1.73 in 1960 to 0.48 in 1990 (p < 0.0001). Student/staff ratios had declined significantly over the 30-year period (p < 0.005) as had the graduate/staff ratio (p < 0.01). The Faculty reports indicated that the research-in-progress reported for exceeded the actual publication rate in 1990, whereas the opposite was the case in 1960. There was a statistically significant decline in the number of international conference abstracts published and an increase in the number of regional conference abstracts (p < 0.01) and also a significant decrease in the number of papers presented at conferences compared with the number of conferences attended without a paper being presented (p < 0.0001). The research publication record and the medical graduate/staff ratio of the Mona Faculty had declined significantly over the 30 years under review. There was also a significant decline in the graduate/staff ratio in the same period. Some of the conventional reasons given for this decline such as staff shortages and increased clinical service or teaching load are discussed.

? Paul, T. (2000), Medical research at the Faculty of Medical Sciences, UWI, Mona Campus, 1960-1990. *West Indian Medical Journal*, **49** (2), 180.

Full Text: Wes Ind Med J49, 180.pdf

Keywords: Research

? Arowolo, T.A. (2004), Heavy metals and health. *West Indian Medical Journal*, **53** (2), 63-65.

Full Text: Wes Ind Med J53, 63.pdf

# Title: Western Journal of Nursing Research

Full Journal Title: Western Journal of Nursing Research

ISO Abbreviated Title:

JCR Abbreviated Title: West J Nurs Res

ISSN: 0193-9459

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Beck, C.T. (1989), Maternal-newborn nursing research published from 1977 to 1986. *Western Journal of Nursing Research*, **11** (5), 621-626.

Full Text: [1989\Wes J Nur Res11, 621.pdf](1989/Wes%20J%20Nur%20Res11,%20621.pdf)

Keywords: Nursing, Research

# Title: Wetlands

Full Journal Title: Wetlands

ISO Abbreviated Title: Wetlands

JCR Abbreviated Title: Wetlands

ISSN: 0277-5212

Issues/Year: 4

Journal Country/Territory: United States

Language: English

Publisher: Soc Wetland Scientists

Publisher Address: 810 E Tenth St, P O Box 1897, Lawrence, KS 66044

Subject Categories:

Ecology: Impact Factor 1.109, 73/114 (2006)

Environmental Sciences: Impact Factor 1.109, 74/144 (2006)

# Title: WHO Offset Publ

(WHO Offset Publ.)

? (1986), The International Drinking Water Supply and Sanitation Decade. Review of regional and global data (as at 31 December 1983). *WHO Offset Publ*, **92**, 1-30.

# Title: Wiadomości Lekarskie

Full Journal Title: Wiadomości Lekarskie

ISO Abbreviated Title:

JCR Abbreviated Title: Wiad Lek

ISSN: 0043-5147

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Bojko, K. (2007), Factors of evaluation and interaction of scientific journals--impact factor and interjournal impact factor. *Wiadomości Lekarskie*, **60** (1-2), 98-104.

Abstract: The aim of the study was to analyse the extent of influence ofjournals with high Impact Factor (IF) into the world’s science development. The survey was performed using Journal Citation Reports, Science Edition 1998-2001 database. One hundred journals with the highest IF were extracted and Interjournal Impact Factor (IIF) was made for each of them. It was proved that--regardless of the field the journals belong to--their influence into the filed and other periodicals should not be evaluated according to their IF value. It has been established to evaluate the journals, not particular articles. That’s why we should not change its application and use it to express an opinion on the publications and scientific workers.

Keywords: Application, Database, Development, Evaluation, Field, Impact, Interaction, Journals, Periodicals, Publications, Science, Survey, Value

# Title: Wiener Klinische Wochenschrift

Full Journal Title: [Wiener Klinische Wochenschrift](http://www.springerlink.com/content/112448/?p=df675e047a7e4212a3b99103ff07b053&pi=0)

ISO Abbreviated Title: Wien. Klin. Wochen.

JCR Abbreviated Title: Wien Klin Wochenschr

ISSN: 0043-5325

Issues/Year: 24

Journal Country/Territory: Austria

Language: English

Publisher: Springer-Verlag Wien

Publisher Address: Sachsenplatz 4-6, PO Box 89, A-1201 Vienna, Austria

Subject Categories:

Medicine, General & Internal: Impact Factor

? Majer, E.H. and Bischko, J. (1972), Experience in acupuncture analgesia in otorhinolaryngology. *Wiener Klinische Wochenschrift*, **84** (49), 798-??.

? Roschal, H., Lang, B. and Hell, E. (1992), Effects of surgery for morbid-obesity on physical and mental state of health. *Wiener Klinische Wochenschrift*, **104** (15), 467-473.

Abstract: More than 400 patients with morbid obesity were treated surgically in our unit over the past 18 years. Three different methods (intestinal bypass, biliointestinal shunt and vertical banded gastroplasty) were used. In order to assess any postoperative increase in life quality and to compare the three different techniques, 25 matched patients from each group were followed up and the findings compared with a group of non-operated morbidly obese persons. Psychological tests were also supplied. Irrespective of the technique performed a significant increase in quality of life was obtained in 75% of the cases.

Keywords: Death, Bariatric Operations, Postoperative Life Quality

? Navarro, F.A. (1996), The language of medicine in Austria (1920-1995). *Wiener Klinische Wochenschrift*, **108** (12), 363-369.

Abstract: The objective of this study was to perform a citation analysis of the frequency of the various languages used in the bibliographical references of the original articles published in the Wiener klinische Wochenschrift during the past 75 years (1920-1995). The languages of publication were recorded of 14, 667 references from 800 original papers, at the rate of 50 articles per year at intervals of five years. The percentage of references in German remained constant until 1946, but has been decreasing progressively since that time: 87% in 1920, 84% in 1946, 51% in 1970, and 20% in 1995. The percentage of references in English, on the other hand, has continued to increase, especially since 1946: 3% in 1920, 9% in 1946, 41% in 1970, and 79% in 1995. Even though the importance of English started to increase as from 1946, it did not supplant German as the main language of medicine in Austria until 1980 (thirty years later than usually accepted up to now).

Keywords: Austria, English, German, Language, Bibliographical References, Scientific Activity, English, Science

? Garfield, E. (2002), The impact factor of *Wiener Klinische Wochenschrift*. *Wiener Klinische Wochenschrift*, **114** (5-6), 236.

Full Text: Wie Kli Woc114, 236.pdf

? Garfield, E. (2002), The impact factor of *Wiener Klinische Wochenschrift*. *Wiener Klinische Wochenschrift*, **114** (19-20), 881.

Full Text: Wie Kli Woc114, 881.pdf

# Title: Wildlife Society Bulletin

Full Journal Title: [Wildlife Society Bulletin](http://www.jstor.org/action/showPublication?journalCode=wildsocibull)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0091-7648

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Krausman, P.R., Morgart, J.R. and Rosenstock, S.S. (2003), Comments and replies to published papers: Advancing science or unnecessary quibbles? *Wildlife Society Bulletin*, **31** (1), 208-211.

Full Text: [2003\Wil Soc Bul31, 208.pdf](2003/Wil%20Soc%20Bul31,%20208.pdf)

Abstract: Comments and replies to published articles are often ignored. We examined use of comments and replies by the scientific community and rated their values. We examined comments and replies from 3 journals, covering 1990 through 2001, rated them as positive or unnecessary, and used Science Citation Index to compare the number of times each was cited. We examined 30 exchanges (i.e., original paper, comment, and reply or replies); 19 (63%) were classified as unnecessary. There also was a marked difference in how exchanges were received by the scientific community. Original papers, comments, and replies were cited 476, 104, and 80 times, respectively. Authors, editors, and reviewers should more carefully review submissions to increase the number of useful comments and replies. Comments and replies should receive as much scrutiny as original papers and should be peer-reviewed.

Keywords: Authors, Biodiversity Conservation, Comments, Community, Comparative Breeding Ecology, Coopers-Hawks, Desert Bighorn Sheep, Environmental Sciences, Exurban Areas, Inbreeding Depression, Journals, National-Wildlife-Refuge, Natural-Resources, Papers, Peer-Reviewed, Power Analysis, Referees, Replies, Review, Science, Science Citation Index

# Title: Wirtschaftsinformatik

Full Journal Title: Wirtschaftsinformatik

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Schlogl, C. (2003), Mapping the intellectual structure of information management. *Wirtschaftsinformatik*, **45** (1), 7-16.

Abstract: In this paper, the main dimensions of information management are analysed by means of, author cocitation. The article is structured as Wows: After a short introduction, the method used in the study will be described. This will be followed by. the structure of the study. According to the results of the analysis, a distinction can be made between technology-oriented and information-oriented information management approaches. Technology-oriented approaches deal primarily with the efficient and effective use of computer-based information systems. They are in the domains of Management Information Systems (MIS) and business informatics. Information-oriented approaches focus mainly on information, with special attention given to its transfer and use. The design of computer-based information systems is practically ignored by these approaches, which are in the field of information science.

Keywords: 1980s, Analysis, Author Cocitation Analysis, Author Cocitation Analysis, Business Informatics, Co-Citation Analysis, Cocitation, Field, Informatics, Information Management, Information Science, Information Systems, Information-Oriented Information Management Approaches, Intellectual Structure, Management, Mis, Needs, Resource-Management, Science, Scientific Literature, Scientometrics, Space, Systems, Technology-Oriented Information Management Approaches

? Resch, A. and Schlogl, C. (2004), Business informatics from the perspective of its main publication organ. A scientometric analysis of the journal *Wirtschaftsinformatik*/Angewandte Informatik. *Wirtschaftsinformatik*, **46** (4), 302-310.

Abstract: This paper presents a scientometric analysis of the journal WIRTSCHAFTSINFORMATIK / Angewandte Informatik. For this purpose, a total of 23 volumes of the journal were analysed manually. The analysis focuses on the level of the journal, the articles and the authors, as well as the institutions of the authors and the references.

Keywords: Analysis, Angewandte Informatik, Applied Informatics, Authors, Business Informatics, Citation Analysis, Informatics, Institutions, Journal, Journal Analysis, Library, of-the-Art, Publication, Purpose, References, Science, Scientometric, Scientometric Analysis, Scientometrics, Wirtschaftsinformatik

# Title: Wisconsin Medical Journal

Full Journal Title: [Wisconsin Medical Journal](http://www.wisconsinmedicalsociety.org/health_news/wmj_archive.cfm)

ISO Abbreviated Title:

JCR Abbreviated Title: Wis Med J

ISSN: 0043-6542

Issues/Year:

Journal Country/Territory:

Language: English

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Kreul, W. (1960), Regional anesthesia for increasing obstetrical patient safety. *Wisconsin Medical Journal*, **59** (15), 370-373.

Keyword: Anesthesia, Conduction; Anesthesia, Obstetrical

# Title: Wkly Epidemiol Rec

? (2003), Acute respiratory syndrome China, Hong Kong Special Administrative Region of China, and Viet Nam. *Wkly Epidemiol Rec*, **78**, 73-74.

Full Text: [VACCINES: Wkly Epidemiol Rec](W/Wkl%20Epi%20Rec78,%2073.pdf)

# Title: Women & Health

Full Journal Title: Women & Health

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0363-0242

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Andsager, J.L., Hust, S.J.T. and Powers, A. (2000), Patient-blaming and representation of risk factors in breast cancer images. *Women & Health*, **31** (2-3), 57-79.

Full Text: [2000\Wom Hea31, 57.pdf](2000/Wom%20Hea31,%2057.pdf)

Abstract: Media coverage of some cancers in the past often equated cancer with a death sentence. Breast cancer coverage in 1990s magazines, however, has become less fatalistic, more frequent, and discusses a broader range of issues than before. This study examined whether the visual images accompanying magazine articles about breast cancer have also evolved. We used Goffman’s (1976) rituals of subordination to measure patient-blaming acid subordinating disempowering images. We also analyzed race, ethnicity, body type, and age of females in the images to gauge whether these demographic risk factors were represented in a random sample of images from nine magazines over a 30-year period. Magazines analyzed represented three genres-women’s magazines. fashion, beauty, and general news. Findings suggest that patient-blaming images have decreased in some categories and women portrayed are slightly more representative of risk factors of age and race, ethnicity. Magazine images tended to reinforce stereotyped portrayals of femininity to the detriment of cancer patients. Fashion, beauty magazines, aimed at younger women, were most likely to portray breast cancer images in stereotyped. patient-blaming ways. with the least representative images of risk factors. The social construction of feminine beauty seems to overpower accuracy in creating these images.

Keywords: Accuracy, Age, Breast Cancer, Cancer, Construction, Coverage, Death, General, Patients, Random Sample, Representation, Risk, Risk Factors, Social, Women

# Title: Wood and Fiber Science

Full Journal Title: [Wood and Fiber Science](http://apt.allenpress.com/aptonline/?request=get-moreinfo&issn=0735-6161)

ISO Abbreviated Title: Wood Fiber Sci.

JCR Abbreviated Title: Wood Fiber Sci

ISSN: 0735-6161

Issues/Year: 4

Journal Country/Territory: United States

Language: English

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Forestry: Impact Factor 0.560 (2003)

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? Conner, A.H. (1984), Kinetic modeling of hardwood prehydrolysis. Part I. Xylan removal by water prehydrolysis. *Wood and Fiber Science*, **16** (2), 268-277.

Full Text: [1984\Woo Fib Sci16, 268.pdf](1984/Woo%20Fib%20Sci16,%20268.pdf)

Abstract: The kinetics of xylan removal from quaking aspen, paper birch, American elm, and red maple by water prehydrolysis (autohydrolysis) was reevaluated, and additional data for the water prehydrolysis of southern red oak were obtained. Xylan removal from these hardwood species can be modeled kinetically as the sum of two parallel first-order reactions—one fast and one slow. The rate constant for the fast reaction is highly correlated with the rate constant for the slow reaction for all species studied. The rate constant for initial xylan removal usually reported in the literature is actually a complex function of the rate constants for both the fast and slow reactions and is based solely on the initial data points. This paper presents an improved method for modeling xylan removal that allows modeling throughout the course of its reactions. The reason there are two different rates of xylan removal can be more easily explained on the basis of accessibility rather than any variability in the polymeric structure of the xylan being removed. Thus, the slow rate may be due to a portion of the xylan being embedded within or attached to the lignin via lignin-carbohydrate bonds.

Keywords: Xylan, Prehydrolysis, Water Prehydrolysis, Autohydrolysis, Kinetics, Hardwoods, Aspen, *Populus Tremuloides*, Birch, *Betula Papyrifera*, ELM, *Ulmus Americana*, Maple, *Acer Rubrum*, Southern Red Oak, *Quercus Falcata*

? Conner, A.H., Libkie, K. and Springer, E.L. (1985), Kinetic modeling of hardwood prehydrolysis. Part II. Xylan removal by dilute hydrochloric acid prehydrolysis. *Wood and Fiber Science*, **17** (4), 540-548.

Full Text: [1985\Woo Fib Sci17, 540.pdf](1985/Woo%20Fib%20Sci17,%20540.pdf)

Abstract: Knowledge of prehydrolysis kinetics has applicability to the design, development, and modeling of processes to separate wood into its basic chemical constituents (i.e., cellulose, hemicellulose, and lignin). The kinetics of xylan hemicellulose removal with 0.10 M HCl at 120 C from quaking aspen, paper birch, American elm, red maple, and southern red oak was studied. The mathematical model developed in Part I to describe the kinetics of xylan removal by water prehydrolysis of these species could be used to model xylan removal with dilute hydrochloric acid. Xylan removal could thus be modeled as the sum of two parallel first-order reactions—one fast and one slow. However, unlike the case with water prehydrolysis where the rate constants for the fast (kf) and slow (ks) reaction processes could be correlated with each other, they could not be correlated for HCl prehydrolysis. Instead the kf and ks values determined for each species clustered about average kf and ks values for all the species as a whole. A single set of parameters determined from a nonlinear least squares fit of the experimental prehydrolysis data for all the species as a whole to the model could be used to reasonably describe the course of xylan removal from all the species. The fact that one set of parameters could be used suggests that the same reactions are taking place on prehydrolysis and that the chemical structure and physical morphology of the xylan hemicellulose were essentially the same in the species studied and probably in all temperate hardwood species. The model thus provides a good approximation of xylan removal from any temperate hardwood with dilute hydrochloric acid at the reaction conditions studied.

Keywprds: Xylan, Prehydrolysis, Hydrochloric Acid, Kinetics, Hardwoods, Aspen (*Populus Tremuloides*), Birch (*Betula Papyrifera*), Elm (*Ulmus Americana*), Maple (*Acer Rubrum*), Southern Red Oak (*Quercus Falcata*)

? Conner, A.H. and Lorenz, L.F. (1986), Kinetic modeling of hardwood prehydrolysis. Part III. Water and dilute acetic acid prehydrolysis of southern red oak. *Wood and Fiber Science*, **18** (2), 248-263.

Full Text: [1986\Woo Fib Sci18, 248.pdf](1986/Woo%20Fib%20Sci18,%20248.pdf)

Abstract: The hemicelluloses in wood are more readily hydrolyzed than is cellulose. Because it is advantageous to process the hemicellulose sugars separately from the glucose obtained from the cellulose, most processes for utilizing wood as a source of chemicals and liquid fuels include a prehydrolysis step to remove the hemicellulose prior to the main hydrolysis of the cellulose to glucose. Kinetic data are required to model the reactions that occur during prehydrolysis so that optimum conditions and product mixes can be predicted. Two promising prehydrolysis methods, the Iotech steam explosion process and the Stake process, are based on water prehydrolysis (autohydrolysis). The kinetics of water and of dilute (5%) acetic acid prehydrolysis of southern red oak wood over the temperature range of 170 to 240 C were investigated. Kinetic parameters were determined that permitted modeling not only of xylan removal from the wood but also of the occurrence of xylan oligosaccharides, free xylose, furfural, and further degradation products in the prehydrolyzate. At lower temperatures (approximately 170 to 200 C), xylan removal could be modeled as the sum of two parallel reactions (one for an easily hydrolyzed portion and one for a more resistant portion of xylan) using the equation derived in Part I. At the highest temperature studied (236.9 C), the removal of xylan from the wood was best modeled as a single reaction with a small fraction of the xylan being essentially nonreactive. The occurrence of xylan oligosaccharides, xylose, furfural, and further degradation products in the prehydrolyzate was modeled as consecutive, irreversible pseudo first-order reactions. A timelag associated with the depolymerization of the xylan oligosaccharides to xylose was accounted for in the model by allowing the apparent rate constant for the formation of xylose to increase exponentially with time to a maximum value. Increasing the temperature decreased the time required for the overall reactions to occur, increased the portion of xylan removed from the wood, and increased the yield of total anhydroxylose units (xylose + xylan oligosaccharides) that were recovered in the prehydrolyzate. Prehydrolysis with dilute acetic acid does not greatly affect the maximum yields of products in the prehydrolyzate over those observed with water prehydrolysis, however, the time to maximum yield decreased. The data presented in this report indicate that, at higher temperatures, water or dilute acetic acid prehydrolysis gives yields comparable to those for dilute sulfuric acid prehydrolysis at 170 C recently reported in the literature. Preliminary results with lignin isolated from the water and acetic acid prehydrolysis residues confirm recent reports that lignins of this type are useful as phenol substitutes in phenolformaldehyde adhesives.

Keywords: Prehydrolysis, Autohydrolysis, Water Prehydrolysis, Acetic Acid Prehydrolysis, Kinetics, Modeling, Southern Red Oak, *Quercus Falcata* Michx

? Wolcott, M.P. and Shutler, E.L. (2003), Temperature and moisture influence on compression recovery behavior of wood. *Wood and Fiber Science*, **35** (4), 540-551.

Full Text: [2003\Woo Fib Sci35, 540.pdf](2003/Woo%20Fib%20Sci35,%20540.pdf)

Abstract: The primary limitation of non-veneer wood composites for applications in moist environments is dimensional instability. Thickness instabilities from moisture absorption primarily result from damaged cell structures that recover upon absorption of moisture. Previous research has shown that manipulating the pressing parameters involved in the manufacture of non-veneer wood composites (i.e., temperature and moisture) can lead to a more dimensionally stable product. However, the precise phenomena controlling these changes are not fully defined. To understand development of pressing- induced damage, the large strain, compression-recovery behavior of wood and polyurethane (PUR) foam (i.e., as a model system) was studied at a variety of compression temperatures spanning the glassy to rubber transition. The behavior is then related to polymer phase transitions to discern the role of viscoelastic behavior in damage evolution. The elastic modulus (E) and yield stress (sigma(y)) were used to characterize the elastic region of compression, whereas fractional recovery (R) and dissipated energy (ΔE) represented the inelastic component. The PUR foam displayed a distinct glassy plateau region dominated by E, sigma(y), and DeltaE as well as low R. Wood with 22 and 12% MC behaved similarly to the elastomeric PUR foam, however, limits on environmental control prevented testing in the rubbery regime for the 12% MC samples. The E and sigma(y) also decreased with increasing compression temperature for oven-dried yellow-poplar. However, in contrast to yellow- poplar with either 12 or 22% MC, an increase in ΔE was accompanied by a decrease in R with increasing compression temperature of the oven-dried yellow-poplar. An apparent change in mechanism occurs when compressing wood at high temperatures without moisture present. This change was attributed to kinetic effects such as thermal degradation or crosslinking reactions.

Keywords: Biomass Pretreatment, Compression, Cork, Extraction, Glass-Transition Temperature, Hardwoods, Hydrolysis, Pressing, Recovery, Relaxation, Springback

# Title: Wood Science and Technology

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Subject Categories:

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Materials Science, Paper & Wood: Impact Factor 0.291, 11/20 (2000)

? Carrasco, F. and Roy, C. (1992), Kinetic study of dilute-acid prehydrolysis of xylan-containing biomass. *Wood Science and Technology*, **26** (3), 189-208.

Full Text: [1992\Woo Sci Tec26, 189.pdf](1992/Woo%20Sci%20Tec26,%20189.pdf)

Abstract: With the current interest in chemicals production from biomass and in view of the emerging pulping processes, the hydrolysis of lignocellulosics is being considered as a promising industrial approach. Since hemicellulose is more readily hydrolyzed than cellulose, most processes include a prehydrolysis step to remove pentosans prior to the main hydrolysis of cellulose to glucose. However, the mechanism of solid-phase acid-catalyzed hydrolysis has not been elucidated and it is impossible to predict the extent of reaction a priori. Having the goal to design reactors, engineers need empirical rate equations. A series of kinetic data available in the literature have been compiled and different kinetic empirical models were analyzed in order to simulate the dilute-acid prehydrolysis of xylan-containing materials. The objective of this paper is to provide profiles of xylan removal and xylose production as a function of a few process variables such as: preheating time, heating rate, acid concentration, reaction temperature and reaction time. Moreover, the influence of biomass species as well as the type of reactor were studied to understand the different solubilization profiles obtained. Other variables such as biomass concentration and particle size were also analyzed. The cellulose dissolved during the prehydrolytic stage was calculated to determine the prehydrolysis selectivity.

Keywords: Sulfuric-Acid, Hydrolysis, Xylose, Saccharification, Economics, Residues

? Hernandez, R.E. (1993), Influence of moisture sorption history on the swelling of sugar maple wood and some tropical hardwoods. *Wood Science and Technology*, **27** (5), 337-345.

Full Text: [1993\Woo Sci Tec27, 337.pdf](1993/Woo%20Sci%20Tec27,%20337.pdf)

Abstract: Samples of nine tropical hardwoods from Peru and sugar maple wood from QuebeC were selected to perform moisture sorption tests associated with swelling tests at 25°C. The results demonstrate that, for a given equilibrium moisture content, tangential and radial dimensions, and hence the volume of wood, are greater after desorption than after adsorption. The importance of these differences, so-called second-order effects of moisture sorption, varied with the species and with the direction of swelling. These effects are proportionally greater in the tangential direction of wood than in its radial axis. Finally, two types of samples showed similar swellings for three equilibrium moisture contents.

? Seki, K., Saito, N. and Aoyama, M. (1997), Removal of heavy metal ions from solutions by coniferous barks. *Wood Science and Technology*, **31** (6), 441-447.

Full Text: [1997\Woo Sci Tec31, 441.pdf](1997/Woo%20Sci%20Tec31,%20441.pdf)

Abstract: The abilities of 15 coniferous barks for removing toxic heavy metal ions were investigated. The barks considerably varied in the adsorption ability to each metal ion. of the barks tested, high adsorption ability for heavy metal ions was found in Picea abies (Norway spruce). Equilibrium experiments using P. jezoensis (Yezo spruce) bark showed that the adsorption of Cd2+ was greatly affected by the pH of solution and the initial Cd2+ concentration in solution. The adsorption of Cd2+ by P. jezoensis bark followed Freundlich isotherm in the concentration range 10-330 mgCd2+/L. The continuous column experiments using P. jezoensis bark indicated that the packing had retained 10.1-14.2 mg Cd2+/g adsorbent until the column broke through.

Keywords: Adsorbent, Adsorption, Bark, Freundlich Isotherm, Heavy Metal, Heavy Metal Ions, Heavy-Metal, Leaves, Metal, Metal Ions, pH, Uranium

Jorge, F.S., Santos, T.M., de Jesus, J.P. and Banks, W.B. (1999), Reactions between Cr(VI) and wood and its model compounds. Part 2:Characterisation of the reaction products by elemental analysis, magnetic susceptibility and FTIR. *Wood Science and Technology*, **33** (6), 501-517.

Full Text: [W\Woo Sci Tec33, 501.pdf](W/Woo%20Sci%20Tec33,%20501.pdf)

Abstract: Hexavalent chromium solutions at two pH levels (about 1.3 and 7.8) were reacted with wood, gum ghatti, lignin, cellulose and simple model compounds representing wood chemical structures (guaiacol, vanillin, vanillyl alcohol, homovanillyl alcohol, methyl-(beta-D-glucoside, and methyl-beta-cellobioside). Reaction products were isolated and characterised by elemental analysis, magnetic susceptibility, and Fourier-transform infrared spectroscopy (FTIR). Data suggest that all the chromium present in the reaction products is in its trivalent oxidation state. After reduction reactions, wood and macromolecular substances generally fixed a relatively low level of chromium, which contrasts with the high level in the products isolated from the reaction with the model compounds. It appears that the reaction of the simple model compounds with Cr(VI) did not produce complex adducts of Cr(III) but inorganic substances, of the hydrated chromium oxide type. Therefore, under the experimental conditions applied, simple model compounds do not seem to behave chemically as wood or as the macromolecular substances investigated. Hence, their significance as model compounds must be object of further assessment. An exception is the product from the reaction of vanillyl alcohol and K2CrO4 aq. This contains a relatively small amount of chromium and its FTIR spectrum presents rather well defined bands indicating reaction of the phenolic hydroxyl and secondary alcohol groups. This system must be worthy of further investigation as a model for lignin.

Keywords: Cca-Treated Wood, Chromated Copper Arsenate, Southern Pine, Spectroscopic Analysis, Chromic-Acid, Preservatives, Performance, Durability, Mechanism, Stability

Naderi, N. and Hernández, R.E. (2000), Influence of wood planing on the second-order effects of moisture sorption in sugar maple. *Wood Science and Technology*, **33** (3), 215-222.

Full Text: [W\Woo Sci Tec33, 215.pdf](W/Woo%20Sci%20Tec33,%20215.pdf)

Abstract: Summary Two types of machines, a conventional planer, and a fixed-knife pressure-bar planer were used to prepare matched specimens of sugar maple wood. After adsorption and desorption, both experiments at 21 °C, the EMC, swelling in all principal directions as well as compliance coefficient in radial compression were measured. Two specimen sizes were used for these expe-riments. For a given equilibrium moisture content, tangential and radial dimensions were greater after desorption than after adsorption, as previously described. When equilibrium was reached by gaining moisture, the wood was stiffer in radial compression compared to when the equilibrium was reached after losing moisture. The magnitude of this phenomenon, second-order effects of moisture sorption, was slightly affected by the type of planing. These effects on swelling were greater for large specimens prepared by conventional planing compared to fixed-knife pressure-bar planing. Small specimens showed similar magnitudes of this phenomenon with both planing methods. No differences between planing methods were found for the radial compliance coefficient measured on either specimen size. Therefore, the second-order effects of moisture sorption appeared to be a bulk phenomenon and not restricted to the superficial layers of wood.

Aoyama, M., Tsuda, M., Cho, N.S. and Doi, S. (2000), Adsorption of trivalent chromium from dilute solution by conifer leaves. *Wood Science and Technology*, **34** (1), 55-63.

Full Text: [W\Woo Sci Tec34, 55.pdf](W/Woo%20Sci%20Tec34,%2055.pdf)

Abstract: Chromium(III), Cr(III) adsorption capacities of the leaves of 34 conifer species were examined. Among these, Ginkgo biloba, Taxus cuspidata, Cephalotaxus harringtonia var. nana, and Taxodiaceae and Cupressaceaes showed large capacities to adsorb Cr(III). The adsorption capacities of conifer leaves for Cr(III) (3.12-5.09 mgCr g-1 adsorbent) compared favorably with those of commercial activated carbons (1.23-2.75 mgg-1). Factors affecting Cr(III) adsorption were studied using G. biloba leaves. The factors included solution pH, contact time, temperature, and the initial concentration of Cr(III). The amount of Cr(III) adsorbed on the adsorbent increased steadily with increasing pH in a pH range from 2 to 5, with increasing contact time, and with increasing temperature ranging 20 to 40°C. The Cr(III) adsorption was also affected by the initial concentration of Cr(III) in the solution. A linear relationship was observed between the amount of Cr(III) adsorbed and the equilibrium concentration of Cr(III) in the solution when graphed logarithmically. The maximum capacity of G. biloba leaves was 27.5 mgCr g-1 adsorbent by column experiments.

Keywords: Heavy-Metal Ions, Activated Carbon, Aqueous-Solutions, Removal, Uranium, Barks

Marchetti, V., Clement, A., Gerardin, P. and Loubinoux, B. (2000), Synthesis and use of esterified sawdusts bearing carboxyl group for removal of cadmium(II) from water. *Wood Science and Technology*, **34** (2), 167-173.

Full Text: [W\Woo Sci Tec34, 167.pdf](W/Woo%20Sci%20Tec34,%20167.pdf)

Abstract: Improvement of the reaction of succinic anhydride with wood meal was studied in order to prepare low cost materials for the removal of heavy metals. Without solvent, the use of 1 equivalent of pyridine or triethylamine, succinic anhydride was necessary to obtain high grafting efficiencies at 80°C. In the presence of small quantities of 1,2-dichloroethane as swelling agent, only 0.1 equivalent of catalyst was needed to obtain satisfactory results. Three more or less modified sawdusts were used after activation with NaHCO3 for the removal of cadmium(II) from water. Metal binding capacity was directly connected with the acid value estimated by titration and can reach 200 mg, g. Strongly modified sawdust showed a cadmium binding capacity lower than expected because of diester formation

Keywords: Activation, Adsorption, Cadmium, Heavy Metals, Heavy-Metal Ions, Removal, Sawdust, Wood, Woods

Aoyama, M. and Tsuda, M. (2000), Removal of Cr(VI) from aqueous solutions by larch bark. *Wood Science and Technology*, **35** (5), 425-434.

Full Text: [W\Woo Sci Tec35, 425.pdf](W/Woo%20Sci%20Tec35,%20425.pdf)

Abstract: The ability of larch (Larix leptolepis Gold.) bark to remove Cr(VI) from dilute aqueous solutions was investigated. The research parameters included the solution pH, contact time, temperature and initial concentration of Cr(VI) in solution. of the parameters studied, the solution pH was found to be the most crucial. The Cr(VI) removal decreased steadily throughout the pH range studied (pH 2-6), while the Cr adsorption peaked at pH 3. Because the chemical reduction of Cr(VI) to trivalent state occurred to lesser extents even in strong acidic media, the Cr(VI) removal was mainly governed by physico-chemical adsorption. The positive value of the heat adsorption (DeltaH(0)) indicates the endothermic nature of the Cr(VI) adsorption. The relatively slow rate and irreversible nature of the adsorption as well as the order of the magnitude of the heat adsorption value suggest that the adsorption is of a chemical type. The adsorption data obtained from the equilibrium experiments were well fitted to both the Langmuir and Freundlich isotherms.

Keywords: Acid, Adsorption, Bark, Binding, Chromium, Coniferous Leaves, Heavy-Metal Ions, Langmuir, Peanut Skins, Recovery, Removal, Waste, Water

Garrote, G. and Parajó, J.C. (2002), Non-isothermal autohydrolysis of Eucalyptus wood. *Wood Science and Technology*, **36** (2), 111-123.

Full Text: [W\Woo Sci Tec36, 111.pdf](W/Woo%20Sci%20Tec36,%20111.pdf)

Abstract: Non-isothermal autohydrolysis treatments of Eucalyptus globulus wood were carried out in batch reactors in order to assess the kinetics of hemicellulose degradation, as well as the effects caused on cellulose and lignin. Experiments were carried out at a liquor to wood ratio of 8 g, g, and two heating profiles were explored. The maximum temperature considered was 224°C, and the longest reaction time was 0.94 h. The experimental variables considered were solid residue yield, solid residue composition and composition of liquors. Up to 90.4% of the initial xylan was removed in treatments, which also caused some delignification (up to 13.8% of the initial lignin was removed), whereas cellulose was almost quantitatively retained in solid phase. The conversion of xylan into xylooligomers, with further hydrolysis to xylose and decomposition of this sugar into furfural was assessed by means of a kinetic model based on sequential, first order reactions involving kinetic coefficients with Arrhenius-type dependence on temperature.

Keywords: Acid Prehydrolysis, Biomass, Extraction, Fractionation, Hardwood Prehydrolysis, Hydrolysis, Kinetics, Lignin, Lignocellulosics, Pretreatment, Water, Wheat-Straw, Wood

Arévalo, R. and Hernández, R.E. (2004), Influence of moisture sorption on the tangential compression strength of Mahogany wood (*Swietenia macrophylla* King). *Wood Science and Technology*, **37** (5), 419-425.

Full Text: [W\Woo Sci Tec37, 419.pdf](W/Woo%20Sci%20Tec37,%20419.pdf)

Abstract: Moisture sorption tests and compression tangential tests at 25degreesC were carried out on specimens of mahogany (Swietenia macrophylla King) wood from Peru. The tests were performed over seven adsorption and five desorption moisture conditions, and differences in strength between adsorption and desorption curves at a given equilibrium moisture content were evaluated. The results showed that second-order effects in mahogany wood were not discernible in either the tangential compliance coefficient or for the stress at the proportional limit in tangential compression.

Keywords: Sugar Maple Wood, Hardwoods

Low, K.S., Lee, C.K. and Mak, S.M. (2004), Sorption of copper and lead by citric acid modified wood. *Wood Science and Technology*, **38** (8), 629-640.

Full Text: [W\Woo Sci Tec38, 629.pdf](W/Woo%20Sci%20Tec38,%20629.pdf)

Abstract: The sorption characteristics of citric acid modified wood to remove copper and lead ions from aqueous solution under batch conditions have been investigated. Sorption was pH dependent with increasing uptake at higher pH values. The kinetics of sorption for both ions was rapid with 90% sorption taking place within the first 60 min regardless of its initial concentration. Sorption can be explained by a second-order kinetics model from which the rate constant, the equilibrium sorption capacity and the initial rate were calculated. From these parameters,. the predictive models for Cu and Pb sorbed (q(t)) in time t and at an initial concentration (C-o) are given by q(t) = C(o)i[0.31 C-o-2.29 + (0.04C(o) + 5.19)t] and q(t) = C(o)dagger/[0.06C(o) - 6.59 + (0.001C(o) + 4.48)r] for Cu and Pb, respectively. Using these models the predicted and experimental uptakes of Cu and Pb were compared and discussed. Maximum sorption capacities of modified wood under present experimental conditions were 23.70 and 82.64 mg/g for Cu and Pb, respectively. However. for untreated wood the corresponding values were 2.56 and 7.71 mg/g indicating a tenfold increase in sorption upon citric, acid modification. Ethylene diamine tetraacetic acid and nitrilotriacetic acid complexed with both ions render sorption less favorably. However-salicylic acid had little influence. In a binary system, Pb ions Were more favorably sorbed than Cu Ions which could be due to the larger ionic radius of the former ions.

Keywords: Ion-Exchange Properties, Metal-Ions, Quaternized Wood, Aqueous-Solution, Heavy-Metals, Rice Hulls, Removal, Biosorption, Adsorption, Adsorbents

? Rao, P.S., Reddy, K.V.N.S., Kalyani, S. and Krishnaiah, A. (2007), Comparative sorption of copper and nickel from aqueous solutions by natural neem (*Azadirachta indica*) sawdust and acid treated sawdust. *Wood Science and Technology*, **41** (5), 427-442.

Full Text: [2007\Woo Sci Tec41, 427.pdf](2007/Woo%20Sci%20Tec41,%20427.pdf)

Abstract: This study investigates the potential use of neem (*Azadirachta indica*) sawdust treated with hydrochloric acid for the removal of copper(II) and nickel(II) ions from wastewater. The effects of different system variables, viz, adsorbent dosage, initial metal ion concentration, pH and contact time were studied. The results showed that as the amount of the adsorbent was increased, the percentage of metal ion removal increased accordingly. Optimum pH value for metal adsorption is determined as 5.0 for Cu(II) and 4.0 for Ni(II) ions. Maximum metal is sequestered in 150 min for Cu(II) and 180 min for Ni(II) after the beginning of every experiment. Similar experiments were carried out with acid treated sawdust to compare the results. The adsorption of metal ions followed a first order rate equation. Both Freundlich and Langmuir adsorption models are suitable for describing the sorption of Cu(II) and Ni(II) on the two forms of sawdust. Furthermore, the natural organic matter (neem sawdust) is characterized by FTIR spectra and surface area analysis. At optimal conditions the maximum adsorption capacity is found to be 48.3 and 286 mg/g for Cu(II) and 31.5 and 74.1 mg/g for Ni(II) in natural and acid treated forms, respectively.

Keywords: Acid, Adsorbent, Adsorbent Dosage, Adsorption, Adsorption Capacity, Adsorption Models, Analysis, Aqueous Solutions, Azadirachta Indica, Barks, Capacity, Cassava Waste, Concentration, Contact Time, Copper, Cu, Cu(II), Dosage, Dye, Effects, Experiment, Experiments, First Order, Freundlich, FTIR, FTIR Spectra, Heavy-Metal Ions, Hydrochloric Acid, Ion, Ions, Kinetics, Langmuir, Langmuir Adsorption, Leaves, Matter, Metal, Metal Adsorption, Metal Ion, Metal Ion Concentration, Metal Ion Removal, Metal Ions, Models, Natural, Natural Organic Matter, Ni, Nickel, Optimal Conditions, Order, Organic, Organic Matter, pH, Potential, Rate, Rate Equation, Removal, Sawdust, Solutions, Sorption, Spectra, Surface, Surface Area, Time, Treated Sawdust, Value, Wastewater

? Gong, R.M., Ni, S.J., Zhao, J.J. and Li, N. (2009), Epichlorohydrin and aspartic acid incorporated into sawdust and application as sorbent for methylene blue. *Wood Science and Technology*, **43** (3-4), 183-193.

Full Text: [2009\Woo Sci Tec43, 183.pdf](2009/Woo%20Sci%20Tec43,%20183.pdf)

Abstract: In this paper, a new cation exchanger is prepared by activating sawdust with epichlorohydrin, followed by coupling the epoxy-activated sawdust with aspartic acid. The sawdust cation exchanger (SCE) was investigated for its methylene blue (MB) removal capacity from aqueous solution. The removal experiments were performed under various conditions such as different initial pH, SCE dosage, dye concentration, ionic strength, and contact time in a batch system. The highest sorption capacity of MB was obtained beyond pH 4. The 2.0 g/l or more of SCE could remove above 95% of MB from 250 mg/l of dye solution. Increasing the ionic strength of the solution caused decline of MB sorption. The sorption isotherm conformed well to the Langmuir model. The sorption process could be described by the pseudo-second-order kinetic model.

Keywords: Agricultural Waste, Aqueous-Solutions, Dye Adsorption, Equilibrium, Malachite Green, Reactive Dyes, Removal, Rice Husk, Sorption, Textile Waste-Water

? Mun, S.P., Ku, C.S. and Kim, J.P. (2010), Adsorption of metal and uranyl ions onto amidoximated *Pinus densiflora* bark. *Wood Science and Technology*, **44** (2), 283-299.

Full Text: [2010\Woo Sci Tec44, 283.pdf](2010/Woo%20Sci%20Tec44,%20283.pdf)

Abstract: Pine (*Pinus densiflora*) bark was chemically modified by grafting with acrylonitrile (AN) through Fenton reaction and conversion of the cyano group to an amidoxime group by reaction with hydroxylamine. Treatments of pine bark with 160 mM H2O2 at 40AºC yielded similar to 70% grafting in 6-h reaction. After alkali hydrolysis of amidoximated pine bark (AOPB), its adsorption capacity (q (e)) for copper ions was largely increased from 0.5 to 1.8 mmol/g. Adsorption of the hydrolyzed AOPB (HAOPB) followed the pseudo-second-order kinetic model. Among the metal ions tested, the order of adsorption capacity (q (e)) predicted by the kinetic model at equilibrium time was Hg2+ > UO22+> Cd2+ > Cu2+ > Zn2+ > N2+. The adsorption process was pH-dependent, and the adsorption equilibrium was observed in the pH range of 6-7 for all the metal ions. Even though pine bark is a good adsorbent for Hg2+ and UO22+ ions, it had a poor affinity for the other ions tested. It was obviously found that HAOPB had very high adsorption abilities for heavy metal and uranyl ions.

Keywords: Acrylonitrile, Adsorbent, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Antioxidant Properties, Aqueous-Solutions, Capacity, Cd2+, Copper, Cu2+, Equilibrium, Fenton, Graft-Polymerization, Grafting, H2O2, Heavy Metal, Heavy-Metal, Hydrolysis, Ions, Kinetic, Kinetic Model, Metal, Metal Ions, Methylene-Blue, Model, Modified, Ni2+, pH, pH-Dependent, Pine Bark, Pseudo Second Order, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Radiata Bark, Range, Reaction, Removal, Sawdust, Sorption, Time, Treatments, Uranyl Ions, Water, Zn2+

? Rafatullah, M., Sulaiman, O., Hashim, R. and Ahmad, A. (2012), Removal of cadmium(II) from aqueous solutions by adsorption using meranti wood. *Wood Science and Technology*, **46** (1-3), 221-241.

Full Text: [2012\Woo Sci Tec46, 221.pdf](2012/Woo%20Sci%20Tec46,%20221.pdf)

Abstract: Meranti wood, an inexpensive material, has been utilized as an adsorbent for the removal of cadmium(II) from aqueous solutions. Various physico-chemical parameters such as equilibrium contact time, solution pH, initial metal ion concentration, and adsorbent dosage level were studied. Langmuir, Freundlich, Dubinin-Radushkevich (D-R) and Temkin isotherms were used to analyze the equilibrium data at different temperatures. The experimental data fitted well with the Langmuir adsorption isotherm, indicating the monolayer adsorption of the cadmium(II). The monolayer adsorption capacity of meranti wood for cadmium(II) was found to be 175.43, 163.93 and 153.84 mg/g at 30, 40, and 50AºC, respectively. The thermodynamics of cadmium(II) adsorption on meranti wood indicates its spontaneous and exothermic nature. Kinetic studies showed that the adsorption followed a pseudo-second-order kinetic model. The results indicated that the meranti wood could be an alternative for more costly adsorbents used for cadmium(II) removal.

Keywords: Adsorbent, Adsorbents, Adsorption, Biosorption, Cadmium, Cd(II), Concentration, Dubinin-Radushkevich, Equilibrium, Freundlich, Heavy-Metal Ions, Isotherm, Isotherms, Kinetic, Kinetic Studies, Kinetics, Langmuir, Metal Ion, Pb(II) Ions, pH, Removal, Rice Husk, Sawdust, Sorption, Thermodynamics, Waste-Water

# Title: Work & Stress

Full Journal Title: Work & Stress

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Jolibois, S., Mouzé-Amady, M., Chouanière, D., Grandjean, F., Nauer, E. and Ducloy, J. (2000), WebStress: A web interface to explore a multidatabase bibliographic corpus on occupational stress. *Work & Stress*, **14** (4), 283-296.

Full Text: [2000\Wor Str14, 283.pdf](2000/Wor%20Str14,%20283.pdf)

Abstract: A bibliographic study on a multidisciplinary subject, such as occupational stress, requires a multidatabase query facility. Given this, we searched eight databases belonging to different fields (medicine, psychology, etc.) and from different countries. Thus, more than 26000 references on occupational stress were gathered. A bibliographic corpus of this sort is unusable because of the heterogeneous format of the records and the number of duplicate entries. Considering the limitations of commercial programs, we have developed a system, called WebStress, for reformatting the data and removing duplicates. The huge number of references and the research needs of updating and searching have necessitated the addition of several other functions to WebStress. Therefore WebStress comprises a web interface that makes it possible to search the corpus with advanced features (using clustering, a specialized thesaurus on stress and Boolean queries). In addition to the usual bibliographic queries on a specific database such as Medline, WebStress provides bibliometric analysis of the corpus, which might contribute to a detailed analysis on occupational stress in order to highlight the networks of researchers and to find the main topics studied in this area. WebStress is not yet available to researchers in general. It is being further developed, and also permission needs to be obtained from the eight commercial bibliographic databases that it consults.

Keywords: Occupational Stress Bibliographic Database Library Information Standards Reformatting Deduplication Interface Bibliometrics

# Title: WCECS 2008: World Congress on Engineering and Computer Science

Full Journal Title: WCECS 2008: World Congress on Engineering and Computer Science

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Al-Meshragi, M., Ibrahim, H.G. and Aboabboud, M.M. (2008), Equilibrium and Kinetics of Chromium Adsorption on Cement Kiln Dust. *WCECS 2008: World Congress on Engineering and Computer Science*, 54-62.

Abstract: The adsorption of Chromium trivalent has been studied. Its equilibrium isotherm has been measured. The isotherm was determined by stirring 3 g of Cement Kiln Dust, with 250 ml of a chromium solution (from a tannery effluents wastewater) of initial concentrations 2336 and 4320 mg/L respectively. The stirring rate was used at constant rate of 1200 rpm and the temperature maintained at 25±2°C. A contact time of around 60 min. was required to achieve equilibrium. The experimental isotherm results have been fitted using Langmuir, Freundlich, Temkin and Dubinin-Radushkevich equations. The monolayer adsorption capacity is 303 mg Cr(III) per g of Cement Kiln Dust. A comparison of kinetic models applied to the adsorption of Cr(III) ions on the adsorbent was evaluated for the first order, the pseudo first order, the pseudo second order, Elovich and intraparticle diffusion kinetic models, respectively. Kinetic parameters, rate constant, equilibrium sorption capacities and related correlation coefficients for each kinetic model were calculated and discussed. Results show that the pseudo second order kinetic model was found to correlate the experimental data well.

Keywords: Activated Carbon, Adsorption, Aqueous-Solutions, Cement Kiln Dust, Dyes, Equilibrium, Fly-Ash, Intraparticle Diffusion, Ions, Isotherm and Kinetics, Kinetics, Metal Removal, Phosphate Adsorption, Sorption, Tannery Wastewater, Waste, Water

# Title: World Applied Sciences Journal

Full Journal Title: [World Applied Sciences Journal](http://www.idosi.org/wasj/online.htm); [World Applied Sciences Journal](http://www.wasj.org/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1818-4952

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mahvi, A., Nouri, J., Omrani, G. and Gholami, F. (2007), Application of *Platanus orientalis* leaves in removal of cadmium from aqueous solution. *World Applied Sciences Journal*, **2** (1), 40-44.

Full Text: [2007\Wor App Sci J2, 40.pdf](2007/Wor%20App%20Sci%20J2,%2040.pdf)

Abstract: Removal of cadmium from aqueous solution was studied; using platanus orientalis leaves (POL) and their ash in 2006 in Iran. Bach adsorption experiments were performed as a function of solute concentration, contact time, pH and ironic strength for the experiment. The effect of Ca2+, Mg2+, Na and K+ on adsorption was then examined. The effect of this adsorbent on COD in aqueous solution showed that 1 g l-1 of adsorbent caused increase of 110 and 76 mg l-1 COD in deionized water in 120 min for POL and its ash. The maximum removal took place in the pH range of 7 contact time in 60 minutes and initial concentration of 2 mg l-1. The cadmium sorption followed both the Longmuir and Freundlich’s equation isotherms. The study showed POL ash was more favorable than living ones as well as in removing cadmium from the aqueous solution. The adsorbent capacity was also studied. The adsorbent capacity and the adsorbent intensity values showed that Platanus orientalis leaves, a non-conventional adsorbent is efficient in removing Cd from aqueous solution. The adsorption data fitted well into Freundlich isotherm.

Keywords: Adsorption, Aqueous, Cadmium, Capacity, Cd, COD, Freundlich, Freundlich Isotherm, Iran, Isotherm, Isotherms, pH, Removal, Solute, Sorption, Water

? Mehdi, S., Obaid-ur-rehman, Ranjha, A. and Muhammad, S. (2007), Adsorption capacities and availability of phosphorus in soil solution for rice wheat cropping system. *World Applied Sciences Journal*, **2** (4), 244-265.

Full Text: [2007\Wor App Sci J2, 244.pdf](2007/Wor%20App%20Sci%20J2,%20244.pdf)

Abstract: A study was conducted to measure the phosphorus (P) adsorption capacities in a typic Camborthid (Bhalike series) soil of rice tract of Punjab, Pakistan, to compute the P fertilizer quantities for field application, internal and external P requirements of wheat, sorghum (Sorghum bicolor) fodder and rice, P fertility build-up factor (PFBF) and level of P build-up. The soil selection was based on clay percentage and calcium carbonate content. The soil was free from salinity and sodicity, deficient in organic matter and adequate in available potassium. Sorption isotherm was constructed in the laboratory by equilibrating and shaking 2.5 g soil with 25 ml of 10 m M CaCl2 containing 0, 5, 10, 15, 20, 40, 60 and 80 g P ml-1 as KH2PO4 for 24 h. Sorption data was fitted into linear form of Langmuir and modified Freundlich models and P adsorption capacity was determined from the equations. Theoretical doses were computed from modified Freundlich model for field application. Different theoretical P levels were applied in the field to develop soil solution P level of 0.01, 0.02, 0.03, 0.04, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.40 and 0.50 mg l-1 along with a control of native P soil solution. An overall control (NK=0 with native P) was also kept. The recommended doses of N and K were applied to all the crops along with the recommended agronomic practices. P was also applied at 13.65 and 19.65 mg P kg-1 to subsequent sorghum fodder and rice crops, respectively. Plant sampling was performed at booting stage of wheat and rice and at the harvest of each crop. The maximum P adsorption was 555 g g-1 with buffering capacity of 116.55 g g-1 soil. The highest wheat grain yield was 4.24 Mg ha-1; sorghum fresh fodder yield was 48.95 Mg ha-1 and rice paddy yield was 4.38 Mg ha-1. Total P uptake by wheat was 19.91 kg ha-1, by sorghum fodder was 34.67 kg ha-1 and by rice was 20.49 kg ha-1. The mean PFBF (mg P required to build 1 mg P kg-1 soil) was 18.51 and the level of P build-up (mg P kg-1 built-up in soil for each mg P kg-1 soil applied) was 0.054. Level of P depletion was 0.154 mg P kg-1 for NPK control plots while 0.173 mg P kg-1 for P control plots. Internal P requirement (for 95% relative yield) for wheat was 0.249% at booting stage and 0.277% for grain stage. For sorghum fodder, internal P requirement was 0.326% and for rice, it was 0.165% at booting stage and 0.220% for paddy stage. So, plant sampling at booting stage best correlated the results with 95% relative yield of rice and wheat. External Olsen P requirement for wheat was 13.80 mg kg-1, for sorghum fodder was 12.68 mg kg-1 and for rice was 10.05 mg kg-1. External solution P requirement for wheat was 0.252 mg l-1.

Keywords: Adsorption, Adsorption Capacity, Capacity, Clay, Freundlich, Isotherm, Langmuir, Mg, Models, Phosphorus, Sorption, Sorption Isotherm, System

? AjayKumar, A.V., Darwish, N.A. and Hilal, N. (2008), Study of various parameters in the biosorption of heavy metals on activated sludge. *World Applied Sciences Journal*, **5** (5S), 32-40.

Full Text: [2008\Wor App Sci J5, 32.pdf](2008/Wor%20App%20Sci%20J5,%2032.pdf)

Abstract: Heavy metal pollution has become one of the most serious environmental problems today. Billions of gallons of wastewaters containing oils and particulates are produced each year by metallurgical plants, ships, petroleum and gas operations, industrial washing operations and other processes. Unfortunately, water systems have long tended to be one of the neglected areas of the process plant. However, this situation is changing rapidly as environmental legislation tightens. An investigation has been undertaken to determine the removal of heavy metals (Cd2+, Cu2+, Ni2+ and Zn2+) of high environmental priority due to their toxicity, from dilute aqueous solutions studied in the present work by biosorption using inexpensive biomaterials like activated sludge. Activated sludge is used widely in water treatment plants and is easily available. To understand the action of bio metals uptake, the essential role played by extra cellular polymeric substance (EPS) needs to be understood. Factors influencing the biosorption of the heavy metals are cleaning of the sludge, pH, initial metal ion concentration, weight of the adsorbent, mixing index, time and temperature. The adsorption parameters were determined using both Langmuir and Freundlich isotherm models and showed a better fitting of experimental data. The maximum sorption uptake of the studied metal ions by activated sludge showed the following order Cd2+ > Cu2+ > Ni2+ > Zn2+.

Keywords: Activated Sludge, Adsorption, Aqueous, Biosorption, Biosorption of Heavy Metals, Cu2+, Freundlich, Freundlich Isotherm, Heavy Metal, Heavy Metals, Isotherm, Langmuir, Metal, Metal Ions, Metals, Models, Ni2+, pH, Removal, Sludge, Solutions, Sorption, Temperature, Treatment, Water, Water Treatment, Zn2+

? Alzaydien, A. (2009), Orange peels as a low cost adsorbent for the removal of Pb(II) from wastewater: Equilibrium and kinetic studies. *World Applied Sciences Journal*, **6** (3), 309-322.

Full Text: [2009\Wor App Sci J6, 309.pdf](2009/Wor%20App%20Sci%20J6,%20309.pdf)

Abstract: In this study, the potential of low-cost agricultural byproducts, namely, orange peel in the removal of lead(II) ions from aqueous solutions was investigated. Adsorption of lead(II) ions onto a powder prepared from orange peel was investigated with the variation in the parameters of pH, contact time, the amount of adsorbent and lead(II) ions concentration at ambient temperature. Four kinetic models are the pseudo-first-order, pseudo-second-order, Elovich and intraparticle diffusion equations, were selected to interpret the adsorption data. Kinetic parameters such as the rate constants, equilibrium adsorption capacities and related correlation coefficients, for each kinetic model were calculated and discussed. The linear Langmuir and Freundlich models were applied to describe equilibrium isotherms and both models fitted well. The monolayer adsorption capacity was found as 21.1 mg g-1 at pH 6 and 20C. The dimensionless separation factor (R L) has shown that orange peel can be used for removal of Pb(II) from aqueous solutions. The negative free energy of adsorption indicated that the adsorption of lead(II) ions onto orange peel was feasible and spontaneous. The sorption capacity of the orange peel is comparable to the other available adsorbents and it is quite cheaper.

Keywords: Adsorption, Adsorption Capacity, Aqueous, Capacity, Diffusion, Elovich, Equilibrium, Freundlich, Intraparticle Diffusion, Isotherms, Kinetic, Kinetic Models, Kinetic Parameters, Langmuir, Models, Orange Peel, Pb(Ii), Ph, Pseudo Second Order, Pseudo-Second-Order, Removal, Separation Factor, Solutions, Sorption, Temperature, Wastewater

? Shakeri, A., Moore, F. and Modabberi, S. (2009), Heavy metal contamination and distribution in the Shiraz industrial complex zone soil, South Shiraz, Iran. *World Applied Sciences Journal*, **6** (3), 413-425.

Full Text: [2009\Wor App Sci J6, 413.pdf](2009/Wor%20App%20Sci%20J6,%20413.pdf)

Abstract: Concentrations of heavy metals (As, Co, Cu, Ni, Mo Pb and Zn) are studied in the soil of Shiraz industrial complex zone, south Shiraz, Iran to assess metal contamination due to industrialization, urbanization and agricultural activity. Soil samples were collected from three different depths. The A and C depths are enriched with metals such as Ni, As, Mo, Cu, Pb, and Zn, compared with the B depth. The average abundance order of heavy metal contents in soil depth are: Ni > Zn > Cu > Co > Pb > As > Mo. Soil contamination is assessed on the basis of contamination factor (CF) and modified degree of contamination (mCd). The CF and mCd base of background values in the three sampled depths for Cu, Zn, Co, Ni, Mo and As are moderate. Pb reveals considerable contamination. The results of enrichment factor (EF) show that using Sc concentration in the average shale produces higher average EF values for Ni, Co and Mo as compared to average values determined using the actual Sc content in lower core baseline values (background). The results of the principal component analysis (PCA) show Zn, Co, Ni, Sc, Cu, Al and Fe come from a similar source and are not influenced by anthropogenic sources. High loading of Zn, Co, Cu, and Ni with clay, Al and Fe indicate the active role played by Al and Fe hydroxides and clay content on distribution and sorption of the studied heavy metals in soil. Also, PCA results indicate that As, Mo and Pb behave differently at different depths.

Keywords: Clay, Complex, Core, Cu, Heavy Metal, Heavy Metals, Industrialization, Iran, Metal, Metals, Pb, Soil, Soil Contamination, Sorption

? Esmaeili, A. and Ghasemi, S. (2009), Evaluation of the activated carbon prepared of algae marine *Gracilaria* for the biosorption of Ni(II) from aqueous solutions. *World Applied Sciences Journal*, **6** (4), 515-518.

Full Text: [2009\Wor App Sci J6, 515.pdf](2009/Wor%20App%20Sci%20J6,%20515.pdf)

Abstract: Biosorption of heavy metals can be an effective process for the removal and recovery of heavy metal ions from aqueous solutions. In this study, the batch removal of nickel(II) ions from aqueous solution under different experimental conditions using activated carbon prepared of red alga Gracilaria was investigated in this study. The nickel(II) uptake was dependent on initial pH and initial nickel concentration, with pH 5 being the optimum value. The equilibrium data were fitted using Langmuir and Freundlich isotherm model, with the maximum nickel(II) uptake of 99.03% determined at a pH of 5. At various initial nickel(II) concentrations (30-70 mg/L), If the adsorption is design correctly, it will be attractive. Sorption equilibrium was attained between 15 and 120 min. The nickel(II) uptake by activated carbon was best described by Pseudo-second order rate model. This study, shows the usage of activated carbon as a valuable material for the removal of Ni from aqueous solution wastewater and a better substitute to be used in activated marine red algae.

Keywords: Activated Carbon, Adsorption, Aqueous, Biosorption, Carbon, Equilibrium, Evaluation, Freundlich, Freundlich Isotherm, Heavy Metal, Heavy Metals, Isotherm, Langmuir, Metal, Metal Ions, Metals, Nickel, pH, Pseudo Second Order, Pseudo-Second Order, Recovery, Removal, Solutions, Sorption, Wastewater

? Moghaddam, A., Najafpour, G., Mohammadi, M. and Heydarzadeh, H. (2009), Removal of methylene blue from waste stream by fly ash-clay-sand adsorbent. *World Applied Sciences Journal*, **6** (8), 1073-1077.

Full Text: [2009\Wor App Sci J6, 1073.pdf](2009/Wor%20App%20Sci%20J6,%201073.pdf)

Abstract: Methylene Blue (MB) adsorption from aqueous solution was investigated. Solid adsorbents were fabricated from charcoal fly ash, clay and fine sand with the proportion of 50, 25 and 25 percent, respectively. Experiments were conducted in a packed column to remove MB from the synthetic wastewater. The generated wastewater contained 4 mg/l of MB. The wastewater with flow rates of 18, 35 and 50 ml/min was continuously pumped through the column. The effluent samples were collected at a time interval of 2 min. It was observed that the amount of adsorption was enhanced as the flow rates were gradually decreased. Langmuir and Freundlich isotherm models of adsorption were investigated to interpret the experimental data. The obtained results revealed that the sorption data were well projected by the Freundlich model Adsorption model represented by Langmuir isotherm also depicts similar results. Maximum adsorption of 3.88 mg/g at the contact time of 8.8 min was obtained.

Keywords: Adsorption, Adsorption Model, Aqueous, Clay, Fly Ash, Freundlich, Freundlich Isotherm, Isotherm, Langmuir, Langmuir Isotherm, Methylene Blue, Models, Removal, Sorption, Wastewater

? Arugay, A. and Caparanga, A. (2009), Reusability of *Sargassum cristaefolium* in sorption-desorption of Pb2+, Cu2+ and Ni2+ in batch and fixed-bed systems. *World Applied Sciences Journal*, **6** (10), 1326-1334.

Full Text: [2009\Wor App Sci J6, 1326.pdf](2009/Wor%20App%20Sci%20J6,%201326.pdf)

Abstract: As alternative method to the usual chemical precipitation method for removing heavy metal ions from wastewater, biosorption is considered effective if the biomass can be subjected to repeated sorption-desorption processes. This study had evaluated the reusability of Sargassum cristaefolium biomass in repeated sorption-desorption of a multi-metal system containing Pb2+, Cu2+ and Ni2+ in batch-contact process and fixed-bed column contractor. Results suggest that the biomass can be regenerated and reused for multiple sorption-desorption cycle; however, the multiple sorption-desorption cycle had resulted in a low concentration ratio for Cu2+ and Ni2+. The use of fixed-bed column contractor can offer an advantage over batch-contact because it can achieve better separation and higher concentration ratio over several consecutive sorption-desorption cycles.

Keywords: Biomass, Biosorption, Cu2+, Fixed Bed Column, Fixed-Bed, Heavy Metal, Metal, Metal Ions, Ni2+, Pb2+, Sargassum, System, Wastewater

? Sara, K., Jamil, A., Mukhtar-ul-Hassan, F., Hafza, B.F. and Hafiza, N.K. (2009), Removal of chromium(VI) by biosorption of Eucalyptus Bark. *World Applied Sciences Journal*, **6** (12), 1638-1643.

Full Text: [2009\Wor App Sci J6, 1638.pdf](2009/Wor%20App%20Sci%20J6,%201638.pdf)

Abstract: Adsorption of Chromium(VI) on the Eucalyptus Bark has been studied with the variation in parameters. Different parameters like particle size of adsorbent, concentration of adsorbate, amount of adsorbent, stirring speed, time, temperature and pH were studied. The adsorption has been carried out in batch process. The adsorption capacity increases with decreasing the particle size of adsorbent. The optimum conditions for the maximum adsorption are attained with 2.0 g of adsorbent, 40 ppm metal ion concentration, at room temperature (10C), with 90 min contact time, with 300 rpm agitation speed and at pH 2.

Keywords: Adsorption, Adsorption Capacity, Biosorption, Capacity, Chromium, Metal, pH, Removal, Temperature

? Malarvizhi, R., Wang, M.H. and Ho, Y.S. (2010), Research trends in adsorption technologies for dye containing wastewaters. *World Applied Sciences Journal*, **8** (8), 930-942.

Full Text: [2010\Wor App Sci J-Ho.pdf](2010/Wor%20App%20Sci%20J-Ho.pdf); [2010\Wor App Sci J8, 930.pdf](2010/Wor%20App%20Sci%20J8,%20930.pdf)

Abstract: The main object of this study is to investigate the research trend in removal of dyes from waste water by using adsorption technology for the past 16 years. Data are based on the online version of Science Citation Index (SCI), Web of Science from 1993 to 2008 that covers all the articles published for the past 16 years in SCI journals. Articles referring to dye adsorption were assessed by many aspects including model fitting the trend of publication outputs during 1993-2008, distribution of author keywords and keyword plus analysis. Distribution of articles based on subject categories and journals along with the country wise publications were also studied. From the analysis of words appeared in the title and keywords, it can be concluded that “activated carbon,” “biosorption,” “kinetics,” “Methylene blue,” and “isotherms” could be more popular words and the new words like “photocatalytic degradation,” “photocatalysis,” “titanium dioxide,” and “oxidation” appeared to be the new advanced techniques that are going to be adopted more in future studies. This method of bibliometric analysis can help the relevant researchers to realize the panorama of globalized way of dye removal from wastewater and establish the further research direction.

Keywords: Adsorption, Dyes, Activated Carbon, Biosorption, Isotherm, Kinetics, Scientometrics

# Title: World Chinese Journal of Digestology

Full Journal Title: [World Chinese Journal of Digestology](http://e48.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=XXHB&NaviLink=%e4%b8%96%e7%95%8c%e5%8d%8e%e4%ba%ba%e6%b6%88%e5%8c%96%e6%9d%82%e5%bf%97)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Wang, X. N. and L.C. (2006), Bibliometric analysis of literatures on relationship between Helicobacter pylori infection and gastric carcinogenesis. World Chinese Journal of Digestology, **14** (29), 2883-2888.

Full Text: [2006\Wor Chi J Dig14, 2883.pdf](2006/Wor%20Chi%20J%20Dig14,%202883.pdf)

Abstract: AIM:To present the research progress on the correlations between Helicobacter pylori infection and the risks of gastric cancer, and conclude the hot topics. METHODS:The international papers, published from 2001 to 2006 on this topic, were analyzed by the method of citation analysis, and then the highly-cited references were clustered by SPSS soft package. Based on the contents of the papers in each cluster, the hot-topic researches were concluded. RESULTS:Research literatures about the topic mainly come from the ...

Keywords: Helicobacterpylori, Gastric Cancer, Bibliometrics Analysis

# Title: WCECS 2009: World Congress on Engineering and Computer Science

Full Journal Title: WCECS 2009: World Congress on Engineering and Computer Science

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gipp, B. and Beel, J. (2009), Identifying related documents for research paper recommender by CPA and COA, *WCECS 2009: World Congress on Engineering and Computer Science*, **1-2**, 636-639.

Abstract: This work-in-progress paper introduces two new approaches called Citation Proximity Analysis (CPA) and Citation Order Analysis (COA). They can be applied to identify related documents for the purpose of research paper recommender systems. CPA is a variant of co-citation analysis that additionally considers the proximity of citations to each other within an article’s full-text. The underlying idea is that the closer citations are to each other in a document, the more likely it is that the cited documents are related. For example, citations listed in the same sentence are more likely to express related thoughts than citations listed only in the same section. In COA, the order of citations are considered, allowing the identification of a text similar to one that has been translated from language A to language B, as the citations would still occur in the same order. However, it is also shown that CPA and COA cannot replace text analysis and existing citation analysis approaches for research paper recommender systems since they all have their own strengths and weaknesses.

Keywords: Bibliometrics, Citation, Citation Analysis, Citation Order Analysis, Citation Proximity Analysis, Citations, Related Documents, Research, Research Paper Recommender, Science, World

# Title: World-Class University and Ranking: Aiming Beyond Status, Higher Education for a Knowledge Society

Full Journal Title: World-Class University and Ranking: Aiming Beyond Status, Higher Education for a Knowledge Society

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? van Raan, A.F.J. (2007), Challenges in the ranking of universities. In *World-Class University and Ranking: Aiming Beyond Status, Higher Education for a Knowledge Society*, Edited by Sadlak, J. and Cai, L.N., 87-121.

Full Text: [2007\Hig Edu Kno Soc87.pdf](2007/Hig%20Edu%20Kno%20Soc87.pdf)

Keywords: Bibliometric Indicators, Science, Consequences, Performance, Coverage, Citation

# Title: World Health and Population

Full Journal Title: World Health and Population

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

# Title: World Journal of Biological Psychiatry

Full Journal Title: World Journal of Biological Psychiatry

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Broadbent, H.J., van den Eynde, F., Guillaume, S., Hanif, E.L., Stahl, D., David, A.S., Campbell, I.C. and Schmidt, U. (2011), Blinding success of rTMS applied to the dorsolateral prefrontal cortex in randomised sham-controlled trials: A systematic review. *World Journal of Biological Psychiatry*, **12** (4), 240-248.

Full Text: [2011\Wor J Bio Psy12, 240.pdf](2011/Wor%20J%20Bio%20Psy12,%20240.pdf)

Abstract: Objectives. The lack of a suitable sham condition for repetitive transcranial magnetic stimulation (rTMS) research may compromise the success of blinding procedures. The aim of this systematic review was to examine the reporting of blinding success in randomised sham-controlled trials (RCTs) of rTMS applied to the dorsolateral prefrontal cortex. Methods. A literature search using PUBMED and Web of Science was conducted to identify RCTs of rTMS. Regression analyses were used to investigate whether participants in the real and sham rTMS groups differed in (1) their ability to correctly guess to which intervention they had been randomised, and (2) how likely they were to think they had received real rTMS. Results. Thirteen out of 96 (13.5%) RCTs reported blinding success. Available data from 9/13 studies showed that participants in real and sham rTMS groups were not significantly different in their ability to correctly guess their intervention allocation, but with a trend for participants in the real group to more often guess correctly. However, people in the real rTMS groups were significantly more likely to think they had received real rTMS compared with those in sham rTMS groups. Conclusions. Few RCTs in rTMS report on blinding success. As current sham methods may inadequately mimic real rTMS, this could result in only partial success of blinding and bias estimations of treatment effects.

Keywords: Bias, Blinding, Disorder, Efficacy, Empirical-Evidence, Intervention, Literature, Major Depression, Metaanalysis, Methods, Pain, Prefrontal Cortex, Research, Review, Safety, Science, Success, Systematic, Systematic Review, Tms, Transcranial Magnetic Stimulation, Treatment, Trend, Web of Science

# Title: World Journal of Gastroenterology

Full Journal Title: [World Journal of Gastroenterology](http://www.wjgnet.com/1007-9327/mcsy.asp)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1007-9327

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Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Yang, H. and Zhao, Y.Y. (2008), Variations of author origins in *World Journal of Gastroenterology* during 2001-2007. *World Journal of Gastroenterology*, **14** (19), 3108-3111.

Full Text: [2008\Wor J Gas14, 3108.pdf](2008/Wor%20J%20Gas14,%203108.pdf)

Abstract: AIM: To discuss the variations and distributions of authors who published their papers in World Journal of Gastroenterology (WJG) during 2001-2007 and evaluate the development of WJG and gastroenterology core journals in recent years by comparing the contributions of the authors. METHODS: WJG articles published in 2001-2007 were searched from MEDLINE database (by ISI Web of Knowledge). The variations (cooperation degree, cooperation rate) and distributions of the first authors were analyzed with bibliometric methods. SCIE was used to collect articles published in Am J Gastroenterol, Gastroenterology, Scand J Gastroenterol and WJG in 2007, and comparison of the data was made. Comparison indicators included the article number of annual journals, cooperation degree of authors, cooperation rate, mean number of articles published in each WJG issue, number of countries of the first WJG authors, geographical distribution and article contribution ratio of all WJG authors and domestic authors. RESULTS: Of the 5851 articles covered in MEDLINE, 173, 236, 633, 826, 1496, 1382 and 1105 articles were cited from 2001 to 2007. The cooperation degree was 5.11, 5.56, 5.75, 5.76, 6.31, 5.90 and 5.64 respectively. The cooperation rates was 94.80%, 99.15%, 98.89%, 98.55%, 99.13%, 96.67% and 95.66%, respectively. The mean number of articles published in each WJG issue from 2001 to 2007 was 28, 39, 52, 34, 31, 28 and 23, respectively. The number of countries of the first WJG authors was 8, 8, 27, 32, 49, 61 and 56, respectively. The first authors of WJG came from 3 continents in 2001 and covered 6 continents in 2006-2007. The number of articles written by Asian authors was 136 (79.07%), 227 (96.19%), 575 (90.98%), 713 (87.81%), 1111 (75.32%), 712 (53.98%) and 555 (53.21%), respectively in 2001-2007. The number of articles written by European & American authors increased from 36 (20.93%) and 8 (3.39%) in 2001-2002 to 563 (42.68%) and 452(43.34%) in 2006-2007. The number of countries except for China contributing papers was increased. The number of articles written by first authors of Japan rose from 0 (0%) in 2001-2002 to 287 (12.15%) in 2006-2007. The number of articles written by American authors increased from 6 (1.47%) in 2001-2002 to 158 (6.69%) in 2006-2007. The number of articles written by Chinese authors was 136 (79.07%), 227 (96.19%), 548 (86.71%), 669 (82.39%), 884 (59.93%), 380 (28.81%) and 320 (30.68%), respectively, in 2001 to 2007. The number of articles published in Am J Gastroentero% Gastroenterology, Scand J Gastroenterol and WJG was 565, 586, 238 and 1118, respectively in 2007. The cooperation degree was 4.77, 6.14, 5.95 and 5.64, respectively, in 2007. The cooperation rate was 95.40%, 84.18%, 96.63% and 95.66%, respectively, in 2007. The number of countries of authors contributing papers was 44, 35, 42 and 62, respectively, in 2007. CONCLUSION: The geographical distribution of WJG authors is wide for the past 2 years. WJG has made a step onto international publishing, and drawn even more attentions from gastroenterology researchers. Its authors are distributed over 74 countries in 6 global continents, and the journal has become the main intermediary for international gastroenterology researchers to demonstrate their research accomplishments. (C) 2008 WJG. All rights reserved.

Keywords: Asian, Bibliometric, Bibliometric Methods, Bibliometrics, China, Chinese, Comparison, Cooperation, Data, Database, Development, Distributed, Distribution, First, Gastroenterology, Indicators, International, ISI, Japan, Journal, Journals, MEDLINE, Methods, Papers, Publishing, Rates, Research, Rights, Science Citation Index, World Journal of Gastroenterology

? Rahimi, R., Nikfar, S., Rezaie, A. and Abdollahi, M. (2009), Efficacy of tricyclic antidepressants in irritable bowel syndrome: A meta-analysis. *World Journal of Gastroenterology*, **15** (13), 1548-1553.

Full Text: [2009\Wor J Gas15, 1548.pdf](2009/Wor%20J%20Gas15,%201548.pdf)

Abstract: We aimed to evaluate the efficacy of tricyclic antidepressants (TCAs) as a therapeutic option for irritable bowel syndrome (IBS) through meta-analysis of randomized controlled trials. For the years 1966 until September 2008, PUBMED, Scopus, Web of Science, and Cochrane Central Register of Controlled Trials were searched for double-blind, placebo-controlled trials investigating the efficacy of TCAs in the management of IBS. Seven randomized, placebo-controlled clinical trials met our criteria and were included in the meta-analysis. TCAs used in the treatment arm of these trials included amitriptyline, imipramine, desipramine, doxepin and trimipramine. The pooled relative risk for clinical improvement with TCA therapy was 1.93 (95% CI: 1.44 to 2.6, P < 0.0001). Effect size of TCAs versus placebo for mean change in abdominal pain score among the two studies was -44.15 (95% CI: -53.27 to -35.04, P < 0.0001). It is concluded that low dose TCAs exhibit clinically and statistically significant control of IBS symptoms. (C) 2009 The WIG Press and Baishideng. All rights reserved.

Keywords: Abdominal Pain, Amitriptyline, Antibiotic-Therapy, Antidepressants, Clinical Response, Clinical Trials, Cochrane, Control, Controlled Clinical-Trials, Crohns-Disease, Double-Blind, Efficacy, Irritable Bowel Syndrome, Management, Meta Analysis, Meta-Analysis, Pain, Placebo, Probiotics, Publication Bias, Pubmed, Randomized Controlled Trials, Relative Risk, Remission, Risk, Science, Scopus, Symptoms, Systematic Review, Therapy, Treatment, Tricyclic Antidepressants, Ulcerative-Colitis, Web of Science

? Hasani-Ranjbar, S., Nayebi, N., Larijani, B. and Abdollahi, M. (2009), A systematic review of the efficacy and safety of herbal medicines used in the treatment of obesity. *World Journal of Gastroenterology*, **15** (25), 3073-3085.

Full Text: [2009\Wor J Gas15, 3073.pdf](2009/Wor%20J%20Gas15,%203073.pdf)

Abstract: This review focuses on the efficacy and safety of effective herbal medicines in the management of obesity in humans and animals. PUBMED, Scopus, Google Scholar, Web of Science, and IranMedex databases were searched up to December 30, 2008. The search terms were “obesity” and (“herbal medicine” or “plant”, “plant medicinal” or “medicine traditional”) without narrowing or limiting search elements. All of the human and animal studies on the effects of herbs with the key outcome of change in anthropometric measures such as body weight and waist-hip circumference, body fat, amount of food intake, and appetite were included. In vitro studies, reviews, and letters to editors were excluded. of the publications identified in the initial database, 915 results were identified and reviewed, and a total of 77 studies were included (19 human and 58 animal studies). Studies with Cissus quadrangularis (CQ), Sambucus nigra, Asparagus officinalis, Garcinia atroviridis, ephedra and caffeine, Slimax (extract of several plants including Zingiber officinale and Bofutsushosan) showed a significant decrease in body weight. In 41 animal studies, significant weight loss or inhibition of weight gain was found. No significant adverse effects or mortality were observed except in studies with supplements containing ephedra, caffeine and Bofutsushosan. In conclusion, compounds containing ephedra, CQ, ginseng, bitter melon, and zingiber were found to be effective in the management of obesity. Attention to these natural compounds would open a new approach for novel therapeutic and more effective agents. (C) 2009 The WIG Press and Baishideng. All rights reserved.

Keywords: Adverse Effects, Animal, Attention, Body Weight, Body-Weight, Caffeine, Controlled Clinical-Trial, Databases, Double-Blind, Efficacy, Fat, Google Scholar, Herbal Medicine, High-Fat Diet, Human, Humans, In Vitro, Management, Momordica-Charantia, Mortality, Obesity, Outcome, Oxidative Stress, Plants, Publications, Pubmed, Review, Safety, Salacia-Reticulata, Science, Scopus, Systematic, Systematic Review, Treatment, Visceral Adipose-Tissue, Web of Science, Weight Gain, Weight Loss, Zingiber-Officinale, Zucker Rats

? Yang, H., Zhang, J.H. and Zhang, F. (2009), Papers featured in the *World Journal of Gastroenterology* from 2006 to 2007. *World Journal of Gastroenterology*, **15** (35), 4471-4475.

Full Text: [2009\Wor J Gas15, 4471.pdf](2009/Wor%20J%20Gas15,%204471.pdf)

Abstract: AIM: To analyze papers published in the World Journal of Gastroenterology (WJG) from 2006 to 2007. We investigated the highly cited papers for geographic distribution of the cited authors, as well as the distribution of the citing journals and year of citation.

METHODS: Papers published in WJG from 2006 to 2007 and their citations were retrieved from the Science Citation Index Expanded (SCIE). The papers and their citations were analyzed according to bibliometric methods, including the number of citations for a given paper, the distribution of the highly cited papers, the geographic distribution of the cited authors, and the years of citation.

RESULTS: Two thousand five hundred and six papers published in WJG from 2006 to 2007 were collected through SCIE, and 2335 of these were categorized as articles, reviews or proceedings. In 2006 and 2007, the average citation rate was 85.08% and 70.48%, respectively, and the average number of citations per paper was 4.33 and 2.51. Among the 2506 papers, 1963 were cited 8788 times by other articles. The mean number of citations per paper was 3.51. The papers with over three citations accounted for 54.72% of all those that were cited, and the total number of citations accounted for 85.38% of the total of 8788 citations. Thirteen papers were cited over 30 times and the highest number of citations for any one paper was 98. The cited authors came from 70 different countries or regions, with China, Japan and the United States being the most frequent. The highest average citation rate and number of citations per paper were for authors from Canada (96.30%, 6.89), Hungary (92.31%, 5.62), Australia (88.46%, 5.46), Germany (87.04%, 5.33), and Spain (87.50%, 5.11). The impact factor was 2.081 and the self-citation rate was 9.41% in 2008. The papers published in WJG in 2006-2007 were cited by 1597 journals.

CONCLUSION: The papers in WJG have a high number of citations, and have been cited in numerous journals by authors from various countries. The results imply that WJG has an influential academic profile in gastroenterology around the world. (C) 2009 The WIG Press and Baishideng. All rights reserved

Keywords: Citation Analysis, Bibliometrics, World Journal of Gastroenterology, Citation-Classics, Impact

? Buzas, G.M. (2010), Role of *Orvosi Hetilap* in the development of Hungarian gastroenterology. *World Journal of Gastroenterology*, **16** (18), 2317-2320.

Full Text: [2010\Wor J Gas16, 2317.pdf](2010/Wor%20J%20Gas16,%202317.pdf)

Abstract: AIM: To analyze the contribution of Orvosi Hetilap (Hungarian Medical Journal) to the field of gastroenterology. METHODS: All issues of the journal between 1857 and 2008 and identified original articles and reviews dealing with gastroenterology were reviewed. The rate of publications, the thematic distribution and foreign sources of knowledge were assessed. The dates that major achievements in gastroenterology were introduced in Hungary were compared to those dates in Western medicine. RESULTS: A total of 4799 original/research articles on gastroenterology were published, which represents 11.1% of the total publications. Thematic rankings showed that liver and biliary diseases represented 20.36% of the total, followed by gastric diseases (9.35%) and surgery (8.77%). A total of 268 foreign journals were reviewed: 50.9% were German, 30.4% English, 12.1% French and only 6.6% were in other languages. The major achievements of gastroenterology were introduced with varying delays compared to Western countries. CONCLUSION: Orvosi Hetilap has made a large contribution to the development of Hungarian gastroenterology. The high proportion of gastroenterology studies underlines the importance of digestive diseases in public health. (C) 2010 Baishideng. All rights reserved.

Keywords: Articles, Content Analysis, Contribution, Development, English, Gastroenterology, Health, Hepatology, Journal, Journals, Knowledge, Medicine, Orvosi Hetilap, Public Health, Publications, Rankings, Scientometrics, Surgery

? Dong, J., Zou, J.A. and Yu, X.F. (2011), Coffee drinking and pancreatic cancer risk: A meta-analysis of cohort studies. *World Journal of Gastroenterology*, **17** (9), 1204-1210.

Full Text: [2011\Wor J Gas17, 1204.pdf](2011/Wor%20J%20Gas17,%201204.pdf)

Abstract: AIM: To quantitatively assess the relationship between coffee consumption and incidence of pancreatic cancer in a meta-analysis of cohort studies. METHODS: We searched MEDLINE, EMBASE, Science Citation Index Expanded and bibliographies of retrieved articles. Studies were included if they reported relative risks (RRs) and corresponding 95% CIs of pancreatic cancer with respect to frequency of coffee intake. We performed random-effects meta-analyses and meta-regressions of study-specific incremental estimates to determine the risk of pancreatic cancer associated with a 1 cup/d increment in coffee consumption. RESULTS: Fourteen studies met the inclusion criteria, which included 671080 individuals (1496 cancer events) with an average follow-up of 14.9 years. Compared with individuals who did not drink or seldom drank coffee per day, the pooled RR of pancreatic cancer was 0.82 (95% CI: 0.69-0.95) for regular coffee drinkers, 0.86 (0.76-0.96) for low to moderate coffee drinkers, and 0.68 (0.51-0.84) for high drinkers. In subgroup analyses, we noted that, coffee drinking was associated with a reduced risk of pancreatic cancer in men, while this association was not seen in women. These associations were also similar in studies from North America, Europe, and the Asia-Pacific region. CONCLUSION: Findings from this meta-analysis suggest that there is an inverse relationship between coffee drinking and risk of pancreatic cancer. (c) 2011 Baishideng. All rights reserved.

Keywords: Acid, Alcohol, Analyses, Asia Pacific, Association, Bibliographies, Caffeine, Cancer, Cells, Citation, Coffee, Cohort, Cohort Study, Consumption, Criteria, Dose-Response Data, Estimates, Europe, Events, Follow-Up, Incidence, Inhibition, Mar, Medline, Men, Meta-Analysis, Metaanalysis, Methods, North, North America, Pancreatic Cancer, Pancreatic Neoplasm, Region, Rights, Risk, Risks, Science, Science Citation Index, Science Citation Index Expanded, Tea Consumption, Trend Estimation, Women

? Yu, L., Wang, C.Y., Xi, B., Sun, L., Wang, R.Q., Yan, Y.K. and Zhu, L.Y. (2011), GST polymorphisms are associated with hepatocellular carcinoma risk in Chinese population. *World Journal of Gastroenterology*, **17** (27), 3248-3256.

Full Text: 2011\Wor J Gas17, 3248.pdf

Abstract: AIM: To investigate the association between GSTM1 and GSTT1 polymorphisms and the risk of hepatocellular carcinoma (HCC) in Chinese population. METHODS: Literature databases including PubMed, ISI web of science and other databases were searched. Pooled odds ratio (OR) and 95% CI were calculated using random- or fixed- effects model. Subgroup analysis and sensitivity analysis were also performed. RESULTS: Nineteen studies of GSTM1 (2660 cases and 4017 controls) and 16 studies of GSTT1 (2410 cases and 3669 controls) were included. The GSTM1/GSTT1 null genotypes were associated with increased risk of HCC in Chinese population (for GSTM1, OR = 1.487, 95% CI: 1.159 to 1.908, P = 0.002; for GSTT1, OR = 1.510, 95% CI: 1.236 to 1.845, P = 0.000). No publication bias was detected. In subgroup analysis, glutathione S-transferases polymorphisms were significantly associated with HCC risk among the subjects living in high-incidence areas, but not among the subjects living in low-incidence areas. CONCLUSION: The present meta-analysis suggests that GSTM1/GSTT1 null genotypes are associated with increased risk of HCC in Chinese population. (C) 2011 Baishideng. All rights reserved.

Keywords: Aflatoxin B-1, Analysis, Bias, Cancer Incidence, Carcinoma, Databases, Genetic Polymorphisms, Glutathione-S-Transferase, GSTM1, GSTT1, Hepatitis-B Carriers, Hepatocarcinogenesis, Hepatocellular Carcinoma, ISI, Literature, Liver Cancer, M1, Meta Analysis, Meta-Analysis, Metaanalysis, Model, Null Genotypes, Polymorphism, Polymorphisms, Publication, Publication Bias, Pubmed, Ratio, Risk, Science, Sensitivity, Susceptibility, Web of Science

? Meng, W.B., Li, X., Li, Y.M., Zhou, W.C. and Zhu, X.L. (2011), Three initial diets for management of mild acute pancreatitis: A meta-analysis. *World Journal of Gastroenterology*, **17** (37), 4235-4241.

Full Text: [2011\Wor J Gas17, 4235.pdf](2011/Wor%20J%20Gas17,%204235.pdf)

Abstract: AIM: To compare non-liquid and clear-liquid diets, and to assess whether the latter is the optimal treatment for mild acute pancreatitis. METHODS: The Cochrane Library, PUBMED, EMBASE, EBM review databases, Science Citation Index Expanded, and several Chinese databases were searched up to March 2011. Randomized controlled trials (RCTs) that compared non-liquid with clear-liquid diets in patients with mild acute pancreatitis were included. A meta-analysis was performed using available evidence from RCTs. RESULTS: Three RCTs of adequate quality involving a total of 362 participants were included in the final analysis. Compared to liquid diet, non-liquid diet significantly decreased the length of hospitalization [mean difference (MD): 1.18, 95% CI: 0.82-1.55; P < 0.00001] and total length of hospitalization (MD: 1.31, 95% CI: 0.45-2.17; P = 0.003). The subgroup analysis showed solid diet was more favorable than clear liquid diet in the length of hospitalization, with a pooled MD being -1.05 (95% CI: -1.43 to -0.66; P < 0.00001). However, compared with clear liquid diet, both soft and solid diets did not show any significant differences for recurrence of pain after re-feeding, either alone [relative risk (RR): 0.95; 95% CI: 0.51-1.87; P = 0.88] and (RR: 1.22; 95% CI: 0.69-2.16; P = 0.49), respectively, or analyzed together as non-liquid diet (RR: 0.80; 95% CI: 0.47-1.36; P = 0.41). CONCLUSION: The non-liquid soft or solid diet did not increase pain recurrence after re-feeding, compared with the clear-liquid diet. The non-liquid diet reduced hospitalization. (C) 2011 Baishideng. All rights reserved.

Keywords: Acute, Acute Pancreatitis, Analysis, Citation, Clinical-Trial, Cochrane, Databases, Diet, Differences, Duct Obstruction, Embase, Guidelines, Hospitalization, Length of Stay, Management, Meal, Meta Analysis, Meta-Analysis, Nutrition, Nutritious Supplement, Pain, Patients, Quality, Randomized Controlled Trials, Rats, Recurrence, Review, Risk, Safe, Science, Science Citation Index, Secretion, Solid Diet, Treatment

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? Hsu, J.P. and Chiang, T.Y. (1991), Removal of cadmium ions in waste-water through biosorption. *World Journal of Microbiology & Biotechnology*, **7** (5), 571-572.

Full Text: [1991\Wor J Mic Bio7, 571.pdf](1991/Wor%20J%20Mic%20Bio7,%20571.pdf)

Abstract: Cadmium ions in wastewater can be removed by biosorption on to Acinetobacter calca var. antratus, isolated from a wastewater sample from a copper refinery. There are two equilibrium states: the first, which is reached quickly, is probably direct adsorption, and the second may be due to the release of ion adsorption materials by lysed cells.

Ariff, A.B., Mel, M., Hasan, M.A. and Karim, M.I.A. (1999), The kinetics and mechanism of lead(II) biosorption by powderized *Rhizopus* *oligosporus*. *World Journal of Microbiology & Biotechnology*, **15** (2), 291-298.

Full Text: [W\Wor J Mic Bio15, 291.pdf](W/Wor%20J%20Mic%20Bio15,%20291.pdf)

Abstract: The kinetics and mechanism of lead biosorption by powderized *Rhizopus* *oligosporus* were studied using shake flask experiment. The optimum biomass concentration and initial solution pH for lead sorption at initial lead concentrations ranging from 50-200 mg/l was obtained at 0.5 g/l and pH5, respectively. In term of the ratio of initial lead concentration to biomass concentration ratio, the highest lead adsorption was obtained at 750 mg/g which gave the maximum lead uptake capacity of 126 mg/g. The experimental data of lead sorption by R. oligosporus fitted well to the Langmuir sorption isotherm model, indicating that the sorption was similar to that for an ion-exchange resin. This means that the sorption is a single layer metal adsorption that occurred as a molecular surface coverage. This assumption was confirmed by the examination of lead sorption using transmission electron microscope and energy dispersive X-ray analysis, which showed that during sorption most of the lead was adsorbed on the surface of cell.

Keywords: Adsorption, Cadmium, Biomass, Arrhizus, Binding, Uranium, Metals, Cells

Aloysius, R., Karim, M.I.A. and Ariff, A.B. (1999), The mechanism of cadmium removal from aqueous solution by nonmetabolizing free and immobilized live biomass of *Rhizopus oligosporus*. *World Journal of Microbiology & Biotechnology*, **15** (5), 571-578.

Full Text: [W\Wor J Mic Bio15, 571.pdf](W/Wor%20J%20Mic%20Bio15,%20571.pdf)

Abstract: A preliminary study on the removal of cadmium by nonmetabolizing live biomass of *Rhizopus oligosporus* from aqueous solution is presented. The equilibrium of the process was in all cases well described by the Langmuir sorption isotherm, suggesting that the process was a chemical, equilibrated and saturable mechanism which reflected the predominantly site-specific mechanism on the cell surface. A curve of Scatchard transformation plots reflected the covalent nature of Cd2+ adsorption by the cells. The maximum cadmium uptake capacities were 34.25 mg/g for immobilized cells and 17.09 mg/g for free cells. Some factorial experiments in shake flasks were performed in order to investigate the effect of different initial cadmium concentrations and biomass concentrations on the equilibrium. Experimental results showed a reverse trend of the influence of the immobilized and free biomass concentration on the cadmium specific uptake capacity. The immobilized cells had a higher specific cadmium uptake capacity with increasing biomass concentrations compared to free cells. In a bioreactor, the cadmium uptake capacity of immobilized cells (qmax = 30.1-37.5 mg/g) was similar to that observed in shake flask experiments (qmax = 34.25 mg/g) whereas with free cells the bioreactor qmax of 4.8-13.0 mg/g, was much lower than in shake flasks (qmax = 17.09 mg/g), suggesting that cadmium biosorption by immobilized cells of R. oligosporus might be further improved in bigger reactors. EDAX and transmission electron microscopic experiments on the fungal biomass indicated that the presence of Cd2+ sequestrated to the cell wall was due to bioadsorption.

Keywords: Biomass, Biosorption, Cadmium, Fungi, Immobilized, *Rhizopus Oligosporus*, Biosorption, Accumulation, Uranium, Biotechnology, Sorption, Metals, Zinc, pH

? Karna, R.R., Uma, L., Subramanian, G. and Mohan, P.M. (1999), Biosorption of toxic metal ions by alkali-extracted biomass of a marine cyanobacterium, Phormidium valderianum BDU 30501. *World Journal of Microbiology & Biotechnology*, **15** (6), 729-732.

Full Text: [1999\Wor J Mic Bio15, 729.pdf](1999/Wor%20J%20Mic%20Bio15,%20729.pdf)

Abstract: Alkali-extracted biomass of Phormidium valderianum BDU 30501, a marine filamentous, non-heterocystous cyanobacterium adsorbed more than 90% of cadmium ions from solutions containing 0.1-40 mM. Cadmium binding accounted up to 18% of biomass weight (w/w). The algal biosorbent was also efficient is sequestering metal ions (Cd2+, Co2+, Cu2+, Ni2+) from a mixture. Biosorbent placed in dialysis tubing could concentrate Cd2+ (50-65%) from 1 l solution (10 and 100 ppm) at equilibrium. Biosorbent immobilized in polyvinyl foam also removed cadmium and cobalt efficiently, but required longer contact times (24 h). Most of the bound metal ions (> 80%) could be desorbed with 0.1 M HCl or EDTA, while other reagents were less efficient in the order: H2SO4 > NH4Cl > CaCl2 > Na2SO4 > KSCN > KCl > NH4OH > NaHCO3. The regenerated biosorbent retained 80% of the initial binding capacity for Cd2+ and 50% binding capacity for Co2+ up to three cycles of reuse. Infrared spectra of the biosorbent preparation suggested carboxyl groups to be the primary sites for metal binding.

Keywords: Alga, Biosorbent, Biosorbent, Biosorption, Cobalt, Metal Ions, Neurospora-Crassa, Phormidium Valderianum, Removal

Dias, M.A., Castro, H.F., Pimentel, P.F., Gomes, N.C.M., Rosa, C.A. and Linardi, V.R. (2000), Removal of heavy metals from stainless steel effluents by waste biomass from Brazilian alcoholic beverage production. *World Journal of Microbiology & Biotechnology*, **16** (1), 107-108.

Full Text: [W\Wor J Mic Bio16, 107.pdf](W/Wor%20J%20Mic%20Bio16,%20107.pdf)

Abstract: The capacity of waste biomasses from sugar-cane aguardente, a traditional Brazilian spirit, for metal biosorption was assessed. Free biomass and biomass immobilized onto chitin and Dowex (ion-exchange resin) were utilized to remove chromium, iron and nickel from both synthetic solutions and stainless steel effluents. The best performance in terms of metalsorbed was observed in with free biomass, with the following adsorption capacity: 70% chromium, 50% iron and 20% nickel at pH 4.0.

Keywords: Aguardente, Biomass, Biomass Immobilized, Biosorption, Heavy Metal

Pradhan, S. and Rai, L.C. (2000), Optimization of flow rate, initial metal ion concentration and biomass density for maximum removal of Cu2+ by immobilized *Microcystis*. *World Journal of Microbiology & Biotechnology*, **16** (6), 579-584.

Full Text: [W\Wor J Mic Bio16, 579.pdf](W/Wor%20J%20Mic%20Bio16,%20579.pdf)

Abstract: The potential of alginate-immobilized Microcystis packed in a column for maximum removal of Cu2+ at different flow rates, biomass, and initial metal ion concentration was assessed in a continuous flow system. Although Cu2+ removal did occur at all the flow rates tested, it was maximum (54%) at 0.75 ml min-1 flow rate, 30 µg ml-1 initial metal ion concentration and 0.016 g biomass. Cu2+ removal was influenced by inlet metal ion concentration and biomass density. An increase in the biomass concentration from 0.016 to 0.128 g resulted in an apparent increase in percentage removal but the Cu2+ adsorbed per unit dry wt. declined. When the flow rate (0.75 ml min-1) and biomass density (0.064 g) were kept constant and the inlet metal ion concentration was varied from 10 to 150 µg ml-1, a 68% removal of Cu2+ was obtained at 50 µg ml-1 initial concentration in a time duration of 15 min. The metal-laden columns were efficiently desorbed and regenerated following elution with double distilled water (DDW) (pH 2) (89%). This was followed by 1 mm EDTA > 1 mm NTA > 0.1 mm EDTA > 1 mm HCl > 1 mm HNO3 > 5 mm CaCl2 > DDW (pH 7.0) > 1 mm NaHCO3 > 1 mm CaCl2. of the total (2.83 mg) adsorbed Cu2+, 1.89 mg (67%) was desorbed by DDW (pH 2) within the first 20 min of elution time. Thereafter the desorption rate slowed down and only 22% (0.632 mg) desorption was obtained in the last 20 min. In contrast to water pH 2, the desorption of Cu2+ by 1 mm EDTA was very slow, the maximum being 8% after 40 min of elution.

Keywords: Biomass, Cu2+ Removal, Desorbing Agents, Flow Rate, Initial Metal Ion Concentration, Microcystis, Laboratory-Grown Microcystis, Cadmium Removal, Fungal Biomass, Marine-Algae, By-Products, Biosorption, Yeast, Copper(II), Adsorption, Recovery

Kogej, A. and Pavko, A. (2001), Comparison of *Rhizopus nigricans* in a pelleted growth form with some other types of waste microbial biomass as biosorbents for metal ions. *World Journal of Microbiology & Biotechnology*, **17** (7), 677-685.

Full Text: [W\Wor J Mic Bio17, 677.pdf](W/Wor%20J%20Mic%20Bio17,%20677.pdf)

Abstract: Biosorption of metal ions (Li+, Ag+, Pb2+, Cd2+, Ni2+, Zn2+, Cu2+, Sr2+, Fe2+, Fe3+ and Al3+) by *Rhizopus nigricans* biomass was studied. It was shown that metal uptake is a rapid and pH-dependent process, which ameliorates with increasing initial pH and metal concentrations. Different adsorption models: Langmuir, Freundlich, split-Langmuir and combined nonspecific-Langmuir adsorption isotherm were applied to correlate the equilibrium data. The maximum biosorption capacities for the individual metal ions were in the range from 160 to 460 µmol/g dry weight. Scatchard transformation of equilibrium data revealed diverse natures of biomass metal-binding sites. The binding of metals was also discussed in terms of the hard and soft acids and bases principle. The maximum biosorption capacities and the binding constant of *R. nigricans* were positively correlated with the covalent index of metal ions.

The following types of waste microbial biomass originating as by-products from industrial bioprocesses were tested for biosorption of metal ions: *Aspergillus* terreus, Saccharomyces cerevisiae, Phanerochaete chrysosporium, Micromonospora purpurea, M. inyoensis and Streptomyces clavuligerus. The determined maximum biosorption capacities were in the range from 100 to 500 µmol/g dry weight. The biosorption equilibrium was also represented with Langmuir and Freundlich sorption isotherms.

Keywords: Adsorption Isotherm, Biosorption, Covalent Index, Metal Ions, *Rhizopus nigricans*, Waste Biomass, Arrhizus Biomass, Penicillium-Chrysogenum, Biosorption, Adsorption, Binding, Mechanism, Hard

? Karunasagar, D., Arunachalam, J., Rashmi, K., Latha, J.N.L. and Mohan, P.M. (2003), Biosorption of inorganic and methyl mercury by a biosorbent from *Aspergillus niger*. *World Journal of Microbiology & Biotechnology*, **19** (3), 291-295.

Full Text: [2003\Wor J Mic Bio19, 291.pdf](2003/Wor%20J%20Mic%20Bio19,%20291.pdf)

Abstract: A biosorbent prepared by alkaline extraction of *Aspergillus niger* biomass was evaluated for its potential to remove mercury species - inorganic (Hg2+) and methyl mercury (CH3Hg+) - from aqueous solutions. Batch experiments were carried out to determine the pH and time pro. le of sorption for both species in the pH range 2 - 7. The Hg2+ exhibited more rapid sorption and higher capacity than the CH3Hg+. Further, removal of both mercury species from spiked ground water samples was efficient and not influenced by other ions. Sorption studies with esterified biosorbent indicated loss of binding of both mercury species (> 80%), which was regained when the ester groups were removed by alkaline hydrolysis, suggesting the involvement of carboxyl groups in binding. Further, no interconversion of sorbed species occurred on the biomass. The biosorbent was reusable up to six cycles without serious loss of binding capacity. Our results suggest that the biosorbent from *Aspergillus niger* can be used for removal of mercury and methyl mercury ions from polluted aqueous effluents.

Keywords: Aspergillus, Bioaccumulation, Biomass, Bioremediation, Biosorption, Mercury, Methyl Mercury, Methylmercury, Neurospora-Crassa, Removal, Toxic Metal-Ions

? Keharia, H., Patel, H. and Madamwar, D. (2004), Decolorization screening of synthetic dyes by anaerobic methanogenic sludge using a batch decolorization assay. *World Journal of Microbiology & Biotechnology*, **20** (4), 365-370.

Full Text: [2004\Wor J Mic Bio20, 365.pdf](2004/Wor%20J%20Mic%20Bio20,%20365.pdf)

Abstract: The nonspecific ability of anaerobic sludge bacteria obtained from cattle dung slurry was investigated for 17 different dyes in a batch assay system using sealed serum vials. Experiments using Reactive Violet 5 (RV 5) showed that sludge bacteria could effectively decolorize solutions having dye concentrations up to 1000 mg l-1 with a decolorization efficiency of above 75% during 48 h of incubation. Headspace gas composition of anaerobic batch systems for varying dye concentration revealed that lower concentrations of RV 5 (up to 500 mg l-1) were found to be stimulatory to the methanogenic activity of sludge bacteria. However at higher dye concentrations, the headspace gas composition was found to be similar to batch assay controls without dye, indicating that dye at higher concentrations was inhibitory to methanogenic bacteria of sludge. The optimum inoculum and incubation temperature for maximum decolorization of RV 5 was found to be 9.0 g l-1 (in terms of total solids) and 37degreesC, respectively. Of sixteen other dyes tested, nine (Reactive Black 5, Reactive Blue 31, Reactive Blue 28, Reactive Red HE8B, Reactive Yellow, Reactive Golden Yellow, Mordant Orange, Novatic Olive R S/D & Navilan Yellow GL) were decolorized with more than 88% efficiency; three (Orange II, Navy Blue HER & Novatic Blue BC S/D) were decolorized with about 92.5% efficiency, this was merely due to sorption, whereas the other dyes were decolorized due to biotransformation.

Keywords: Anaerobic Dye Decolorization, Anthraquinone Dye, Azo Dye, Azo-Dye, Bacteria, Batch Decolorization Assay, Cattle Dung, Cattle Waste, Decolorization, Degradation, Dye, Dyes, Effluents, Granular Sludge, Intestinal Bacteria, Methane-Producing Bacteria, Microbial Decolorization, Reactive Black 5, Reactive Dyes, Reduction, Sludge, Solutions, Sorption, System, Temperature, Textile Dyes

Godjevargova, T., Mihova, S. and Gabrovska, K. (2004), Fixed-bed biosorption of Cu2+ by polyacrylonitrile-immobilized dead cells of *Saccharomyces cerevisiae*. *World Journal of Microbiology & Biotechnology*, **20** (3), 273-279.

Full Text: [W\Wor J Mic Bio20, 273.pdf](W/Wor%20J%20Mic%20Bio20,%20273.pdf)

Dead cells of *Saccharomyces cerevisiae* 54 were immobilized by entrappment in polyacrylonitrile. The beads obtained were used to adsorb copper in an up-flow fixed-bed column. The effect of polymer content and cell loading were studied to optimize the porosity and the efficiency in copper removal of the biosorbent beads in a batch system. The optimal concentration of the polyacrylonitrile was assumed to be 12% (w/v) and a concentration of 0.5 g cell dry weight in 1 g polymer was most effective in adsorption of Cu2+. The adsorption capacity of this biosorbent was 27 mg Cu2+/g dry biomass at 200 mg/l initial concentration of copper ions. Adsorption of Cu2+ in a batch system was studied using different initial concentrations of the solute. The optimal conditions in the up-flow column of the following parameters were determined: flow rate, bed height, and initial concentration of Cu2+ of the solutions. Results of fixed-bed biosorption showed that breakthrough and saturation time appeared to increase with the bed height, but decrease with the flow rate and the initial concentration. The linearized form of the Thomas equation was used to describe dynamic adsorption of metal ions. As a result, the adsorption capacity of the batch system and the column system was compared. Desorption of copper ions was achieved by washing the column biomass with 0.1 M HCl at an eluent flow rate of 1 ml/min. The reusability of the immobilized biomass was tested in five consecutive adsorption–desorption cycles. The regenerated beads retained over 45% of their original adsorption capacity after five A/D cycles.

Keywords: Biosorption, Cu2+, Fixed-Bed Column, Immobilized Cells, Polyacrylonitrile

? Liu, G.F., Zhou, J.T., Wang, J., Song, Z.Y. and Qv, Y.Y. (2006), Bacterial decolorization of azo dyes by *Rhodopseudomonas palustris*. *World Journal of Microbiology & Biotechnology*, **22** (10), 1069-1074.

Full Text: [2006\Wor J Mic Bio22, 1069.pdf](2006/Wor%20J%20Mic%20Bio22,%201069.pdf)

Abstract: The ability of Rhodopseudomonas palustris AS1.2352 possessing azoreductase activity to decolorize azo dyes was investigated. It was demonstrated that anaerobic conditions were necessary for bacterial decolorization, and the optimal pH and temperature were pH 8 and 30-35°C, respectively. Decolorization of dyes with different molecular structures was performed to compare their degradability. The strain could decolorize azo dye up to 1250 mg 1-1, and the correlation between the specific decolorization rate and dye concentration could be described by Michaelis-Menten kinetics. Long-term repeated operations showed that the strain was stable and efficient during five runs. Cell extracts from the strain demonstrated oxygen-insensitive azoreductase activity in vitro.

Keywords: Azo Dye, Azoreductase, Decolorization, Rhodopseudomonas Palustris, Waste-Water, Aerobic Azoreductase, Molecular-Cloning, Genome Sequence, Purification

? Zhou, M., Liu, Y.G., Zeng, G.M., Li, X., Xu, W.H. and Fan, T. (2007), Kinetic and equilibrium studies of Cr(VI) biosorption by dead *Bacillus licheniformis* biomass. *World Journal of Microbiology & Biotechnology*, **23** (1), 43-48.

Full Text: [2007\Wor J Mic Bio23, 43.pdf](2007/Wor%20J%20Mic%20Bio23,%2043.pdf)

Abstract: Many studies have been carried out on the biosorption capacity of different kinds of biomass. However, reports on the kinetic and equilibrium study of the biosorption process are limited. In our experiments, the removal of Cr(VI) from aqueous solution was investigated in a batch system by sorption on the dead cells of Bacillus licheniformis isolated from metal-polluted soils. Equilibrium and kinetic experiments were performed at various initial metal concentrations, pH, contact time, and temperatures. The biomass exhibited the highest Cr(VI) uptake capacity at 50°C, pH 2.5 and with the initial Cr(VI) concentration of 300 mg/g. The Langmuir and Freundlich models were considered to identify the isotherm that could better describe the equilibrium adsorption of Cr(VI) onto biomass. The Langmuir model fitted our experimental data better than the Freundlich model. The suitability of the pseudo first-order and pseudo second-order kinetic models for the sorption of Cr(VI) onto Bacillus licheniformis was also discussed. It is better to apply the pseudo second-kinetic model to describe the sorption system.

Keywords: Biosorption, Bacillus Licheniformis, Cr(VI), Equilibrium Isotherms, Kinetic Modeling, Dried Activated-Sludge, Aqueous-Solution, Chromium(VI), Sorption, Cadmium, Cations, Yeasts, Algae, Peat

? Sadhasivam, S., Savitha, S. and Swaminathan, K. (2007), Feasibility of using *Trichoderma harzianum* biomass for the removal of erioglaucine from aqueous solution. *World Journal of Microbiology & Biotechnology*, **23** (8), 1075-1081.

Full Text: [2007\Wor J Mic Bio23, 1075.pdf](2007/Wor%20J%20Mic%20Bio23,%201075.pdf)

Abstract: The test fungus Trichoderma harzianum was isolated from the Western Ghats area of Tamilnadu, India. The study involves the feasibility of using T.harzianum to remove erioglaucine from an aqueous solution in batch mode. The batch mode experimental parameters such as effect of agitation time and initial dye concentration, adsorbent mass and pH were determined. The results revealed that, the fungal biomass at 1.5 g/50 ml adsorbent mass removed 75.67-88.05% of dye (10-50 mg/l) in 105 min at pH 4.0. The adsorption equilibrium data followed both Langmuir and Freundlich isotherms. From the Langmuir isotherm, the adsorbent had adsorption capacity (Q(0)) of 3.09 mg/g. Pseudo first and second order rate kinetic equations were applied to the experimental adsorption data. The results indicate that the adsorbent system followed second order rate kinetics.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption Equilibrium, Adsorption Equilibrium Data, Adsorption Isotherm, Adsorption Kinetics, Agitation, Aqueous Solution, Batch, Batch Mode, Biomass, Capacity, Concentration, Dye, Dye Biosorption, Dye Removal, Effluents, Equations, Equilibrium, Equilibrium Data, Erioglaucine, Experimental, Freundlich, Freundlich Isotherms, Fungal, Fungal Biomass, Fungus, India, Isotherm, Isotherms, Kinetic, Kinetic Equations, Kinetics, Langmuir, Langmuir And Freundlich Isotherms, Langmuir Isotherm, Langmuir-Isotherm, Lead(II), Mass, Microbial Decolorization, Order, Parameters, pH, Rate, Rate Kinetics, Recovery, Removal, Second Order, Solid-Waste, Sorption, T. Harzianum, Test, Textile-Dye, Time, Trichoderma Harzianum, Water

? Chojnacka, K. (2007), Using biosorption to enrich the biomass of *Chlorella vulgaris* with microelements to be used as mineral feed supplement. *World Journal of Microbiology & Biotechnology*, **23** (8), 1139-1147.

Full Text: [2007\Wor J Mic Bio23, 1139.pdf](2007/Wor%20J%20Mic%20Bio23,%201139.pdf)

Abstract: The paper discusses biosorption of Cr(III), Cu(II), Mn(II), Zn(II) and Co(II) to the biomass of Chlorella vulgaris, to produce a biologically bound, concentrated form of microelements. The kinetics of biosorption was described with a pseudo-second order equation and equilibrium with the Langmuir isotherm. The mechanism of biosorption was identified as cation-exchange with alkaline metals. Cation-exchange capacity was evaluated as 4.07 meq g-1. The effect of operation conditions, pH and temperature, on biosorption performance was investigated and the best operation conditions for biosorption were selected (pH 5, temperature 25°C). The maximum sorption capacity of microelements was determined in single-metal system at pH 5 and 25°C: Zn(II) 3.30 meq g-1, Cu(II) 1.77 meq g-1, Co(II) 1.75 meq g-1, Cr(III) 1.74 meq g-1, Mn(II) 0.764 meq g-1. Biosorption experiments were also carried out in multi-metal system. The biomass of C. vulgaris enriched with microelements via the process of biosorption in both single- and multi-metal system was discussed in terms of preparation of feed supplement for laying hens and piglets. The experiments showed that 1 kg of conventional feed for laying hens can be supplemented with 0.20 g of the biomass enriched with microelements and for piglets with 0.15 g of the preparation.

Keywords: Algae, Biological Feed Supplement, Biomass, Biosorption, Capacity, Cation Exchange, Cation-Exchange, Chlorella, Chlorella Vulgaris, Co(II), Conventional, Cr(III), Cu(II), Culture, Equilibrium, Experiments, Feed, Health Food, Isotherm, Kinetics, Langmuir, Langmuir Isotherm, Langmuir-Isotherm, Maximum Sorption, Maximum Sorption Capacity, Mechanism, Metal-Ions, Metals, Microalgae, Microelements, Mineral, Mn(II), Multi-Metal, Multimetal System, Nickel(II), Operation, Order, Paper, Parameters, Performance, pH, Preparation, Process, Pseudo Second Order, Pseudo-Second Order, Pseudo-Second-Order, Removal, Single-Metal System, Sorption, Sorption Capacity, Temperature, Zn(II)

? Li, X.F., Wei, W.Z., Zeng, X.D., Zeng, J.X., Yin, J. and Wu, L. (2007), Kinetic and equilibrium studies of copper biosorption onto *Pseudomonas aeruginosa* base using direct determination of copper by a voltammetric method. *World Journal of Microbiology & Biotechnology*, **23** (10), 1465-1471.

Full Text: [2007\Wor J Mic Bio23, 1465.pdf](2007/Wor%20J%20Mic%20Bio23,%201465.pdf)

Abstract: This paper provided information on the use of linear sweep anodic stripping voltammetry for evaluating the process of copper biosorption onto Pseudomonas aeruginosa. This technique was suited to determine the concentration of free copper ion on site on the mercaptoethane sulfonate modified gold electrode surface without any pretreatment. It was in favor of the study of kinetic process as the fast changing kinetic data characteristic just after the beginning of biosorption could be accurately depicted. Based on the electrochemical results, the kinetics and equilibrium of biosorption were systematically examined. The pseudo-second-order kinetic model was used to correlate the kinetic experimental data and the kinetic parameters were evaluated. The Langmuir and Freundlich models were applied to describe the biosorption equilibrium. It was found that the Langmuir isotherm fitted the experimental data better than the Freundlich isotherm. Maximum adsorption capacity of copper ion onto Pseudomonas aeruginosa was 0.9355 μmol mg-1 (about 59.4417 mg g-1).

Keywords: Adsorption, Adsorption Capacity, Anodic Stripping Voltammetry, Aqueous-Solution, Base, Biosorption, Capacity, Concentration, Copper, Copper Biosorption, Copper Ion, Cu(II), Determination, Electrochemical, Electrode, Equilibrium, Equilibrium Studies, Experimental, Experimental Data, Freundlich, Freundlich Isotherm, Gold, Information, Ion, Ions, Isotherm, Kinetic, Kinetic Model, Kinetic Parameters, Kinetics, Kinetics And Equilibrium, Langmuir, Langmuir Isotherm, Langmuir-Isotherm, Linear, Linear Sweep Anodic Stripping Voltammetry, Mercaptoethane Sulfonate, Metals, Method, Model, Models, Modified, Paper, Parameters, Pretreatment, Process, Pseudo Second Order, Pseudo Second Order Kinetic, Pseudo-Second-Order, Pseudo-Second-Order Kinetic Model, Pseudomonas, Pseudomonas Aeruginosa, Sorption, Stripping Voltammetry, Surface, Voltammetry

? Liu, T., Li, H.D., Li, Z., Xiao, X., Chen, L.L. and Deng, L. (2007), Removal of hexavalent chromium by fungal biomass of *Mucor racemosus*: Influencing factors and removal mechanism. *World Journal of Microbiology & Biotechnology*, **23** (12), 1685-1693.

Full Text: [2007\Wor J Mic Bio23, 1685.pdf](2007/Wor%20J%20Mic%20Bio23,%201685.pdf)

Abstract: This study reported the hexavalent chromium removal by untreated Mucor racemosus biomass and the possible mechanism of Cr(VI) removal to the biomass. The optimum pH, biomass dose, initial Cr(VI) concentration and contact time were investigated thoroughly to optimize the removal condition. The metal removal by the biomass was strongly affected by pH and the optimum pH ranged from 0.5 to 1.0. The residual total Cr was determined. It was found that dichromate reduction occurred at a low very low pH value. At biomass dose 6 g/l, almost all the Cr(VI) ions were removed in the optimum condition. Higher removal percentage was observed at lower initial concentrations of Cr(VI) ions, while the removal capacity of the biomass linearly depended on the initial Cr(VI) concentration. More than half of Cr(VI) ions were diminished within 1 h of contact and removal process reached a relative equilibrium in approximately 8 h. Almost all of the Cr(VI) ions were removed in 24 h when initial concentrations were below 100 mg/l. The equilibrium data were fitted in to the Langmuir and the Freundlich isotherm models and the correlated coefficients were gained from the models. A Fourier transform infrared spectra was employed to elucidate clearly the possible biosorption mechanism as well.

Keywords: Biosorption, Reduction, Cr(VI), Isotherm Models, Mucor Racemosus, Heavy-Metal Removal, Aqueous-Solutions, Biosorption, Reduction, Trivalent, Sorption, Rouxii, Ion

? Sathishkumar, M., Binupriya, A.R., Swaminathan, K., Choi, J.G. and Yun, S.E. (2008), Arsenite sorption in liquid-phase by *Aspergillus fumigatus*: adsorption rates and isotherm studies. *World Journal of Microbiology & Biotechnology*, **24** (9), 1813-1822.

Full Text: [2008\Wor J Mic Bio24, 1813.pdf](2008/Wor%20J%20Mic%20Bio24,%201813.pdf)

Abstract: The live and pretreated biomass of Aspergillus fumigatus was used for the biosorption of As(III) from aqueous solution. Three parameters that affect the As(III) adsorption, namely agitation time, concentration of As(III), and pH have been investigated. In order to develop an effective and accurate design model for removal of As(III), adsorption kinetics and equilibrium data are essential basic requirements. Lagergren first-order and second-order were used to fit the experimental data. The studies on optimization of agitation time, adsorbent dosage, and pH showed that the FeCl3 treated biomass had the maximum capacity to adsorb As(III) and live biomass was found to be minimum compared to all pretreated. The Langmuir, Freundlich, and Temkin adsorption models were used for the mathematical description of the biosorption equilibrium. The maximum adsorption capacity of 0.538 mg/g was observed in FeCl3 treated biomass using Langmuir isotherm. Batch mode experiments proved to be efficient. Desorption studies were also carried out with dilute sodium hydroxide to recover both the adsorbent and adsorbate.

Keywords: Adsorbent, Adsorption, Adsorption Capacity, Adsorption Kinetics, Agitation, Aqueous Solution, Aqueous-Solutions, As(III), As(III), Aspergillus Fumigatus, Biomass, Biosorption, Capacity, Concentration, Desorption, Drinking-Water, Equilibrium, Experimental, Experiments, First Order, Freundlich, Hydroxide, Isotherm, Isotherms, Kinetics, Kinetics, Langmuir, Langmuir Isotherm, Mode, Model, Models, Mycelial Biomass, Optimization, pH, Pretreatment, Rates, Red Mud, Removal, Second Order, Second-Order, Sodium, Solution, Sorption

? Mao, J., Won, S.W. and Yun, Y.S. (2009), Biosorption of reactive and basic dyes using fermentation waste *Corynebacterium glutamicum*: The effects of pH and salt concentration and characterization of the binding sites. *World Journal of Microbiology & Biotechnology*, **25** (7), 1259-1266.

Full Text: [2009\Wor J Mic Bio25, 1259.pdf](2009/Wor%20J%20Mic%20Bio25,%201259.pdf)

Abstract: A low cost biosorbent, *Corynebacterium glutamicum*, was studied for the sorption of Reactive Red 4 (RR 4) and Methylene Blue (MB). The equilibrium isotherm data were well described by the Langmuir model. pH edge experiments showed that pH of the solution was an important controlling parameter in the sorption process. In the case of RR 4, with increases in the pH from 2 to 10, the uptake decreased from 52 to 1 mg/g; conversely, the uptake of MB increased and the maximum MB uptake was obtained at pH a parts per thousand yen 9. An increase in the salt concentration strongly influenced the uptake of MB, but had no effect on that of RR 4. In order to identify the binding sites for the dye molecules, the biosorbent was potentiometrically titrated, the results of which showed the presents of four major functional group types on the biomass surface, which were confirmed by FTIR analysis. It was found that positively charged amine groups (Biomass-NH3+) were the likely binding sites for anionic RR 4, and negatively charged carboxyl (Biomass-COO-) and phosphate groups (Biomass-HPO4-) played a role in the electrostatic attraction of cationic MB.

Keywords: Adsorption, Basic Dyes, Binding Sites, Biomass, Biosorbent, Biosorption, Cell-Walls, *Corynebacterium Glutamicum*, Decolorization, Dye, Dyes, Effluent, Equilibrium, Equilibrium Isotherm, FTIR, Functional-Groups, Groups, Isotherm, Langmuir, Langmuir Model, Metal-Ions, Methylene Blue, Methylene-Blue, Model, pH, Phosphate, Reactive Red 4, Removal, Sorption, Waste, Wheat-Straw

? Khambhaty, Y., Mody, K., Basha, S. and Jha, B. (2009), Biosorption of Cr(VI) onto marine *Aspergillus niger*: Experimental studies and pseudo-second order kinetics. *World Journal of Microbiology & Biotechnology*, **25** (8), 1413-1421.

Full Text: [2009\Wor J Mic Bio25, 1413.pdf](2009/Wor%20J%20Mic%20Bio25,%201413.pdf)

Abstract: The removal of hexavalent chromium from aqueous solution was studied in batch experiments using dead biomass of three different species of marine Aspergillus after alkali treatment. All the cultures exhibited potential to remove Cr(VI), out of which, Aspergillus niger was found to be the most promising one. This culture was further studied employing variation in pH, temperature, metal ion concentration and biomass concentration with a view to understand the effect of these parameters on biosorption of Cr(VI). Higher biosorption percentage was evidenced at lower initial concentration of Cr(VI) ion, while the sorption capacity of the biomass increased with rising concentration of ions. Biomass as low as 0.8 g l-1 could biosorb 95% Cr(VI) ions within 2,880 min from an aqueous solution of 400 mg l(-1) Cr(VI) concentration. Optimum pH and temperature for Cr(VI) biosorption were 2.0 and 50A°C, respectively. Kinetic studies based on pseudo second order models like Sobkowsk and Czerwinski, Ritchie, Blanchard and Ho and Mckay rate expressions have also been carried out. The nature of the possible cell-metal ion interactions was evaluated by FTIR, SEM and EDAX analysis.

Keywords: Adsorption, Analysis, Aqueous Solution, Aqueous-Solutions, Aspergillus Niger, Batch, Batch Experiments, Biomass, Biosorption, Capacity, Chromium, Concentration, Cr(VI), Culture, Dead Fungal Biomass, EDAX, Experimental, Experiments, FTIR, Heavy-Metals, Hexavalent Chromium, Hexavalent Chromium, Ions, Kinetic, Kinetic Studies, Kinetics, Marine Fungi, Metal, Metal-Ions, Models, pH, Potential, Pseudo Second Order, Pseudo Second Order Kinetics, Pseudo-Second Order, Pseudo-Second Order Kinetics, Pseudo-Second-Order, Removal, *Rhizopus-arrhizus*, Second Order, Second-Order, SEM, Solution, Sorption, Sorption Capacity, Species, Temperature, Treatment, Water

? Ting, A.S.Y. and Choong, C.C. (2009), Bioaccumulation and biosorption efficacy of Trichoderma isolate SP2F1 in removing copper (Cu(II)) from aqueous solutions. *World Journal of Microbiology & Biotechnology*, **25** (8), 1431-1437.

Full Text: [2009\Wor J Mic Bio25, 1431.pdf](2009/Wor%20J%20Mic%20Bio25,%201431.pdf)

Abstract: In our study, we isolated the isolate Trichoderma SP2F1 from sediment samples from the Penchala River, heavily contaminated with effluents from nearby industrial areas. Qualitative and quantitative screening using plate and broth assay, respectively, supplemented with various concentrations of Cu(II) showed the isolate was able to tolerate 6 mM CuSO4, although growth was also detected in broths with 10 mM CuSO4. Trichoderma spp. was able to remove Cu(II) in aqueous solutions in both viable and non-viable cell forms. Bioaccumulation capacity of viable SP2F1 cells removed 19.60 mg g-1 of Cu(II) after 168 h incubation, while the maximum Cu(II) biosorption capacity for non-viable SP2F1 cells was 28.75 mg g-1 of Cu(II). Results here showed that Trichoderma spp isolate SP2F1 has good potential for application in Cu(II) removal, can be used to treat sewage waste by applying either in viable or non-viable cell forms.

Keywords: Adsorption, Application, Aqueous Solutions, Bioaccumulation, Biomass, Bioremediation, Biosorption, Capacity, Copper, Copper Tolerance, Cu(II), Cu(II) Biosorption, Cu(II) Removal, Efficacy, Effluents, Equilibrium, Forms, Growth, Heavy Metal, Heavy-Metals, Ions, Lead(II), Potential, Pseudomonas-Putida, Removal, Screening, Sediment, Sediment Samples, Sewage, Solutions, Sorption, Strains, System, *Trichoderma* spp, Waste

? Wang, B.E. and Guo, X. (2011), Reuse of waste beer yeast sludge for biosorptive decolorization of reactive blue 49 from aqueous solution. *World Journal of Microbiology & Biotechnology*, **27** (6), 1297-1302.

Full Text: [2011\Wor J Mic Bio27, 1297.pdf](2011/Wor%20J%20Mic%20Bio27,%201297.pdf)

Abstract: Reactive blue 49 was removed from aqueous solution by biosorption using powder waste sludge composed of *Saccharomyces cerevisiae* from the beer-brewing industry. The effect of initial pH, temperature and the biosorption thermodynamics, equilibrium, kinetics was investigated in this study. It was found that the biosorption capacity was at maximum at initial pH 3, that the effect of temperature on biosorption of reactive blue 49 was only slight in relation to the large biosorption capacity (25AºC, 361 mg g-1) according as the biosorption capacity decreased only 43 mg g-1 at the temperature increased from 25 to 50AºC. The biosorption was spontaneous, exothermic in nature and the dye molecules movements decreased slightly in random at the solid/liquid interface during the biosorption of dye on biosorbents. The biosorption equilibrium data could be described by Freundich isotherm model. The biosorption rates were found to be consistent with a pseudo-second-order kinetics model. The functional group interaction analysis between waste beer yeast sludge and reactive blue 49 by the aid of Fourier transform infrared (abbr. FTIR) spectroscopy indicated that amino components involved in protein participated in the biosorption process, which may be achieved by the mutual electrostatic adsorption process between the positively charged amino groups in waste beer yeast sludge with negatively charged sulfonic groups in reactive blue 49.

Keywords: Adsorption, Aqueous Solution, Behavior, Biomass, Biosorption, Biosorption Isotherm, Biosorption Kinetics, Biosorption Thermodynamics, Corynebacterium-Glutamicum, Dye, Effluent, Equilibrium, FTIR, Ions, Isotherm, Kinetics, Performance, pH, Reactive Dye, Removal, *Saccharomyces cerevisiae*, *Spirogyra-rhizopus*, Thermodynamics, Waste, Waste Beer Yeast Sludge

# Title: World Journal of Surgery

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Trinca, G.W. (1992), Road trauma prevention: Perspectives. *World Journal of Surgery*, **16** (3), 370-373.

Full Text: [1992\Wor J Sur16, 370.pdf](1992/Wor%20J%20Sur16,%20370.pdf)

Abstract: Road trauma is a major public health problem in all motorized societies. Doctors who treat casualities must commit themselves not only to providing optimum care but to becoming equally involved in the epidemiological and sociological aspects of road trauma prevention. The prevention of trauma requires a threefold approach: prevent the crash, prevent injury in the crash, and prevent injury aggravation after the crash. Strategies and program options to implement them have been formulated to reduce traffic injury. These strategies are exposure control, crash prevention, injury control, behavior modification, and post-crash trauma management. The combined experience of war injuries and road trauma has lead to major advances in investigation technology and management procedures and far less costly efforts directed at road trauma prevention. The balance between prevention on the one hand and investigation and procedure on the other needs to be addressed. Productive research adequately funded is essential if prevention initiatives are to succeed in reducing the incidence of highway death and injury.

Keywords: Injury

Izutani, R., Katoh, M., Asano, S., Ohyanagi, H. and Hirose, K. (1996), Enhanced expression of manganese superoxide-dismutase messenger-RNA and increased tnf-α messenger-RNA expression by gastric-mucosa in gastric-cancer. *World Journal of Surgery*, **20** (2), 228-233.

Full Text: [W\Wor J Sur20, 228.pdf](W/Wor%20J%20Sur20,%20228.pdf)

Abstract: Manganese superoxide dismutase (Mn-SOD), a mitochondrial enzyme, is a cytokine-regulated acute-phase protein that protects cells from free radicals. The current investigations examined the in vivo regulation of the expression of Mn-SOD mRNA and tumor necrosis factor α (TNF α) mRNA in gastric carcinoma tissue. The expression of these transcripts in breast carcinoma tissue also was examined because breast cancer is a much more TNF-sensitive tumor than gastric cancer. TNF α mRNA was markedly increased in gastric carcinoma tissue (p < 0.005). There were significantly higher levels of Mn-SOD mRNA in gastric carcinoma tissue than in noncancerous tissue (p < 0.0001). The level of Mn-SOD mRNA in gastric carcinoma tissue was higher than that in breast carcinoma tissue (p < 0.005). Up-regulation of Mn-SOD mRNA in gastric carcinoma tissue most likely serves as a protective mechanism against superoxide radicals and TNF cytotoxicity.

Keywords: Tumor-Necrosis-Factor, Human-Fibroblasts, Cytotoxicity, Induction, Cells, Interleukin-1, Lymphotoxin, Carcinoma, Genes, RNA

? Paladugu, R., Schein, M., Gardezi, S. and Wise, L. (2002), One hundred citation classics in general surgical journals. *World Journal of Surgery*, **26** (9), 1099-1105.

Full Text: [2002\Wor J Sur26, 1099.pdf](2002/Wor%20J%20Sur26,%201099.pdf)

Abstract: The number of times an article is cited in scientific journals reflects its impact on a specific biomedical field or specialty and reflects the impact of the authors’ creativity. Our objective was to identify, and analyze the characteristics of the 100 most frequently cited articles published in journals dedicated to general surgery and its close subspecialties. Using the database (1945-1995) of the Science Citation Index of the Institute for Scientific Information. 1500 articles cited 100 times and more were identified and the top 100 articles selected for further analysis. The 100 articles were published between 1931 and 1990. with more than two-thirds of them published after 1960. The mean number of citations per article was 405, (range 278-1013). Altogether, 84 of the articles originated from North America (USA 78, Canada 6) and the UK (12). New York State led the list of U.S. states with 14, and Harvard and Columbia University led the list of institutions with 6 articles each. The 100 articles were published in 10 surgical journals led by the Annals of Surgery (n = 40), followed by Surgery (n = 15), Archives of Surgery (n = 12), Surgery, Gynecology and Obstetrics (n = 11), and British Journal of Surgery (n = 10). A total of 86 of the articles reported clinical experiences, 6 were clinical review articles, and 14 dealt with basic science. Eighteen articles reported a new surgical technique and six a prosthetic device. Gastrointestinal surgery and trauma and critical care led the list of the surgical fields, each with 25 articles, followed by vascular surgery (n = 15). Thirty-four persons authored two or more of the top-cited articles. This list of the top-cited papers identifies seminal contributions and their originators, facilitating the understanding and discourse of modern surgical history and offering surgeons hints about what makes a contribution a ‘top-cited classic,’ To produce such a ‘classic’ the surgeon and his or her group must come up with a clinical or nonclinical innovation, observation, or discovery that has a long-standing effect on the way we practice-be it operative or nonoperative. Based on our findings, to be well cited such a contribution should be published in the English language in a high-impact journal. Moreover, it is more likely to resonant loudly if it originates from a North American or British ‘ivory tower.’.

Keywords: Impact

? Jiménez, R.E., Gutiérrez, A.R. and Benitez, I.M. (2003), Methodologic requirements for assessing surgical procedures in current medical literature. *World Journal of Surgery*, **27** (2), 229-233.

Full Text: [2003\Wor J Sur27, 229.pdf](2003/Wor%20J%20Sur27,%20229.pdf)

Abstract: Even though, in theory, a new surgical technique should traverse all the stages established for drugs before being introduced into medical practice, it is suspected that many surgical procedures are utilized without having rigorously evaluated their efficacy and safety. With the aim of identifying the methodologic aspects currently employed for assessing new surgical procedures, a descriptive bibliographic study was carried out. Altogether, 75 journal articles published from 1996 to 1998 were reviewed. The papers must have come from studies carried out with the expressed objective of evaluating a surgical procedure and were selected through MEDLINE or directly from six prestigious medical journals (three specifically surgical and three general). Of the reviewed articles, 47% were retrospective studies, and the rest were prospective studies. More than 40% of the retrospective studies omitted some basic methodologic features, namely a description of the patients’ source or a definition of the inclusion criteria. Among the 41 prospective articles, only 35 used a control group and 15 did not employ random allocation. Other basic issues, such as the sample size or inclusion of prognostic factors in the analysis, were present in fewer than 50% of the articles. It seems there is consensus about admitting that rigorous assessment of new surgical treatments should be an unavoidable condition before introducing such treatment into practice. The facts demonstrate that this principle is not being followed.

Keywords: Allocation, Analysis, Assessing, Assessment, Consensus, Control, Criteria, Drugs, Efficacy, General, Journal, Journal Articles, Journals, Literature, Medical, Medical Journals, Medical Literature, Medical Practice, MEDLINE, Papers, Patients, Practice, Procedure, Procedures, Prognostic Factors, Prospective, Prospective Studies, Retrospective Studies, Safety, Sample Size, Size, Source, Surgical Procedure, Surgical Procedures, Surgical Technique, Theory, Treatment

? Koo, M., Kim, J.H., Kim, J.S., Lee, J.E., Nam, S.J. and Yang, J.H. (2011), Cases and literature review of breast sparganosis. *World Journal of Surgery*, **35** (3), 573-579.

Full Text: [2011\Wor J Sur35, 573.pdf](2011/Wor%20J%20Sur35,%20573.pdf)

Abstract: Sparganosis is a seldom encountered disease of the breast. Based on the results of previous studies and our own experience, we investigated the clinical characteristics of breast sparganosis. Four patients who were treated for breast sparganosis at Samsung Medical Center were included in the study, and additional data were retrieved from the Index Medicus and the Science Citation Index (SCI). The Korean Medical (KM) database and the Korean Association of Medical Journal Editors (KAMJE) database were searched to include information from Korean journals that is not included in international citation indexes. Among 35 patients, 8 (32%) had a record of oral ingestion of an intermediary host. All patients presented with a breast mass, with migration in 6 cases (25%) and pain or an itching sensation in 6 cases (25%). Elongated tubular structures were found in the subcutaneous layer in 22 cases (88%) during radiologic exam. All patients underwent complete surgical excision. Twenty-seven of 29 (93.1%) patients’ spargana was separated and confirmed grossly. Histologically, granulomatous inflammation was the most common feature. A single worm was extracted in 16 cases (76.2%) and 5 cases (23.8%) had multiple worms. Sparganosis tends to present as a suspicious mass in the subcutaneous layer of the breast. Complete surgical excision is the treatment of choice, with careful postoperative surveillance.

Keywords: Characteristics, Choice, Citation, Citation Indexes, Clinical, Data, Database, Disease, Editors, Experience, Feature, Host, Inflammation, Information, International, Itching, Journal, Journals, Literature, Mar, Migration, Oral, Pain, Patients, Postoperative, Record, SCI, Science, Science Citation Index, Surveillance, Treatment

# Title: WMSCI 2008: 12th World Multi-Conference on Systemics, Cybernetics and Informatics, Vol IV, Proceedings

Full Journal Title: WMSCI 2008: 12th World Multi-Conference on Systemics, Cybernetics and Informatics, Vol IV, Proceedings

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Darvish, H. (2008), The impact of the latent semantic analysis on science and technology: A bibliometric analysis. *WMSCI 2008: 12th World Multi-Conference on Systemics, Cybernetics and Informatics, Vol IV, Proceedings*, 224-228.

Abstract: Latent Semantic Analysis (LSA) has been in use in several different fields of science. Several modeling techniques including Boolean, settheoretic, vector space, and probabilistic models studied. In this paper, we first describe the concept of “LSA” and then present the preliminary results of an exploratory study. We carried out a small-scale bibliometric analysis to find out the impact of LSA on various scientific and technological fields. We downloaded bibliographic records with “Latent Semantic Analysis” in their titles from Thomson’s Science Citation Index Expanded and used Bibexcel and Pajek to perform several bibliometric and network analyses such as co-citation, co-authorship and co-word. It appears that LSA has had an impact on a wide variety of scientific disciplines from discourse analysis to cognitive science to machine learning.

Keywords: Analyses, Analysis, Bibliometric, Bibliometric Analysis, Citation, Co-Authorship, Co-Citation, Coauthorship, Cocitation, Cognitive, Disciplines, Discourse, Discourse Analysis, First, Impact, Latent Semantic Analysis, Latent Semantic Indexing, Learning, Machine, Machine Learning, Modeling, Models, Network, Preliminary Results, Records, Science, Science Citation Index, Social Network, Space, Techniques, Technology

# Title: World Neurosurgery

Full Journal Title: World Neurosurgery

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language: English

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lee, H.C., Chuang, H.C., Cho, D.Y., Cheng, K.F., Lin, P.H. and Chen, C.C. (2010), Applying cerebral hypothermia and brain oxygen monitoring in treating severe traumatic brain injury. *World Neurosurgery*, **74** (6), 654-660.

Full Text: [2010\Wor Neu74, 654.pdf](2010/Wor%20Neu74,%20654.pdf)

Abstract: BACKGROUND: Severe traumatic brain injury (TBI) was to be one of the major health problems encountered in modern medicine and had an incalculable socioeconomic impact. The initial cerebral damage after acute brain injury is often exacerbated by postischemic hyperthermia and worsens the outcome. Hypothermia is one of the current therapies designed to combat this deleterious effect. The brain tissue oxygen (P(ti)O(2))-guided cerebral perfusion pressure (CPP) management was successfully reduced because of cerebral hypoxic episodes following TBI.

MATERIALS AND METHODS: Forty-five patients with severe TBI whose Glasgow Coma Scale (GCS) score ranged between 4 and 8 during September 2006 and August 2007 were enrolled in China Medical University Hospital, Taichung, Taiwan. One patient with a GCS score of 3 was excluded for poor outcome. These patients were randomized into three groups. Group A (16 patients) was intracranial pressure/cerebral perfusion pressure (ICP/CPP)-guided management only, Group B (15 patients) was ICP/CPP guided with mild hypothermia, and Group C (14 patients) was combined mild hypothermia and P(ti)O(2) guided with CPP management on patients with severe TBI. All patients were treated with ICP/CPP management (ICP <20 mm Hg, CPP >60 mm Hg). However, the group with P(ti)O(2) monitoring was required to raise the P(ti)O(2) above 20 mm Hg. Length of intensive care unit stay, ICP, P(ti)O(2), Glasgow Outcome Scale (GOS) score, mortality, and complications were analyzed.

RESULTS: The ICP values progressively increased in the first 3 days but showed smaller changes in hypothermia groups (Groups B and C) and were significantly lower than those of the normothermia group (Group A) at the same time point. We also found out that the averaged ICP were significantly related to days and the daily variations [measured as (daily observation - daily group mean)(2)] of ICP were shown to the significantly different among three treatment groups after the third posttraumatic day. The values of P(ti)O(2) in Group C tended to rise when the ICP decreased were also observed. A favorable outcome is divided by the result of GOS scores. The percentage of favorable neurologic outcome was 50% in the normothermia group, 60% in the hypothermia-only group, and 71.4% in the P(ti)O(2) group, with statistical significance. The percentage of mortality was 12.5% in the normothermia group, 6.7% in the hypothermia-only group, and 8.5% in the P(ti)O(2) group, without statistical significance in three groups. Complications included pulmonary infections, peptic ulcer, and leukocytopenia (43.8% in the normothermia group, 55.6% in the hypothermia-only group, and 50% in the P(ti)O(2) group).

CONCLUSIONS: Therapeutic mild hypothermia combined with P(ti)O(2)-guided CPP/ICP management allows reducing elevated ICP before 24 hours after injury, and daily variations of ICP were shown to be significantly different among the three treatment groups after the third posttraumatic day. It means that the hypothermia groups may reduce the ICP earlier and inhibit the elicitation of acute inflammation after cerebral contusion. Our data also provided evidence that early treatment that lowers P(ti)O(2) may improve the outcome and seems the best medical treatment method in these three groups. We concluded that therapeutic mild hypothermia combined with P(ti)O(2)-guided CPP/ICP management provides beneficial effects when treating TBI, and a multicenter randomized trial needs to be undertaken.

Keywords: Brain Tissue Oxygen, Cerebral Perfusion Pressure, Glasgow Outcome Scale, Hypothermia, Intracranial Pressure, Traumatic Brain Injury, Treatment Process Capability, Severe Head-Injury, Promising Treatment Modality, Therapeutic Hypothermia, Perfusion-Pressure, Tissue Oxygen, Intracranial-Pressure, Metabolism, Opportunities, Temperature, Management

? Jones, T., Huggett, S. and Kamalski, J. (2011), Finding a way through the scientific literature: Indexes and measures. *World Neurosurgery*, **76** (1-2), 36-38.

Full Text: [2011\Wor Neu76, 36.pdf](2011/Wor%20Neu76,%2036.pdf)

Keywords: Bibliometrics, Impact, Impact Factor, Indexing, Journals, Literature, Prestige, Usage

# Title: World Patent Information

Full Journal Title: [World Patent Information](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5784&_auth=y&_acct=C000011279&_version=1&_urlVersion=0&_userid=1134284&md5=4459bcc7032b68d6cfb847fc61f186a6)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1064-8429

Issues/Year:

Journal Country/Territory:

Language: English

Publisher: Primedia Business Magazines & Media Inc.

Publisher Address:

Subject Categories:

: Impact Factor

Carpenter, M.P. and Narin, F. (1983), Validation study: Patent citations as indicators of science and foreign dependence. *World Patent Information*, **5** (3), 180-185.

Full Text: [W\Wor Pat Inf5, 180.pdf](W/Wor%20Pat%20Inf5,%20180.pdf)

Abstract: The purpose of this study was to test whether the distribution of citations from issued U.S. patents could be used to measure the science dependence and the foreign dependence of patented technologies. The citations considered were front page references from U.S. patents citing to U.S. and foreign patents, to research papers and to other publications. Rankings based on the number of citations per patent to the scientific literature were compared to peer rankings of the science dependence of the technologies. Rankings based on the number of citations to foreign origin material, including foreign origin U.S. patents, foreign patents and foreign priority statements, were compared to peer rankings of the foreign dependence of the technological areas.

For the analysis a total of 24 technologies were chosen. Twelve of these were judged in advance to be science dependent and twelve were judged in advance to be foreign dependent. A peer group of 19 high level R&D managers was asked to rank all 24 technologies in terms of both their science and their foreign dependence. The bibliometric rankings of the technologies, based on their citations, were then compared with the peer rankings of the technologies.

Overall, a high degree of agreement was found between the experts’ opinion as to the science and foreign dependence of the areas and the corresponding bibliometric rankings. For example, the eight technologies judged most science dependent by experts averaged 0.92 cites per patent to scientific journal papers, while the eight technologies judged least science dependent had only 0.05 references per patent to journal papers. Similarly, large and statistically significant differences were found in the number of cites to foreign origin material for the eight technologies judged most foreign dependent by the experts when compared with the eight technologies judged least foreign dependent by the experts. These findings provide support for the hypothesis that patent citation data can be used in technological indicators development, and in technological policy analysis. They imply that citation-based location and analysis of science and foreign dependent technologies is a valid research tool when applied to the U.S. patent system.

Garg, K.C., Karki, M.M.S. and Krishnan Marg, K.S. (1988), Bibliometric study of world literature on patents. *World Patent Information*, **10** (4), 237-242.

Full Text: [W\Wor Pat Inf10, 237.pdf](W/Wor%20Pat%20Inf10,%20237.pdf)

Abstract: Some bibiliometric characteristics of the literature on patents have been studied. The period considered is 1900 to 1980. Data have been analysed into the types of publications, i.e.books, conference proceedings, reports, journals, etc. and grouped under four broad categories. Language-wise distribution of the publication data has been done to find out the pattern of distribution in different languages. Journal-wise distribution of articles has been studied to find out the pattern of authorship as well as the most prolific authors. The growth of the literature on patents was found exponential in nature. It follows Bradford’s law, with the `core’ comprising nine journals containing 33% of the literature.

Lamus, J.F. (1997), Evaluation of the rank command as a tool for the bibliometric analysis. *World Patent Information*, **19** (1), 83-84.

Full Text: [W\Wor Pat Inf19, 83.pdf](W/Wor%20Pat%20Inf19,%2083.pdf)

Abstract: The paper describes the techniques used in the evaluation of the rank command available in the Dialog System, as a tool for bibliometric analysis to be applied to the patent documents in area of horizontal drilling, of the World Patent Index database. This command can show statistical trends from the search results, which were analyzed during 1980-1994. Fields were selected according to the type of information required, countries, companies and researchers with the major R&D efforts in the horizontal drilling technology, and the most cited patent was analyzed. The analysis of selected fields indicates the possibility of combining and ordering alphabetically and decreasingly the partial results of the rank command. Likewise, it is possible to obtain the desired records in a continuous manner and to work at the same time with two of the options mentioned. With regard to some of the limitations, this command can be only applied to certain fields of the database and not to two fields simultaneously.

Karki, M.M.S. (1997), Patent citation analysis: A policy analysis tool. *World Patent Information*, **19** (4), 269-272.

Full Text: [W\Wor Pat Inf19, 269.pdf](W/Wor%20Pat%20Inf19,%20269.pdf)

Abstract: Patent citation analysis is a recent development which uses bibliometric techniques to analyse the wealth of patent citation information. This paper describes the various facets of patent citations and patent citation studies, and their important applications. Construction of technology indicators being an important use of patent citations, various patent citation based technological indicators and their applications are also described.

Gupta, V.K. and Pangannaya, N.B. (2000), Carbon nanotubes: Bibliometric analysis of patents. *World Patent Information*, **22** (3), 185-189.

Full Text: [W\Wor Pat Inf22, 185.pdf](W/Wor%20Pat%20Inf22,%20185.pdf)

Abstract: Patents are rich sources of technical and commercial information. Bibliometric analysis of patents provides information on the nature and growth of the inventive activity, its international comparison, the active players from industry, academia and government, co-inventorship, linkages with science, and technological trends. The present paper highlights the results of such a study in the area of carbon nanotubes. The analysis indicates that first patents were filed immediately after the discovery of the carbon nanotubes. The researchers at Nippon Electric Company (NEC) have been most active in the field. There is considerable thrust on patenting in the area of synthesis or processes for production of the carbon nanotubes. The technological trends indicate the possibilities of applications in the areas of nano test tubes, nanoelectronics, and polymer and composite materials.

? Gress, B. (2010), Properties of the USPTO patent citation network: 1963–2002. *World Patent Information*, **32** (1), 3-21.

Full Text: [2010\Wor Pat Inf32, 3.pdf](2010/Wor%20Pat%20Inf32,%203.pdf)

Abstract: The network of patent citations is a collection of clumps of citations between closely related patents, with the largest clumps being defined by patent technology categories. The exchange of citations between these groups evolves over time and reveals technological trends. By using USPTO data and considering the evolution of backwards- and forwards-, and intra- and inter-citations, conclusions about the generality, originality, and productivity of patents and technology categories can be drawn.

Keywords: USPTO, Patent Citation Network, Technology Categories, Network Analysis, Technology Productivity, Patent Originality, Citation Trade, Disequilibrium Citation Rates, Citation Conservation

? Gress, B. (2010), Literature listing. *World Patent Information*, **32** (1), 81-87.

Full Text: [2010\Wor Pat Inf32, 81.pdf](2010/Wor%20Pat%20Inf32,%2081.pdf)

# Title: The World of Physical Chemistry

Oxford University Press, Oxford

Laidler, K.J. (1993), *The World of Physical Chemistry*, Oxford University Press, Oxford, New York and Toronto.

# Title: World Today

Full Journal Title: World Today

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language: English

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Granville, B. (2000), Freedom’s charm. *World Today*, **56** (3), 23-24.

Abstract: Development as freedom - these three words - the title of Nobel prize winner Amartya Sen’s book - kept coming back to me as I was listening to the opening remarks of the second international meeting of economists on globalisation and development problems in Cuba at the end of January. There were four opening addresses, and to my surprise, all were about six year old Elian Gonzalez and the ‘imperialist’ ultra-right country - the United States - which prevented his return home. There was a mixture of propaganda and real concern for the boy’s well-being.

# Title: World Wastes

Full Journal Title: World Wastes

ISO Abbreviated Title:

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Issues/Year:

Journal Country/Territory:

Language: English

Publisher: Primedia Business Magazines & Media Inc.

Publisher Address:

Subject Categories:

: Impact Factor

? Shanoff, B. (1994), Regulating MSW incinerator ash. *World Wastes*, **37** (7), 106.

? Murphy, M.E. (1995), MSW incinerator operators adapt to new REGS. *World Wastes*, **38** (4), 6.

# Title: 3rd World Water Congress of the International-Water-Association, APR 07-12, 2002

Full Journal Title: 3rd World Water Congress of the International-Water-Association, APR 07-12, 2002

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1606-9749

Issues/Year:

Journal Country/Territory:

Language:

Publisher: I W A Publishing, London

Publisher Address:

Subject Categories:

: Impact Factor

Reddad, Z., Gérente, C., Andrès, Y. and Le Cloirec, P. (2002), Comparison of the fixation of several metal ions onto a low-cost biopolymer. *3rd World Water Congress of the International-Water-Association, APR 07-12, 2002*, **2** (5-6), 217-224.

Full Text: [W\Wat Sci TecWat Sup2, 217.pdf](W/Wat%20Sci%20TecWat%20Sup2,%20217.pdf)

Abstract: In the present work, sugar beet pulp, a common waste from the sugar refining industry, was studied in the removal of metal ions from aqueous solutions. The ability of this cheap biopolymer to sorb several metals namely Pb2+, Cu2+, Zn2+, Cd2+ and Ni2+ in aqueous solutions was investigated. The metal fixation capacities of the sorbent were determined according to operating conditions and the fixation mechanisms were identified. The biopolymer has shown high elimination rates and interesting metal fixation capacities. A pseudo-second-order kinetic model was tested to investigate the adsorption mechanisms. The kinetic parameters of the model were calculated and discussed. For 8×10-1 M initial metal concentration, the initial sorption rates (v(0)) ranged from 0.063 mmol.g-1.min-1 1 for Pb2+ to 0.275 mmol.g-1. Min-1 for Ni2+ ions, with the order: Ni2+ > Cd2+ > Zn2+ > Cu2+ > Pb2+. The equilibrium data fitted well with the Langmuir model and showed the following affinity order of the material: Pb2+ > Cu2+ > Zn2+ > Cd2+ > Ni2+. Then, the kinetic and equilibrium parameters calculated q(m) and v(0) were tentatively correlated to the properties of the metals.

Finally, equilibrium experiments in multimetallic systems were performed to study the competition of the fixation of Pb2+, Zn2+ and Ni2+ cations. In all cases, the metal fixation onto the biopolymer was found to be favourable in multicomponent systems. Based on these results, it is demonstrated that this biosorbent represents a low-cost solution for the treatment of metal-polluted wastewaters.

Keywords: Adsorption, Biopolymer, Ion-Exchange, Metal Ions, Aqueous-Solution, Heavy-Metals, Sorption, Removal, Cations

# Title: Worldviews on Evidence-Based Nursing

Full Journal Title: [Worldviews on Evidence-Based Nursing](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1741-6787/issues)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Scott, S.D., Profetto-McGrath, J., Estabrooks, C.A., Winther, C., Wallin, L. and Lavis, J.N. (2010), Mapping the knowledge Utilization field in nursing from 1945 to 2004: A bibliometric analysis. *Worldviews on Evidence-Based Nursing*, **7** (4), 226-237.

Full Text: [2010\Wor Evi-Bas Nur7, 226.pdf](2010/Wor%20Evi-Bas%20Nur7,%20226.pdf)

Abstract: Background: The field of knowledge utilization has been hampered by several issues including: the synonymous use of multiple terms with little attempt at definition precision; an overexamination of knowledge utilization as product, rather than a process; and a lack of progress to cross disciplinary boundaries to advance knowledge development. In order to address the challenges and current knowledge gaps in the knowledge utilization field in nursing, a comprehensive picture of the current state of the field is required. Methods: Bibliometric analyses were used to map knowledge utilization literature in nursing as an international field of study, and to identify the structure of its scientific community. Findings: Analyses of bibliographic data for 433 articles from the period 1945-2004 demonstrated three trends: (1) there has been significant recent growth and interest in this field, (2) the structure of the scientific knowledge utilization community is evolving, and (3) the Web of Science does not index the majority of journals where this literature is published. Conclusions: In order to enhance the accessibility and profile of this literature, and nursing’s scientific literature at large, we encourage the International Academy of Nursing Editors to work collaboratively to increase the number of journals indexed in the Web of Science.

Keywords: Bibliometric, Bibliometric Analysis, Bibliometrics, Citations, Cocitation, Collaboration, Data, Development, Field, Growth, Impact, Journals, Knowledge, Knowledge Utilization, Literature, Mapping, Nursing, Nursing Research, Process, Science, Science Policy, Translation, Trends, Web of Science

# Title: Wuhan University Journal of Natural Sciences

Full Journal Title: [Wuhan University Journal of Natural Sciences](http://e32.cnki.net/KNS50/Navi/item.aspx?NaviID=1&BaseID=WHDZ&NaviLink=Wuhan%20University%20Journal%20of%20Natural%20Sciences)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hu, M. (2004), A statistical analysis on papers and authors in *Wuhan University Journal of Natural Sciences* in 2003. *Wuhan University Journal of Natural Sciences*, **9** (6), 983-986.

Full Text: [2004\Wuh Uni J Nat Sci9, 983.pdf](2004/Wuh%20Uni%20J%20Nat%20Sci9,%20983.pdf)

Abstract: The author of this article counts and analyzes the papers and authors printed in 2003 Wuhan University journal of Natural Sciences by means of bibliometric statistical methods, of which the characteristics of papers and authors are expounded. The result shows that the ratio of reprinting of this journal has been increased and the areas where the authors come from and their organization scattered in the whole world are widened as well, which implies a better known fame of the journal.

# Title: X-Ray Spectrometry

Full Journal Title: X-Ray Spectrometry

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Injuk, J. and Van Grieken, R. (2003), Literature trends in x-ray emission spectrometry in the period 1990-2000: A review. *X-Ray Spectrometry*, **32** (1), 35-39.

Abstract: A quantitative overview is given of the role that x-ray emission analysis methods, in their various forms, play in the literature for the period from January 1990 to the end of December 2000. The major sources of information were computerized searches through Chemical Abstracts and Web of Science and, specifically for 1998, a manual search through Analytical Abstracts. Areas that are covered in this review pertain to the recent trends in x-ray emission spectrometry in general and in some specific techniques such as x-ray fluorescence analysis, synchrotron radiation-induced and particle-induced x-ray emission, total-reflection and micro-x-ray fluorescence analysis. A brief outline of recent developments in the specific fields is given, with emphasis on the various excitation and detection modes, on different application areas and on relative contributions of different countries and languages to the x-ray emission spectrometry literature. It appears that environmental monitoring and research continue to be particularly important publication fields for x-ray spectrometry. Copyright (C) 2003 John Wiley Sons, Ltd.

Keywords: Analysis, Chemical Abstracts, Copyright, Environmental, Information, Literature, Monitoring, Overview, Publication, Quantitative, Research, Review, Science, Spectra, Trends, Tunnel Junction Detectors, Web of Science

# Title: XXX Congress of the International Union of Leather Technologists & Chemists Societies, Proceedings

Full Journal Title: XXX Congress of the International Union of Leather Technologists & Chemists Societies, Proceedings

ISO Abbreviated Title:

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ISSN:

IDS Number: BMT67

Issues/Year:

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Language:

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Publisher Address:

Subject Categories:

: Impact Factor

? Tang, K.Y., Zheng, X.J., Tu, L.M. and Shelly, D.C. (2009), Study on the adsorption kinetics of water vapor on collagen fibers. *XXX Congress of the International Union of Leather Technologists & Chemists Societies, Proceedings*, 56-60.

Abstract: The adsorption behaviors and adsorption kinetics of water on collagen fibers was investigated. It is shown that water uptaking on collagen fiber is rapid in the first 6 hours, followed by a slower rate until equilibrium is reached. The water adsorption on collagen fibers at equilibrium (water adsorption capacity, Me) increases with increasing the relative humidity of the environment. The more the relative humidity of the environment is, the longer the time is needed to reach equilibrium. Both the Lagergren first-order adsorption kinetics model and the second-order adsorption kinetics model were employed to analyze the experimental data, while the second-order adsorption kinetics model presented a better correlation to the experimental data, suggesting that there are chemical bonds in the adsorption. Intra-particle diffusion plots showed multi-linearity with three distinct stages: initial curved portion, followed by intermediate linear portion and then, a plateau. It was proposed that the water adsorption process in the intermediate linear part should be controlled by intra-particle diffusion. The linear plots, not passing through the origin, indicated that the intra-particle diffusion was not the only one factor controlling the water adsorption rate.

Keywords: Adsorption, Adsorption Capacity, Adsorption Kinetics, Adsorption Rate, Capacity, Chemical, Collagen, Collagen Fiber, Collagen Fibers, Correlation, Data, Diffusion, Environment, Equilibrium, Experimental, Fibers, First, First Order, Hide, Intra Particle Diffusion, Intra-Particle Diffusion, Intraparticle Diffusion, Kinetics, Kinetics Model, Leather, Model, Origin, Second Order, Second-Order, Water, Water Adsorption, Water Adsorption Capacity

? Huang, X., Ren, T., Chen, J., Liao, X.P. and Shi, B. (2009), Preparation of un-tanned pig skin waste-loaded metal ions adsorbents and their adsorption behaviors to fluoride, Phosphate and arsenate in aqueous solutions. *XXX Congress of the International Union of Leather Technologists & Chemists Societies, Proceedings*, 243-253.

Abstract: Leather making process inevitably produce skin wastes due to the operation of splitting, trimming and shaving. The production of un-tanned skin waste is increasing since the wet-white technology is widely adopted. The un-tanned skin wastes are characterized by a high content of collagen protein. Considering the high activity of collagen protein towards many metal ions, it is feasible to obtain low-cost adsorbents by the reaction of un-tanned skin waste with different metal ions such as Fe(III) and Zr(IV), which can be applied for the effective removal of fluoride, phosphate and arsenate from aqueous solutions. In this study, two kinds of adsorbents, un-tanned pigskin waste-loaded Fe(III) or Zr(IV) (denoted as: UPW-Fe or UPW-Zr), were prepared and batch adsorption experiments were carried out to evaluate their adsorption behaviors, including the effect of pH, adsorption isothermal, as well as the adsorption kinetics. As a result, both UPW-Fe and UPW-Zr exhibited excellent adsorption capacities and fast adsorption rate to fluoride, phosphate and arsenate in aqueous solutions. These investigations provide a promising alternative utilization of an-tanned skin waste.

Keywords: Activated Carbons, Adsorbents, Adsorption, Adsorption Capacities, Adsorption Isothermal, Adsorption Kinetics, Adsorption Rate, Alternative, Aqueous Solutions, Arsenate, Batch, Batch Adsorption, Chrome Shavings, Collagen, Cr(III), Experiments, Fe(III), Fluoride, Investigations, Ions, Isothermal, Kinetics, Leather Waste, Low Cost, Low Cost Adsorbents, Low-Cost Adsorbents, Metal, Metal Ions, Operation, Oxide, pH, Phosphate, Protein, Removal, Skin, Solutions, Technology, Un-Tanned Skin Waste, Utilization, Waste, Zr(IV)

# Title: Yakhteh

Full Journal Title: Yakhteh

ISO Abbreviated Title: Yakhteh

JCR Abbreviated Title: Yakhteh

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Alijani, R. and Karami, N. (2010), A review of scientific publications by Iranian researchers on stem cells in the ISI database. *Yakhteh*, **11** (4), 456-458.

Full Text: [2010\Yakhteh11, 456.pdf](2010/Yakhteh11,%20456.pdf)

Abstract: The purpose of this survey is to identify the number of scientific papers written about stem cells by Iranian researchers. In this regard, to use the results for future stem cell research by Iranian scientists. In this survey we have used scientometric method as a single quantitative method. The statistical population of this article includes all articles published by Iranian researchers from the earliest records until the end of 2007 as cited in the ISI database, which is the web based version of science citation index (SCI). The results show that Ghavamzadeh with 19 articles is the most productive Iranian researcher in the ISI database. The majority of published articles have been written by more than one author. A review of the findings show that Iranian researchers have been successful in stem cell production.

Keywords: Articles, Citation, Database, ISI, ISI Database, Publications, Research, Researchers, Review, Sci, Science, Stem Cells

# Title: Yearbook of Medical Informatics

Full Journal Title: Yearbook of Medical Informatics

ISO Abbreviated Title:

JCR Abbreviated Title: Yearb Med Inform

ISSN: 0943-4747

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Bodenreider, O. (2008), Biomedical ontologies in action: Role in knowledge management, data integration and decision support. *Yearbook of Medical Informatics*, 67-79.

Abstract: OBJECTIVES: To provide typical examples of biomedical ontologies in action, emphasizing the role played by biomedical ontologies in knowledge management, data integration and decision support. METHODS: Biomedical ontologies selected for their practical impact are examined from a functional perspective. Examples of applications are taken from operational systems and the biomedical literature, with a bias towards recent journal articles. RESULTS: The ontologies under investigation in this survey include SNOMED CT, the Logical Observation Identifiers, Names, and Codes (LOINC), the Foundational Model of Anatomy, the Gene Ontology, RxNorm, the National Cancer Institute Thesaurus, the International Classification of Diseases, the Medical Subject Headings (MeSH) and the Unified Medical Language System (UMLS). The roles played by biomedical ontologies are classified into three major categories: knowledge management (indexing and retrieval of data and information, access to information, mapping among ontologies); data integration, exchange and semantic interoperability; and decision support and reasoning (data selection and aggregation, decision support, natural language processing applications, knowledge discovery). CONCLUSIONS: Ontologies play an important role in biomedical research through a variety of applications. While ontologies are used primarily as a source of vocabulary for standardization and integration purposes, many applications also use them as a source of computable knowledge. Barriers to the use of ontologies in biomedical applications are discussed.

Keywords: Access, Access to Information, Aggregation, Bias, Biomedical, Biomedical Research, CT, Data, Decision, Decision Support, Discovery, Impact, Indexing, Information, Integration, International Classification of Diseases, Investigation, Journal, Journal Articles, Knowledge, Knowledge Management, Literature, Management, Mapping, Methods, Objectives, Reasoning, Research, Role, Source, Standardization, Support, Survey, Systems

# Title: Yearbook of Physical Anthropology

Full Journal Title: Yearbook of Physical Anthropology

ISO Abbreviated Title:

JCR Abbreviated Title: Zavod Lab Sssr

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Schneider, W.H. (1995), Blood group research in Great Britain, France, and the United States between the world wars. *Yearbook of Physical Anthropology*, **38** (0), 87-114.

# Title: Zavodskaya Laboratoriya

Full Journal Title: Zavodskaya Laboratoriya

ISO Abbreviated Title:

JCR Abbreviated Title: Zavod Lab Sssr

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Shlyakhov, A.F., Sokolov, A.V. and Zhukhovitskii, A.A. (1975), Determination of adsorption-isotherm from binary-solutions by method of developing chromatography without liquid-eluent. *Zavodskaya Laboratoriya*, **41** (1), 25-27.

? Alksnis, O.N. and Yanovskii, S.M. (1975), Simplified gas-chromatographic method for adsorption-isotherm measurements without application of a detectors. *Zavodskaya Laboratoriya*, **41** (8), 976-978.

# Title: Zdravniski Vestnik-Slovenian Medical Journal

Full Journal Title: Zdravniski Vestnik-Slovenian Medical Journal

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Miholic, P. and Juznic, P. (2009), Social medicine in the process of scientific communication: The overview of the publications of the authors in the field of Social Medicine in Science Citation Index and Social Sciences Citation Index. *Zdravniski Vestnik-Slovenian Medical Journal*, **78** (4), 181-185.

Abstract: Background The scientific publishing means publishing the results of scientific research in the scientific journals. Scientific publishing is not possible without scientific communication and sharing information among scientists. Keeping up with scientific achievements and spreading them is the core of all research work. The recognition is a factor of the highest importance for the scientific publications, where in the process of scientific communications the results of the research work are published. The purpose of the research work in social medicine is to achieve the awareness, which is necessary for efficient and successful health care. Methods On the basis of the science citations database (Web of Science) the publications of researchers, who work in the field of public health, were checked. It was found out that more than a third of researchers had publications published in Science Citation Index (SCI) as well as in Social Sciences Citation Index (SSCI). Results The overlapping of analysed articled in both indexed databases were 26%. Researching health care is a medical field with a strong social character; such research deals with medicine, health care and health is a social phenomenon. Conclusions Social medicine is one area of medical science, however, the research in this area should be valued and estimated differently as other areas of research, like clinical medicine. It would be sensible that the ARRS expert system and others, who use qualitative as well as quantitative, bibliometric methods for judging the quality and recognition of research work, take this into account in the future.

Keywords: Citation, Citation Index, Citations, Communication, Core, Database, Databases, Field, Future, Health, Health Care, Journal Impact, Journals, Medical, Medicine, Methods, Overlapping, Public Health, Publications, Publishing, Quality, Research, Research Work, Researchers, SCI, Science, Science Citation Index, Scientific Communication, Scientific Journals, Scientific Publication, Scientific Publications, Scientific Research, Slovenia, SSCI, System, Web of Science

# Title: Zdravstveni Vestnik

Full Journal Title: Zdravstveni Vestnik

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Grubic, Z. (1992), Biomedical-research in Slovenia and its significance - Representation of our most cited articles in 1979 through 1988. *Zdravstveni Vestnik*, **61** (2), 83-88.

Full Text: 1992\Zdr Ves61, 83.pdf

Abstract: Starting-points: Paper has two parts. In the first part author argues with some, rather questionable, but still quite often heard opinions about the role of the biomedical sciences in Slovenia. Author is advocating the opinion that Slovenian biomedical science must be oriented towards international scientific community, becoming in this way a more significant part of it. Methods: In the second part of the paper, four out of five most cited Slovenian biomedical publications published in the period from 1979-1988 are introduced. Abstracts of the papers are followed by the comments of their authors. They are explaining motives for the work that resulted in the publications discussed here. Authors are also estimating the significance of these publications.

Keywords: Articles, Author, Authors, Biomedical, Biomedical Publications, Biomedical Research, Cited Articles, Methods, Papers, Publications, Science, Sciences, Slovenia

# Title: Zdravstveno Varstvo

Full Journal Title: Zdravstveno Varstvo

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Miholic, P. (2010), Bibliometric analysis of the journal “*Zdravstveno Varstvo*”: 2003-2009. *Zdravstveno Varstvo*, **49** (3), 109-116.

Full Text: 2010\Zdr Var49, 109.pdf

Abstract: Background: Bibliometrics is a set of methods for systematical collection of texts and published data for further study and analysis. Bibliometric analysis of a scientific journal is to a great extent also analysis of the research field covered by that journal. We did bibliometric analysis of the journal Zdravstveno varstvo to assess its visibility and the role it plays in the scientific exchange of information. Methods: We reviewed 28 issues of the journal, published during a period of seven years. The contributions were studied by the following sections: editorials, original and review scientific articles, letters to the editor, book reviews and obituaries. Quanitative bibliometric analysis of Zdravstveno varstvo for the period 2003-2009 provided an objective view of the contents and development of the journal over the period studied. Results: As shown by the results obtained, the quality of publications has markedly improved over the past seven years. Multi-authored articles prevail. Journal articles are the most frequently cited source, followed by monographs (mostly in English); half of the sources quoted are less than five years old. Conclusions: The results suggest that both health care practice and research constitute a medical field that is very closely related to social sciences; it approaches the fields of medicine, health care and health as social phenomenons. The inclusion of Zdravstveno varstvo in the Expanded Social Science Index (SSCI) in 2009 is not a coincidence but a result of the committment of editors to reach the goal they had set in the past.

Keywords: Analysis, Bibliometric, Bibliometric Analysis, Bibliometrics, Book Reviews, Data, Development, English, Exchange, Field, Journal, Medical, Medicine, Periodicals, Public Health, Public-Health, Publications, Quality of Publications, Research, Review, Science, Sciences, Scientific Journal

# Title: Zeitschrift fur die Alttestamentliche Wissenschaft

Full Journal Title: Zeitschrift fur die Alttestamentliche Wissenschaft

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Yitzhaki, M. (1987), The relationship between biblical studies and ancient near-east studies, a bibliometric approach. *Zeitschrift fur die Alttestamentliche Wissenschaft*, **99** (2), 232-248.

Full Text: Zei Alt Wis99, 232.pdf

Keywords: Bibliometric

# Title: Zeitschrift für Angewandte Mathematik und Physik

Full Journal Title: [Zeitschrift für Angewandte Mathematik und Physik](http://www3.interscience.wiley.com/cgi-bin/jhome/5007542?CRETRY=1&SRETRY=0) (ZAMM - Journal of Applied Mathematics and Mechanics)

ISO Abbreviated Title: Angew. Math. Phys.

JCR Abbreviated Title: Z Angew Math Phys

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Hauser, C. (1971), Adsorption kinetics of catalytic centers on TiO2. *Zeitschrift für Angewandte Mathematik und Physik*, **22** (4), 783-??.

# Title: Zeitschrift für Anorganische und Allgemeine Chemie

Full Journal Title: [Zeitschrift für Anorganische und Allgemeine Chemie](http://www3.interscience.wiley.com/cgi-bin/jhome/109741324), [Zeitschrift für Anorganische und Allgemeine Chemie](http://www3.interscience.wiley.com/cgi-bin/jhome/109741324)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0044-2313

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Tammann, G. and Köster, W. (1922), The velocity of the effect of oxygen, sulphuric acid and halogens on metals. *Zeitschrift für Anorganische und Allgemeine Chemie*, **123** (3), 196-224.

Full Text: [-1959\Zei Ano All Che123, 196.pdf](-1959/Zei%20Ano%20All%20Che123,%20196.pdf)

? Tammann, G. and Köster, W. (1922), Metallographische Mitteilungen aus dem Institut für physikalische Chemie der Universität Göttingen. CV. Die Geschwindigkeit der Einwirkung von Sauerstoff, Schwefelwasserstoff und Halogenen auf Metalle. *Zeitschrift für Anorganische und Allgemeine Chemie*, **123** (3), 196-224.

? Lorenz, R. and Landé, A. (1925), Adsorption und Ubereinstimmende Zustiinde. *Zeitschrift für Anorganische und Allgemeine Chemie*, **125** (1), 47-58.

Full Text: [-1959\Zei Ano All Che125, 47.pdf](-1959/Zei%20Ano%20All%20Che125,%2047.pdf)

? Magnus, A. and Both, H. (1926), Über Adsorption Nr. 7. Über die Adsorption von Kohlendioxyd-Wasserstoffgemischen an Holzkohle. *Zeitschrift für Anorganische und Allgemeine Chemie*, **150** (1), 311-325.

Full Text: [-1959\Zei Ano All Che150, 311.pdf](-1959/Zei%20Ano%20All%20Che150,%20311.pdf)

# Title: Zeitschrift fuer Anorganische und Angewandte Psychologie

P.S.: Zeitschrift means Journal

Full Journal Title: Zeitschrift fuer Anorganische und Angewandte Psychologie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Rothmund, V. and Kornfeld, G. (1918), Der Basenaustausch im Permutit. I. *Zeitschrift fuer Anorganische und Angewandte Psychologie*, **103**, 129-163.

Full Text: [-1959\Zei fue Ano Ang Psy103, 129.pdf](-1959/Zei%20fue%20Ano%20Ang%20Psy103,%20129.pdf)

Rothmund, V. and Kornfeld, G. (1919), Der Basenaustausch im Permutit. II. *Zeitschrift fuer Anorganische und Angewandte Psychologie*, **108**, 215-225.

Full Text: [-1959\Zei fue Ano Ang Psy108, 215.pdf](-1959/Zei%20fue%20Ano%20Ang%20Psy108,%20215.pdf)

# Title: Zeitschrift fur Anorganische Chemie

Full Journal Title: Zeitschrift fur Anorganische Chemie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? van Remmelen, J.M. (1900), The adsorption 5 Essay - The adsorption of HCl and KCl of watery solutions through colloidal tin oxide. *Zeitschrift fur Anorganische Chemie*, **23** (2), 111-125.

Keywords: Adsorption, HCl

# Title: Zeitschrift für Bibliothekswesen und Bibliographie

Full Journal Title: Zeitschrift für Bibliothekswesen und Bibliographie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gorraiz, J. and Schlogl, C. (2003), Bibliometric analysis of Subito, a document delivery system - Correlation of journal demand and citation frequency. *Zeitschrift für Bibliothekswesen und Bibliographie*, **50** (3), 131-140.

Full Text: Zei Bib Bib50, 131.pdf

Abstract: This article presents a bibliometric analysis of the German document delivery service Subito. Following a brief introduction and a description of the service, the article focusses on the results of the analysis. The first study question was whether a considerable portion of the articles ordered via Subito could be provided by a relatively small number of periodicals. The second question dealt with a pattern of concentration in connection with the market share of the periodical publishers. Thirdly, the distribution of the top 100 periodicals from which the most articles are ordered was analysed by subject. And, finally, the article shows the relationship between the frequency of journals order via Subito to the citation frequency reported by the Journal Citation Reports (JCR). In conclusion, the authors note the limitations of the study and summarize the main findings.

Keywords: Bibliometric Analysis

? Schlogl, C. and Stock, W.G. (2006), German journals of library and information science - Readers, quotes and publications in scientometric analysis. *Zeitschrift fur Bibliothekswesen und Bibliographie*, **53** (5), 244-255.

Full Text: Zei Bib Bib53, 244.pdf

Abstract: German-language journals in the field of library and information science (LIS; German abbrev.: BID) are described using scientometric indicators concerning reader perception (reading frequency, application of the contents of the articles, publication frequency, publication preference), journal references (impact factor, half-life of references, references per article, journal self-reference rate), and editorial characteristics (structure of authorship and readership, article selection, rejection rate, revision rate). Special focus is given to the comparison of the outcomes of the three studies. As the results show practitioners play a dominant role in German-language LIS journals both as authors and as readers. Practitioners publish for practitioners, usually they do not reference much to the existing literature but are more interested in current topics. The rejection rate is generally low, article selection on the basis of peer review is applied only in a few journals. Several LIS journals (in particular those edited by professional associations) resemble information islands. An LIS journal meeting international quality standards and covering all aspects of LIS does not exist in German-speaking countries so far.

Keywords: Analysis, Authors, Authorship, Countries, Field, Impact, Impact Factor, Impact-Factor, Indicators, Information Science, Journal, Journals, Library And Information Science, LIS, Literature, Peer Review, Peer-Review, Professional, Publication, Publications, Quality, Reference, Science, Scientometric, Scientometric Analysis, Scientometric Indicators, Standards, Topics

# Title: Zeitschrift für Chemie

From Volume 1 (1906) to Volume 12 (1913), this journal was published as Zeitschrift für Chemie und Industrie der Kolloide.

From Volume 13 (1913) to Volume 110/1 (1945- and from Volume 110/2 (1948) to Volume 179 (1961), this journal was published as Kolloid Zeitschrift.

From Volume 180 (1962) to Volume 251 (1973), this journal was published as Kolloid-Zeitschrift & Zeitschrift für Polymere.

Full Journal Title: Zeitschrift für Chemie

ISO Abbreviated Title:

JCR Abbreviated Title: Z Chem

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Moller, D. and Heckner, K.H. (1971), Electrode kinetics of irreversible processes on solid electrodes - blocking and adsorption phenomena in voltammetric study on hydroxylamine. *Zeitschrift für Chemie*, **11** (12), 477-??.

Full Text: Zei Che11, 477.pdf

? Pilchows, K. and Wolf, F. (1972), Kinetics of adsorption of propylene on zeolitic molecular- sieves. *Zeitschrift für Chemie*, **12** (5), 183-??.

Full Text: Zei Che12, 183.pdf

? Kretzsch, G. (1974), Theoretical basis and practical role of adsorption-kinetics of surface-active substances. *Zeitschrift für Chemie*, **14** (7), 261-265.

Full Text: Zei Che11, 261.pdf

? Winzer, A. and Geyer, R. (1975), Adsorption-kinetics of K+(42) on freshly precipitated barium sulfate. *Zeitschrift für Chemie*, **15** (11), 456-458.

Full Text: Zei Che11, 456.pdf

? Winzer, A. and Geyer, R. (1977), Adsorption and ion-exchange kinetics of Na+(Na-22) and K+(K-42) on membrane active agents in mixed-solvents. *Zeitschrift für Chemie*, **17** (7), 276-277.

Full Text: Zei Che17, 276.pdf

# Title: Zeitschrift fur Deutsches Altertum und Deutsche Literatur

Full Journal Title: Zeitschrift fur Deutsches Altertum und Deutsche Literatur

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lienert, E. (1989), Mirror-robbing and red boots - Self-citations in the songs of neidhardt. *Zeitschrift fur Deutsches Altertum und Deutsche Literatur*, **118** (1), 1-16.

# Title: Zeitschrift fur Elektrochemie

Full Journal Title: Zeitschrift fur Elektrochemie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0372-8323

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? van’t Hoff, H.J. (1902), Purification of drinking water using ozone. *Zeitschrift fur Elektrochemie*, **8**, 504-507.

# Title: Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie

Full Journal Title: Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0372-8323

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Notes: highly cited

? Einstein, A. (1908), Elementary theory of the Brownian motion. *Zeitschrift fur Elektrochemie und Angewandte Physikalische Chemie*, **14**, 235-239.

Keywords: Brownian Motion, Theory

? Marc-Jena, R. (1914), Kinetics and adsorption. *Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie*, **20** (16/17), 515-524.

? Polanyi, M. (1920), News on the adsorption and adsorption forces principle. *Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie*, **26**, 370-374.

? Polanyi, M. (1921), Adsorption catalysis. *Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie*, **27**, 142-150.

? Freundlich, H.M.F. and Burgess, L.L. (1929), A case of adsorption regression. *Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie*, **35**, 362-366.

? Polanyi, M. (1929), Basics of the potential theory of adsorption. *Zeitschrift für Elektrochemie und Angewandte Physikalische Chemie*, **35**, 431-432.

# Title: Zeitschrift für Ernahrungswissenschaft

Full Journal Title: Zeitschrift für Ernahrungswissenschaft

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Elshobaki, F.A., Saleh, Z.A. and Saleh, N. (1990), The effect of some beverage extracts on intestinal iron-absorption. *Zeitschrift für Ernahrungswissenschaft*, **29** (4), 264-269.

Abstract: The effect of some beverage extracts namely anise, mint, caraway, cumin, tilia, liquorice, karkade and tea, on the absorption of iron was tested in tied-off intestinal segments of rats. The rate of intestinal iron absorption was calculated in terms of an absorption index. The tannin, phytic acid and ascorbic acid contents of these beverages were analysed.

The results show that anise, mint, caraway, cumin, tilia, liquorice, arranged in decreasing order of their effect, promoted the absorption of iron. Karkade did not exert an appreciable effect while tea inhibited absorption. The results are discussed in relation to the content of these beverages of tannins, phytic or ascorbic acids. It is recommended to offer these beverages to children and also to adults as a preventive agent to iron deficiency anemia. Also can be used for the preparation of bioavailable medicinal iron.

Keywords: Iron, Absorption, Beverages, Anemia, Anise, Mint, Caraway, Cumin, Tilia, Licorice, Karkade, Tea

# Title: Zeitschrift fur Gastroenterologie

Full Journal Title: [Zeitschrift fur Gastroenterologie](https://www.thieme-connect.de/ejournals/toc/zfg/103073)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Bohlen, A.B., Vitzthum, K., Mache, S., Quarcoo, D., Scutaru, C. and Groneberg, D.A. (2010), Scientometric analysis of the BMI. *Zeitschrift fur Gastroenterologie*, **48** (11), 1285-1292.

Full Text: 2010\Zei Gas48, 1285.pdf

Abstract: Background: The connection between overweight and health risks has been known since the beginning of the 19th century. In order to define overweight, the “body mass index” (BMI) in kg/m(2) was introduced. Methods: The present study evaluates the quantity and quality of the published literature available, and its changes over the years. Basic bibliographic methods and recent visualizing techniques were used in order to analyse and categorise research in the field of the BMI. The data were extracted from “ISI Web of Science” by Thomson Reuters beginning from 1900 to 2008 by defined search terms. Results: There are 63,845 articles on the subject available. It shows, that the number of annual publications is increasing continuously, starting in 1972. The bibliometric methods and the application of density equalising maps reveal global research productivity and citation activity with emphasis on the USA. Conclusion: The present study supplies a first bibliometric approach to visualise research activity in the field of BMI. Furthermore, it provides data that can be used for the identification of research clusters and to locate regions where more research needs to be done. Despite the controversial discussion, the analysed data suggest that the BMI is still an important, simple, and inexpensive measure for the assessment of the nutritional status that comes to a worldwide use.

Keywords: 19th Century, Activity, Bibliometric, Bibliometric Methods, Body-Mass Index, Cancer-Mortality, Cardiorespiratory Fitness, Cardiovascular-Disease, Citation, Colorectal Cancer, Density, Disease Risk-Factors, Fat Distribution, Field, Follow-up, Heart-Disease, Intestine, Literature, Obesity, Publications, Research, Stomach, USA, Waist Circumference

# Title: Zeitschrift fur Geschichtswissenschaft

Full Journal Title: Zeitschrift fur Geschichtswissenschaft

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Sammet, K. (2011), The scientific plagiarism. On the failure of a system. *Zeitschrift fur Geschichtswissenschaft*, **59** (3), 272-273.

Keywords: Plagiarism

# Title: Zeitschrift fur Gesundheitspsychologie

Full Journal Title: Zeitschrift fur Gesundheitspsychologie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Schwarzer, R. and Richert, J. (2009), Health Psychology at the International Congress of Psychology in Berlin, Germany, 2008. *Zeitschrift fur Gesundheitspsychologie*, **17** (1), 40-42.

Abstract: The worldwide increasing popularity of health psychology is illustrated by an analysis of data gathered at the International Congress of Psychology (ICP) in Berlin, 2008. The first analysis deals with the topics of interest that participants had stated when registering online for the congress. Out of 26 topics, health psychology obtained rank 9. The second analysis deals with the primary category in which abstracts were classified. Out of 6,252 abstracts, 10.65% were assigned to health psychology as the primary domain of research. These congress-based data may complement previous bibliometric data that attest to the increasing importance of health psychology.

Keywords: Analysis, Bibliometric, Bibliometric Data, Germany, Health, Health Beliefs, Health Promotion, Health Psychology, Prevention, Primary, Research, Topics

? Haug, S. and Schaub, M. (2011), Efficacy of Internet programs for tobacco smoking: A systematic review. *Zeitschrift fur Gesundheitspsychologie*, **19** (4), 181-196.

Full Text: [2011\Zei Ges19, 181.pdf](2011/Zei%20Ges19,%20181.pdf)

Abstract: The aim of this study is to systematically review the published literature on the efficacy of Internet programs for smoking cessation, smoking prevention, and prevention of passive smoking. Electronic searches of PubMed, MEDLINE, Web of Science, PsycINFO, and the Cochrane Register of Controlled Trials were conducted in July 2010. Randomized controlled trials reporting results about the efficacy of internet interventions for tobacco prevention compared to a control group or a standard intervention were included in the review. Initial searches in the literature databases identified 359 articles, of which 17 were eligible for inclusion in this review. In these articles, 16 studies were described: 14 studies addressed the efficacy of smoking cessation interventions, 2 studies reported results of combined smoking prevention and cessation programs. From the 14 smoking cessation interventions, 6 were effective to increase smoking abstinence rates in comparison to control groups. Due to the heterogeneity of the studies, particularly concerning the control groups, we did not pool study results overall. However, we pooled study results and calculated effect sizes for studies with similar control conditions. Compared to control groups without intervention, there was a trend but no statistically significant effect of Internet programs to increase abstinence rates (relative risk (RR) 1.42; 95%-confidence interval (CI) 0.85-2.37). Compared with minimal interventions, online smoking cessation interventions were effective (RR1.31; CI 1.09-1.57). Internet interventions were not effective compared with personal counseling interventions (RR 0.86; CI 0.72-1.04), with a tendency of personal interventions to be more effective. In comparison with a standard intervention, the standard intervention combined with an additional internet program was not more effective (RR 1.27; CI 0.70-2.31). Internet interventions which addressed smokers motivated to quit were more often effective than Internet interventions addressing unselected populations of smokers. The combined smoking prevention and cessation programs were effective on single, but not on all outcome criteria in comparison to assessment only groups. Effective Internet programs exist, particularly for smoking cessation in smokers motivated to quit. However, none of these programs was evaluated in German speaking countries. The empirical evidence for the efficacy of Internet based smoking prevention programs is marginal and, so far, no evidence exists for programs for the prevention of passive smoking.

Keywords: Assessment, Assistance, Behavior, Cessation Program, Cochrane, Computer, Control, Control Groups, Databases, Efficacy, Internet, Intervention, Interventions, Literature, Medline, Mortality, Outcome, Prevention, Pubmed, Randomized Controlled Trials, Randomized Controlled-Trial, Relative Risk, Review, Risk, Science, Smoking, Systematic, Systematic Review, Tobacco, Transtheoretical Model, Trend, Web of Science

# Title: Zeitschrift für Gerontologie

Full Journal Title: [Zeitschrift für Gerontologie](http://www.springerlink.com.ludwig.lub.lu.se/content/101583/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Lang, E., Arnold, K. and Kupfer, P. (1994), Women live longer: Biological, medical and sociological causes. *Zeitschrift für Gerontologie*, **27** (1), 10-15.

Full Text: Zei Ger27, 10.pdf

Abstract: The results of studies concerning the mortality rates of both sexes are of great similarity in all industrial countries. For underdeveloped countries, little information is available, but analogue proportions can be supposed. In the nations of the industrialized world males have a significantly higher mortality rate, which shortens their life expectancy in comparison with that of woman. Since about 1970 a deceleration of this development has been observed. The diseases responsible for this fact are ischemic heart disease, lung cancer, accidents, and other traumatic incidences, but also infectious diseases. Concerning the origins of ischemic heart disease, the influence of sex hormones especially on the lipid profile are being discussed, nevertheless, for the enhanced coronary risk of males environmental and behavioral factors seem to be more important than biological reasons. As for carcinosis being a reason for the mortality of males, lung cancer is in the foremost position. Cigarette Consumption, as well as the higher exposure to cancerogenic substances related to typically male professions, are held responsible for this. As for other types of cancer, environmental factors depending on gender are strongly considered as a reason for different rates of mortality. Furthermore, sociological explanations for these differing frequencies are being discussed. Occupational differences and the different positions held in working life by each gender are believed to be responsible for the higher rate of mortality among males. Also, risk taking behavior seems to be found more often among males, than among females. A variety of hypotheses based on genetics have been given to explain the different gender-specific rates of mortality, but none of them has yet been proven correct. The present and historical perspectives of social influences, such as lifestyle and environmental factors, are more important for the explanation of sex differences in rates of mortality than are hereditary factors. Finally, under discussion is that the leading criterion of life expectancy should be replaced or substantially completed by aspects of life quality (in the terms of ‘health expectancy’).

Keywords: Sex-Differences, Life Expectancy, Mortality, Gender, Health, Men, Population, Morbidity, Mortality Rate, Life Expectancy, Sex Differences, Male Risk, Environmental and Behavioral Factors

# Title: Zeitschrift für Kardiologie

Full Journal Title: [Zeitschrift für Kardiologie](http://www.springerlink.com/content/101585/?p=435c7e4bcfbf4dce82ee3ce11ebfcbdb&pi=0)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0300-5860

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Heintzen, P. (2001), Scientometrics - Measuring and counting in science and economics. *Zeitschrift für Kardiologie*, **90** (12), 978-982.

Full Text: [2001\Zei Kar90, 978.pdf](2001/Zei%20Kar90,%20978.pdf)

Keywords: Economics, Science, Scientometrics

# Title: Zeitschrift für Klinische Psychologie Psychiatrie und Psychotherapie

Full Journal Title: Zeitschrift für Klinische Psychologie Psychiatrie und Psychotherapie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Gunzelmann, T., Hessel, A. and Brahler, E. (1999), The quality of life of the elderly patient with chronic illness. *Zeitschrift für Klinische Psychologie Psychiatrie und Psychotherapie*, **47** (2), 123-140.

Abstract: By means of the ‘Profile of the qualify of life of chronically ill’ (PLC, Siegrist er al., 1996) the health-related life quality was assessed in a community sample of 566 subjects (aged 61-93 years). This study is based on the fact that the physical strength of aging people is declining and that there is an increasing risk for chronic body complaints with increasing age (multimorbidity). In most cases this causes negative consequences for the psychic well-being and the competence in daily life and social contacts. The results of this study reveal a decline in the health-related life quality of the elderly compared with younger people (18-60 years). This holds further true with growing age within the group of the elderly more than 60 pears of age. There are only small sex-specific differences. Compared with old people from West German: in the elderly from East Germany we found a higher amount of the ability to enjoy, a higher amount of the ability to form interpersonal relationships and a higher amount of the sense of belonging. There are high correlations of the health-related life quality with the subjective body experience and with the psychic mood. Beyond age also the level of education and of income are important determinants for different dimensions of health related quality of life. The results show that specific age norms are necessary for the elderly.

? Decker, O. and Brahler, E. (2001), On books and journals - Discussion of the evaluation of scientific performance in culturally and linguistically bound disciplines in medicine. *Zeitschrift für Klinische Psychologie Psychiatrie und Psychotherapie*, **49** (3), 235-246.

Abstract: The financial support of scientific institutions more and more depends on evaluating programms. Different modells of evaluation purposes are discussed. The number of journal articels published by scientist and the international distribution of articels are used for academic evaluation purposes. On the basis of bibliometric features, the citations of the ‘Zeitschrift ftir Klinische Psychologic, Psychiatric und Psychotherapie’ is recorded. Based on this records, there is a discussion on the significance of the competition indicators for quality-assurance of articels

Keywords: Behavior, Bibliometric, Chronic Illness, Citations, Depressive-Disorders, Differential-Diagnosis, German, Journals, Life, Patient, Psychotherapeutic Interventions, Schizophrenics, Viewpoint

? Berth, H., Petermann, F., Dinkel, A. and Brahler, E. (2005), Clinical psychology, psychiatry and psychotherapy - All under one umbrella? *Zeitschrift fur Klinische Psychologie Psychiatrie und Psychotherapie*, **53** (4), 370-382.

Abstract: For more than 50 years, the journal ‘Klinische Psychologie, Psychiatrie und Psychotherapie’ (Clinical Psychology, Psychiatry and Psychotherapy) has been one of the leading journals for articles of the corresponding psychological branches. Regarding the progressing specialization and differentiation of these branches the question arises, if one journal alone can still cover this thematical width. To answer this question, the complete releases of the years 2003 and 2004 of the journal were bibliometrically analyzed regarding a) the presence of the scientific sectors in the article titles and b) their textual focuses. Overall 43 articles were released in the given timeframe. About 25 % each accounted for Clinical Psychology and for Psychotherapy, whereas Psychiatry was hardly represented at all. Furthermore there was a relatively broad publication of articles on the subjects of Medical Psychology and test development. Textual focuses were composed of the prevalences of diverse psychological disorders and of the predictors for the success of psychotherapy. The results basically confirm the journals title, but likewise offer indications for possible changes.

Keywords: Adolescents, Bibliometrics, Child, Clinical Psychology, Disorder, Experiences, German-Language Version, Journal, Phenomenology, Psychiatry, Psychotherapy, Publication, Questionnaire, Representative Sample, Symptomatology, Therapy

# Title: Zeitschrift für Klinische Psychologie und Psychotherapie

Full Journal Title: Zeitschrift für Klinische Psychologie und Psychotherapie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0084-5345

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Krampen, G., Miller, M. and Montada, L. (2002), Bibliometrical results on the history of clinical psychology in the 20th century. *Zeitschrift für Klinische Psychologie und Psychotherapie*, **31** (2), 121-126.

Abstract: Background: Bibliometrical results on the development of clinical psychology publications with historiographical orientation in the 20th century are presented. Research questions: How can the history of clinical psychology and of its research domains be reconstructed biometrically with reference to the publications in international psychology and psychology from the German-speaking countries? Methods: Databases are the Psychological Abstracts (1927-1966), PsycLit (1967-1999) and PSYNDEX (1977-1999), in which psychological publications are documented relatively exhaustively. Results: Historiographically described are (1) the bibliometrically clearly demonstrable boom of clinical psychology publications since the 1950s, (2) the relatively low rate of psychotherapeutically relevant publications in comparison to those concerning disorders, health services, hospital programs, and rehabilitation, and (3) the relatively low rate of empirical and experimental (controlled) studies published on psychotherapy in contrast to all other domains of applied psychology. Consequences: There has been a clear boom of clinical psychology publication output since the 1950s in international psychology, as well as psychology from the German-speaking countries. However, there are publication deficits in the domain of psychotherapy and especially in the domain of experimental and broader empirically founded studies. Problems of bibliometric analyses are discussed as well as the implications of the results for the future of clinical psychology, especially psychotherapy research.

Keywords: History of Psychology, Clinical Psychology, Psychotherapy, Mental Disorders, Bibliometry

# Title: Zeitschrift für Naturforschung Section A-A Journal of Physical Sciences

Full Journal Title: Zeitschrift für Naturforschung Section A-A Journal of Physical Sciences

ISO Abbreviated Title: Z. Naturfors. Sect. A-J. Phys. Sci.

JCR Abbreviated Title: Z Naturforsch Sect A

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Roth, W., Gottwald, B.A. and Haul, R. (1974), Kinetic adsorption isotope-effect of CH4 and CD4 in molecular- flow experiments. *Zeitschrift für Naturforschung Section A-A Journal of Physical Sciences*, **29** (11), 1614-1621.

# Title: Zeitschrift fur Orthopadie und Unfallchirurgie

Full Journal Title: Zeitschrift fur Orthopadie und Unfallchirurgie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Niemeyer, P., Koestler, W. and Sudkamp, N.P. (2011), Problems and complications of surgical techniques for treatment of full-thickness cartilage defects. *Zeitschrift fur Orthopadie und Unfallchirurgie*, **149** (1), 45-51.

Abstract: Aim: There has been great progress concerning the surgical treatment of full-thickness cartilage defects within recent years. Surgical techniques such as arthroscopic microfracturing (MF), autologous osteochondral transplantation (OCT) and autologous chondrocyte implantation (ACI) have been introduced and, by using these techniques, reliable and satisfying clinical results can be achieved. Nevertheless, there are also technique-related problems and characteristic complications of all surgical techniques in the field of cartilage repair. Knowledge of these complications is essential for every surgeon using these techniques. The aim of the present article is to give an overview concerning technique-associated and characteristic complications of the most common cartilage repair techniques including arthroscopic microfracturing, autologous osteochondral transplantation and autologous chondrocyte implantation (ACI). Methods: In order to identify relevant literature concerning complications following cartilage repair, medical databases including “MEDLINE”, “ovid” and “Web of Science” were searched for the terms “autologous chondrocyte implantation”, “autologous chondrocyte transplantation”, “microfracture”, “osteochondral transplantation”, “cartilage repair”, “cartilage defect” and “complications” in October 2009. The present publication represents a non-systematic review including publications which were considered relevant for describing charateristic complications and adverse events in surgical techniques used for cartilage repair. Results: Although the number of studies describing complications and adverse events following surgical cartilage repair studies is limited, for all techniques included in the present review (arthroscopic microfracturing, autologous osteochondral transplantation and autologous chondrocyte implantation) technique-associated and characteristic complications could be identified. While regenerative tissue following microfracturing seems to be limited in terms of durability, intralesional bone formation and elevation of the subchondral bone plate seem to be characteristic problems of this technique. Harvest morbidity, degeneration of the surrounding cartilage, necrosis of the transplanted cylinders and a lack of integration of the cartilage into the surrounding cartilage seem to be related to the transplantation of osteochondral cylinders (OATS/OCT), while hypertrophic regenerative cartilage, disturbed fusion into the adjacent cartilage, delamination and insufficient cartilage regeneration are associated with the autologous chondrocyte implantation (ACI). Conclusion: The present paper identifies technique-associated complications for the most common surgical techniques used for cartilage repair. Even if the clinical relevance of the complications described in the current article has not been investigated to its fullest extent, the awareness of these characteristic complications is essential in order to avoid them whenever possible or to develop standardised treatment regimes for these problems. This needs to be addressed in further investigations.

Keywords: Adverse Events, Articular-Cartilage, Autologous Chondrocyte Implantation, Autologous Chondrocyte Implantation, Awareness, Bone, Cartilage Defect, Cartilage Repair, Chondral Defects, Complications, Contact Pressure, Databases, Follow-up, Knee Surgery, Knowledge, Literature, Medical, Methods, Microfracture Technique, Minipig Model, Morbidity, Natural-History, Osteochondral Transplantation, Overview, Publication, Publications, Randomized-Trial, Regeneration, Review, Surgical, Transplantation, Treatment

# Title: Zeitschrift fur Padagogische Psychologie

Full Journal Title: Zeitschrift fur Padagogische Psychologie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Leutner, D. and Wirth, J. (2007), As mirrored by the journal: Themes and trends of educational psychology in the years 2005 to 2007. *Zeitschrift fur Padagogische Psychologie*, **21** (3-4), 195-202.

Abstract: From 2008 on Jens Moeller will take over from Detlev Leutner the role of the editor of the German Journal of Educational Psychology. This gives the reason to analyse figures, facts and trends of contemporary educational psychology as they are mirrored in the articles of the Journal. It turns out that the Journal enjoys great and increasing popularity among authors, leading to an increase of manuscript submissions and, thus, to an increasing rejection rate. Analysing the Journal’s impact factor shows that its variability over time is due to the variability of self-citations (i.e., citations from the Journal to the Journal), not to the variability of non self-citations (i.e., citations from other journals to the Journal). The non-self-citations represent a rather stable component of the Journal’s impact factor that amounts to 0.50 impact-factor points which is quite large relative to other German journals in the field of educational psychology. Concerning research themes, there is a strong trend favouring articles on << self-concept, motivation, and emotion in the learning process >> to the disadvantage of articles on << leaming and instruction >> and << educational psychological research on training programs >>. Overall, the German Journal of Educational Psychology seems to be in a good position for meeting future challenges.

Keywords: 5th Graders, Academic Self-Concept, Achievement, Citations, Educational Psychology, Epistemological Beliefs, Impact Factor, Journal, Journal Impact Factor, Journals, Learning Environments, Motivation, Non-Self-Citation, Performance, Psychology, Research, Research Trend, School Subjects, Self Citations, Self-Citation, Self-Citations, Student Characteristics, Teachers Stress, Trend

? Moller, J., Retelsdorf, J. and Sudkamp, A. (2010), Editorial: As mirrored by the journal: Themes and trends of educational psychology in the years 2008 to 2010. *Zeitschrift fur Padagogische Psychologie*, **24** (3-4), 163-169.

Abstract: From 2010 on Oliver Dickhauser will take over the role of the editor of the German Journal of Educational Psychology from Jens Moller. This gives the reason to analyze figures, facts and trends of contemporary educational psychology as they are mirrored in the articles of the Journal. It turns out that the Journal enjoys great popularity among authors, leading to a stable number of manuscript submissions. Analyzing the Journal’s impact factor shows that its variability over time is mostly due to the variability of self-citations (i.e., citations from the Journal to the Journal). Notably, the number of non-self-citations (i.e., citations from other journals to the Journal) increased to 0.72 in 2009. Concerning research themes, there is a trend favoring articles on “learning and instruction” (with a high numbers of papers on teaching and teachers) depending on corresponding special issues of the Journal. Overall, the German Journal of Educational Psychology seems to be in a good position for meeting future challenges.

Keywords: Citations, Diagnostic Competence, Educational Psychology, Goal Orientation, Impact Factor, Journal Impact Factor, Journals, Learning-Strategies, Mathematics Instruction, Multiple Irritations, Non-Self-Citation, Psychology, Research, Research Trend, Secondary-School, Self Citations, Self-Citation, Self-Citations, Self-Concept, Simulated Classroom, Student Performance, Test Anxiety, Trend

# Title: Zeitschrift für Pflanzenernahrung und Bodenkunde

Full Journal Title: Zeitschrift fur Pflanzenernahrung und Bodenkunde

Full Journal Title: [Journal of Plant Nutrition and Soil Science](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1522-2624/issues) since 1999, Vol 162

ISO Abbreviated Title: Z. Pflanzen. Bodenk.

JCR Abbreviated Title: Z Pflanz Bodenkunde

ISSN: 0044-3263

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Journal Country/Territory: Germany

Language: Multi-Language

Publisher: Wiley-V C H Verlag GmbH

Publisher Address: Muhlenstrasse 33-34, D-13187 Berlin, Germany

Subject Categories:

Agronomy: Impact Factor 1.207, / (2000)

Plant Sciences: Impact Factor 1.207, 47/137 (2000)

Agriculture, Soil Science: Impact Factor 1.207, 8/29 (2000)

? Mayer, R. (1978), Adsorption isotherms as regulators controlling heavy metal transport in soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **141** (1), 11-28.

Full Text: [1978\Zei Pfl Bod141, 11.pdf](1978/Zei%20Pfl%20Bod141,%2011.pdf)

? Grimme, H. (1980), Effect of field strength on the quantity of K desorbed from soils by electro-ultrafiltration. *Zeitschrift für Pflanzenernahrung und Bodenkunde*, **143** (1), 98-106.

Full Text: [1960-80\Zei Pfl Bod143, 98.pdf](1960-80/Zei%20Pfl%20Bod143,%2098.pdf)

Abstract: Only halftime (a measure of desorption rate) was found to vary with field strength. The quantities which were actually desorbed within a given time were, of course, also dependant on field strength because of the change of desorption rate with field strength. The theoretical desorption maximum, however, as obtained from extrapolating the cumulative desorption curve, remained unaffected.

The desorption maximum was always equal or close to the exchangeable K content. No fractionation of exchangeable K was possible by applying different field strengths. The sum of desorbed + residual exchangeable K approximated closely the exchangeable K content. Thus there was no evidence of a significant release of non-exchangeable K. It was concluded that there is no corrosive attack on the clay mineral structure during the EUF extraction procedure.

? David, M.B. and Zech, W. (1990), Adsorption of dissolved organic-carbon and sulfate by acid forest soils in the Fichtelgebirge, FRG. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **153** (6), 379-384.

Full Text: [1990\Zei Pfl Bod153, 379.pdf](1990/Zei%20Pfl%20Bod153,%20379.pdf)

Abstract: The adsorption of dissolved organic carbon (DOC) and sulfate was examined in mineral horizons of acid soils from damaged (Oberwarmensteinach) and healthy (Wulfersreuth) Norway spruce forested sites in the Fichtelgebirge (NE-Bavaria). The A horizons of both sites desorbed DOC at all levels added, whereas the B horizons (Bs and Bv) retained added DOC at levels > 5 mmol C kg-1. An initial mass isotherm used on the B horizon data indicated that these soils have a greater affinity for DOC than B horizons from Spodosols in the northeastern U.S. Sulfate was only retained at high solution levels, and retention was pH dependent. Nitrate and sulfate additions (1000-mu-eq L-1 anion) had minor effects on DOC adsorption. Overall, there was little difference in DOC or sulfate retention at the two sites, indicating atmospheric deposition inputs have not affected these processes.

Keywords: Adsorption, Altitudes, Chemistry, DOC, pH, Rain, Retention, Soils, Spodosol, Transport

? Polyzopoulos, N.A. and Pavlatou, A. (1992), Phosphate sorption isotherms revisited. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **155** (1), 71-72.

Full Text: [1992\Zei Pfl Bod155, 71.pdf](1992/Zei%20Pfl%20Bod155,%2071.pdf)

Abstract: A criterion is proposed for assessing ranges of validity of equilibrium isotherms for phosphate sorption by soils. This criterion is based on the geometrical features commonly exhibited by such isotherms and is analogous to the one that was first formulated by Aharoni and Ungarish in connection with the kinetics of chemisorption reactions. Its use with equilibrium isotherms is illustrated with three widely used expressions for the representation of phosphate sorption by soils but it would also be expected to be useful in connection with sorption of other solutes by soils as well as by other adsorbents.

Keywords: Desorption, Elovich Equation, Equilibrium, Isotherms, Kinetics, Soils, Sorption, Sorption Isotherms

? Richter, J., Richter, O., Marucchini, C. and Perucci, P. (1992), Kinetics of degradation of some herbicides in soil samples under controlled conditions. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **155** (4), 261-267.

Full Text: [1992\Zei Pfl Bod155, 261.pdf](1992/Zei%20Pfl%20Bod155,%20261.pdf)

Abstract: Experimental results on degradation of four herbicides - Chlorsulfuron, Atrazine, Alachlor and Metolachlor - in soils under varying conditions am partially reviewed and subjected to a kinetic investigation using different approaches. In no case the experimental data are in accordance with pure first order kinetics: for Chlorsulfuron, a pseudo-first-order description holds, whereas the degradation of the three other herbicides may correctly be described by combining first order degradation with a simultaneous first order adsorption. Predicting herbicide concentration in field soils by simulation using pure first order degradation models and the corresponding kinetic parameter functions as validated in the laboratory may strongly underestimate concentrations especially with alkaline soils in warmer climates.

Keywords: Adsorption, Atrazine, Chlorsulfuron, Degradation, Herbicides, Kinetics, Model, Persistence, Residues, Soil, Soils

? Elkhatib, E.A., Elshebiny, G.M. and Balba, A.M. (1992), Comparison of four equations to describe the kinetics of lead desorption from soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **155** (4), 285-291.

Full Text: [1992\Zei Pfl Bod155, 285.pdf](1992/Zei%20Pfl%20Bod155,%20285.pdf)

Abstract: The rate of Pb desorption was investigated from clay (Silly clay, Torrifluvent), CaCO3-rich (Sandy clay, Calciorthid), and sandy (Sandy loam, Quartzipsamment) soils at two different temperatures. Lead has not been released from CaCO3-rich soils which suggests irreversible Pb sorption by the soil. The desorption was quite hysteretic from sand and clay soils. The total amount of Pb released from the clay soil exceeded that released from the sandy soil. The lower Pb desorption associated with the sandy soil is probably due to its higher calcium carbonate content relative to the clay soil. The kinetics of Pb desorption were evaluated using the Elovich, modified Freundlich, parabolic diffusion, and first order equations. The first order and parabolic diffusion equations adequately described the kinetics of Pb desorption from clay and sandy soils under isothermal conditions. The choice of first order and parabolic equations among others investigated was bawd on the goodness of fit and the more scientific theoretical assumptions of the equations. The apparent Pb diffusion rate coefficient (D(d)) and desorption rate coefficient (k(d)) values from the clay and sandy soils increased with increasing temperature.

Keywords: Adsorption, Desorption, Diffusion, Freundlich, Kinetics, Lead, Soil, Soils, Sorption

? Gerke, J. and Dette, H. (1993), Phosphate sorption isotherms revisited - Comments. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **156** (1), 89.

Full Text: [1993\Zei Pfl Bod156, 89.pdf](1993/Zei%20Pfl%20Bod156,%2089.pdf)

Keywords: Isotherms, Sorption, Sorption Isotherms

? Polyzopoulos, N.A. and Pavlatou, A. (1993), Phosphate sorption isotherms revisited - Response. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **156** (1), 91.

Full Text: [1993\Zei Pfl Bod156, 89.pdf](1993/Zei%20Pfl%20Bod156,%2089.pdf)

Keywords: Isotherms, Sorption, Sorption Isotherms

? Gerth, J., Brummer, G.W. and Tiller, K.G. (1993), Retention of Ni, Zn and Cd by Si-associated goethite. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **156** (2), 123-129.

Full Text: [1993\Zei Pfl Bod156, 123.pdf](1993/Zei%20Pfl%20Bod156,%20123.pdf)

Abstract: Synthetic goethite used to study the effects of reaction time and temperature on the pH-dependent sorption of Ni, Zn and Cd was associated with amorphous silica. Ni interacted with dissolved Si and formed a Ni/Si precipitate on the goethite surface. Individual metals added at a concentration of 0.5 mumol g-1 and sorbed during a reaction period of 504 hours (21 days) at 35°C were extracted by 0.7 M HNO3 for 14 days. At the end of this period 11, 28 and 40 percent of Ni, Cd and Zn, respectively, were not extracted whereas 20 percent of the total Fe content of the goethite and 39 percent of the associated Si were dissolved. During the sorption process metals became immobilized in the goethite particles. This effect can be related to a diffusion of metal ions into micropores. A total mobilization of sorbed metals can only be achieved by a complete dissolution of the goethite. The strong fixation of Ni, Zn and Cd by goethite suggests that additions of this Fe oxide could be used to ameliorate highly contaminated sludges or soils.

Keywords: Adsorption, Desorption, Diffusion, Iron, Kinetics, Metal Ions, Oxides, Phosphate, Soil Clay Fractions, Soils, Sorption

? Wilczynski, A.W., Renger, M., Jozefaciuk, G., Hajnos, M. and Sokolowska, Z. (1993), Surface area and CEC as related to qualitative and quantitative changes of forest soil organic matter after liming. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **156** (3), 235-238.

Full Text: [1993\Zei Pfl Bod156, 235.pdf](1993/Zei%20Pfl%20Bod156,%20235.pdf)

Abstract: Water vapor adsorption isotherms were used for estimation of (apparent) surface areas of samples of limed and unlimed plots of an acidic sandy forest soil. Samples were taken at two microrelief (ridge and furrow) positions from five subsequent 10 cm layers. Values of surface area and CEC correlated linearly with organic matter content but only for four bottom layers. Surface areas and CEC values calculated per the unit mass of organic carbon were higher in upper layers than in lower layers for control samples. For limed samples an opposite trend was observed. The estimated average (apparent) charge densities of organic matter showed a better correlation with humic to fulvic acids ratio. Values of surface charge densities for every investigated profile increased with depth and they were lower in limed than in unlimed profiles.

Keywords: Adsorption, Adsorption Isotherms, Fulvic Acids, Isotherms, Soil, Trend

? Elkhatib, E.A., Elshebiny, G.M., Elsubruiti, G.M. and Balba, A.M. (1993), Thermodynamics of lead sorption and desorption in soils. *Zeitschrift für Pflanzenernahrung und Bodenkunde*, **156** (6), 461-465.

Full Text: [1993\Zei Pfl Bod156, 461.pdf](1993/Zei%20Pfl%20Bod156,%20461.pdf)

Abstract: Thermodynamics of Lead (Pb) sorption and desorption was investigated with samples of a clayic Torrifluvent, a sandy clayic Calciorthid, and sandy Quartzipsamment. The values of activation energy for Pb sorption on the Calciorthid (ranged from 20.7 to 27.7 kJ mol-1) were higher than those of the Torrifluvent (ranged from 3.4 to 17.4 kJ mol-1) and the Quartzipsamment (1.5 to 4.6 kJ mol-1). The energies of activation for adsorption “E(a)” were greater than those for desorption “E(d)”, indicating that more energy was needed to sorb Pb than to desorb Pb. The enthalpy of activation (DELTAH\*) values indicate that Pb sorption is endothermic reaction while Pb desorption is exothermic reaction. The entropy of activation (DELTAS\*) values for Pb sorption were negative and increased with increasing surface coverage. The free energy of activation (DELTAG\*) values ranged from 81.2 to 89.2 and from 83.6 to 84.0 kJ mol-1 for Pb sorption and desorption respectively.

Keywords: Adsorption, Desorption, Exchange, Kinetics, Lead, Sorption, Thermodynamics

? Sokołowska, Z., Józefaciuk, G., Sokołowski, S., Renger, M. and Wilczynski, W. (1993), Water vapor adsorption as related to liming of acidic sandy forest soil. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **156** (6), 495-499.

Full Text: [1993\Zei Pfl Bod156, 495.pdf](1993/Zei%20Pfl%20Bod156,%20495.pdf)

Abstract: Water vapor adsorption isotherms were measured for soil samples taken from five subsequent 10 cm layers of limed and unlimed Cambic Arenosol under forest, Applying the numerical approximation of adsorption isotherms with an exponential isotherm equation and a local BET model. the surface areas, average adsorption energies and adsorption energies distribution functions were calculated. The values of average adsorption energies increased slightly with the depth of the layer, however no marked differences were observed between the average energies for the equivalent layers of both limed and unlimed profiles. For unlimed profiles the energy distribution functions possessed two maxima, the smaller maximum. however, disappeared in limed profile.

Keywords: Adsorption, Adsorption Isotherms, Approximation, Energy-Distribution Function, Isotherm, Isotherms, Soil

? Prodromou, K.P. (1994), Response of phosphate adsorption by acid soils to the use of electrolyte. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **157** (1), 23-28.

Full Text: [1994\Zei Pfl Bod157, 23.pdf](1994/Zei%20Pfl%20Bod157,%2023.pdf)

Abstract: The presence of electrolyte in the solution, increases the amount of adsorbed anions. This increase, mainly depends on the kind of electrolyte, the concentration in the solution and the pH of treatment. In this work the process of phosphate adsorption in acid soils (Dystric subgroups of Inceptisols and Entisols) with and without use of electrolyte, lyte, was studied in order to find the real adsorption capacity of soils and the equations that fit to the adsorption data. It was found out that the shape of the isotherms obtained without electrolyte was different from that with electrolyte. The amount of the adsorbed anions was higher in the later case. The Freundlich gave a good fit to the isotherm data and the exponent of Freundlich equation was correlated with some properties of the soils.

Keywords: Adsorption, Adsorption Capacity, Charge, Curves, Freundlich, Isotherms, Soils, Sorption, Surface, Treatment

? Schulte, A. and Beese, F. (1994), Adsorption density isotherms for heavy-metals and their ecological signification. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **157** (4), 295-303.

Full Text: [1994\Zei Pfl Bod157, 295.pdf](1994/Zei%20Pfl%20Bod157,%20295.pdf)

Abstract: To study the adsorption of Cd, Zn, Cu and Pb, 16 Israelian and German soil samples of different chemical soil reactions were taken and analyzed for their physical and chemical properties. Traditional adsorption isotherms reveal the relation between the amount of heavy metals adsorbed and the heavy metal concentration in the soil solution only for the soil in study and can therefore not be applied to othe soils. To meet the aim of modelling heavy metal adsorption and mobility also for soils differing greatly in their properties, it was attempted to establish generalizing adsorption isotherms for soils of entirely different compositions. The generalizing heavy metal adsorption density isotherms for the Al-Hydroxid-, Silicate- and Carbonate buffer range introduced in the following seem to allow a sufficiently corresponding description to be given of the quantity/intensity relation of Cd, Zn, Cu and Pb in soils which differ greatly in their specific surface area.

Keywords: Adsorption, Adsorption Isotherms, Heavy Metal, Heavy Metals, Isotherms, Metal Adsorption, Mobility, Soil, Soils, Translocation

? Marschner, B., Henke, U. and Wessolek, G. (1995), Effects of meliorative additives on the adsorption and binding forms of heavy metals in a contaminated topsoil from a former sewage farm. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **158** (1), 9-14.

Full Text: [1995\Zei Pfl Bod158, 9.pdf](1995/Zei%20Pfl%20Bod158,%209.pdf)

Abstract: In a laboratory study, a heavy metal contaminated topsoil from a former sewage farm in Berlin was amended with different additives: lime, ash/gypsum, bark mulch, brown coal and combinations of these treatments. After 8 weeks of incubation, pH of the lime and ash/gypsum treatments increased to 6.2-6.3 compared to 5.2-5.3 in the control and the other treatments. Organic-C content rose from 42 g/kg in the control to 46-53 g/kg in the organic amendments. In reaction to the pH-increase the water soluble fraction of Cd, Cu and Zn was reduced by roughly 60%, 30% and 80% respectively. Cd- and Zn-binding forms as determined with NH4-acetate- and EDTA-extracts were note affected by the treatments, while the ash/gypsum-treatment increased EDTA-extractable Pb by 17%. The exchangeable Cu-Fraction (NH4-acetate extract) was reduced in all treatments to 82-93% of the control values, with the greatest effects in the tree bark amendment. The FREUNDLICH adsorption isotherms also show an increased sorption of heavy metals in the lime and ash/gypsum treatments. Organic amendments alone or in combination with lime had little effect on heavy metal adsorption.

Keywords: Acid, Adsorption, Adsorption Isotherms, Forest Soil, Freundlich, Heavy Metal, Heavy Metals, Isotherms, Metal Adsorption, Soil Solution, Sorption, Water

? Wagner, B., Schewes, R., Maidl, F.X. and Fischbeck, G. (1995), Measurement of residues and simulation of the movement of atrazine in deeper soil layers after long-term application in agriculture. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **158** (4), 333-338.

Full Text: [1995\Zei Pfl Bod158, 333.pdf](1995/Zei%20Pfl%20Bod158,%20333.pdf)

Abstract: The herbicide atrazine [2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine] was applied to corn at recommended rates over a period of 18 years until 1988. The investigated field was sampled down to a depth of 10 m in 1989 and 1991. In both years residues of atrazine were determined down to 10 m depth by HPLC-analysis of soil extracts in concentrations of up to 12 μg/kg. Batch-experiments were conducted to established sorption isotherms of various soil layers. Numerical simulations of the migration of atrazine, based on the Richards-equation and the convection-dispersion-equation with first-order degradation were performed and compared to the measurements. Depth-dependent distribution of atrazine residues could be roughly reproduced by calculations, But the calculated depth-profiles of atrazine concentrations varied strongly within the variability of the sensitive parameters. The deterministic model used was therefore not able to predict the amount of pesticide residues in groundwater recharge precisely.

Keywords: Adsorption, Atrazine, Degradation, Isotherms, Soil, Sorption, Sorption Isotherms

? Schulte, A. (1995), Influence of soil sample preparation on cd and cu adsorption in acid forest soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **158** (5), 465-467.

Full Text: [1995\Zei Pfl Bod158, 465.pdf](1995/Zei%20Pfl%20Bod158,%20465.pdf)

Abstract: The influence of soil sample preparation on Cd and Cu adsorption was investigated using six acid forest soil samples and comparing adsorption isotherms for fresh and air-dried samples. While no influence of sample preparation on Cd adsorption capacity was found, air-drying resulted in a significant decrease in Cu adsorption density in all six soil samples under investigation at ecotoxicologically relevant concentrations in the soil solution.

Keywords: Adsorption, Adsorption Capacity, Adsorption Isotherms, Isotherms, Soil

? Alewell, C. and Matzner, E. (1996), Water, NaHCO3-, NaH2PO4- and NaCl- extractable SO42- in acid forest soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **159** (3), 235-240.

Full Text: 1996\Zei Pfl Bod159, 235.pdf

Abstract: A variety of different methods have been used for the determination of inorganic soil SO42- in the past, which makes it difficult to compare SO42- contents of soils. Sulfate was extracted with the four commonly used extraction solutions 0.5 M NaHCO3, 0.02 M NaH2PO4, 0.1 M NaCl and H2O from A-, Bw- and Bs-horizons of six acid forest soils. 5 g of field moist soil were percolated with a flow rate of 5 ml/h and percolations were repeated as long as SO42- was detectable in the percolate (> 0.5 mg SO4 . l-1). NaCl and NaHCO3 extracted highest amounts of total inorganic SO42- in A-horizons, but NaHCO3 caused analytical problems. NaHCO3 and NaH2PO4 yielded highest amounts in B-horizons. With the exception of Bs-horizons more than 70% of the total inorganic SO42- was H2O-soluble. Thus, if H2O-soluble SO42- is defined as reversibly bound, the greater part of the inorganic SO42- fraction can potentially be released, if SO42- deposition decreases.

Keywords: Biomass, Desorption, Kinetics, Retention, Soil, Soils, Sorption, Sulfate Adsorption, Sulfur, Temperature, Variety

? Siebe, C. and Fischer, W.R. (1996), Effect of long-term irrigation with untreated sewage effluents on soil properties and heavy metal adsorption of Leptosols and Vertisols in Central Mexico. *Zeitschrift für Pflanzenernahrung und Bodenkunde*, **159** (4), 357-364.

Full Text: 1996\Zei Pfl Bod159, 357.pdf

Abstract: The effect of long-term irrigation with untreated sewage effluents from Mexico City on soil properties and heavy metal adsorption behaviour of soils at irrigation District 03 in the Mezquital Valley, Central Mexico, was studied. General soil parameters of 25 samples from Ap-horizons of Mollic Leptosols and Eutric Vertisols taken at sites which have been under irrigation for different periods of time were compared with samples from fields under rainfed agriculture. The adsorption of Pb, Cd, Cuand Zn was analysed in 8 selected samples by batch experiments. The long-term irrigation of soils with untreated sewage effluent has increased the contents of total (TOC) and dissolved (DOC) organic carbon in Ap-horizons of Leptosols and Vertisols, and diminished the contents of manganese oxides in Vertisols. This influences the heavy metal adsorption behaviour of both soils, since DOC enhances metalsolubility at low loading rates and TOC improves metal adsorption capacities at high loading rates. The possibility of an increase in the chloride content in soils due to wastewater irrigation and its relation to higher Cd mobility are discussed, as in the importance of humus balance control through oriented management practices in order to minimize heavy metal mobility in soils, which have been under irrigation with wastewater during long periods.

? Matschonat, G. and Matzner, E. (1996), Soil chemical properties affecting NH4+ sorption in forest soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **159** (5), 505-511.

Full Text: 1996\Zei Pfl Bod159, 505.pdf

Abstract: Fourteen European forest soils from the boreal to the mediterranean climate on different parent materials were investigated with respect to their ability to store NH4+ in exchangeable form, using sorption isotherms. Distribution coefficients for NH4+ sorption per unit weight of soil were in the range of 0.02 to 0.77. NH4+ sorption coefficients were usually highest in the forest floor of a given soil. NH4+ sorption behaviour of mineral soil horizons was correlated to soil parameters that are determined during routine soil analysis. A combination of CEC and base saturation explained up to 95% of the variability of NH4+ sorption. In the forest floors, variability in NH4+ sorption could not be explained quantitatively from independent soil parameters. The affinity of the sorption sites for NH4+ was the mast important factor for explanation of the variability in NH4+ sorption in the forest floors but was of low importance in mineral soil horizons. As NH4+ exchanges predominantly base cations, susceptibility of NH4+ to transport through the soil profile increases with low base saturation of a soil as well as with low CEC values.

Keywords: Ammonium, Dissolved Organic-Carbon, Exchangeable Cations, Isotherms, Potassium, Quantity-Intensity Relationships, Soil, Soils, Sorption, Sorption Isotherms, Sulfate, Weight

? Pätzold, S. and Brümmer, G.W. (1997), Fate, sorption, and leaching of the herbicide diuron after annual application in an orchard soil (Orthic Luvisol). *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **160** (2), 165-170.

Full Text: [1997\Zei Pfl Bod160, 165.pdf](1997/Zei%20Pfl%20Bod160,%20165.pdf)

Abstract: A three years field trial was conducted in an apple orchard on a loess site (Orthic Luvisol) with annual applications of the herbicide diuron. An accumulation of biologically effective residues of the herbicide was not observed, although a carry-over of herbicide residues in a range of 46-77 μg/kg dry soil in the 0-5 cm layer occurred between different years. After. application in May, the residues were rapidly degraded during the following summer months. Disappearance of diuron residues from the 0-5 cm layer conformed to first-order kinetics during the first six months after application. The DT50-values ranged from 14 to 30 days. As the degradation rate decreased with time, the level of remaining residues on a long-term scale was best represented by two combined exponential functions for the fast and-slow degradation rate. The distribution coefficient between adsorbed and dissolved residues increased with time, indicating decreasing mobility of herbicide residues. The distribution coefficients and the-extractable residue contents were strongly negatively correlated. A few days after a diuron application in May 1994, about 15% of the applied amounts could be analyzed in subsoil samples from 30-60 cm depth (6%) and 60-90 cm depth (9%), while high concentrations of diuron remained in the 0-5 cm soil layer. This vies the result of a heavy rainfall (20 mm) and a rapid movement of seepage water into the subsoil due-to preferential transport in soil macropores like earthworm channels and shrinkage cracks, which frequently occurred in this untilled loess soil. Different transport patterns were observed during the winter months in 1992/93 and 1993/94, when only low amounts of the diuron applied in spring were leached down to 30-60 cm depth. In winter time, the remaining low concentrations of extractable residues were strongly adsorbed and therefore remained in the upper soil layers.

Keywords: Degradation, Kinetics, Mobility, Soil, Sorption, Water

? Kaiser, K. and Zech, W. (1997), About the sorption of dissolved organic matter to forest soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **160** (3), 295-301.

Full Text: 1997\Zei Pfl Bod160, 295.pdf

Abstract: This investigation characterizes the major forest soils of the temperate climatic zones (leptosols,vertisols, cambisols, luvisols; podzols, stagnosols, gleysols)as sorbents for dissolved organic matter (DOM). Sorption isotherms were obtained for 135 soil horizons from 36 profiles. When solutions containing no DOC were added, the release of dissolved organic carbon (DOG) was highest for horizons rich in organic C (A and Bh horizons). In subsoil horizons DOC release was much lower. Most of the investigated top soils (A and E horizons) and Bh, Bg, and C horizons showed a weak DOC sorption. This was caused by low contents of sorbents (clay and sesquioxides) and/or high contents of organic C. Organic C seems to reduce the DOC sorption by occupying binding sites. Subsoils rich in clay and sesquioxides like Bs, Bt, and Bw horizons showed a strong retention of DOG. Under the aerobic conditions of the experiments,some of the subsoils of stagnosols and gleysols also showed a strong sorption of DOG. However, in sorption experiments conducted after an anaerobic incubation, the DOC sorption decreased significantly.

Keywords: Carbon, Doc, Horizons, Isotherms, Soil, Soils, Sorption, Sulfate, Water

? Sokolowska, Z., Hajnos, M., Jozefaciuk, G., Hoffmann, C. and Renger, M. (1997), Influence of humic acid on water adsorption characteristics of kaolin and quartz. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **160** (3), 327-331.

Full Text: 1997\Zei Pfl Bod160, 327.pdf

Abstract: Water vapor adsorption isotherms were measured for samples of kaolin and quartz amended with different amounts of humic acid extracted from a Cambic Arenosol under forest. Applying the approximation of the adsorption isotherms with the BET equation the monolayer capacities (surface areas) for the studied systems were calculated. for kaolin systems the surface area decreased sharply at low humic acid additions and this slowly increased with the further rise of the humic acid content, whereas for the quart the increase of surface area was only noted for high humic acid contents. Using an exponential isotherm equation with a local BET model, thee absorption energy distribution functions were calculated for kaolin systems. The shape of the adsorption energy distributions shown that the increase in humic content changed the character of the surface from more hydrophilic to more hydrophobic. For intermediate humic acid contents, the energy distribution function had two maxima - more polar and less polar. At high humic acid contents the energy distribution function tended to the estimated value for pure humic acid, indicating high surface-coverage with organic material. As measured by the mercury intrusion porosimetry, for the kaolin samples the amount of the largest pores decreases and the amount of the smallest pores increases with the accumulation of humic acid. For the quartz systems only very high doses of humic acid are reflected in changes of pore size distribution.

Keywords: Adsorption, Adsorption Isotherms, Approximation, Energy, Heterogeneity, Isotherms, Soil, Vapor, Water

? MeyerWindel, S., Ketelsen, H. and Widmoser, P. (1997), On the relation of herbicide adsorption and soil organic fraction. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **160** (4), 361-368.

Full Text: 1997\Zei Pfl Bod160, 361.pdf

Abstract: Freundlich adsorption isotherms were measured for four herbicides (atrazine, terbuthylazine, chlorotoluron, isoproturon) and 24 soil horizons, which are typical of Schleswig-Holstein, northern Germany. The relationship between the adsorption constant (K-Fr) of a chemical and the fraction of organic carbon (f(OC)) of the soil horizons was evaluated. Chemical specific K-OC’-values, that are independent of soil organic carbon fraction varied considerably for each herbicide (CV about 50%); therefore these values as well as K-OC-values, that are determined by linear regression of K-Fr and f(OC) should be evaluated critically before application. K-OC’- and K-OC-values derived from experiments showed decreasing affinity of the herbicides to soil horizons in the order terbuthylazine > chlorotoluron > atrazine congruent to isoproturon. Calculation of K-OC from K-OW or water solubility of each herbicide, however, led to changes in the above mentioned ranking. Hence, especially K-OW or water solubility based K-OC-values may lead to false conclusions concerning chemical mobility. For atrazine, terbuthylazine and isoproturon Freundlich adsorption constants increased overproportionally with increasing organic carbon content of soils. The relationships between K-Fr and f(OC) therefore were described better by a non-linear equation (second order polynom) than by a linear approach. Contrary, for chlorotoluron a linear relation between K-Fr and f(OC) holds at least for the range of f(OC) investigated in this study.

Keywords: Adsorption, Adsorption Isotherms, Atrazine Adsorption, Behavior, Freundlich, Herbicides, Isotherms, K-Oc, Mobility, Sediments, Soil, Soils, Sorption, Water

? Alewell, C. (1998), Investigating sulfate sorption and desorption of acid forest soils with special consideration of soil structure. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **161** (1), 73-80.

Full Text: 1998\Zei Pfl Bod161, 73.pdf

Abstract: When investigating the reversibility of soil and water acidification due to a reduction of SO42- deposition, the size and stability of the reversibly bound SO42- fraction in soils are important parameters. The desorption behaviour of SO42- in three acid forest soils was investigated using columns with undisturbed and disturbed (< 5 mm sieved) soil material. The results were compared to batch experiments. A comparison of the undisturbed and the disturbed soil samples showed that the soil structure had no effect on the chemistry of the soil solution, the S-mineralisation rates or the SO42- desorption rates. A comparison of the batch and the column method showed only minor differences in desorption rates. However, fitting the measured desorption rates to a modified Langmuir equation showed a more distinct difference between both methods. It was concluded that the batch method was more suitable to establish SO42- desorption isotherms. When investigating SO42- dynamics of soils, the heterogeneity of the soils has to be considered because the spatial variability of isotherm parameters was found to be greater than differences between the investigated methods. Furthermore, SO42- sorption showed a distinct hysteresis. While mast of the sorbed SO42- was desorbed at concentrations less than or equal to 5-10 mg SO42-.l(-1), a sorption of SO42- was observed only at concentrations greater than or equal to 20-30 mg SO42-.l(-1).

Keywords: Acidification, Adsorption, Batch, Chemical-Properties, Desorption, Isotherms, Langmuir, Small-Scale Heterogeneity, Soil, Soils, Sorption, Water

? Assimakopoulos, J., Bovis, C., Kosmas, C. and Nychas, A. (1998), The fate of freshly added phosphorus in representative agricultural soils. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **161** (3), 261-266.

Full Text: 1998\Zei Pfl Bod161, 261.pdf

Abstract: Surface and subsurface samples from 26 representative agricultural soils (13 Entisols, 9 Alfisols and 4 Vertisols) from Central and South Western Greece were equilibrated for a week with P solutions ranging from zero to 800 mg P kg(-1) soil. The Freundlich and in the cases of high fine carbonate content (> 6%) the linear equations described the sorption isotherms in a satisfactory way. Sequential fractionation indicated that a 0.1 M NaOH plus 1 M NaCl + 0.3 M Na-citrate + 1 M NaHCO3 (buffer) solution extracted more than 60% of the P retained by Entisols containing low to medium fine carbonates and by Vertisols, and less than 60% by Entisols with a high fine carbonate content. In ail Entisols, this percentage decreased significantly at P additions higher than 150 mg kg(-1). The opposite was observed in Vertisols, in which this fraction was the most important part of the retained P up to the maximum P addition. In contrast, in Alfisols this fraction reached 100%, but in the case of high Bray-P (> 50 ppm) it was more than 100% of the retained P. The second fraction extracted with the 0.3 M Na-citrate + 1 M NaHCO3 buffer plus Na-dithionite was found to be much smaller than the first fraction, increasing with P additions in absolute amounts but remaining constant as a percentage of the retained P, ranging from 15-35 % among the studied samples. The third fraction obtained with 1 M HCl solution showed a peculiar behaviour. It was close to zero of the retained P in samples containing carbonates (Entisols and Vertisols) at P additions up to 300 mg kg(-1) soil, but increased significantly at higher P additions and almost doubled in Entisols. Finally, the P fraction obtained after seven successive extractions with 0.01 M CaCl2, correlated well by a polynomial of and degree equation with NaOH+CB-P and linearly with Olsen-P and Bray-P.

Keywords: Acid, Additions, Calcareous Soils, Freundlich, Iron, Isotherms, Mediterranean Soils, Oxides, P-Sorption, Phosphate Adsorption, Sequential P-Extraction, Soil, Soils, Sorption, Sorption Isotherms, Sri-Lankan Alfisols

? Springob, G. and Bottcher, J. (1998), Parameterization and regionalization of Cd sorption characteristics of sandy soils. I. Freundlich type parameters. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **161** (6), 681-687.

Full Text: 1998\Zei Pfl Bod161, 357.pdf

Abstract: Cd sorption isotherms (n = 24) were established for arable, sandy soils of the ‘Fuhrbergher Feld’ catchment area northeast of Hannover (Germany) using 0.01 M-c Ca(NO3)(2) solution with Cd additions rangiing from 0 to 44 μM-c Cd. Alternative fractions of initially (prior to analysis) sorbed Cd. (S-0) were added to the amount sorbed during the experiments. The Freundlich equation was fitted to the resulting isotherms. The obtained retention parameters k and M varied with respect to the different S-0 fractions. Isotherms corrected with Cd-EDTA as S-0 fraction were nonlinear in their log-form. The highest degree of log-linearity is obtained if S-0 is characterized by 40% of the aqua regia extractable Cd. The corresponding k values ranged from 36 to 1275 g(1-M) L-M kg(-1) (mean 338 g(1-M) L-M kg(-1), cv = 92%). The Freundlich exponent M showed less variation (0.7 to 1.1, cv = 12%) with a mean of 0.88. Functions based on these parameters predicted Cd concentrations in Ca(NO3)(2)-soil suspensions well (r(2) = 0.96) but were hardly related to Cd concentrations of ‘fresh’ soil solutions (r(2) = 0.20).

Keywords: Cadmium, Freundlich, Freundlich Parameters, Heavy-Metals, Isotherms, Retention, Soil, Soils, Sorption, Sorption Isotherms, Surface-Area

? Springob, G. and Bottcher, J. (1998), Parameterization and regionalization of Cd sorption characteristics of sandy soils. II. Regionalization: Freundlich k estimates by pedotransfer functions. *Zeitschrift fur Pflanzenernahrung und Bodenkunde*, **161** (6), 689-696.

Full Text: 1998\Zei Pfl Bod161, 689.pdf

Abstract: The aim waste describe Cd sorption in spatially variable sandy soils of the ‘Fuhrberger Feld’ catchment area as a prerequisite for prognosis of Cd transport in soil and of the threat of groundwater pollution. Thus, the possibility is evaluated to derive a generalized Freundlich equation based on multiple regressions relating the retention parameters k and M (from isotherm data of part I of this study) to basic soil properties (pedotransfer functions). For the parameter M (exponent), the correlation ‘measured vs estimated’ was weak (r(2) <0.5)whereas k was well predictable by pedotransfer functions. The best regression was obtained if organic carbon (OC), clay content and H+ activity were combined as independent variables (r(2) up to 0.96). The obtained k values were much higher than those from comparable literature models, probably due to lower ionic strength and different composition of our background solutions used for the isotherms. As a critical evaluation, the estimates for k were used to derive solute Cd concentrations (C-est) which then were compared to measured data (range 0.1-3 μg L-1). The best but still unsatisfactory r(2) was 0.77, obtained if C-est was compared to Cd in 0.01 M-c Ca(NO3)(2) equilibria (Cd-0). Cd in fresh soil solution (Cd-z) showed no significant correlation with C-est, except for one relationship where OC had been excluded from the preceding multiple regression of k. Generally, the role of the variable OC remained unclear. Direct multiple regressions of measured solute Cd vs soil properties (bypassing k, no sorbed fraction) yielded much closer correlations, with r(2) = 0.9 for Cd-0 vs OC, H+ activity, clay (log data, OC decreases C) and r(2) = 0.7 for Cd-z vs OC, H+ activity, clay (log data, OC enhances C).

Keywords: Cadmium, Freundlich, Isotherms, Multiple Regression, Prognosis, Scale, Soil, Soils, Sorption, Surface-Area

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Zeitschrift für Physik A Hadrons and Nuclei

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? Polányi, M. (1920), Adsorption from solutions of limited soluble substances. *Zeitschrift für Physik*, **2** (1), 111-116. (English)

Notes: IIsotherm

? Polányi, M. (1920), Adsorption aus lösungen beschränkt löslicher stoffe. *Zeitschrift für Physik*, **2** (1), 111-116.

Full Text: [-1959\Zei Phy2, 111.pdf](-1959/Zei%20Phy2,%20111.pdf)

? König, M. (1922), On gaseous adsorption in ultramicroscopic particles. *Zeitschrift fur Physik*, **11** (1), 253-259. (English)

Keywords: Adsorption

? König, M. (1922), Über Gasadsorption an ultramikroskopischen Teilchen. *Zeitschrift fur Physik*, **11** (1), 253-259.

Full Text: [-1959\Zei Phy11, 253.pdf](-1959/Zei%20Phy11,%20253.pdf)

? Statz, W. (1922), An experimental determination of true adsorption coefficients of x-rays. *Zeitschrift fur Physik*, **11** (1), 304-325. (English)

Keywords: Adsorption

? Statz, W. (1922), Eine experimentelle bestimmung des wahren absorptionskoeffizienten von harten röntgenstrahlen. *Zeitschrift fur Physik*, **11** (1), 304-325.

Full Text: [-1959\Zei Phy11, 304.pdf](-1959/Zei%20Phy11,%20304.pdf)

? Rudberg, E.G. and von Euler, H. (1923), Adsorption of silver salts on silver- and gold surfaces. *Zeitschrift fur Physik*, **13** (1), 275-283. (English)

Keywords: Adsorption

? Rudberg, E.G. and von Euler, H. (1923), Adsorption von silbersalzen an silber- und goldoberflächen. *Zeitschrift fur Physik*, **13** (1), 275-283.

Full Text: [-1959\Zei Phy13, 275.pdf](-1959/Zei%20Phy13,%20275.pdf)

? Grotrian, W. (1923), The adsorption spectra of some metal vapours. *Zeitschrift fur Physik*, **18** (1), 169-182. (English)

Keywords: Adsorption

? Grotrian, W. (1923), Die Absorptionsspektren einiger Metalldämpfe. *Zeitschrift fur Physik*, **18** (1), 169-182.

Full Text: [-1959\Zei Phy18, 169.pdf](-1959/Zei%20Phy18,%20169.pdf)

Notes: IIsotherm, highly cited

? Frenkel, J. (1924), Theory of the adsorption and related occurrences. *Zeitschrift für Physik*, **26**, 117-138. (English)

? Frenkel, J. (1924), Theorie der adsorption und verwandter erscheinungen. *Zeitschrift für Physik*, **26**, 117-138.

Full Text: [-1959\Zei Phy26, 117.pdf](-1959/Zei%20Phy26,%20117.pdf)

Notes: highly cited, IIsotherm

? Frumkin, A. (1926), Affectation of the adsorption of neutral molecules by means of electrical field. *Zeitschrift für Physik*, **35** (10), 792-802. (English)

Notes: highly cited, IIsotherm

? Frumkin, A. (1926), Über die beeinflussung der adsorption von neutralmolekülen durch ein elektrisches feld ein beitrag zur theorie der elektrokapillarkurven. *Zeitschrift für Physik*, **35** (19), 792-802.

Full Text: [-1959\Zei Phy35, 792.pdf](-1959/Zei%20Phy35,%20792.pdf)

? Schaefer, C. and Philipps, B. (1926), Adsorption spectrum of the carbonic acid and the shape of CO2 molecules. *Zeitschrift fur Physik*, **36** (9/10), 641-656. (English)

Keywords: Adsorption, CO2

? Schaefer, C. and Philipps, B. (1926), Das absorptionsspektrum der kohlensäure und die gestalt der CO2-molekel. *Zeitschrift fur Physik*, **36** (9/10), 641-656.

Full Text: [-1959\Zei Phy36, 641.pdf](-1959/Zei%20Phy36,%20641.pdf)

? Durau, F. (1926), The adsorption of gases on glass and silver power. *Zeitschrift fur Physik*, **37** (6), 419-457. (English)

Keywords: Adsorption

? Durau, F. (1926), Über adsorption von gasen an glas- und silberpulvern. *Zeitschrift fur Physik*, **37** (6), 419-457.

Full Text: [-1959\Zei Phy37, 419.pdf](-1959/Zei%20Phy37,%20419.pdf)

? Wegener, H. (1955), Adsorption von kalium auf quarzoberflachen. *Zeitschrift fur Physik*, **140** (5), 465-472. (English)

Keywords: Adsorption

? Wegener, H. (1955), Adsorption von kalium auf quarzoberflächen. *Zeitschrift fur Physik*, **140** (5), 465-472.

Full Text: [-1959\Zei Phy140, 465.pdf](-1959/Zei%20Phy140,%20465.pdf)

? Ort, W. (1961), Zum widerstandsverhalten sehr dunner wismutschchten, insbesondere bei der adsorption von sauerstoff. *Zeitschrift fur Physik*, **163** (2), 230-239.

Full Text: [1960-80\Zei Phy163, 230.pdf](1960-80/Zei%20Phy163,%20230.pdf)

Keywords: Adsorption

# Title: Zeitschrift für Physikalische Chemie-Abteilung A-Chemische Thermodynamik Kinetik Elektrochemie Eigenschaftslehre

Full Journal Title: Zeitschrift für Physikalische Chemie-Abteilung A-Chemische Thermodynamik Kinetik Elektrochemie Eigenschaftslehre

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ISSN: 0372-9656

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Stranski, I.N. and Kuleliew, K. (1929), Article on the isomorphic forth growth of ion crystals on top of each other. *Zeitschrift für Physikalische Chemie-Abteilung A-Chemische Thermodynamik Kinetik Elektrochemie Eigenschaftslehre*, **142** (6), 467-475

Keywords: Growth

? Fischbeck, K., Maas, H. and Meisenheimer, H. (1934), The adsorption isotherm. *Zeitschrift für Physikalische Chemie-Abteilung A-Chemische Thermodynamik Kinetik Elektrochemie Eigenschaftslehre*, **171** (5/6), 385-398.

? Dunken, H. (1940), A simple derivation of the Langmuir absorption isotherm. *Zeitschrift für Physikalische Chemie-Abteilung A-Chemische Thermodynamik Kinetik Elektrochemie Eigenschaftslehre*, **187** (2), 105-106.

# Title: Zeitschrift für Physikalische Chemie-Abteilung B-Chemie der Elementarprozesse Aufbau der Materie

Full Journal Title: Zeitschrift für Physikalische Chemie-Abteilung B-Chemie der Elementarprozesse Aufbau der Materie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0372-9664

Issues/Year: 12

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? de Boer, J.H. and Zwikker, C. (1929), Absorption as a consequence of polarisation. The absorption isotherm. *Zeitschrift für Physikalische Chemie-Abteilung B-Chemie der Elementarprozesse Aufbau der Materie*, **3** (6), 407-418.

? Roginsky, S. and Zeldowitsch, J. (1932), (Preliminary report.) - The question of the chain mechanism of the catalytic oxidation of hydrogen. *Zeitschrift für Physikalische Chemie-Abteilung B-Chemie der Elementarprozesse Aufbau der Materie*, **18** (4/5), 361-363.

# Title: Zeitschrift für Physikalische Chemie-Frankfurt

Full Journal Title: Zeitschrift für Physikalische Chemie-Frankfurt

ISO Abbreviated Title:

JCR Abbreviated Title: Z Phys Chem-Frankfurt

ISSN: 0044-3336

Issues/Year: 12

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

? Plieth, W.J. (1969), Kinetics of electrochemical reactions in adsorption layers on metal-electrolyte phase boundaries. *Zeitschrift für Physikalische Chemie-Frankfurt*, **67** (4-6), 178-??.

? Bockris, J.O.M. and Habib, M.A. (1975), Comparison of single and multiple imaging approaches to ionic adsorption-isotherm. *Zeitschrift für Physikalische Chemie-Frankfurt*, **98** (1-6), 43-60.

? Drachsel, W. and Becker, K.A. (1977), Adsorption of gaseous benzene in H-mordenite. 1. New model isotherm for zeolitic adsorption. *Zeitschrift für Physikalische Chemie-Frankfurt*, **106** (1-2), 33-44.

? Riedhammer, T.M., Melnicki, L.S. and Bruckenstein, S. (1978), Isotherm and electrosorption valency for underpotential deposits of silver on gold. *Zeitschrift für Physikalische Chemie-Frankfurt*, **111** (2), 177-192.

# Title: Zeitschrift für Physikalische Chemie (Leipzig)

Title: Journal for Physical Chemistry (English) (Z. Phys. Chem.)

Full Journal Title: [Zeitschrift fur Physikalische Chemie](http://www.oldenbourg.de/verlag/z-phys-chem/)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0044-3336

Issues/Year: 12

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

Impact Factor

Kooij, D.M. (1893), Über die Zersetzung des gasförmigen phosphorwasserstoffs. *Zeitschrift für Physikalische Chemie* (*Leipzig*), **12**, 155-161.

? Vriens, J. (1899), Adsorption. *Zeitschrift fur Physikalische Chemie* (*Leipzig*), **31**, 230-234.

Abstract: The adsorption taking place when a centinormal solution of nitric acid is passed through a number of filter papers is measured by determining the molecular conductivity of the liquid before and after filtration. The author concludes that the diminution of concentration is proportional to the number of filters employed.

Keywords: Adsorption

Notes: hghly cited, IIsotherm

Freundlich, H.M.F. (1906), Über die adsorption in lösungen. *Zeitschrift für Physikalische Chemie* (*Leipzig*), **57A**, 385-470.

Full Text: [-1959\Zei Phy Che57A, 385.pdf](-1959/Zei%20Phy%20Che57A,%20385.pdf)

Notes: highly cited

Freundlich, H.M.F. (1906), Concerning adsorption in solutions. *Zeitschrift für Physikalische Chemie-Stochiometrie und Verwandtschaftslehre*, **57** (4), 385-470.

Freundlich, H.M.F. (1906), Over the adsorption in solutions. *Journal for Physical Chemistry*, **57A**, 385-470. (English)

# Title: Zeitschrift für Physikalische Chemie-Leipzig

Full Journal Title: [Zeitschrift fur Physikalische Chemie](http://www.oldenbourg.de/verlag/z-phys-chem/), [Zeitschrift für Physikalische Chemie](http://www.extenza-eps.com/OLD/loi/zpch)

ISO Abbreviated Title:

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ISSN: 0942-9352

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Journal Country/Territory:

Language:

Publisher:

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Subject Categories:

: Impact Factor

? Kocirik, M. and Zikanova, A. (1972), Kinetics of adsorption in case of rectangular adsorption isotherm. *Zeitschrift für Physikalische Chemie-Leipzig*, **250** (3-4), 250-??.

? Blank, H. and Bulow, M. (1975), Combined isoster-isotherm measurement of adsorption equilibria. *Zeitschrift für Physikalische Chemie-Leipzig*, **256** (1), 199-204.

? Karger, J., Bulow, M. and Schirmer, W. (1975), Adsorption-kinetics of binary n-paraffin-benzol mixtures on synthetic zeolithes. 1. Experimental phenomenon and its significance. *Zeitschrift für Physikalische Chemie-Leipzig*, **256** (1), 144-152.

? Bulow, M., Karger, J., Vanphat, N. and Schirmer, W. (1976), Kinetics of gas-phase adsorption of hexane on NaX zeolite. 1. Discussion of sorption curves. *Zeitschrift für Physikalische Chemie-Leipzig*, **257** (6), 1205-1216.

? Goral, M. and Janaszewski, B. (1977), Problem of vapor non-ideality in barkers method of vapor-pressure isotherm data-processing. *Zeitschrift für Physikalische Chemie-Leipzig*, **258** (3), 417-425.

? Karger, J., Bulow, M. and Vanphat, N. (1976), Kinetics of gas-phase adsorption of hexane on NaX zeolite. 2. Comparison of sorption and NMR self-diffusion measurements on zeolites with different crystallite radii. *Zeitschrift für Physikalische Chemie-Leipzig*, **257** (6), 1217-1231.

? Goral, M. (1977), Error analysis in barkers method of vapor-pressure isotherm data-processing. *Zeitschrift für Physikalische Chemie-Leipzig*, **258** (6), 1040-1044.

? Gelbin, D., Roethe, K.P., Schon, G. and Struve, P. (1978), Pore diffusion and barrier resistance in adsorption-kinetics. *Zeitschrift für Physikalische Chemie-Leipzig*, **259** (3), 581-584.

? Radeke, K.H., Struve, P. and Ehrhardt, K. (1978), Evaluation of adsorption-kinetics studies at constant volume and variable pressure. *Zeitschrift für Physikalische Chemie-Leipzig*, **259** (3), 568-574.

? Miller, R. and Lunkenheimer, K. (1978), Adsorption-kinetics on fluid phase boundaries - numerical- solution for diffusion controlled adsorption process. *Zeitschrift für Physikalische Chemie-Leipzig*, **259** (5), 863-868.

? Kolasinska, G. and Oracz, P. (1979), Generalization of error analysis and problem of vapor non-ideality in barkers method of vapor-pressure isotherm data-processing. *Zeitschrift für Physikalische Chemie-Leipzig*, **260** (1), 169-173.

? Jaroniec, M., Patrykiejew, A. and Borowko, M. (1979), Some remarks on the Langmuir adsorption-isotherm. *Zeitschrift für Physikalische Chemie-Leipzig*, **260** (2), 221-224.

? Dabrowski, A. and Jaroniec, M. (1980), Application of isotherm equations to the adsorption from binary-liquid mixtures on heterogeneous surfaces for determining the surface phase capacity. *Zeitschrift für Physikalische Chemie-Leipzig*, **261** (2), 359-366.

? Patrykiejew, A., Jaroniec, M. and Marczewski, A.W. (1984), Application of the partially mobile adsorption model in studies of the temperature-dependence of adsorption-isotherms. *Zeitschrift für Physikalische Chemie-Leipzig*, **265** (1), 195-198.

# Title: Zeitschrift für Physikalische Chemie-International Journal of Research in Physical Chemistry & Chemical Physics

Full Journal Title: Zeitschrift für Physikalische Chemie-International Journal of Research in Physical Chemistry & Chemical Physics

ISO Abbreviated Title: Z. Phys. Chemie-Int. J. Res. Phys. Chem. Chem. Phys.

JCR Abbreviated Title: Z Phys Chem

ISSN: 0942-9352

Issues/Year: 5

Journal Country/Territory: Germany

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Publisher: R Oldenbourg Verlag

Publisher Address: Lektorat M/N, K Berber-Nerlinger, Postfach 80 13 60, D-81613 Munich, German

Subject Categories:

Chemistry, Physical: Impact Factor 0.861, 61/91 (2000)

Physics, Atomic, Molecular & Chemical: Impact Factor

# Title: Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre

Full Journal Title: Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0372-8501

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ikeda, K. (1900), Derivatives of reaction isotherms and reaction isochores for mixture dissociation. *Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **33** (3), 287-294

Keywords: Isotherms

? Braun, L. (1900), The absorption of nitrogen and hydrogen in acqueous solutions of various dissociated materials. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **33** (6), 721-739.

Keywords: Absorption, Hydrogen, Nitrogen

? Lorentz, H.A. (1901), The critical isotherm and the density of the saturated vapour and liquid of isopentane and carbonic acid. *Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre* , **36** (4), 509-510.

Keywords: Isotherm

? Gzn, N.Q. (1902), Isotherms for mixtures of hydrogen chloride and ethane. *Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **39** (1), 14-26.

Keywords: Isotherms

? Caubet, F. (1903), The form of the practical isothermism in gas mixtures. Revision. *Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **43** (1), 115-117.

? Preuner, G. (1903), The isotherm of yeast dissociation in 448(degrees). *Zeitschrift fur Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **44** (6), 733-753.

Keywords: Isotherm

? Freundlich, H.M.F. (1906), Concerning adsorption in solutions. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **57** (4), 385-470.

? Freundlich, H.M.F. and Losev, G. (1907), The adsoprtion of dyes by carbon and fibres. (An article on the theory of dyeing.). *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **59** (3), 284-312.

? Freundlich, H.M.F. (1907), Remarks on the treatise of M.W. Travers ‘adsorption and occlusion’. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **61** (2), 249-254.

? Freundlich, H.M.F. and Neumann, W. (1909), On the adsorption of dyeing materials. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **67** (5), 538-550.

? Freundlich, H.M.F. (1910), The impact of the adsorption in the precipitation of suspension colloid. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **73** (4), 385-423.

? Schmidt, G.C. (1910), On the adsorption of solutions. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **74** (6), 689-737.

? Schmidt, G.C. (1911), Adsorption of solutions. Second treatise. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **77** (6), 641-660.

? Freundlich, H.M.F. and Posnjak, E. (1912), The decrease in the rate of crystalisation as side effect of adsorption. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **79** (2), 168-176.

? Freundlich, H.M.F. and Schucht, H. (1913), The importance of adsorption in the precipitation of suspension-colloids. II. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **85** (6), 641-659.

? Freundlich, H.M.F. and Schucht, H. (1913), On the rate of adsorption decline in the conversion of mercury-sulphide from the amorphous form to a more crystalline form. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **85** (6), 660-680.

? von Georgievics, G. and Dietl, A. (1914), Information on the kinetics of sorption. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **87** (6), 669-691.

? Polanyi, M. (1914), Adsorption and capillarity from the stand point of the II. main clause. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **88** (5), 622-631.

? Polanyi, M. (1914), Adsorption and capillarity from the stand point of the II. main clause. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **88** (5), 622-631.

? Freundlich, H.M.F. and Hase, E. (1915), On the rate of decline in adsorption. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **89** (4), 417-463.

? Berenyi, L. (1920), Examination of the Polanyi theory of adsorption. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **94** (5-6), 628-662.

? Freundlich, H.M.F. and Wreschner, M. (1923), The adsorption of the uranium X-1 and thorium by means of coals. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **106** (5/6), 366-377.

? Polanyi, M. (1925), The influence of osmotic pressure and expansion pressure and adsorption. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **114** (5/6), 387-393.

? Furth, R. (1927), Adsorption-phenomena and diffusion-phenomena in electrical fields. Theoretical comments on the homonymous work. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **126** (3/4), 238-246.

? Goldmann, F. and Polanyi, M. (1928), Adsorption of coal vapour and the heat expansion in the moistening layer. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **132** (5/6), 321-370.

? Polanyi, M. and Welke, K. (1928), Adsorption, adsorption heat and bond character of coal sulphur dioxide in small allocations. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **132** (5/6), 371-383.

? Heyne, W. and Polanyi, M. (1928), Adsorption from solutions. (Adsorbents: Coal, Adsorptives: Limited soluble compounds.). *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **132** (5/6), 384-398.

? Schmidt, O. (1928), Experimental articles on the theory of sorption. (2. Announcement on the mechanism of heterogenic catalysis.). *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **133** (3/4), 263-303.

? Polanyi, M. (1928), Application of Langmuir’s theory to the adsorption of gases to charcoal. *Zeitschrift für Physikalische Chemie--Stochiometrie und Verwandtschaftslehre*, **138** (6), 459-462.

# Title: Zeitschrift für Physikalische Chemie-Wiesbaden

Full Journal Title: Zeitschrift für Physikalische Chemie-Wiesbaden

ISO Abbreviated Title:

JCR Abbreviated Title: Z Phys Chem-Wiesbaden

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Corma, A. and Garciafierro, J.L. (1980), The role of the energetics of the adsorption equilibrium in kinetic-studies. 1. Catalytic isomerization of xylenes. *Zeitschrift für Physikalische Chemie-Wiesbaden*, **120** (2), 243-254.

# Title: Zeitschrift für Physik

Full Journal Title: Zeitschrift fur Physik

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Polanyi, M. (1920), Adsorption from solutions of limited soluble substances. *Zeitschrift für Physik*, **2**, 111-116.

# Title: Zeitschrift fur Slawistik

Full Journal Title: Zeitschrift fur Slawistik

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Siegel, H. (2001), Russian literary journals 1800-1812. A complete index according to author and subject category. *Zeitschrift fur Slawistik*, **46** (1), 115-117

Keywords: Author, Journals, Subject Category

# Title: Zeitschrift für Sozialpsychologie

Full Journal Title: Zeitschrift fur Sozialpsychologie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0044-3514

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Schutz, H. and Six, B. (1994), More than 7000 pages of social-psychology: A journal in retrospect. *Zeitschrift für Sozialpsychologie*, **25** (1), 5-17.

Abstract: On the occasion of the 25th anniversary of the Zeitschrift fur Sozialpsychologie the 556 articles published between 1970 and 1993 were content analysed. Based on a category schema with 14 general content domains and 33 subthemes a global analysis of all articles was performed. Additionally, a subsample of 251 articles about empirical studies was analysed. Compared to previous bibliometric approaches in this and other journals in the area of social psychology, it can be shown that the Zeitschrift fur Sozialpsychologie corresponds by and large to its own image: being a journal with high methodological standards. Furthermore, in recent years there has been a strong tendency to deal with topics of public interest, and to treat the relation between basic and applied research in a more balanced way

Keywords: Analysis, Bibliometric, Empirical Studies, FUR, General, Journal, Journals, Psychology, Public, Research, Schema, Social, Standards

? Krampen, G., Schui, G. and Montada, L. (2004), International dissemination of social psychology from the German-speaking countries. *Zeitschrift für Sozialpsychologie*, **35** (2), 83-91.

Abstract: With reference to the discussion on the internationality of psychology from the German-speaking countries the international dissemination of social psychology from, the German-speaking countries is compared with the total of the other psychological research sub-discipline’s. Bibliometrical results point at significant increase in the proportion of English publications from social psychology since 1980, being approximately twice as large as the proportion of English publications from the total of all other psychological research disciplines. and mostly marked as social cognition research, Citation analyses show that papers from social psychology are on average more frequently cited in international journals than publications from the total of all other, disciplines. Results of an E-Mail-survey (N = 564) confirm that the international strength of social psychology from the German-speaking countries is due to the number of English publications as well as to contributions in international peer-reviewing, memberships in psychological associations, stays abroad and research co-operations.

Keywords: Social Psychology, Research, Publications, Internationalisation, Citations, Bibliometry, Science Research, Germany, Austria, Switzerland, Provincialism, Language, English, Publish

? Krampen, G. and Schui, G. (2006), Historiography of research on aggression in the last quarter of the 20th century: Comparative bibliometrical analyses of psychological research in the German-speaking and Anglo-American research community. *Zeitschrift für Sozialpsychologie*, **37** (2), 113-123.

Abstract: The development of psychological research on aggression between 1977 and 2003 is described and reviewed with reference to publications documented in the databases PsycEJFO (with its focus on the Anglo-American literature) and PSYNDEX (focus on publications from the German-speaking countries). Bibliometrical results refer to general historiographical trends in aggression research as well as to developments in social psychology (i.e., aggressive, antisocial behavior), personality research (i.e., aggressiveness), and in research on violence and aggression in micro-, meso-, macro-systems, criminal behavior, victimization, and clinical settings. Additionally, main foci of research on aggression are described based on the distinction of basic and applied psychological research. All bibliometrical analyses follow a comparative and historiographical approach pinpointing essential similarities as well as differences in the development of aggression research in the Anglo-American and the German-speaking research communities.

Keywords: Aggression, Analyses, Anglo-American, Approach, Behavior, Clinical, Community, Databases, Development, General, Literature, Personality, Psychology, Publications, Research, Social, Trends, Violence

# Title: Zeitschrift fur Klinische Psychologie Psychiatrie und Psychotherapie

Full Journal Title: Zeitschrift fur Klinische Psychologie Psychiatrie und Psychotherapie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject ies:

: Impact Factor Categor

? Decker, O. and Brahler, E. (2001), On books and journals - Discussion of the evaluation of scientific performance in culturally and linguistically bound disciplines in medicine. *Zeitschrift fur Klinische Psychologie Psychiatrie und Psychotherapie*, **49** (3), 235-246.

Abstract: The financial support of scientific institutions more and more depends on evaluating programms. Different modells of evaluation purposes are discussed. The number of journal articels published by scientist and the international distribution of articels are used for academic evaluation purposes. On the basis of bibliometric features, the citations of the ‘Zeitschrift ftir Klinische Psychologic, Psychiatric und Psychotherapie’ is recorded. Based on this records, there is a discussion on the significance of the competition indicators for quality-assurance of articels

Keywords: Behavior, Bibliometric, Chronic Illness, Citations, Depressive-Disorders, Differential-Diagnosis, German, Journals, Life, Patient, Psychotherapeutic Interventions, Schizophrenics, Viewpoint

? Berth, H., Petermann, F., Dinkel, A. and Brahler, E. (2005), Clinical psychology, psychiatry and psychotherapy - All under one umbrella? *Zeitschrift fur Klinische Psychologie Psychiatrie und Psychotherapie*, **53** (4), 370-382.

Abstract: For more than 50 years, the journal ‘Klinische Psychologie, Psychiatrie und Psychotherapie’ (Clinical Psychology, Psychiatry and Psychotherapy) has been one of the leading journals for articles of the corresponding psychological branches. Regarding the progressing specialization and differentiation of these branches the question arises, if one journal alone can still cover this thematical width. To answer this question, the complete releases of the years 2003 and 2004 of the journal were bibliometrically analyzed regarding a) the presence of the scientific sectors in the article titles and b) their textual focuses. Overall 43 articles were released in the given timeframe. About 25 % each accounted for Clinical Psychology and for Psychotherapy, whereas Psychiatry was hardly represented at all. Furthermore there was a relatively broad publication of articles on the subjects of Medical Psychology and test development. Textual focuses were composed of the prevalences of diverse psychological disorders and of the predictors for the success of psychotherapy. The results basically confirm the journals title, but likewise offer indications for possible changes.

Keywords: Adolescents, Bibliometrics, Child, Clinical Psychology, Disorder, Experiences, German-Language Version, Journal, Phenomenology, Psychiatry, Psychotherapy, Publication, Questionnaire, Representative Sample, Symptomatology, Therapy

# Title: Zeitschrift fur Klinische Psychologie und Psychotherapie

Full Journal Title: Zeitschrift fur Klinische Psychologie und Psychotherapie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0084-5345

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Krampen, G., Miller, M. and Montada, L. (2002), Bibliometrical results on the history of clinical psychology in the 20th century. *Zeitschrift fur Klinische Psychologie und Psychotherapie*, **31** (2), 121-126.

Abstract: Background: Bibliometrical results on the development of clinical psychology publications with historiographical orientation in the 20th century are presented. Research questions: How can the history of clinical psychology and of its research domains be reconstructed biometrically with reference to the publications in international psychology and psychology from the German-speaking countries? Methods: Databases are the Psychological Abstracts (1927-1966), PsycLit (1967-1999) and PSYNDEX (1977-1999), in which psychological publications are documented relatively exhaustively. Results: Historiographically described are (1) the bibliometrically clearly demonstrable boom of clinical psychology publications since the 1950s, (2) the relatively low rate of psychotherapeutically relevant publications in comparison to those concerning disorders, health services, hospital programs, and rehabilitation, and (3) the relatively low rate of empirical and experimental (controlled) studies published on psychotherapy in contrast to all other domains of applied psychology. Consequences: There has been a clear boom of clinical psychology publication output since the 1950s in international psychology, as well as psychology from the German-speaking countries. However, there are publication deficits in the domain of psychotherapy and especially in the domain of experimental and broader empirically founded studies. Problems of bibliometric analyses are discussed as well as the implications of the results for the future of clinical psychology, especially psychotherapy research.

Keywords: History of Psychology, Clinical Psychology, Psychotherapy, Mental Disorders, Bibliometry

# Title: Zeitschrift fur Psychiatrie Psychologie und Psychotherapie

Full Journal Title: Zeitschrift fur Psychiatrie Psychologie und Psychotherapie

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Stengler, K., Glaesmer, H. and Dietrich, S. (2011), Gender in mental health research: A bibliometric analysis. *Zeitschrift fur Psychiatrie Psychologie und Psychotherapie*, **59** (4), 305-310.

Full Text: 2011\Zei Psy Psy Psy59, 305.pdf

Abstract: Are gender specific aspects reflected in current psychiatric-psychotherapeutical research in Germany? The analysis is based on original research published in three German journals (Psychotherapeut; Psychiatrische Praxis; Psychotherapie . Psychosomatik . Medizinische Psychologie) in 2009 and 2010. Gender specific aspects were examined in only 16 out of 191 papers. Only three of these 16 papers reported results for both genders. Though the number of papers with male and female first authorship was roughly equal in all papers reviewed, more than two thirds (69 %) of the papers dealing with gender specific aspects have been written by women. Most papers referred to gender in the sample characteristics, however, only 25 % of the papers actually included gender in their statistical analyses. Even though gender has a strong impact on mental health and mental illness, to date, gender differences still appear to have been insufficiently addressed. More attention should be given to gender-specific results. This will facilitate gender-specific inferences and appropriate healthcare decisions.

Keywords: Analysis, Attention, Authorship, Bibliometric, Borderline Personality-Disorder, Depression, Differences, Effort-Reward Imbalance, Female-Patients, Gender, Germany, Impact, Institutionalization, Journals, Male, Medical Psychology, Mental Health, Mental Illness, Papers, Psychiatry, Psychotherapy, Questionnaire, Rehabilitation, Research, Schizophrenia, Sex, Statistical, Women

# Title: Zeitschrift für Psychosomatische Medizin und Psychotherapie

Full Journal Title: Zeitschrift fur Psychosomatische Medizin und Psychotherapie

ISO Abbreviated Title: Z. Psychosom. Med. Psychother.

JCR Abbreviated Title: Z Psychosom Med Psyc

ISSN: 0340-5613

Issues/Year: 4

Journal Country/Territory: Germany

Language: English

Publisher: Vandenhoeck & Ruprecht

Publisher Address: Theaterstrasse 13, Postfach 77, W-37070 Gottingen, Germany

Subject Categories:

Psychiatry Psychology: Impact Factor

? Leiberich, P., Averbeck, M., Grotekusch, M., Schroeder, A., Olbrich, E. and Kalden, J.R. (1993), Life quality of cancer-patients as a multidimensional concept. *Zeitschrift für Psychosomatische Medizin und Psychoanalyse*, **39** (1), 26-37.

Abstract: An important aim of supportive care for cancer patients (pts) is the maintenance or improvement of their life quality. Therefore it is interesting to measure pts’ LQ while testing new cytotoxic drugs or palliative therapy like artificial nutrition. A short questionnaire also is helpful in order to inform physicians and psychooncologists about pts’ needs for psychosocial intervention. Based on coping-research, gerontology and well-being-psychology we have developed a 69-item-questionnaire ‘Scales for Measuring LQ’ with good test-statistics. This instrument emphasizes pts’ life experiences and subjective appraisal of objective life conditions. Basic state, internalized life experiences and life orientations in a sample of 179 pts with chemo-or radiotherapy are more important for LQ than objective symptoms, subjectively perceived physical condition and mood. The surprisingly high LQ scores in cancer pts can best be explained by their reduced aspiration levels. Correlations with emotional and belonging support obtained from the partner or confidant are significant. Social support is before all related to our pts’ positive life experiences (.68, .59) and to their life satisfaction (.58, .47).

Keywords: Index, Life Quality-Transaction Between Person and Environment, Chemotherapy, Questionnaire, Multidimensional Approach

? Decker, O. and Brahler, E. (1998), Quality control and bibliometric features - publications in psychosomatic medicine examplified by the *Zeitschrift für Psychosomatische Medizin und Psychoanalyse*. *Zeitschrift für Psychosomatische Medizin und Psychoanalyse*, **44** (4), 370-384.

Abstract: First, on the basis of bibliometric features, the publication of the Zeitrchrift fur Psychsomatische Medizin und Psychoanalyse is recorded. Based on this record, there is a discussion on the significance of competition indicators for the quality-assurance of scientific works. In a first step the sources quoted by the authors are described: These are indicators for the scientific issues aimed by the publishers and thus an internal definition of quality. In a second step, the criterion of quality is to be judged by means of a general rating. It is the intention of the authors to take up on a discussion stimulated by Buddeberg (1998).

Keywords: Bibliometrics, Quality Control, Peer Review, Standardized Publication, Impact Factor, Operationalized Psychodynamic Diagnosis, Concept Topical Conflict, Psychogenic Disorders, Somatic Diseases, Psychotherapy, Emotions, Biography, Adaptation, Anxiety, System

? Brahler, V.E. and Ruger, U. (2004), The most frequently cited articles in the SCI and SSCI of the *Zeltschrift für Psychosomatische Medizin und Psychotherapie* (*Journal of Psychosomatic Medicine and Psychotherapy*) - A review and analysis. *Zeitschrift für Psychosomatische Medizin und Psychotherapie*, **50** (4), 430-440.

Full Text: [2004\Zei Psy Med Psy50, 430.pdf](2004/Zei%20Psy%20Med%20Psy50,%20430.pdf)

Abstract: Aim: We investigate which articles out of the entire fifty volumes of the Zeitschrift far Psychosomatische Medizin und Psychotherapie (Journal of Psychosomatic Medicine and Psychotherapy (Psychoanalysis)) have been most frequently cited. These articles are analysed according to the groups of authors and topics. Methods: The citation frequency was determined in the source journals listed by the ISI and contained in the SCI and SSCI data banks. Results: 58 articles were cited at least ten times, and five of these articles were cited at least twenty times. One article was cited 45 times and thus was the top runner. The authors who are particularly important in their specialized areas dominated, and the most frequently cited articles were distributed quite evenly in both psychosomatic and psychotherapeutic topics. Discussion: A relatively large number of articles in this journal have a sustained influence among experts in the field. Since there are not many of German journals listed in the ISI data banks or have only recently been included by them, the number of citations is most likely considerably higher.

Keywords: Analysis, Authors, Citation, Citations, Crohns-Disease, Dermatological Artifacts, Inpatient Psychotherapy, Journal, Journals, Life-Events, Patient, Psychogenic Disorders, Risk-Factors, Sci, Self, Therapy, Ulcerative-Colitis

? Petermann, F., Schussler, G. and Glaesmer, H. (2008), Is evidence-based assessment fact or fiction? A bibliometric analysis of three German journals. *Zeitschrift für Psychosomatische Medizin und Psychotherapie*, **54** (4), 393-408.

Abstract: Objectives: Despite the ongoing process for the development and dissemination of empirically supported treatments, little attention has been paid to the development of evidence-based diagnostics. The article aims at evaluating diagnostic procedures and instruments ill current clinical research in terms of evidence-based assessment. Methods: Volums 2006 and 2007 of three German psychological journals “Psychotherapeut,” “Psychotherapie, Psychosomatik und Medizinische Psychologic,” and “Zeitschrift fur Psychiatrie, Psychologie und Psychotherapie” were screened for empirical reports and articles dealing with diagnostic issues. 93 articles were identified and evaluated. Results: Most Studies used psychometrically valid and established instruments for assessment. However, diagnostic interviews were relatively scarce, as were multimodal assessments. Measures used for outcome evaluation often lacked evidence of sensitivity to change. Conclusion: Clinical assessment to date does not meet criteria for evidence-based diagnostics. Implications for research and guideline development are discussed.

Keywords: Analysis, Assessment, Assessments, Attention, Behavior-Therapy, Bibliometric, Bibliometric Analysis, Change, Clinical, Clinical Diagnostics, Clinical Research, Criteria, Depressive Personality-Disorder, Development, Diagnostic Guidelines, Diagnostics, Empirical, Established Psychological Psychotherapists, Evaluation, Evidence, Evidence Based, Evidence-Based, Evidence-Based Assessment, Fur, Guideline, Inpatient Treatment, Interviews, Journals, Meta-Content Analysis, Outcome, Outcome Evaluation, Posttraumatic-Stress-Disorder, Procedures, Process, Psychiatric Comorbidity, Psychological, Quality-of-Life, Research, Screening Instrument, Sensitivity, Somatoform Disorders

? Petermann, F. and Schussler, G. (2010), Psychotherapy research in the German-speaking community - A bibliometric analysis of three journals. *Zeitschrift fur Psychosomatische Medizin und Psychotherapie*, **56** (3), 297-313.

Full Text: [2010\Zei Psy Med Psy56, 297.pdf](2010/Zei%20Psy%20Med%20Psy56,%20297.pdf)

Abstract: Objectives: Psychotherapy research has often been considered a neglected topic in clinical psychology, psychosomatic medicine, and psychiatry because of its massive organizational and financial demands. However, it is unclear whether this assumption actually reflects the research activities in the field. Methods: We conducted a bibliometric analysis of the annual volumes for 2008 and 2009 of three clinical journals published in German. All publications referring to facets of psychotherapy research were analysed. Results: About 30% of the publications dealt with issues of psychotherapy research. Outcome and process studies were about equally distributed. Process research frequently focused on patient variables as outcome predictors. Outcome studies most often presented effectiveness studies with rather small sample sizes. Conclusion: Psychotherapy research is a well-represented and multifaceted field in the German speaking research community. However, the traditional distinction between efficacy and process research among the various schools of psychotherapy research may be hampering further developments in this branch. The government-funded research networks may turn out to be promising approaches to overcoming some of the obstacles of classic psychotherapy research. Z Psychosom Med Psychother 56/2010, 297-313.

Keywords: Analysis, Anxiety Disorders, Bibliometric, Bibliometric Analysis, Bmbf Research Networks, Clinical Psychology, Cognitive-Behavioral Therapy, Day Clinic Treatment, Depressive-Disorders, Efficacy Studies, F, Field, Germany, Journals, Medicine, Networks, Panic Disorder, Patient, Personality-Disorders, Process, Process Studies, Psychiatry, Psychodynamic Psychotherapy, Psychology, Psychotherapy, Psychotherapy Research, Publications, Randomized Controlled-Trial, Research, Research Network, Social Phobia

# Title: Zeitschrift des Vereines Deutscher Ingenieure

Full Journal Title: Zeitschrift des Vereines Deutscher Ingenieure

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0341-7255

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Thomae, C. (1900), The World’s Fair in Paris 1900. Purification of drinking water by ozone. *Zeitschrift des Vereines Deutscher Ingenieure*, **44**, 1685-1688.

? Wolff, L.C. (1904), Tests on the utilisation of peat. *Zeitschrift des Vereines Deutscher Ingenieure*, **48** (24), 887-892.

? Landsberg, ?? (1923), Lignite and peat as locomotive fuels. *Zeitschrift des Vereines Deutscher Ingenieure*, **67** (??), 263-264.

# Title: Zeitschrift für Wasser- und Abwasser-Forschung-Journal for Water and Wastewater Research-Acta Hydrochimica et Hydrobiologica

Full Journal Title: Zeitschrift für Wasser- und Abwasser-Forschung-Journal for Water and Wastewater Research-Acta Hydrochimica et Hydrobiologica

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0044-3727

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Chmielewska-Horvathova, E., Konecny, J. and Bosan, Z. (1994), Ammonia removal from tannery wastewaters by selective ion-exchange on Slovak clinoptilolite. *Zeitschrift für Wasser- und Abwasser-Forschung-Journal for Water and Wastewater Research-Acta Hydrochimica et Hydrobiologica*, **5**, 269-272.

Abstract: The purpose of the work was to verify and demonstrate, on a pilot plant scale, the applicability of the Slovak clinoptilolite as a natural selective ion exchanger for the removal of ammonia from tannery wastewaters. During the pilot treatment experiments at an industrial wastewater treatment plant of the Shoe Manufacturing Industry Svit-Otrokovice, about 260 m3 of wastewaters were treated. The regeneration process was carried out with 2% NaCl (pH = 9, NaOH) and the eluate was distributed into 3 fractions. Only the most concentrated ammonia fraction was stripped in the renovation step. The economic efficiency of the studied method was compared with the biological nitrification-denitrification method.

Keywords: Tannery Waste-Water, Ammonia Removal, Ion Exchange, Ammonia Stripping

# Title: Zentralblatt fur Bakteriologie Mikrobiologie und Hygiene Series A-Medical Microbiology Infectious Diseases Virology Parasitology

Full Journal Title: Zentralblatt fur Bakteriologie Mikrobiologie und Hygiene Series A-Medical Microbiology Infectious Diseases Virology Parasitology

ISO Abbreviated Title: Zentralbl Bakteriol Mikrobiol Hyg A

JCR Abbreviated Title:

ISSN: 0174-3031

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Guinée, P.A. and Jansen, W.H. (1987), Serotyping of Aeromonas species using passive haemagglutination. *Zentralblatt fur Bakteriologie Mikrobiologie und Hygiene Series A-Medical Microbiology Infectious Diseases Virology Parasitology*, **265** (3-4), 305-313.

Abstract: Antisera were raised with heat-killed vaccines prepared from 25 Aeromonas hydrophila strains, 4 A. sobria strains and one A. caviae strain. Twenty-seven of these 30 antisera gave high titers when tested in the microtiter tray agglutination (MTA) test with their homologous antigen heated at 100°C for 30 min. Three O antisera gave low titers in the MTA test but reacted to high titers in the haemagglutination (HA) test with conserved sheep red blood cells coated with alkali-treated heat extract. All 27 antisera showing high titers in the MTA test, showed even higher titers in the HA test. Therefore, the HA technique was employed to type 306 strains isolated from surface and drinking water, from food samples and from faeces of human patients with diarrhea. of 155 A. hydrophila strains 21 (14%) could not be typed. For A. sobria and A. caviae, the percentage of untypable strains was 46% and 68% respectively. Many A. sobria and A. caviae strains reacted to titer in A. hydrophila O antisera. A limited number of strains reacted to titer in more than one specific O antiserum. Immunoelectrophoretic studies indicated that the O antigen is often represented by more than one precipitation line and that true K antigens occur in Aeromonas.

# Title: Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin

(Zentralbl. Bakteriol. Mikrobiol. Hyg. [B])

Full Journal Title: Zentralblatt fur Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0174-3015

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Frank, C. and Dott, W. (1985), Nitrate-removal from drinking-water by biological denitrification. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin*, **181** (1-2), 18.

? Takács, S. (1987), Nitrate content of drinking water and tumours of the digestive organs. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin*, **184** (3-4), 269-279.

Abstract: A survey of malignant tumours involving the digestive organs and the bladder registered in 7 districts and 5 towns in the County of Borsod was conducted. Between 1967 and, (1983), the number of registered cases of tumours involving the digestive organs (including liver) was 3558 (incidence rate 691.6%) and that of bladder tumours amounted to 293 (incidence rate 56.9%). Males were more frequently affected than females with these types of tumour. Among the lesions of the digestive tract gastric tumours prevailed followed by tumours of the colon and of the rectum. The nitrate and nitrite contents of the drinking water consumed by the patients were also investigated. The average values were compared with the tumour incidence rate of the respective area. In most areas, the trend coincided i.e. lower morbidity was associated with lower average nitrate values. The data available revealed that about two-thirds (64.0%) of tumour cases affecting the digestive organs were living in areas where the nitrate concentration of drinking water was over 100 mg l-1. Analyses based on the various types of disease yielded similar results. The incidence of tumours in patients, drinking water with a nitrate content of 0 to 100 mg l-1 was 34.1 to 41.1%. The possible inter relationships between these figures are analysed and the implementation of additional epidemiologic and pathophysiologic investigations are suggested.

? Inoue, M., Nakashima, H., Ishida, T., Tsubokura, M. and Sakazaki, R. (1988), Isolation of Yersinia pseudotuberculosis from water. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin*, **186** (4), 338-343.

Abstract: In recent years, a number of sporadic or community infections of Yersinia pseudotuberculosis were observed in several mountain area of Okayama Prefecture, Japan. Epidemiological observations strongly suggested that drinking water in those areas, i.e. non-chlorinated water from mountain stream or wells, must be the source of the infection, so we examined the waters from the epidemic areas to detect the organisms. The examinations revealed the germs in the waters, the contamination rate of water from the northern areas is higher than that from the southern urban regions. The isolation procedures for the germs were also studied and improved. The media added with blood or hemin proved to be better for isolation of the organism.

? Aleksic, S. and Bockemühl, J. (1988), Serological and biochemical characteristics of 416 Yersinia strains from well water and drinking water plants in the Federal Republic of Germany: Lack of evidence that these strains are of public health importance. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin*, **185** (6), 527-533.

Abstract: A total of 416 Yersinia strains from well water and drinking water plants in the Federal Republic of Germany was analysed at the National Reference Centre for Salmonella, Hamburg, in the period 1982 to 1987. of these, 341 (82%) strains were Y. enterocolitica, 46 (11%) strains were Y. intermedia, 24 (5.8%) strains were Y. frederiksenii, and 5 strains (1.2%) Y. kristensenii. The serogroups O (3), O (9), and O (5), 27 which in Central Europe are associated with human disease, were not isolated. Seventy-two strains from treated drinking water were characterized by a newly identified combination of O-antigenic factors, i.e. O (6), 30, 47, and 130 strains possessed a hitherto unknown O-antigen, O (5)9. These strains were furthermore associated with a new fimbrial antigen [K3] and a new flagellar antigen [x]. Thus, the majority of Y. enterocolitica strains cultured from drinking water plants was characterized by a rather uniform antigenic pattern which was markedly different from strains isolated from patients. Virulence tests (calcium dependency and autoagglutination at 37°C) were negative in all instances. It is concluded from the results of this study that Yersinia isolates from drinking water plants are of environmental origin without pathogenic importance.

? Inoue, M., Nakashima, H., Ishida, T. and Tsubokura, M. (1988), Three outbreaks of yersinia pseudotuberculosis infection. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene Serie B-Umwelthygiene Krankenhaushygiene Arbeitshygiene Praventive Medizin*, **186** (5-6), 504-511.

Abstract: Three outbreaks of Yersinia pseudotuberculosis infection during 1982 to 1984 in Okayama Prefecture, Japan are described. In outbreak A, Yersinia pseudotuberculosis a causal organism was detected in 16 patients (serotype 5A). The latent period of the infection was 2 to 20 days estimating, from time of ingesting food suspected of being contaminated and onset of the illness. Outbreak B and C occurred in remote mountain areas. In outbreak B, Yersinia pseudotuberculosis bacilli were detected in the feces of 35 out of 276 people (serotype 4B in 34 stools, 2C and 4B in one stool). In outbreak C, 12 children became sick, one of the 4 patients whose stools were examined, showed an organism belonging to serotype 4B. The inhabitants in the area of outbreak B and C took unchlorinated mountain stream and well water for drinking. After the outbreak B and C, we examined water and wild animals fecea in these areas for the bacilli. As a result, they were detected in 3 out of 51 water samples (serotype 4A in one, 6 in 2 samples) and 2 out of 57 wild animal fecal samples (serotype 2C in 2 samples) in B area, and 4 out of 33 water samples (serotype 4A in 2, 4B in 2 samples) in C area.

# Title: Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Erste Abteilung Originale. Reihe B: Hygiene, präventive Medizin

Continues In Part: Archiv für Hygiene und Bakteriologie

Continued By:Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. 1. Abt. Originale. Reihe B. Hygiene, Betriebshygiene, präventive Medizin

Full Journal Title: Zentralblatt für Bibliothekswesen

ISO Abbreviated Title: Zentralbl Bakteriol Orig B

JCR Abbreviated Title:

ISSN: 0300-9661

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Velimirovic, B., Subramanian, M. and Sadek, F. (1975), Socio-economic and environmental factors and human health example of cholera El Tor in Manila. *Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Erste Abteilung Originale. Reihe B: Hygiene, präventive Medizin*, **160** (1), 1-27.

Abstract: The environmental health factors relevant to the occurrence of cholera in an urban milieu (Manila) have been studied. Cholera has been found to be a disease significantly more prevalent in the areas with lowest environmental condition. Association have been found between the disease incidence and several socioeconomic variables: population density, water and sewer connections each per 1000 population and squatter/slum dweller density. The correlation between cholera incidence and population density was found to be statistically significant at 5% level. A multiple regression analysis showed that the variations in cholera incidence were explained to the extent of 53.23% by the three variables-population density, water and sewer connections. In a check, using data for several years, positive correlations were found between incidence rates and the number of persons per sanitary facility, overcrowding, and density per square kilometer. The association between cholera and the low levels of socioeconomic conditions has been examined in a detailed study of a sample of 711 patients during the cholera season 1971-72. The socioeconomic profile of the sample places the patients in the least affluent part of the community.-The paper points out the need for priority of urban redevelopment in areas of maximum health risk.

? Mossel, D.A., van Ekeren, A.J. and Eelderink, I. (1977), A simplified procedure for the examination of drinking water for bacteria of public health significance: The differential hydrobacteriogramme. *Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Erste Abteilung Originale. Reihe B: Hygiene, präventive Medizin*, **165** (5-6), 498-516.

Abstract: A new method is described which can be used for the examination of piped drinking water. It is also suitable for monitoring water which was initially of potable quality, and is intended for reuse in the food industry. The method is based on CLARK’s ‘P-A test’ and, because this allows many bacterial types to be detected, i.e. Enterobacteriaceae, E. coli, P. aeruginosa, Aeromonadaceae and LANCEFIELD group D streptococci it is called differential hydrobacteriogramme. A preliminary resuscitation treatment to revive sublethally injured cells is essential in this procedure. In earlier work this was attained by adding an equal volume of double strength nutrient broth and later double strength MACCONKEY purple broth, making the method somewhat bulky. In the new procedure, after the resuscitation step, a concentrated bile salts/indicator solution is added, allowing subsequent selective enrichment of the taxa sought. Positive enrichment cultures are examined for these organisms by the procedures summarized in Fig. 1. The new method, when tested on approx. 150 artificially inoculated and 92 natural samples, showed the same productivity and selectivity as the one introduced earlier. The new method is recommended for routine monitoring purposes, because it is less bulky.

# Title: Zentralblatt für Bibliothekswesen

Full Journal Title: Zentralblatt für Bibliothekswesen

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 0044-4081

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Mann, G. (1980), Bibliometric analysis of a scientific-technological information-retrieval from the viewpoint of selective dissemination of information. *Zentralblatt für Bibliothekswesen*, **94** (8), 353-362.

# Title: Zentralblatt für Hygiene und Umweltmedizin

Full Journal Title: Zentralblatt fur Hygiene und Umweltmedizin

ISO Abbreviated Title: Zent.bl. Hyg. Umweltmed.

JCR Abbreviated Title: Zbl Hyg Umweltmed

ISSN: 0934-8859

Issues/Year: 5

Journal Country/Territory: Germany

Language: Multi-Language

Publisher: Gustav Fischer Verlag

Publisher Address: Villengang 2, D-07745 Jena, Germany

Subject Categories:

Public, Environmental & Occupational Health: Impact Factor 0.261, 79/85

Infectious Diseases Microbiology: Impact Factor 0.261,

? Rajan, S., Azariah, J. and Bauer, U. (1990), Trihalomethane levels in Madras public drinking water supply system and its impact on public health. *Zentralblatt für Hygiene und Umweltmedizin*, **189** (4), 312-332.

Abstract: It is known that trihalomethanes (THM) are formed during chlorination of drinking water for disinfection. Heightened concern about these substances is due to the fact that THMs are now characterized as potential mutagen, carcinogen and teratogen. Thus, it is a risk factor in human beings. In the present study, a total number of 13 stations located in different drinking water trunk mains of the city of Madras were analysed for THM using the Gas Liquid Chromatographic method. It is reported that THM are formed after treatment of raw water with chlorine at the levels required for disinfection. The THM level in drinking water increased towards the dead-end of the water trunk mains. A relationship between the distance travelled by the potable water and the level of THM was established. At certain stations, the total trihalomethanes level (TTHM) was found to exceed the EPA’s maximum contaminant level. Further, an intermittent addition of the precursors for the formation of THM through the seepage of polluted River Cooum water into the pipe lines has been demonstrated. An experiment on the trihalomethane formation potential (THMFP) clearly revealed the occurrence of higher magnitude of humic substances in source water. Therefore, it is suggested that if suitable steps are not taken, various environmental factors may trigger the THM kinetics. Hence, it is obvious that pretreatment regulations proposed by developed countries are essential if safe drinking water is to be supplied to the people of Madras.

? Havelaar, A.H., Versteegh, J.F. and During, M. (1990), The presence of Aeromonas in drinking water supplies in The Netherlands. *Zentralblatt für Hygiene und Umweltmedizin*, **190** (3), 236-256.

Abstract: The occurrence of Aeromonas in raw, treated and distributed waters of 20 different treatment stations in the Netherlands was studied over a one-and-a-half year period. River water yielded highest numbers (greater than 10,000 cfu/100 ml) of predominantly anaerogenic strains. In open storage reservoirs for river water or dune infiltrate, numbers were usually between 1,000 and 10,000/100 ml with a majority of aerogenic strains, in particular A. sobria. River water after dune infiltration or pure dune water, collected in closed systems, as well as aerobic or anaerobic groundwater, were usually free of Aeromonas in 100 ml. Treated waters showed low counts (usually less than 10 cfu/100 ml), irrespective of raw water source. Regrowth of aeromonads occurred in 16 out of 20 distribution systems examined. Geometric means counts (2nd half of 1986) in these systems varied between 1 and 440 cfu/100 ml and maximum counts between 10 and 3300 cfu/100 ml. Aeromonas-densities were related to temperature and residence time, but not to total organic matter or heterotrophic plate counts. Regrowth occurred particularly in drinking water derived from anaerobic groundwater containing methane. A. hydrophila was the most frequently isolated species from distribution waters, but A. caviae and A. sobria were predominant in a few systems.

? Chowdhury, M.A., Yamanaka, H., Miyoshi, S. and Shinoda, S. (1990), Ecology of mesophilic Aeromonas spp. in aquatic environments of a temperate region and relationship with some biotic and abiotic environmental parameters. *Zentralblatt für Hygiene und Umweltmedizin*, **190** (4), 344-356.

Abstract: The Ecology of mesophilic Aeromonas species has been investigated since January 1988 to examine their occurrence and distribution in aquatic environments of Okayama Prefecture. Water and plankton samples were quantitatively as well as qualitatively analyzed throughout the seasons from five selected stations including fresh, brackish, and saline environments. Analysis of variance and correlation coefficients among the biotic and abiotic parameters were sought. The organisms were found in all the environs with high densities through all the seasons. Plankton samples yielded higher counts of Aeromonas than the water samples in all the environs. Water temperature seemed to play a significant role on their growth during the winter months, however, no significant seasonal variation nor any correlation with fecal pollution were observed in most of the environments. A reciprocal relationship was seen with salt concentration in the saline environment. Among the currently recognized mesophilic species, A. caviae, A. hydrophila, A. sobria, and A. media were isolated with the predominance of anaerobic biovar. The present study reveals that Aeromonas are widely distributed in fresh, brackish and saline environments of this region. The study also reveals that Aeromonas are autochthonous members in aquatic ecosystems and are indigenous to these environs. Aeromonas species isolated from our environments were found to exhibit drug resistance potential which differed from that of isolates from diverse geographical locales. The high incidence of clinically significant Aeromonas species in this aquatic region could be of public health significance for the inhabitants of this region, as well as a challenge to their dependence on aquatic resources.

? Nogueira, M., Moriske, H.J. and Ruden, H. (1990), Chemical and biological characterization from particles collected in the electrostatic precipitator from a municipal waste incinerator. 2. mutagenic activity of the organic extracts and subfractions and concentrations of PAH. *Zentralblatt für Hygiene und Umweltmedizin*, **190** (5-6), 523-535.

? Jacob, J., Bindemann, U. and Stelzer, W. (1991), Characterization of thermophilic *Campylobacter*s originated from a high-rate sewage-treatment plant. *Zentralblatt für Hygiene und Umweltmedizin*, **192** (1), 14-24.

Abstract: *Campylobacter* strains isolated during a one-year study from a municipal waste water treatment plant have been characterized. The study shows a considerable release of *Campylobacter* strains into the receiving linked river system. *Campylobacter* isolated here, are very similar to isolates originating from enteritic cases. In contrast to other reports we conclude that the strains released from the sewage treatment plant into the environment represent a potential risk for public health.

? Mose, J.R., Pfeiffer, K.P., Kock, M., Pichlersemmelrock, F. and Marth, E. (1991), Cancer mortality from 1978 to 1987 in smaller regions of styria, austria, with different environmental-conditions. *Zentralblatt für Hygiene und Umweltmedizin*, **191** (5-6), 563-574.

Abstract: In 1984 we have shown in a study, that regions with high air pollution have a higher respiratory cancer rate than regions without substantial air pollution. In this study 45 small regions of Styria, which can be considered homogenous from an environmental viewpoint, have been studied with respect to age standardized respiratory cancer mortality. These small regions have been classified into regions without substantial air pollution, with substantial air and substantial water pollution. Between 1978 and 1987 we have found that small regions with substantial air or water pollution show an increased age standardized respiratory cancer mortality than small regions with ‘good’ environmental conditions. In some regions the rate was twice as high compared to regions without substantial environmental problems. The main difference was found for the age group between 60 and 75 years. Generally between 1978 and 1987 no trend has been observed, only within age groups a shift can be seen.

Keywords: Air-Pollution, Lung-Cancer, Water, Risk

? Exner, M. (1995), Infectious-diseases from the hygienic viewpoint with special reference of infectious-diseases from the environment: A retrospective and prospective view. *Zentralblatt für Hygiene und Umweltmedizin*, **197** (1-3), 134-161.

Abstract: Infectious diseases showed a considerable change in their epidemiologic significance during this century. Twenty years ago it seemed that infectious diseases would be definity under control. As a result there was a neglect of the efforts for prevention, recognition and controlling of infectious diseases, especially in the administration. Today we have to state that old and new infectious diseases have regained a new and partly dramatic epidemiologic importance, influenced by several factors like overpopulation, wars, hunger, migration in the underdeveloped countries and the increase of the old and the immunosuppressed people of the population in the developed countries. A review is given of the increasing significance of old and new infectious diseases in the last 2 decades. Transmissible diseases from the environment have a special importance because many people are affected hereby. Hygienic aspects of drinking and swimming water, air-and ground caused infectious diseases are treated. The political support is requested. The institutions have had an important role in the prevention and control of infectious diseases in the past like the public health departments, hygiene and medical microbiology urgently need the support and promotion of the government.

? Mathys, W. (1995), Investigations about the chemical composition and ways of reuse of activated carbon sludges from surface water treatment plants. *Zentralblatt für Hygiene und Umweltmedizin*, **197** (5), 420-440.

Abstract: By using activated carbon (PAC) or by other water treatment procedures remarkable amounts of sludges are produced that have normally to be discharged as wastes outside the plant site. The research objective of this study is to get basic information about the quality of PAC sludges to characterise these materials in order to decide between depositing or re-use/recycling. On four water works with artificial ground water recharge and PAC treatment plants to eliminate pesticides from surface waters derailed analysises and experiments were carried out. The determination of carbon, nitrogen, other nutrient elements, heavy-metals and organic pollutants reveal greatly differing amounts within the water works and during the year. The treatment techniques had an important influence on the chemical composition of the sludges. Mixing of PAC sludges with other sludges strongly reduced the amount of carbon. Heavy metals were present only in small quantities. Sludge from one plant, however, contained elevated concentrations of arsenic. PAC sludges from plants treating river water had considerably high amounts of adsorbable organohalogen. Leaching experiments performed with the sludges demonstrated that only small quantities of pollutants are extractable. For most sludges a deposition on domestic refuse dumps is possible. An alternative way is to discharge the liquid sludges into municipal sewage treatment plants. Addition to the biological treatment tank significantly reduced the concentration of AOX in the sewage effluent. Laboratory experiments and field studies on heavily polluted dump leachates showed a remarkable remaining adsorption capacity of the PAC. As a consequence, PAC sludges have to be considered not exclusively as wastes, but rather as valuable materials for purification processes treating waste waters with high loads of organic, especially organohalogen, substances.

Keywords: Pesticides, Atrazine, Removal

? Romano, G., Stampi, S., Zanetti, F., de Luca, G. and Tonelli, E. (1997), Occurrence of gram-negative bacteria in drinking water undergoing softening treatment. *Zentralblatt für Hygiene und Umweltmedizin*, **200** (2-3), 152-162.

Abstract: A study was carried out on the presence of Gram-negative bacteria in the municipal waters of Bologna (Italy) undergoing softening using domestic ion exchangers with an automatic disinfection mechanism. The softening process was seen to cause a 15 fold increase in 22°C and 36°C heterotrophic plate counts. There was a 30 fold increase in Gram-negative bacteria and their number correlated directly with temperature and inversely with active residual chlorine. Organic matter had no effect on bacterial growth. The most commonly found bacteria were various species of *Pseudomonas* (87.6%) (Ps. acidovorans, Ps. denitrificans, Ps. fluorescens and Ps. testosteroni) followed by Aeromonas hydrophila (5.6%) and Stenotrophomonas (Xantomonas) maltophilia (3.8% in outgoing water). *Pseudomonas aeruginosa* (present in 5.6% of incoming water samples and 0.4% of outgoing water) and Yersinia enterocolitica (present in 4.3% of incoming water samples and 1.1% of outgoing water) did not find favorable conditions for growth on the ion exchange resins.

? Heiber, I., Frahm, E. and Obst, U. (1998), Comparison of four methods for the detection of fecal streptococci in water. *Zentralblatt für Hygiene und Umweltmedizin*, **201** (4-5), 357-369.

Abstract: The objective of this study was to select an effective and fast method for the detection of socalled fecal streptococci in water by comparing a method acoording to the German drinking water standard, a membrane filtration method according to the ISO-draft standard 7899/2, the Chromocult(R) *Enterococcus* Broth (Merck)(1) and the Enterolert(R)-System (IDESX)(2). The study was based on a collective of 297 water samples derived from different stages of water treatment and distribution, as well as from individual water supplies. The sensitivity, reliability, and selectivity of the single methods in relation to their practicability was evaluated. Concerning false positive and false negative results, the tests were proved by metabolic characterization of the isolated strains. The advantages and disadvantages of the methods resulting from the investigated criteria are discussed. The work is part of a comparative study within the scope of the DIN ad-hoc-committee ‘fecal streptococci’.

Keywords: Fecal Streptococci, Enterococci, Selective Media, German Drinking Water Standard, Membrane Filtration Method, Chromocult (R), Enterolert (R), Enterococci

# Title: Zentralblatt für Mikrobiologie

(Zentralbl. Mikrobiol.)

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Impact Factor

? Stelzer, W., Jacob, J. and Schulze, E. (1991), Environmental aspects of *Campylobacter* infections. *Zentralblatt für Mikrobiologie*, **146** (1), 3-15.

Abstract: Epidemiological data indicate high incidence of *Campylobacter*iosis. Improperly prepared poultry-products, unpasteurized milk as well as non-chlorinated drinking water were shown to be the main vehicles of *Campylobacter* transmission to man. There is a lack of knowledge concerning the role of various environments in transmission of *Campylobacter*. The review summarizes the present knowledge about occurrence and survival of *Campylobacter*s in various environments (sewage, sludge, surface water, drinking water). In conclusion risk assessment for public health is discussed.

Keywords: *Campylobacter*, Detection, Drinking Water, Surface Water, Sewage, Survival

# Title: Zeolites

Full Journal Title: [Zeolites](http://sdos.ejournal.ascc.net/cgi-bin/sciserv.pl?collection=journals&journal=01442449), [Zeolites](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5786&_auth=y&_acct=C000024058&_version=1&_urlVersion=0&_userid=4191814&md5=01f250ad58a81241c7741cb5668461f8)

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Sano, T., Yamashita, N., Iwami, Y., Takeda, K. and Kawakami, Y. (1996), Estimation of dealumination rate of ZSM-5 zeolite by adsorption of water vapor. *Zeolites*, **16** (4), 258-264.

Full Text: [1996\Zeolites16, 258.pdf](1996/Zeolites16,%20258.pdf)

Abstract: Adsorption isotherms of water were measured at 25°C for HZSM-5 zeolites with various SiO2/Al2O3 ratios. From the analysis of the adsorption isotherms by the D-R method it was found that the micropore volume Wo(H2O) accessible to water molecules increases linearly with an increase in the framework aluminums and that the number of water molecules associated with one framework aluminum is on average five. Based on these results, the number of the framework aluminums in HZSM-5 zeolites dealuminated by thermal treatment at 600-800°C was estimated. It was found that the rate of the dealumination of HZSM-5 zeolite by thermal treatment is apparently second order depending on the number of framework aluminums in the zeolite structure. It became clear that water molecules are able to be used to determine the number of framework aluminums of the dealuminated HZSM-5 zeolite.

Keywords: Dealumination, Zeolite, ZSM-5, Adsorption, Isotherm, Water

Sayed, S.A. (1996), Removal of Sr2+, Ca2+, and Mg2+ from aqueous and aqueous-alcoholic saline media. *Zeolites*, **17** (4), 361-364.

Full Text: [1996\Zeolites17, 361.pdf](1996/Zeolites17,%20361.pdf)

Abstract: Synthetic inorganic ion exchangers have special uses and can be valuable in some trace separations. Zeolite NaA is used in an ion exchange study with Sr2+, Ca2+, and Mg2+ in aqueous NaCl media of ionic strengths, 1, 2, 3, 4, and 5, and in the oversaturated range of 7 and 10 M. A mixed aqueous methanol, ethanol, n-propyl alcohol, and n-butyl alcohol, 1 m NaCl medium has been investigated with the aim of studying the effect of changing the dielectric constant of the medium on the uptake of the studied cations, Which are present in trace concentrations in caustic soda manufactured by the selective membrane technique. The temperature effect on uptake shows an endothermic character for the exchange reactions under investigation.

Keywords: Exchange, Ion Exchange, Mg2+, Nacl Media, Sr2+, Zeolite Naa, Zeolites

Choudhary, V.R. and Mayadevi, S. (1996), Adsorption of methane, ethane, ethylene, and carbon dioxide on silicalite-I. *Zeolites*, **17** (5-6), 501-507.

Full Text: [1996\Zeolites17, 501.pdf](1996/Zeolites17,%20501.pdf)

Abstract: The adsorption of methane, ethane, ethylene, and carbon dioxide on silicalite-l and the thermodynamics of adsorption have been investigated under similar conditions using a gravimetric adsorption apparatus. The order for the adsorption of the different adsorbates on silicalite-l is CH4 < CO2 < C2H4 less than or equal to C2H6. The Dubinin-Polanyi equation is found to fit the isotherm data for the adsorption of methane (305 K) and ethane (305-413 K), the Freundlich equation fits the adsorption data for methane (353 K), ethane (453 K), and carbon dioxide (353 K), and the adsorption of ethylene (305, 353 K) and carbon dioxide (305 K) follows the Langmuir isotherm model. The isosteric heat of adsorption for the adsorption of these gases on silicalite-l lies between 18 and 32 kJ . mol-1, with ethane having the highest value. The heat of sorption is affected mildly by the surface coverage for all of the gases but methane. The heat of adsorption of methane decreases with an increase in its loading. Analysis of the entropy of adsorption reveals that ethane (at an adsorbate loading of <0.8 mmol g-1), methane, ethylene, and carbon dioxide (at all adsorbate loadings studied) are supermobile on the silicalite surface. The mobility of adsorbed methane increases, and that of the other adsorbates decreases with increasing the adsorbate loading. (C) Elsevier Science Inc. 1996

Keywords: Silicalite-I, Adsorption of Methane, Adsorption of Ethane, Adsorption of Ethylene, Adsorption of Carbon Dioxide, Chromatography Pulse Technique, Gas-Chromatography, Zeolites, NAY

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? Dai, G., Yang, K.H. and Li, Q.H. (2000), Bibliometric analysis on tissue engineering research literatures. *Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi*, **14** (5), 308-310.

Full Text: [2000\Zho Xiu Fu Cho Jia Wai Ke Za Zhi14, 308.pdf](2000/Zho%20Xiu%20Fu%20Cho%20Jia%20Wai%20Ke%20Za%20Zhi14,%20308.pdf)

Abstract: OBJECTIVE: To comprehend the progress of tissue engineering research and speculate its developmental trends. METHODS: MEDLINE search was conducted to retrieve the papers published between 1987 to 1999 under the main headings of tissue engineering. Years, nationalities, languages, journals, authors and heading frequencies of 314 papers were analyzed by bibliometrics. RESULTS: Since 1990, the number of tissue engineering research literatures had doubled, and papers between 1998 and 1999 made up 57.96% of the total papers. All papers came from 15 nations, in 6 languages and 140 journals; 64.97% came from United States and 25.79% from England, Netherlands and Germany; 93.95% was in English; 42.04% was published on 15 journals. Vacanti JP and 19 other authors presented 5 to 24 papers. Heading frequencies were cytology 22.89%, transplantation 13.30%, scaffolds and extracellular matrixes 11.72%, implanting 10.60%, polymers 8.91%, potential applications 8.91%, artificial substitutes 6.88%, tissue culture 6.70% and biogenetics 4.96%. CONCLUSION: Tissue engineering literatures mainly come from United States, England, Netherlands and Germany. English is the major language. J Biomed Mater Res and 14 other journals are important journals about tissue engineering research. Vacanti JP and 19 other authors are prolific authors. Cytology, transplantation, scaffolds and extracellular matrixes and implanting are hot topics and key points on tissue engineering research.

Keywords: Analysis, Bibliometrics, Culture, Cytology, Engineering, England, Germany, Journals, Languages, MEDLINE, Methods, Nations, Papers, Polymers, Potential, Research, Scaffolds, Tissue Culture, Transplantation, Trends, United States

# Title: Zhongguo Zhen Jiu

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: Impact Factor

? Fei, Y.T., Yang, D.Q., Hu, L.J., Lu, J. and Tu, Y. (2007), Bibliometrics study on dominant diseases in modern acupuncture clinic. *Zhongguo Zhen Jiu*, **27** (3), 229-232.

Full Text: Zho Zhe Jiu27, 229.pdf

Abstract: OBJECTIVE: To find out the dominant diseases in the clinic of modern acupuncture. METHODS: By means of bibliometrics, clinical acupuncture study literatures from 1978 to 2004, searched from CBM database, were sorted and counted to show the different clinical utilizing quantities and developing trends of different disease groups in the acupuncture clinic. RESULTS: Obviously dominant type: nervous system diseases; mature type: motor system diseases; developing type: 3 kind of diseases including psychosis; premature type: diseases related with surgery; steady type: 3 kind of diseases including digestive system diseases (diseases of liver and gallbladder are not included); pre-developing diseases: 5 kind of diseases including otorhinolaryngologic diseases. CONCLUSION: Among all these types, obvious advantage type and mature type are the most distinguishing. Developing type has the most significant ascending trend. Premature type has relatively strong developing potentiality.

Keywords: Acupuncture, Bibliometrics, Clinic, Clinical, Database, Developing, Diseases, Liver, Methods, Premature, Psychosis, Surgery, Trend, Trends

# Title: Zhongguo Zhong Xi Yi Jie He Za Zhi

Full Journal Title: Zhongguo Zhong Xi Yi Jie He Za Zhi

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1003-5370

Issues/Year:

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: Impact Factor

? Yu, G.P. and Gao, S.W. (1994), Quality of clinical trials of Chinese herbal drugs, a review of 314 published papers. *Zhongguo Zhong Xi Yi Jie He Za Zhi*, **14** (1), 50-52.

Full Text: [1994\Zho Zho Xi Yi Jie He Za Zhi14, 50.pdf](1994/Zho%20Zho%20Xi%20Yi%20Jie%20He%20Za%20Zhi14,%2050.pdf)

Abstract: The study was based on a review of clinical trials for herbal drugs published in various journals. Three journals selected were Chinese Journal of Integrated Traditional and Western Medicine (JITWM), Journal of Traditional Chinese Medicine (JTCM), and a provincial Journal of Traditional Medicine (JTM). In order to reflect different levels of the journal, each paper of the clinical trials of herbal drugs in the above-mentioned journals during the survey years, 1991, 1987 and 1980 (or 1981) was reviewed using a standard checklist and quantified through a score system. A total of 314 paper were reviewed, in which 179 in 1991, 82 in 1987, and 53 in 1980 and 1981. Controlled trials were found in 86% of JITWM, 40.8% of JTCM, and 26.8% of JTM in 1991. Although there was an increased trend in the use or randomized trials, it still showed a lower proportion, respectively 52.9% in JITWM, 36.0% in JTCM, and 11.1% in JTM. We found that the quality of clinical trials in JITWM was the first, JTCM the second, JTM the third and showed a gradually improved trend with time.

Keywords: Chinese, Clinical, Clinical Trials, Drugs, First, Journal, Journals, Quality, Quality of, Randomized, Review, Standard, Survey, Trend

# Title: Zhonghua Yan Ke Za Zhi

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ISO Abbreviated Title:

JCR Abbreviated Title:

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: Impact Factor

? Duan, X., Liu, X. and Zhang, C. (2002), Analysis of articles on ocular fundus diseases in Chinese medical journals. *Zhonghua Yan Ke Za Zhi*, **38** (3), 132-134.

Full Text: [2002\Zho Yan Ke Za Zhi38, 132.pdf](2002/Zho%20Yan%20Ke%20Za%20Zhi38,%20132.pdf)

Abstract: OBJECTIVE: To find out evidence for the improvement of research resources of ocular fundus diseases in China. DATA SOURCES RESEARCH: articles about fundus oculi in 418 Chinese medical journals published in the mainland of China from January 1, 1999 to June 30, 2001. DATA SELECTION: A total of 2 352 articles about ocular fundus diseases included 1 651 original articles, 324 case reports, and 171 reviews. The original articles covered basic research (402 articles), clinical research (530), treatment with combined traditional Chinese and Western medicine (270), clinical application of testing technology (295), epidemiology (142), and others (12). RESULTS: Data showed that retinal detachment, trauma, retinal vein occlusion, and diabetic retinopathy were the major areas of clinical research. Ophthalmology periodicals published most of the achievements in the research of ocular fundus diseases, while less in general medical journals. Yet, reports on critical evaluation of these treatments were not available. The resources of research and utilization in ocular fundus diseases in China had not been documented. CONCLUSIONS: The research into ocular fundus diseases is an active area in China. Critical evaluation and application of the research resources of ocular fundus diseases should be improved.

Keywords: Application, Case Reports, China, Chinese, Clinical, Clinical Research, Diseases, Epidemiology, Evaluation, Evidence, General, Improvement, Journals, Medical, Medical Journals, Medicine, Periodicals, Research, Reviews, Selection, Technology, Testing, Trauma, Treatment, Utilization

? Shi, S.X. and Yang, H. (2005), Analysis of the articles published in Chinese journal of ophthalmology during years 2001 to 2004. *Zhonghua Yan Ke Za Zhi*, **41** (7), 652-655.

Full Text: [2005\Zho Yan Ke Za Zhi41, 652.pdf](2005/Zho%20Yan%20Ke%20Za%20Zhi41,%20652.pdf)

Abstract: OBJECTIVE: To study characteristics of the publication of Chinese Journal of Ophthalmology during years of 2001 to 2004. METHODS: Statistic method was used to retrieve the following parameters of Chinese Journal of Ophthalmology: numbers of articles, columns, citation frequencies, grants support, time lag from accepted to publication. RESULTS: The journal published 926 pieces of papers and 16 reports during years of 2001 to 2004. There were 24 columns; citation rates were 89.98%; papers published in the journal 19.53% got grant support. The times lag for publication was relatively longer. CONCLUSIONS: Chinese Journal of Ophthalmology is a high quality, specialized and core periodical in china.

Keywords: Characteristics, Chinese, Citation, Journal, Methods, Papers, Periodical, Publication, Quality, Rates, Support

? Yu, G., Yang, H. and Zhao, Y.Y. (2005), Analysis of authors of articles published in *Chinese Journal of Ophthalmology* from 1995 to 2004. *Zhonghua Yan Ke Za Zhi*, **41** (8), 763-766.

Full Text: [2005\Zho Yan Ke Za Zhi41, 763.pdf](2005/Zho%20Yan%20Ke%20Za%20Zhi41,%20763.pdf)

Abstract: OBJECTIVE: We aimed to analyze the authors, the organizations and regional distribution of these authors of Chinese Journal of Ophthalmology, and ascertain the core authors, core organizations and core regions. METHODS: Using quantitative analysis method, we analysed the authors, co-authors and the core authors of papers published between 1995 to 2004. Also, the distributions of districts and highly quantitative organization were determined statistically. RESULTS: There were 2143 articles published during the last ten years; 912 author had published only one paper, accounted for 70.59% of total first authors. There were 1853 articles with one or more co-authors, the cooperative rate and degree were 86.47% and 3.56, respectively. There were 290 papers with single author, which accounted for 13.53% of total papers. The number of papers from universities, institutes, affiliated hospitals and hospitals were 246 (11.48%), 176 (8.21%), 969 (45.22%) and 423 (19.74%), respectively. There were 82 core authors published 553 (25.81%) papers, while 20 highly-quantities organizations published 1016 (47.41%) papers. Core region was Beijing, which published 574 (26.78%) articles. CONCLUSIONS: Authors of the Chinese Journal of Ophthalmology have a wide distribution and highly cooperative rate. There are a group of active and talented core authors, who have a great influence on this journal.

Keywords: Analysis, Chinese, Co-Authors, Distribution, First, Hospitals, Journal, Methods, Organization, Papers, Quantitative Analysis, Regional, Universities

# Title: Zhongguo Xinyao yu Linchuang Zazhi

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: Impact Factor

? Tang, W., Wang, Y., Du, W., Chen, B. and Cheng, N. (2002), Analysis of adverse drug reaction of antidiabetic agents according to documents within forty-two years in China. *Zhongguo Xinyao yu Linchuang Zazhi*, **21** (12), 753-758.

Abstract: AIM: To explore the general law and characteristic of the adverse drug reaction (ADR) of antidiabetic agents, providing the information to clinical drug utilization. METHODS: A metrological analysis was conducted on data of ADR of antidiabetic agents in documents within 42 a. RESULTS: The amounts of ADR of antidiabetic agents were equal in men and women, and mainly aged from 45 a to 74 a. The major ADR was metabolism and nutrition barriers, nervous system injured, mental disorder and stomach intestinal system injured. Except acarbose causing stomach and intestinal system injured, the rest ADR was mainly caused by sulphonylureas. The most of prognosis of ADR of antidiabetic agents were good, but also quite a number of them left sequela or death. CONCLUSION: The ADR of antidiabetic agents is comprehensive, some of them are severe. It is worth attaching clinical importance to.

# Title: Zhurnal Fizicheskoi Khimii

English Title: [Russian Journal of Physical Chemistry](http://www.maik.ru/cgi-perl/journal.pl?lang=eng&name=physcha)

(Zh. Fiz. Khim., Russ. J. Phys. Chem.)

Full Journal Title: [Zhurnal Fizicheskoi Khimii](http://www.maik.ru/cgi-perl/journal.pl?name=fizkhim&lang=eng)

ISO Abbreviated Title: Zhurnal Fiz. Khimii

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? Roginsky, S. (1934), ??. *Zhurnal Fizicheskoi Khimii*, **5**, 175-??.

? Elovich, S.Yu. and Zhabrova, G.M. (1939), Mechanism of the catalytic hydrogenation of ethylene on nickel. I. Kinetics of the process. *Zhurnal Fizicheskoi Khimii*, **13**, 1761-1775.

? Elovich, S.Ya. and Zabrova, G.M. (1939), ??. *Zhurnal Fizicheskoi Khimii*, **13**, 1775-??.

Notes: IIsotherm

Темкин, М.И. (1940), O Kинεтике Гεтερогεнньіх Катаλиτичεских Пρоцεссοв. *Zhurnal Fizicheskoi Khimii*, **14** (9-10), 1153-1159.

Full Text: [-1959\Zhu Fiz Khi14, 1153.pdf](-1959/Zhu%20Fiz%20Khi14,%201153.pdf)

? Temkin, M.I. (1941), ??. *Zhurnal Fizicheskoi Khimii*, **15**, 296-??.

Notes: IIsotherm

Temkin, M.I. (1941), Adsorption equilibrium and kinetics of processes on nonhomogenous surfaces and in the interaction between adsorbed moleculars. *Zhurnal Fizicheskoi Khimii*, **15** (3), 296-332.

Full Text: [-1959\Zhu Fiz Khi15, 296.pdf](-1959/Zhu%20Fiz%20Khi15,%20296.pdf)

? Temkin, M. (1945), Partsialnye davleniya v realnykh gazovykh smesyakh. *Zhurnal Fizicheskoi Khimii*, **19** (1-2), 72-82.

? Roginskii, S.Z. and Tsellinskaya, T.F. (1947), Vliyanie svobodnoi energii protsessa prigotovleniya piroliticheskoi zakisi nikelya na aktivirovannuyu adsorbtsiyu. *Zhurnal Fizicheskoi Khimii*, **21** (1), 919-926.

? Temkin, M. (1947), O logarifmicheskoi izoterme adsorbtsii. *Zhurnal Fizicheskoi Khimii*, **21** (4), 516-519.

? Temkin, M. and Kiperman, S. (1947), O kinetike sinteza i razlozheniya ammiaka na razlichnykh katalizatorakh. *Zhurnal Fizicheskoi Khimii*, **21** (8), 927-952.

? Shvartsman, L.A., Samarin, A.M. and Temkin, M.I. (1947), Kinetika vygoraniya ugleroda iz stalnoi vanny. *Zhurnal Fizicheskoi Khimii*, **21** (9), 1027-1032.

Notes: highly cited, IIsotherm

Dubinin, M.M., Zaverina, E.D. and Radushkevich, L.V. (1947), Sorbtsiya i struktura aktivnykh uglei. I. Issledovanie adsorbtsii organicheskikh parov. *Zhurnal Fizicheskoi Khimii*, **21** (11), 1351-1362.

Full Text: [-1959\Zhu Fiz Khi21, 1351.pdf](-1959/Zhu%20Fiz%20Khi21,%201351.pdf)

Notes: IIsotherm

Dubinin, M.M., Zaverina, E.D. and Radushkevich, L.V. (1947), Sorption and structure of active carbons. I. Adsorption of organic vapors. *Zhurnal Fizicheskoi Khimii*, **21** (11), 1351-1362. (English)

? Apelbaum, L. and Temkin, M. (1948), Okislenie ammiaka na setkakh iz platiny i platino-rodievogo splava. 1. *Zhurnal Fizicheskoi Khimii*, **22** (2), 179-194.

? Apelbaum, L. and Temkin, M. (1948), Okislenie ammiaka na setkakh iz platiny i platinorodievogo splava. 2. *Zhurnal Fizicheskoi Khimii*, **22** (2), 195-207.

? Temkin, M.I. (1948), Khimicheskoe srodstvo selena k vodorodu i energetika elementov shestoi gruppy sistemy mendeleeva. *Zhurnal Fizicheskoi Khimii*, **22** (6), 759-760.

? Temkin, M.I. (1948), Ob otvete Kapustinskogo, A.F. *Zhurnal Fizicheskoi Khimii*, **22** (6), 763-764.

? Temkin, M. (1948), Energiya aktivatsii razryada ionov vodoroda. *Zhurnal Fizicheskoi Khimii*, **22** (9), 1081-1089.

? Kulkova, N.V. and Temkin, M.I. (1949), Kinetika reaktsii konversii okisi ugleroda vodyanym parom. *Zhurnal Fizicheskoi Khimii* , **23** (6), 695-713.

? Temkin, M.I. and Shvartsman, L.A. (1949), Aktivnost ugleroda v austenite. *Zhurnal Fizicheskoi Khimii*, **23** (6), 755-760.

Notes: IIsotherm

? Dubinin, M.M., Zaverina, E.D. and Timofeeva, D.P. (1949), Sorbtsiya i struktura aktivnykh uglei. VI. Strukturnye tipy aktivnykh uglei. *Zhurnal Fizicheskoi Khimii*, **23** (10), 1129-1140.

Full Text: [-1959\Zhu Fiz Khi23, 1129.pdf](-1959/Zhu%20Fiz%20Khi23,%201129.pdf)

Notes: IIsotherm

Radushkevich, L.V. (1949), Potential theory of sorption and structure of carbons. *Zhurnal Fizicheskoi Khimii*, **23**, 1410-1420. (English)

? Radushkevich, L.V. (1949), Sorbtsiya i struktura aktivnykh uglei. 7. Potentsialnaya teoriya adsorbtsii i struktura aktivnykh uglei. *Zhurnal Fizicheskoi Khimii*, **23** (23), 1410-1420.

? Temkin, M.I. and Kiperman, S.L. (1953), O magnitnykh svoistvakh i strukture zhelezo-ugolnykh katalizatorov. *Zhurnal Fizicheskoi Khimii*, **27** (5), 753-760.

? Romanushkina, A.E., Kiperman, S.L. and Temkin, M.I. (1953), Ravnovesie pri reaktsii vodoroda s azotom, adsorbirovannym na zheleze. *Zhurnal Fizicheskoi Khimii*, **27** (8), 1181-1194.

? Kabanov, B.N. and Temkin, M.I. (1954), K voprosu o znake elektrodnogo potentsiala i elektrodvizhushchei sily. *Zhurnal Fizicheskoi Khimii*, **28** (12), 2258-2261.

? Timofeev, D.P. (1955), Distribution of sorbed vapour in the grains of activated carbon when the adsorption isotherm is non-linear. *Zhurnal Fizicheskoi Khimii*, **29** (4), 723-729.

? Temkin, M.I. and Frumkin, A.N. (1955), K voprosu ob energii aktivatsii razryada iona vodoroda. *Zhurnal Fizicheskoi Khimii*, **29** (8), 1518-1526.

? Temkin, M.I. (1955), Vychislenie velichiny poverkhnosti po dannym adsorbtsii parov. *Zhurnal Fizicheskoi Khimii*, **29** (9), 1610-1613.

? Evropin, V.A., Kulkova, N.V. and Temkin, M.I. (1956), Kinetika vzaimodeistviya uglekislogo gaza S uglem I izotopnyi obmen. *Zhurnal Fizicheskoi Khimii*, **30** (2), 348-365.

? Temkin, M.I. and Frumkin, A.N. (1956), Ob energii aktivatsii razryada iona vodoroda I probleme absolyutnogo potentsiala V elektrokhimicheskoi kinetike. *Zhurnal Fizicheskoi Khimii*, **30** (5), 1162-1168.

? Temkin, M.I. and Frumkin, A.N. (1956), Zamechaniya o zavisimosti vodorodnogo perenapryazheniya ot prirody katoda v svyazi s rabotoi ryutshi i delakheya. *Zhurnal Fizicheskoi Khimii*, **30** (8), 1885-1888.

? Gelbshtein, A.I., Shcheglova, G.G. and Temkin, M.I. (1956), Kinetika raspada muravinoi kisloty V sredakh H2SO4-H2O I P2O5-H2O. *Zhurnal Fizicheskoi Khimii*, **30** (10), 2267-2274.

? Temkin, M.I. (1957), Kinetics of reactions of the surfaces on solids and the problem of the catalyst of the maximum activity. *Zhurnal Fizicheskoi Khimii*, **31** (1), 3-26.

Keywords: Kinetics

? Elovich, S.Y. and Matorina, N.N. (1956), Izuchenie kompleksoobrazovatelnoi khromatografii s primeneniem mechenykh atomov. 1. Teoreticheskie osnovy i izoterma ionnogo obmena Co2+ i Fe2+. *Zhurnal Fizicheskoi Khimii*, **30** (1), 69-75.

? Elovich, S.Y. and Matorina, N.N. (1956), Izuchenie kompleksoobrazovatelnoi khromatografii s primeneniem mechenykh atomov. 2. Fiziko-khimicheskaya kharakteristika tsitratnykh i oksalatnykh kompleksov zheleza(II) i kobalta(II) metodami ionnogo obmena. *Zhurnal Fizicheskoi Khimii*, **30** (2), 383-390.

? Cherednichenko, V.M. and Temkin, M.I. (1957), The effect of internal diffusion on the course of a catalytic reaction retarded by the reaction product. *Zhurnal Fizicheskoi Khimii*, **31** (1), 157-164.

? Cherednichenko, V.M. and Temkin, M.I. (1957), The kinetics of the catalytic synthesis of methanol. *Zhurnal Fizicheskoi Khimii*, **31** (5), 1072-1089.

Keywords: Kinetics

? Elovich, S.Y. and Prusakov, V.N. (1957), A study of the chromatography of multivalent ions with the aid of labelled atoms. 1. the adsorption of Sr2+ and Oe3+ ions under static and dynamic conditions. *Zhurnal Fizicheskoi Khimii*, **31** (6), 1359-1369.

? Elovich, S.Y. and Prusakov, V.N. (1957), Studies on the chromatography of polyvalent ions by means of labelled atoms. 2. Displacement chromatography of Sr2+ and Ce3+ ions on highly covered adsorbents. *Zhurnal Fizicheskoi Khimii*, **31** (8), 1784-1791.

? Elovich, S.I. and Prusakov, V.N. (1957), The study of multivalent ion chromatography by means of labelled atoms. 3. Displacement chromatography of Ce3+ ions with ultrasmall concentrations of the adsorbent filler. *Zhurnal Fizicheskoi Khimii*, **31** (9), 2012-2016.

? Kulkova, N.V. and Temkin, M.I. (1957), Determination of the free energy of oxigen in the surface layers of oxidation catalysts. 1. *Zhurnal Fizicheskoi Khimii*, **31** (9), 2017-2025.

? Gelbshtein, A.I. and Temkin, M.I. (1957), Kinetics of the chemical interaction between propylene and ethylene with sulfuric acid. *Zhurnal Fizicheskoi Khimii*, **31** (12), 2697-2705.

Keywords: Kinetics

? Tovbin, M.V. and Savinova, E.V. (1957), The kinetics of non-steady state processes at the liquid-gas interface. 2. The effect of adsorption layers on the rate of the non-steady state evaporation of water. *Zhurnal Fizicheskoi Khimii*, **31** (12), 2717-2719.

? Kharin, A.N. and Ampilogov, I.E. (1958), A comparative evaluation of the part played by kinetic factors in the dynamics of adsorption of acetic and butyric acids on a charcoal bed from their aqueous solutions. *Zhurnal Fizicheskoi Khimii*, **32** (2), 341-348.

? Kurilenko, A.I., Kulkova, N.V., Rybakova, N.A. and Temkin, M.I. (1958), The kinetics of the oxidation of ethylene to ethylene oxide on a silver catalyst. 1. Experimental Study of the Kinetic Reaction. *Zhurnal Fizicheskoi Khimii*, **32** (4), 797-805.

Keywords: Kinetics

? Tsybina, E.N., Gelbshtein, A.I., Temkin, M.I. and Arestyakubovich, A.A. (1958), The kinetics of the vapor phase hydration of acetylene in the presence of a carbon-supported phosphoric acid catalyst. *Zhurnal Fizicheskoi Khimii*, **32** (4), 856-863

Keywords: Kinetics, Phosphoric Acid

? Tsybina, E.N., Gelbshtein, A.I. and Temkin, M.I. (1958), Kinetics of the vapor phase hydration of acetylene on zinc phosphate. *Zhurnal Fizicheskoi Khimii*, **32** (5), 995-1002.

Keywords: Kinetics, Phosphate

? Kurilenko, A.I., Kulkova, N.V., Rybakova, N.A. and Temkin, M.I. (1958), The oxidation of ethylene to ethylene oxide on a siler catalyst. 2. *Zhurnal Fizicheskoi Khimii*, **32** (5), 1043-1047

? Kharin, A.N. and Vereshagina, V.I. (1958), The effect of electrolytes on the statics and kinetics of iodine adsorption from solutions by activated carbon. *Zhurnal Fizicheskoi Khimii*, **32** (8), 1878-1888.

? Bulatnikova, Y.I., Apelbaum, L.O. and Temkin, M.I. (1958), Poisoning of ammonia synthesis catalysts by hydrogen sulfide, labelled with radioactive sulfur. *Zhurnal Fizicheskoi Khimii*, **32** (12), 2717-2724.

? Astachov, K.V., Dubinin, M.M., Chmutov, K.V. and Nekrasov, B.V. (1959), Voznesenskii, Sergei, Alexandrovich (1892-1958) - Obituary. *Zhurnal Fizicheskoi Khimii*, **33** (1), 234-237.

? Sokolova, O.F., Morozov, N.M. and Temkin, M.I. (1959), Kinetics of ammonia synthesis at low pressures and under conditions of diffusion retardation. *Zhurnal Fizicheskoi Khimii*, **33** (2), 471-479.

Keywords: Kinetics

? Aleksandrova, L.S., Elovich, S.Y. and Chmutov, K.V. (1959), The dynamics of ionic sorption on various types of cation exchangers. *Zhurnal Fizicheskoi Khimii*, **33** (3), 627-635.

? Golbert, K.A. and Alekseeva, A.V. (1959), The kinetics of the physical adsorption of gases and of their mixtures. 1. Differential method of measuring the kinetics of physical adsorption. *Zhurnal Fizicheskoi Khimii*, **33** (5), 1035-1041.

? Temkin, M.I. (1959), Conditions for the coexistence of gaseous phases. *Zhurnal Fizicheskoi Khimii*, **33** (9), 2040-2044.

? Aleksandrova, L.S., Elovich, S.Y. and Chmutov, K.V. (1959), Dynamics of ionic sorption on various types of cation exchangers. 2. the Diffusion kinetics of dynamical sorption. *Zhurnal Fizicheskoi Khimii*, **33** (5), 1119-1125.

? Sandomirskii, V.B. and Kogan, S.M. (1959), Calculation of the adsorption isotherm in the electronic theory of chemisorption. *Zhurnal Fizicheskoi Khimii*, **33** (8), 1709-1714.

? Kaganer, M.G. (1959), New method for determining the specific surface of adsorbents and other finely divided substances. *Zhurnal Fizicheskoi Khimii*, **33** (10), 2202-2210.

? Boldyrev, V.V. (1959), The application of the electron theory of adsorption to the study of kinetics and mechanism of topochemical reactions. *Zhurnal Fizicheskoi Khimii*, **33** (11), 2539-2541.

? Andrushchenko, N.K. and Shishakov, N.A. (1959), The kinetics of the reversible adsorption of oxygen by surfaces of some metals. *Zhurnal Fizicheskoi Khimii*, **33** (11), 2629-2630.

? Apelbaum, L.O. and Temkin, M.I. (1959), Kinetics of the decomposition of ammonia on platinum at low pressures. *Zhurnal Fizicheskoi Khimii*, **33** (12), 2697-2705

Keywords: Kinetics

? Krishtalik, L.I. (1959), Adsorption equilibrium and kinetics in the interaction of adsorbed atoms through a surface electron gas. *Zhurnal Fizicheskoi Khimii*, **33** (12), 2729-2731.

? Damaskin, B.V., Nikolaevafedorovich, N.V. and Ivanova, R.V. (1960), A study of the adsorption of aliphatic sulfonate anions of the mercury electrode and the effect of the anions on the kinetics of the electrode processes. *Zhurnal Fizicheskoi Khimii*, **34** (4), 894-906.

? Migal, P.K. and Tsiplyakova, V.A. (1960), Kinetics of hydrogen and oxygen adsorption and their reaction on platinum. *Zhurnal Fizicheskoi Khimii*, **34** (6), 1153-1160.

? Tolmacheva, Y.A. and Davydov, A.T. (1960), Investigation of the exchange of sulfate for chloride and iodide ions on the anion exchanger N-O under flow conditions. *Zhurnal Fizicheskoi Khimii*, **34** (6), 1260-1264.

? Apelbaum, L.O., Berezina, Y.I. and Temkin, M.I. (1960), Radiochemical study of the sulfur poisoning of ammonia-oxidation cobalt catalysts. *Zhurnal Fizicheskoi Khimii*, **34** (12), 2795-2803

? Nassonov, P.M. (1961), Adsorption isotherm and sorption and desorption kinetics of gases on heterogeneous surfaces. *Zhurnal Fizicheskoi Khimii*, **35** (1), 118-128.

? Avgul, V.T., Elovich, S.Y., Semenovskaya, T.D. and Chmutov, K.V. (1961), Chromatographic column for high temperature operation. *Zhurnal Fizicheskoi Khimii*, **35** (4), 946-947.

? Apelbaum, L.O. and Temkin, M.I. (1961), On the mechanism of catalytic hydrogenation of ethylene on palladium. *Zhurnal Fizicheskoi Khimii*, **35** (9), 2060-2070.

? Kataeva, N.A. and Kharin, A.N. (1961), The effect of the solvent and of the type of carbon in the kinetics of iodine adsorption from the solution flow. *Zhurnal Fizicheskoi Khimii*, **35** (12), 2794-2799.

? Elovich, S.Y. and Sharapova, N.P. (1962), Diffusion kinetics in the displacement chromatography of univalent ions. 1. Ion exchange equilibrium of uni-univalent ions on the Rf and Ku-2 cation exchangers. *Zhurnal Fizicheskoi Khimii*, **36** (4), 789-795.

? Elovich, S.Y. and Sharapova, N.P. (1962), Diffusion kinetics in the displacement chromatography of univalent ions. 2. Determination of the rate of movement of the front of Cs ions in displacement chromatography. *Zhurnal Fizicheskoi Khimii*, **36** (4), 796-800.

? Elovich, S.Y. and Tonkonog, L.G. (1962), The mechanism of the ion exchange sorption of complex ions. *Zhurnal Fizicheskoi Khimii*, **36** (5), 937-941

? Kataeva, N.A. and Kharin, A.N. (1962), Intradiffusional kinetics of the iodine adsorption from various solvents on carbons with a varying porosity. *Zhurnal Fizicheskoi Khimii*, **36** (5), 973-980.

? Elovich, S.Y. and Semenovskaya, T.D. (1962), Specific catalytic activity of nickel catalysts in the hydrogenation of fats. *Zhurnal Fizicheskoi Khimii*, **36** (6), 1255-1260.

? Kulkova, N.V. and Temkin, M.I. (1962), Determination of the free energy of oxygen in the surface layer of oxidizing catalysts. 2. *Zhurnal Fizicheskoi Khimii*, **36** (8), 1731-1734.

? Tolmacheva, Y.A. and Davydov, A.T. (1962), Dynamics of anion exchange on the exchanger EDE-10P in relation to the flow rate, under the condition of concave adsorption isotherm. *Zhurnal Fizicheskoi Khimii*, **36** (11), 2347-2351.

? Elovich, S.Y., Avgul, V.T. and Semenovskaya, T.D. (1963), Arrangement for measuring isotherms of sorption from solution at temperatures above 100-degrees. *Zhurnal Fizicheskoi Khimii*, **37** (8), 1909.

? Nassonov, P.M. (1963), Adsorption isotherm of ions on a uniformally heterogeneous surface of oxidized metal in electrolyte solutions of arbitrary composition. *Zhurnal Fizicheskoi Khimii*, **37** (10), 2228-2234.

? Ostrovskii, V.E., Karpovich, I.P., Kulkova, N.V. and Temkin, M.I. (1963), Calorimetric determination of the heats of chemisorption at elevated temperatures. *Zhurnal Fizicheskoi Khimii*, **37** (11), 2596-2600.

? Rachinskii, V.V. and Rustamov, S.M. (1964), Theory of ion exchange dynamics. 7. the Dynamics of the ion exchange sorption of different valence ions in the case of a concave isotherm. *Zhurnal Fizicheskoi Khimii*, **38** (4), 885-890.

? Znamenskii, Y.D., Kisanov, V.M. and Timofeev, D.P. (1964), Adsorption kinetics of a substance with varying adsorbability. *Zhurnal Fizicheskoi Khimii*, **38** (10), 2443-2444.

? Kiselev, A.V., Lygin, V.I. and Titova, T.I. (1964), Infrared study of the specific adsorption of ammonia on silica and zeolite. *Zhurnal Fizicheskoi Khimii*, **38** (11), 2730-2733.

? Dubinin, M.M. (1965), Modern state of the theory of volume filling of micropore adsorbents during adsorption of gases and steams on carbon adsorbents. *Zhurnal Fizicheskoi Khimii*, **39**, 1305-1317.

? Kisarov, V.M. (1969), A new equation for the adsorption isotherm. RUSS. J. Phys. Chem. 43 (3), 580-581. *Zhurnal Fizicheskoi Khimii*, **43**, 1037-1038.

? Tkachenk, P.T., Shiryaev, V.K., Bessonov, V.A. and Kasperov, A.I. (1972), External diffusion kinetics of ion exchange sorption in non-aqueous solutions. *Zhurnal Fizicheskoi Khimii*, **46** (1), 85-??.

Keywords: Kinetics, Sorption

? Nassonov, P.M. (1972), Connection between equation for state and isotherm of component adsorption on contact area of a 2-phase system. *Zhurnal Fizicheskoi Khimii*, **46** (3), 676-??.

? Lyubitov, Y.N. (1972), Probability of adsorption kinetics. *Zhurnal Fizicheskoi Khimii*, **46** (4), 951-??.

? Timofeev, D.P. (1972), Approximate equation of desorption kinetics for substances with a sharply arched isotherm of adsorption. *Zhurnal Fizicheskoi Khimii*, **46** (5), 1083-??.

? Maslovsk, R.S., Zubov, P.I., Mikhailo, Y.N. and Pavlinov, T.N. (1972), Kinetics of monomeric molecule adsorption on aluminum and study of properties of nascent chemisorbed layers. *Zhurnal Fizicheskoi Khimii*, **46** (5), 1139-??.

? Matorina, N.N., Chmutov, K.V. and Buchatsk, P.M. (1972), Dynamics of ion-exchange sorption in presence of complexing reagents. 1. Selective elution of a macrocomponent during an arched isotherm of sorption. *Zhurnal Fizicheskoi Khimii*, **46** (5), 1158.

? Akhrimen, V.E., Ampilogo, I.E. and Poteryae, A.V. (1972), Kinetics of iodine adsorption from aqueous-solutions on individual carbon granules. *Zhurnal Fizicheskoi Khimii*, **46** (5), 1262-??.

? Novikov, V.S. (1972), Adsorption isotherm of rough surface. *Zhurnal Fizicheskoi Khimii*, **46** (6), 1590-??.

? Zolotare, P.P. (1972), Dynamic adsorption equilibrium in case of a right angled isotherm and alternating adsorbent concentration in streams. *Zhurnal Fizicheskoi Khimii*, **46** (11), 2838-2841.

? Rossolov, E.N., Bezladno, E.N., Dorozhko, S.P., Keimakh, M.Y., Khosidov, Z.G. and Shestov, E.V. (1972), Kinetic study of adsorption and desorption of water on a solid sorbent under atmospheric air pressure using statistical terms. *Zhurnal Fizicheskoi Khimii*, **46** (11), 2968.

? Matorina, N.N., Buchatsk, P.M. and Chmutov, K.V. (1973), Ion-exchange sorption dynamics in presence of complex forming reagents. 2. Selective washing at linear isotherm sorption. *Zhurnal Fizicheskoi Khimii*, **47** (2), 329-333.

? Astakhov, K.V., Dubinin, M.M., Lepin, L.K., Radushke, L.V. and Chmutov, K.V. (1973), Shilov NA, (his 100th birthday anniversary). *Zhurnal Fizicheskoi Khimii*, **47** (3), 505-510.

? Venitsia, E.V., Makhalov, E.M. and Rubinsht, R.N. (1973), Application of computer for solution of a problem of sorption dynamics in a region of mixed diffusion kinetics at linear isotherm. *Zhurnal Fizicheskoi Khimii*, **47** (3), 665-669.

? Zolotare, P.P. and Kalinich, A.I. (1973), Stationary phase of nonequilibrium adsorption dynamics in a case of intradiffusion kinetics. 1. General equations - first (diffusion) approximation. *Zhurnal Fizicheskoi Khimii*, **47** (3), 677-680.

? Zolotare, P.P. and Kalinich, A.I. (1973), Stationary phase of nonequilibrium adsorption dynamics in a case of intradiffusion kinetics. 2. Calculation of second approximation. *Zhurnal Fizicheskoi Khimii*, **47** (3), 681-684.

? Kurbanbe, E., Larionov, O.G., Chmutov, K.V. and Yudilevi, M.D. (1973), Comparative study of adsorption of organic substances from vapor and liquid-phases. 5. Isotherm of ‘benzene-carbon- tetrachloride-carbon black adsorption. *Zhurnal Fizicheskoi Khimii*, **47** (6), 1617.

? Kurbanbe, E., Larionov, O.G. Chmutov, K.V. and Yudilevi, M.D. (1973), Comparative study of adsorption of organic substances from vapor and liquid-phases. 6. Isotherm of carbon tetrachloride- isooctane-carbon black adsorption. *Zhurnal Fizicheskoi Khimii*, **47** (6), 1617-1618.

? Kurbanbe, E., Larionov, O.G., Chmutov, K.V. and Yudilevi, M.D. (1973), Comparative study of adsorption of organic substances from vapor and liquid-phases. 7. Isotherm of benzene-isooctane- carbon black adsorption. *Zhurnal Fizicheskoi Khimii*, **47** (6), 1618-1619.

? Kazaryan, S.A., Larionov, O.G., Chmutov, K.V. and Yudilevi, M.D. (1973), Comparative study of adsorption of organic substances from vapor and liquid-phases. 8. Isotherm of benzene-ethanol-carbon black adsorption. *Zhurnal Fizicheskoi Khimii*, **47** (6), 1619.

? Bogachev, I.N., Kudaraus, I.A. and Kuznetso, V.P. (1973), Effect of adsorption on exoelectron emission kinetics. *Zhurnal Fizicheskoi Khimii*, **47** (6), 1578-579.

? Inchin, P.A. and Rachinsk, V.V. (1973), Theory of radial-cylindrical sorption dynamics. 4. Frontal nonequilibrium sorption dynamics at linear isotherm. *Zhurnal Fizicheskoi Khimii*, **47** (8), 2062-2066.

? Kazaryan, S.A., Larionov, O.G., Chmutov, K.V. and Yudilevi, M.D. (1973), Comparison of adsorption of organic substances from vapor and liquid-phases. 9. isotherm of isooctane-ethanol-carbon black adsorption. *Zhurnal Fizicheskoi Khimii*, **47** (8), 2171-1973.

? Zolotare, P.P. (1973), Effect of adsorptive concentration fluctuations in grain surface on adsorption kinetics in a case of nonlinear isotherm. *Zhurnal Fizicheskoi Khimii*, **47** (9), 2344-2348.

? Arenkova, G.G., Lozgache, V.I. and Sazonov, M.L. (1974), Chromatography of study of adsorption-isotherm of mixtures. *Zhurnal Fizicheskoi Khimii*, **48** (2), 375-378.

? Zolotare, P.P. and Starov, V.M. (1974), Effect of random vibrations of adsorptive concentration in grain surface on intradiffusion adsorption-kinetics. *Zhurnal Fizicheskoi Khimii*, **48** (3), 737-739.

? Matorina, N.N., Buchatsk, P.M. and Chmutov, K.V. (1974), Dynamics of ion-exchange sorption in presence of complex-forming reagents. 3. Selective washing out at concave sorption isotherm. *Zhurnal Fizicheskoi Khimii*, **48** (4), 976-979.

? Shiryaev, V.K., Tkachenk, P.T. and Kasperov, A.I. (1974), New methods for calculation of mass-transfer coefficient during linear sorption isotherm. *Zhurnal Fizicheskoi Khimii*, **48** (5), 1211-1213.

? Akhrimen, V.E. and Ampilogo, I.E. (1974), Effect of carbon combustion loss on iodine adsorption-kinetics from aqueous potassium iodide solutions. *Zhurnal Fizicheskoi Khimii*, **48** (6), 1508-1510.

? Zolotare, P.P. (1974), Accuracy of approximation obtained in adsorption-kinetic calculations during exchange of continuous convex for broken isotherms. *Zhurnal Fizicheskoi Khimii*, **48** (7), 1778-1781.

? Davydov, V.Y., Kiselev, A.V., Lokutsie, V.A. and Lygin, V.I. (1974), Study of water adsorption by aerosil at simultaneous measurement of adsorption-isotherm and infrared-spectra in an overtone region. *Zhurnal Fizicheskoi Khimii*, **48** (9), 2267-2270.

? Tsabek, L.K. and Rozen, I.V. (1974), Nonisothermal kinetics of sorption in porous grains for S-shaped isotherm. *Zhurnal Fizicheskoi Khimii*, **48** (9), 2297-2299.

? Anurov, S.A., Keltsev, N.V., Smola, V.I. and Toroches, N.S. (1974), Adsorption-kinetics of sulfur-dioxide in natural zeolites. *Zhurnal Fizicheskoi Khimii*, **48** (10), 2586-2587.

? Zolotare, P.P. and Starov, V.M. (1974), Effect of random temperature oscillations on physical adsorption-kinetics. *Zhurnal Fizicheskoi Khimii*, **48** (10), 2598-2600.

? Marutovs, R.M., Roda, I.G. and Goloshch, I.A. (1974), Adsorption-kinetics at variable mass-exchange factor with calculation of external and internal diffusion processes. *Zhurnal Fizicheskoi Khimii*, **48** (10), 2606-2608.

? Semenchenko, V.K. and Israilov, I.U. (1974), Verification of equation for surface-tension isotherm of binary-systems. *Zhurnal Fizicheskoi Khimii*, **48** (12), 3082-3084.

? Zolotarev, P.P. and Marutovskii, R.M. (1975), Intradiffusion adsorption-kinetics of a mixture of 2 substances. *Zhurnal Fizicheskoi Khimii*, **49** (4), 1040-1042.

? Tsabek, L.K. (1975), Desorption dynamics in porous-media for s-shaped isotherm. *Zhurnal Fizicheskoi Khimii*, **49** (4), 1069-1071.

? Avramenko, V.A., Glushchenko, V.Y. and Radaev, E.F. (1975), Adsorption kinetics from dilute solutions, non-limited by diffusion. 1. Nitromethane adsorption from aqueous solution on carbon black. *Zhurnal Fizicheskoi Khimii*, **49** (6), 1532-1534.

? Fedotkin, I.M., Koganovskii, A.M., Roda, I.G. and Marutovskii, R.M. (1975), External diffusion in adsorption dynamics from solutions. *Zhurnal Fizicheskoi Khimii*, **49** (7), 1778-1780.

Keywords: Adsorption, Diffusion

? Tsabek, L.K. (1975), Physical desorption dynamics in presence of complex-type isotherm. *Zhurnal Fizicheskoi Khimii*, **49** (8), 2110-2112.

? Guryanov, V.V., Dubinin, M.M. and Misin, M.S. (1975), Effect of steric limitations and adsorption compression on adsorbate density at limited filling of cylindrical and slotted micropores. *Zhurnal Fizicheskoi Khimii*, **49** (9), 2370-2373.

? Guryanov, V.V., Dubinin, M.M. and Misin, M.S. (1975), Estimation of form and sizes of micropores according to adsorption data. *Zhurnal Fizicheskoi Khimii*, **49** (9), 2374-2377.

? Zolotarev, P.P. and Starov, V.M. (1975), Effect of oscillations of adsorptive concentration in adsorbent grain surface on adsorption process in case of nonlinear isotherm and mixed kinetics. *Zhurnal Fizicheskoi Khimii*, **49** (9), 2437-2439.

? Anurov, S.A., Keltsev, N.V., Smola, V.I. and Torocheshnikov, N.S. (1975), Interrelation between adsorption-kinetics and dynamics in sulfur-dioxide absorption by natural zeolites. *Zhurnal Fizicheskoi Khimii*, **49** (10), 2680-2681.

? Ryazantsev, Y.P. (1975), Method for study of adsorption and desorption-kinetics in a fluidized-bed of adsorbent. *Zhurnal Fizicheskoi Khimii*, **49** (10), 2710-2711.

? Zolotarev, P.P. and Starov, V.M. (1975), Effect of fluctuations of adsorptive concentration in grain surface on desorption-kinetics in case of nonlinear isotherm. *Zhurnal Fizicheskoi Khimii*, **49** (11), 2972-2974.

? Ryazantsev, Y.P. (1976), Desorption-kinetics for sharply convex isotherms at adsorption. *Zhurnal Fizicheskoi Khimii*, **50** (1), 207-209.

? Sinelnikov, B.M. and Kudryashov, I.V. (1976), Reduction kinetics of para nitrobenzoic acid and its adsorption on electrodes, obtained from monocrystalline nickel-copper alloys. *Zhurnal Fizicheskoi Khimii*, **50** (2), 379-383.

? Zadumkin, S.N. and Ibragimov, K.I. (1976), Equation for surface-tension isotherm in binary-systems. *Zhurnal Fizicheskoi Khimii*, **50** (2), 453-457.

? Lebedev, Y.Y. and Samsonov, G.V. (1976), Analyzed solutions of equations for nonequilibrium sorption dynamics of a substance for linear isotherm and calculation of intra-diffusion kinetics. *Zhurnal Fizicheskoi Khimii*, **50** (2), 534-536

? Novikov, V.S. (1976), Adsorption-isotherm of rough surface. *Zhurnal Fizicheskoi Khimii*, **50** (4), 1013-1014.

? Agres, E.M. (1976), Theoretical reasons in selection of isotherm equation for adsorption from dilute-solutions: Detection of surface-activity criteria of solute. *Zhurnal Fizicheskoi Khimii*, **50** (5), 1212-1216.

? Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1976), Adsorption-kinetics at linear distribution of concentration in an unlimited cylinder. 2. Rectangular isotherm - Langmuir isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (5), 1227-1231.

? Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1976), Adsorption-kinetics at linear distribution of concentration in an unlimited cylinder. 3. Langmuir adsorption-isotherm - 2nd stage of process. *Zhurnal Fizicheskoi Khimii*, **50** (5), 1232-1235.

? Zaborenko, K.B., Tsibanov, V.V. and Bogatyrev, I.O. (1976), Calculation of a soluble form of dynamic equation in presence of complex-forming reagents at linear sorption isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (5), 1254-1258.

Akselrud, G.A. and Stepanov, V.D. (1976), Numerical solution of a problem on mixed kinetics of isothermal adsorption. *Zhurnal Fizicheskoi Khimii*, **50** (7), 1815-1818.

? Kalinichev, A.I. (1976), Method of moments in theory of nonequilibrium elutive sorption dynamics of a substance at nonlinear isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (7), 1839-1841.

? Lagutkin, O.D. and Dergachev, B.V. (1976), Analytical relations between virial-coefficients on critical isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (7), 1880-1881.

? Lupeiko, T.G., Belyaev, I.N. and Tarasov, N.I. (1976), Thermodynamics of melt-solid state equilibria according to data of thermal-analysis. 1. Derivation and study of crystallization isotherm equations for components of ternary-systems. *Zhurnal Fizicheskoi Khimii*, **50** (8), 1985-1990.

? Nizametdinova, M.A. and Rachinskii, V.V. (1976), Theory of ion-exchange dynamics. 18. Frontal Formation at linear isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (8), 2050-2055.

? Kalinichev, A.I., Goryacheva, N.A., Chmutov, K.V., Pronin, A.Y. and Zolotarev, P.P. (1976), Effect of nonlinear isotherm on shape of outgoing chromatographic curve. *Zhurnal Fizicheskoi Khimii*, **50** (8), 2056-2059.

? Zolotarev, P.P. and Marutovskii, R.M. (1976), Initial-stage of interdiffusion adsorption-kinetics of a mixture of 2 substances. *Zhurnal Fizicheskoi Khimii*, **50** (9), 2299-2303.

? Nizametdinova, M.A. and Rachinskii, V.V. (1976), Theory of ion-exchange dynamics. 19. Nonequilibrium dynamics of ion-exchange sorption with concave isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (10), 2610-2615.

? Lukyanova, Z.V., Martynyuk, T.G., Shekhobalova, V.I. and Pospelova, T.A. (1976), Decomposition kinetics of hydrogen-peroxide solutions on platinum adsorption catalysts. *Zhurnal Fizicheskoi Khimii*, **50** (11), 2837-2840.

? Akimov, V.N. and Gutenev, P.I. (1976), External diffusion kinetics of isothermal dependence of adsorption and desorption of a multicomponent mixture. *Zhurnal Fizicheskoi Khimii*, **50** (11), 2962-2964.

Keywords: Adsorption, Desorption, Diffusion, Isothermal, Kinetics

? Kalinichev, A.I. (1976), Rules for washing out of sorption and desorption fronts in a wide chromatographic band of substance by nonlinear sorption isotherm. *Zhurnal Fizicheskoi Khimii*, **50** (12), 3135-3140.

? Glushchenko, V.Y. and Khabalov, V.V. (1977), Adsorption-kinetics by unlimited diffusion from weak solutions. 2. Adsorption of aromatic nitro-compounds on carbon-black from aqueous-solutions. *Zhurnal Fizicheskoi Khimii*, **51** (6), 1414-1417.

? Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1977), Adsorption-kinetics during linear distribution of concentration in inorganic cylinder. 1. Linear adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (4), 867-871.

? Zhitomirskii, B.M., Agafonov, A.V., Berman, A.D., Yanovskii, M.I. and Zhomov, A.K. (1977), Study of irreversible reaction-kinetics in pulsed microreactorat nonequilibrium adsorption for Langmuir isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (4), 908-911.

? Rodionov, A.V., Duplyakin, V.K. and Levinter, M.E. (1977), Apparatus for study of adsorption-kinetics of an active phase during synthesis of deposited catalysts. *Zhurnal Fizicheskoi Khimii*, **51** (4), 990-992.

Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1977), Adsorption-kinetics at linear distribution of concentration in unlimited cylinder. IV. Dubinin-Radushkevich adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (5), 1081-1085.

? Tsabek, L.K. (1977), Sorption dynamics in a porous-medium for concave isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (6), 1438-1442.

? Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1977), Adsorption-kinetics during linear distribution of concentration in unlimited cylinder. 4. determination of Sc, Y and La desorption from KFP-8 cationite 2nd stage of process. *Zhurnal Fizicheskoi Khimii*, **51** (6), 1443-1446.

? Kamenev, A.S. and Rachinskii, V.V. (1977), Stationary front equation of sorption dynamics at langmuir-type isotherm with application of a phenomenological model for time-delay. *Zhurnal Fizicheskoi Khimii*, **51** (6), 1528-1530.

? Kalinichev, A.I., Pronin, A.Y., Goryacheva, N.A., Chmutov, K.V. and Filimonov, V.Y. (1977), Washing-out dynamics of leading and trailing fronts of a wide chromatographic band at nonlinear isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (7), 1773-1775.

? Kalinichev, A.I. and Belov, V.V. (1977), Frontal equilibrium in sorption dynamics of a substance for s-shaped isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (7), 1779-1782.

? Aleksashenko, A.A. (1977), Adsorption-kinetics in cases of nonlinear diffusion-coefficient and adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **51** (8), 2080-2083.

? Lebedev, Y.Y. (1977), Analysis of solutions of equations for sorption dynamics at linear isotherm and calculation of diffusion kinetics. 2. Transient conditions. *Zhurnal Fizicheskoi Khimii*, **51** (9), 2387-2389.

? Pugachevich, P.P. and Martirosyan, A.L. (1977), New phenomenological method for a description of solution properties. 1. Isotherm and polytherm equations. *Zhurnal Fizicheskoi Khimii*, **51** (10), 2640-2644.

? Kokotov, Y.A. (1978), Effect of ionite nonhomogeneity on sorption isotherm of absorbed nonexchange electrolyte. 1. Estimation of influence of distribution function form by modeling on computer (a model of local electroneutral ionite). *Zhurnal Fizicheskoi Khimii*, **52** (1), 178-182.

? Kokotov, Y.A. (1978), Influence of ionite nonhomogeneity on sorption isotherm of absorbed nonexchange electrolyte. 2. Analysis of general properties and criticism of local electroneutral ionite model. *Zhurnal Fizicheskoi Khimii*, **52** (1), 183-187.

? Buchatskii, P.M., Matorina, N.N. and Chmutov, K.V. (1978), Influence of complex composition on sorption isotherm form in ion-exchange complex-forming chromatography. *Zhurnal Fizicheskoi Khimii*, **52** (3), 720-721.

? Vigdorovich, V.I. and Tsygankova, L.E. (1978), Utilization of Temkin isotherm for analysis of mechanism of iron anode dissolution. *Zhurnal Fizicheskoi Khimii*, **52** (4), 1003-1007.

? Nazarok, V.I., Evseeva, D.I. and Skorokhod, G.A. (1978), Adsorption-kinetics during linear distribution of concentration in inorganic cylinder. 5. Adsorption-kinetics at Freundlich isotherm - 1st stage of process. *Zhurnal Fizicheskoi Khimii*, **52** (4), 1038-1040.

? Lebedev, Y.Y. and Samsonov, G.V. (1978), Solutions of equations for sorption dynamics at linear isotherm and estimation of diffusion kinetics. *Zhurnal Fizicheskoi Khimii*, **52** (5), 1330-1332.

Shimulis, V.I. and Zhernosek, V.M. (1978), Estimation of equation parameters of Hill-Debur adsorption- isotherm. *Zhurnal Fizicheskoi Khimii*, **52** (6), 1510-1511.

Nazarok, V.I. and Ostrovskii, Y.M. (1978), Approximated adsorption-kinetics in constant volume. I. General scheme for derivation of some equations - approximate solution of a problem for Henry, Langmuir and Freindlich isotherms. *Zhurnal Fizicheskoi Khimii*, **52** (8), 1981-1987.

? Zhukova, L.A. and Rachinskii, V.V. (1978), Equation for precipitation isotherm of polybasic acid salt. *Zhurnal Fizicheskoi Khimii*, **52** (8), 2090-2091.

? Belov, V.V., Kalinichev, A.I. and Nazarov, P.P. (1978), Formation theory of displaced ion-exchange chromatogram in case of s-shaped isotherm of a displacer - methods and techniques of physicochemical studies. *Zhurnal Fizicheskoi Khimii*, **52** (8), 2116-2117.

? Nazarok, V.I. and Ostrovskii, Y.M. (1978), Approximate adsorption-kinetics in constant volume. 2. Accuracy estimation of approximate solution of linear isotherm problem. *Zhurnal Fizicheskoi Khimii*, **52** (10), 2593-2596.

? Nazarok, V.I. and Ostrovskii, Y.M. (1978), Approximate solution of adsorption-kinetics in constant volume. 3. Solution of rectangular isotherm problem. *Zhurnal Fizicheskoi Khimii*, **52** (10), 2597-2601.

? Kazakevich, Y.V. and Eltekov, Y.A. (1978), Determination of interpolated isotherm of Gibbs adsorption from solutions. *Zhurnal Fizicheskoi Khimii*, **52** (10), 2624-2627.

? Nazarok, V.I. and Ostrovskii, Y.M. (1978), Approximate solution of adsorption-kinetics in constant volume. 3. Solution of rectangular isotherm problem. *Zhurnal Fizicheskoi Khimii*, **52** (10), 2597-2601.

? Lebedev, Y.Y. (1978), Analysis of solutions of equations for sorption dynamics at linear isotherm and estimation of diffusion kinetics. 3. System parameters, variable along column. *Zhurnal Fizicheskoi Khimii*, **52** (11), 2940-2942.

? Zhukova, L.A. and Rachinskii, V.V. (1979), Equation for the precipitation isotherm of metal hydroxide. *Zhurnal Fizicheskoi Khimii*, **53** (2), 298-301.

? Eroshenkova, G.V., Volkov, S.A. and Sakodynskii, K.I. (1979), Independence of height value of equivalent theoretical plate in chromatography from nonlinear sorption isotherm. *Zhurnal Fizicheskoi Khimii*, **53** (2), 432-437.

? Magalinskii, V.B. (1979), Multilayer adsorption-isotherm with an estimation of the phase- transitions in some layers. *Zhurnal Fizicheskoi Khimii*, **53** (5), 1271-1274.

? Lebedev, Y.Y. (1979), Analyzing the solutions of some equations of sorption dynamics at linear isotherm and calculation of diffusion kinetics. 4. Study on system parameters, variable along the column. *Zhurnal Fizicheskoi Khimii*, **53** (5), 1328-1331.

? Atanasyants, A.G. (1979), Influence of mo surface-structure on its adsorption ability and kinetic characteristics of anode behavior in alkali. *Zhurnal Fizicheskoi Khimii*, **53** (6), 1533-1536.

? Zolotarev, P.P. and Klyushin, A.I. (1979), Adsorption dynamics of a substance for nonlinear isotherms in case of closed isolated system. 2. External diffusion kinetics and arbitrary broken line of adsorption isotherm. *Zhurnal Fizicheskoi Khimii*, **53** (9), 2377-2379.

? Boronin, V.S., Turakulova, A.O. and Poltorak, O.M. (1979), Adsorption kinetics on inhomogeneous surfaces at symbatic dependence between some changes of heat and activation energy. *Zhurnal Fizicheskoi Khimii*, **53** (11), 2808-2811.

? Muravev, D.N. and Saurin, A.D. (1980), Sorption isotherm of aspartic-acid on Ku-2x8 cationite from non-saturated and supersaturated solutions. *Zhurnal Fizicheskoi Khimii*, **54** (5), 1271-1273.

? Magomedov, M.A. and Magomedov, K.A. (1980), Kinetic-parameters of O2 adsorption on CdSe monocrystallic films. *Zhurnal Fizicheskoi Khimii*, **54** (7), 1738-1740.

? Lebedev, Y.Y. (1980), Analysis of solutions to sorption dynamics equations in linear isotherm and computation of diffusion kinetics. 5. Parameters of system varied along the length of column. *Zhurnal Fizicheskoi Khimii*, **54** (7), 1822-1828

? Telegin, F.Y. and Melnikov, B.N. (1980), Calculation of diffusion-coefficients and boundary-condition constants in case of uniform-porous adsorbents and linear adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **54** (8), 2060-2062.

? Brykina, G.D., Marchak, T.V. and Belyavskaya, T.A. (1980), Ion sorption of copper and nickel by AV-17X8 anion-exchanger, modified with 1-(2-thiazolylazo)-2-naphthol-3,6-disulfonic acid disodium salt. *Zhurnal Fizicheskoi Khimii*, **54** (8), 2094-2097.

? Ugrozov, V.V. and Zolotarev, P.P. (1982), Theory of kinetics of sorption on biporous sorbents for some non-linear isotherm sorptions. 1. Internal diffusion in biporous sorbents. *Zhurnal Fizicheskoi Khimii*, **56** (10), 2607-2609.

? Ugrozov, V.V. and Zolotarev, P.P. (1982), Theory of the kinetics of sorption on biporous sorbents for some non-linear isotherm sorptions. 2. Effects of external mass exchange on the kinetic sorption on biporous sorbents in cases of rectangular isotherm sorption. *Zhurnal Fizicheskoi Khimii*, **56** (10), 2609-2611.

? Arinshtein, A.E. (1983), Precise description of the equilibrium dynamics of sorption with Langmuir type non-linear isotherm. *Zhurnal Fizicheskoi Khimii*, **57** (7), 1773-1777.

? Malisova, A.D., Aranovich, G.L., Zhukhovitskii, A.A. and Yanovskii, S.M. (1984), Washing of boundary zones and the dependence of separation on parameters in continuous chromadistillation. *Zhurnal Fizicheskoi Khimii*, **58** (6), 1495-1500.

? Tolmachev, A.M. (1985), Selection of standard states during the thermodynamic analysis of adsorption equilibria. *Zhurnal Fizicheskoi Khimii*, **59** (11), 2764-2768.

? Aranovich, G.L. (1985), Statistic modeling of adsorption and chromatographic processes. *Zhurnal Fizicheskoi Khimii*, **59** (11), 2778-2782.

? Aranovich, G.L. (1985), Thermodynamics of adsorption from solutions considering the short-range order. *Zhurnal Fizicheskoi Khimii*, **59** (11), 2783-2786.

? Aranovich, G.L. (1986), Isotherm of adsorption from nonideal solutions. *Zhurnal Fizicheskoi Khimii*, **60** (3), 710-714.

? Aranovich, G.L. (1986), Structure of the adsorption layer in irregular solutions. *Zhurnal Fizicheskoi Khimii*, **60** (7), 1716-1720.

? Aranovich, G.L. (1986), Adsorption from solutions on phase-transfer boundaries of complex-geometry. *Zhurnal Fizicheskoi Khimii*, **60** (8), 1975-1980.

? Aranovich, G.L. (1987), Theory of concentration disturbances in nonelectrolyte solutions. *Zhurnal Fizicheskoi Khimii*, **61** (1), 86-93.

? Aranovich, G.L. (1987), Molecular-structure of nonelectrolyte adsorption solutions. *Zhurnal Fizicheskoi Khimii*, **61** (1), 180-186.

? Aranovich, G.L. (1987), Adsorption from solutions in the London approximation of adsorbate-adsorbent interaction. *Zhurnal Fizicheskoi Khimii*, **61** (2), 447-452.

? Aranovich, G.L. (1987), Theory of nonelectrolyte adsorption solutions based on orientation heterogeneity of intramolecular interaction. *Zhurnal Fizicheskoi Khimii*, **61** (5), 1293-1300.

? Aranovich, G.L. (1987), Theory of heterogeneous multicomponent nonelectrolyte solutions. *Zhurnal Fizicheskoi Khimii*, **61** (12), 3251-3259.

? Aranovich, G.L. (1988), Adsorption of molecular solutions near the critical-point of dispersion. *Zhurnal Fizicheskoi Khimii*, **62** (1), 143-149.

? Nemtsova, N.N., Samsonov, G.V. and Pasechni, V.A. (1972), Sorption isotherm of amino-acids during considerable change of concentration of absorbed ions. *Zhurnal Fizicheskoi Khimii*, **62** (2), 520-&.

? Aranovich, G.L. (1988), Adsorption and surface-tension of imperfect nonelectrolyte solutions. *Zhurnal Fizicheskoi Khimii*, **62** (3), 626-631.

? Aranovich, G.L. (1988), Continual theory of heterogeneous nonelectrolyte solutions. *Zhurnal Fizicheskoi Khimii*, **62** (3), 632-639.

? Temkin, M.I. (1988), Equation of gas and liquid states corresponding to the van der Waals model. *Zhurnal Fizicheskoi Khimii*, **62** (10), 2577-2582.

? Aranovich, G.L. (1988), Principle improvement of polymolecular adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **62** (11), 3000-3008.

? Aranovich, G.L. (1988), Adsorption isotherms on the curved surface in bounded adsorption space. *Zhurnal Fizicheskoi Khimii*, **62** (11), 3009-3014.

? Vigdorovich, M.V. and Vigdorovich, V.I. (1989), Certain principles of iron ionization during the adsorption of intermediate ionization products according to the Temkin isotherm. *Zhurnal Fizicheskoi Khimii*, **63** (2), 509-512.

? Aranovich, G.L. (1989), Critical indexes of adsorption. *Zhurnal Fizicheskoi Khimii*, **63** (3), 719-724.

? Aranovich, G.L. (1989), Equation of a state of polymolecular adsorption layer. *Zhurnal Fizicheskoi Khimii*, **63** (4), 1025-1029.

? Aranovich, G.L. (1989), Thermodynamic analysis of the structure of polymolecular adsorption layers in multicomponent solutions. *Zhurnal Fizicheskoi Khimii*, **63** (6), 1527-1534.

? Aranovich, G.L. (1989), Modified isotherm of adsorption on porous adsorbents. *Zhurnal Fizicheskoi Khimii*, **63** (9), 2529-2533.

? Aranovich, G.L. (1990), Determination of adsorption heat under extremely low filling on adsorption-isotherm. *Zhurnal Fizicheskoi Khimii*, **64** (1), 161-165.

? Aranovich, G.L. (1990), Dependence of the composition of molecular adsorption solutions on the distance to sorbent surface. *Zhurnal Fizicheskoi Khimii*, **64** (5), 1330-1336.

? Aranovich, G.L. (1990), Structure of adsorption nonelectrolyte solutions with regard to interactions in 2-nd coordinated sphere. *Zhurnal Fizicheskoi Khimii*, **64** (11), 3124-3127.

? Aranovich, G.L. (1991), Analysis of the structure of nonelectrolyte adsorption solutions based on thermodynamic function series expansion according to excessive density degrees. *Zhurnal Fizicheskoi Khimii*, **65** (4), 1097-1100.

? Aranovich, G.L. (1993), Isotherm of polylayered adsorption. *Zhurnal Fizicheskoi Khimii*, **67** (11), 2323-2324.

? Aranovich, G.L. (1994), Analysis of Gibbs adsorption based on Ono-Kondo equation. *Zhurnal Fizicheskoi Khimii*, **68** (1), 110-113.

? Aranovich, G.L. (1994), Analytical solution of continual version of adsorption equilibrium equation (Lane equation). *Zhurnal Fizicheskoi Khimii*, **68** (2), 305-308.

? Aranovich, G.L. (1994), Solution of ono-kondo equation. *Zhurnal Fizicheskoi Khimii*, **68** (5), 960.

? Kopylova, V.D., Valdman, A.I., Valdman, D.I., Portnykh, N.V. and Ivanova, T.I. (1996), The enthalpy and thermokinetics of adsorption of 3d-metal ions on VION KN-1 carboxyl ion-exchange fiber, *Zhurnal Fizicheskoi Khimii*, **70** (2), 302-306.

? Tolmachev, A.M., Okisheva, N.A., Levchenko, E.M., Rakhlevskaya, M.N., Trubnikov, O.I. and Aranovich, G.L. (1996), Application of lattice models for calculating excess adsorption isotherms for components of nonelectrolyte binary solutions on macroporous adsorbents. *Zhurnal Fizicheskoi Khimii*, **70** (6), 1114-1118.

? Myasnikov, I.A. and Sysoeva, A.P. (1998), The peculiarities of free alkyl radical adsorption on metal oxides and migration of these radicals in polar solvents. *Zhurnal Fizicheskoi Khimii*, **72** (6), 1116-1122.

Keywords: Physical-Chemical Principles, Sensors Electroconductivity, Liquid-Media

# Title: Zhurnal Neorganicheskoi Khimii

Full Journal Title: Zhurnal Neorganicheskoi Khimii

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Vorobeva, G.F., Surin, Y.V. and Molodkin, A.K. (1975), Solubility isotherm of MgCl2-Cs(NH2)2-H2O system at 75°C. *Zhurnal Neorganicheskoi Khimii*, **20** (8), 2296-2297.

? Nikolskii, B.A. and Plyshevskii, Y.S. (1976), Isotherm of CaO-B2O3-Co2-H2O System at 80°C. *Zhurnal Neorganicheskoi Khimii*, **21** (5), 1362-1364.

? Tsurik, L.A., Kamaeva, I.G. and Serebrennikov, V.V. (1977), Solubility isotherm of HfOCl2-CaCl2-HCl-H2O system at 25°C. *Zhurnal Neorganicheskoi Khimii*, **22** (5), 1366-1371.

? Belyaev, I.N., Baglei, R.I., Burtseva, K.G. and Rusina, O.N. (1977), Solubility isotherm at 25°C and physicochemical properties of saturated solutions of system - sodium b-paratungstate-potassium b-paratungstate-water. *Zhurnal Neorganicheskoi Khimii*, **22** (7), 1966-1970.

? Belyaev, I.N. and Baglei, R.I. (1977), Solubility isotherm 25°C and physicochemical properties of saturated solutions of sodium a paratungstate-potassium a paratungstate-water system. *Zhurnal Neorganicheskoi Khimii*, **22** (10), 2848-2854.

? Ashchyan, T.O., Itkina, L.S., Danilov, V.P., Lepeshkov, I.N. and Kotova, L.T. (1978), Solubility isotherm at 25°C of Li,Al=OH,SO4-H2O system. *Zhurnal Neorganicheskoi Khimii*, **23** (3), 812-820.

? Mirsaidov, U., Kurbonbekov, A. and Dzhuraev, K.S. (1979), Solubility isotherm in the Y(BH4)3-LiBH4-tetrahydrofuran system at 20°C. *Zhurnal Neorganicheskoi Khimii*, **24** (10), 2855-2856.

? Konoplev, V.N. (1980), Solubility isotherm of Mg(BH4)2 diethyl-ether toluene at 20°C. *Zhurnal Neorganicheskoi Khimii*, **25** (2), 575-576.

# Title: Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova

Full Journal Title: Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN: 1997-7298

Issues/Year:

Journal Country

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ivushkin, A.A. and Nemtsov, A.V. (2009), Scientometric analysis of materials of Russian and European Congresses of psychiatrists. *Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova*, **109** (8), 63-67.

Full Text: [2009\Zhu Nev Psi Ime Kor109, 63.pdf](2009/Zhu%20Nev%20Psi%20Ime%20Kor109,%2063.pdf)

Keywords: European Congress of Psychiatrists, Russian Congress of Psychiatrists, Sciencemetrics, Content Analysis, Research Publications, Journals, Quality

? Nemtsov, A.V. and Ivushkin, A.A. (2010), Comparative scientometric analysis of the Proceedings of XIII and XIV Congresses of Russian Psychiatrists: Narcology. *Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova*, **110** (5), 98-104.

Full Text: 2010\Zhu Nev Psi Ime Kor110, 98.pdf

Abstract: An analysis of the chapter “Medical help for the substance abuses, clinic, treatment of the abusers, biological studies of the abuses’ in the Proceedings of the last two Russian congresses of psychiatrists (XIII in 2000 and XIV in 2005) reveals the vast multiplicity of topics. The majority of topics featured in the XIII Congress does not provide any follow-up information in the materials of the XIV Congress thus not allowing to figure out the tendencies or consequences in the field of addiction studies. There is no uniformity in the vocabulary used in the chapter analyzed. The dominant topics such as alcoholism and opiate abuse make up a small part of the total amount of papers.

Keywords: Alcoholism, Drug Addictions, Last Congreses of Russion Psychiatrists, Narcology

? Vlasov, V.V. (2010), Significance of scientific publication in professional journals. *Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova*, **110** (7), 86-89.

Full Text: [2010\Zhu Nev Psi Ime Kor110, 86.pdf](2010/Zhu%20Nev%20Psi%20Ime%20Kor110,%2086.pdf)

? Reshetnikov, V.A. and Trushchelev, S.A. (2011), Indicators of research activity. *Zhurnal Nevrologii I Psikhiatrii Imeni S S Korsakova*, **111** (2), 76-83.

Full Text: [2011\Zhu Nev Psi Ime Kor111, 76.pdf](2011/Zhu%20Nev%20Psi%20Ime%20Kor111,%2076.pdf)

Keywords: Impact Factor, Indicators, Medical Information, Medicine, Psychiatry, Research, Scientometrics

# Title: Zhurnal Obshchei Biologii

Full Journal Title: Zhurnal Obshchei Biologii

ISO Abbreviated Title: Zhurnal Obshchei Biol.

JCR Abbreviated Title: Zh Obshch Biol

ISSN: 0044-4596

Issues/Year: 6

Journal Country/Territory: Russia

Language: English

Publisher: Mezhdunarodnaya Kniga

Publisher Address: 39 Dimitrova Ul., 113095 Moscow, Russia

Subject Categories:

Biology: Impact Factor

? Krushinskaya, N.L., Zolotareva, N.N. and Dmitrieva, I.L. (1988), The pattern of social-relations in Tryon Maze Bright and Tryon Maze Dull male-rats estimated on the basis of some biochemical criteria. *Zhurnal Obshchei Biologii*, **49** (2), 255-262.

Full Text: 1988\Zhu Obs Bio49, 255.pdf

? Budilova, E.V., Drogalina, Z.A. and Teriokhin, A.T. (1995), Principal trends of modern ecology and its mathematical tools: An analysis of publications. *Zhurnal Obshchei Biologii*, **56** (2), 179-190.

Full Text: [1995\Zhu Obs Bio56, 179.pdf](1995/Zhu%20Obs%20Bio56,%20179.pdf)

Abstract: About 550 publications (papers and short notes) from the journals <<Ecology>> (USA) and <<Ekologia>> (Russia) were the subtect of a scientometric analysis. The frequencies of encountering of ecological and mathematical keywords as well as the frequencies of their conjoint encountering in one publication are calculated. The obtained data is used to represent, with the aid of the method of multidimensional scaling, interrelations between the most frequent keywords graphically on a plane. As to the ecological keywords, this gives possibility to cluster them into four groups differing by the objects of investigation: terrestrial animals, birds, water animala and plants. On the other hand, these groups differ also by conceptual approaches. to the research - one of them is that of population ecology and the other is that of system ecology. The first is primarily used for studying terrestrial animals and birds and the second for studying plants. To study the water communities both approaches are used with near equal frequency. Six groups of mathematical keywords are revealed. Four of them relate to the methods of mathematical statistics (standard, nonparametric, multidimensional, and analyzing categorical data) and are much more frequently used than two others relating to the differential equations and Markov chains. The data shows also that two above-noted journals differ signiaficantly by intensities of using mathemtical methods.

# Title: Zhurnal Obshchei Khimii

Full Journal Title: Zhurnal Obshchei Khimii

ISO Abbreviated Title:

JCR Abbreviated Title: Zh Obshch Khim

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Ermolenko, I.N. and Pavlyuchenko, M.M. (1958), Kinetics of the oxidation of cellulose by nitrogen dioxide according to the spectral adsorption data on the product. *Zhurnal Obshchei Khimii*, **28** (3), 722-728.

? Gorbunov, A.N. and Fedorov, Y.A. (1978), Equations for lamination isotherm in ternary-systems. *Zhurnal Obshchei Khimii*, **48** (4), 724-720.

# Title: Zhurnal Prikladnoi Khimii

Full Journal Title: Zhurnal Prikladnoi Khimii

ISO Abbreviated Title:

JCR Abbreviated Title: Zh Prikl Khim

ISSN: 0044-4618

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Tibilov, S.G., Ramm, V.M. and Baranova, A.I. (1970), Adsorption kinetics of sulfur trioxide and water vapor by sulfuric acid. *Zhurnal Prikladnoi Khimii*, **43** (2), 273-??.

? Placheno, T.G., Seballo, A.A., Baranov, E.I. and Shiryaev, A.N. (1970), Kinetics of water vapor adsorption on zeolite NaA. *Zhurnal Prikladnoi Khimii*, **43** (4), 816-??.

? Kirgints, A.N. Kabyshev, V.I. and Sokolov, V.M. (1970), Isotherm of water adsorption on iodine. *Zhurnal Prikladnoi Khimii*, **43** (12), 2731-??.

? Semenova, E.P., Romankov, P.G., Lepilin, V.N. and Kozlova, T.I. (1971), Kinetics of adsorption process in countercurrent columnar apparatus with suspended layer of adsorbent. 8. *Zhurnal Prikladnoi Khimii*, **44** (3), 554-??.

? Chernykh, O.A. and Boichino, E.S. (1971), Sorption of metal-ions on hydrated zirconium oxide. *Zhurnal Prikladnoi Khimii*, **46** (11), 2445-2449.

? Podobaev, N.I. and Novikov, V.E. (1974), Adsorption from hydrochloric-acid solutions on propinol iron and its effect on kinetics of electrode processes. *Zhurnal Prikladnoi Khimii*, **47** (5), 1025-1028.

# Title: Zhurnal Vysshei Nervnoi Deyatelnosti Imeni I P Pavlova

Full Journal Title: Zhurnal Vysshei Nervnoi Deyatelnosti Imeni I P Pavlova

ISO Abbreviated Title: Zhurnal Vyss. Nervn. Deyatelnosti Im. I P Pavlov.

JCR Abbreviated Title: Zh Vyssh Nerv Deyat+

ISSN: 0044-4677

Issues/Year: 6

Journal Country/Territory: Russia

Language: English

Publisher: Mezhdunarodnaya Kniga

Publisher Address: 39 Dimitrova Ul., 113095 Moscow, Russia

Subject Categories:

Neurosciences Physiology: Impact Factor

? Zhdanova, I.V., Shipilova, L.S. and Kireeva, K.N. (1987), Relation of hierarchical structure of community and characteristics in learning in outbred white-rats and dull Tryon rats. *Zhurnal Vysshei Nervnoi Deyatelnosti Imeni I P Pavlova*, **37** (4), 769-771.

# Title: Ziva Antika

Full Journal Title: Ziva Antika

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Merkle, S. (1983), Ovid ‘Amores’ 3,2 and ‘Ars Amatoria’ 1,135-162 - A case of self-plagiarism. *Ziva Antika*, **33** (2), 135-145.

# Title: ZKG International

Full Journal Title: ZKG International

ISO Abbreviated Title: ZKG Int.

JCR Abbreviated Title: Zkg Int

ISSN: 0949-0205

Issues/Year: 12

Journal Country/Territory: Germany

Language: English

Publisher: Bauverlag GmbH

Publisher Address: Pressehaus, Am Klingenweg 4a, D-65396 Walluf, Germany

Subject Categories:

Construction & Building Technology Materials Science: Impact Factor

? Weiler, H. (1996), Experience with the purification of coal fired power station and waste incinerator flue gases with lime products. *ZKG International*, **49** (12), A24.

# Title: Zoo Biology

Full Journal Title: [Zoo Biology](http://www3.interscience.wiley.com/journal/35728/home)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Anderson, U.S., Kelling, A.S. and Maple, T.L. (2008), Twenty-five years of *Zoo Biology*: A publication analysis. *Zoo Biology*, **27** (6), 444-457.

Full Text: [2008\Zoo Bio27, 444.pdf](2008/Zoo%20Bio27,%20444.pdf)

Abstract: To expand on earlier publication analyses of the journal Zoo Biology, information from 991 articles published within the journal’s first 25 years was compiled and evaluated. Most articles were applied, descriptive accounts that included inferential statistics and/or biological analyses. In addition, most articles focused on captive animals and concentrated on the behavior and reproduction of mammals, with particular emphasis on primates. With respect to authors, the majority of first authors were affiliated with zoos or universities within the United States and collaborated with co-authors at different institutions. Nearly two-fifths of articles acknowledged receiving external funding and external funding increased over they cars, however, collaboration did not significantly change receipt of external funding. In addition, first authors with zoo affiliations published more descriptive, applied science articles and acknowledged receipt of external funding significantly less often than first authors with University affiliations. Publication latency was comparable to other scientific journals and increased significantly over the 25-year publication period. Longitudinal trends indicated that experimental, applied science, diet and nutrition, and collaborative articles also increased significantly, whereas descriptive, basic science, behavior, and population biology articles decreased significantly. By describing historical trends in zoo research through an analysis of papers published in Zoo Biology, this article may help to bridge gaps and identify new opportunities. Zoo Biol 27:444-457, 2008. (C) 2008 Wiley-Liss. Inc.

Keywords: American Zoos, Analyses, Analysis, Animals, Aquariums, Authors, Authorship, Behavior, Behavioral-Research, Bibliometrics, Biological, Biology, Bridge, Change, Changing Roles, Citations, Co-Authors, Collaboration, Conservation, Diet, Experimental, First, Funding, Information, Institutions, Journal, Journals, Latency, Majority, Mammals, Nutrition, Papers, Population, Primates, Publication, Reproduction, Research, Respect, Science, Scientific Communication, Scientific Journals, Statistics, Trends, United States, Universities, University, Zoo, Zoological Park

? Goulart, V.D., Azevedo, P.G., van de Schepop, J.A., Teixeira, C.P., Barcante, L., Azevedo, C.S. and Young, R.J. (2009), GAPs in the study of zoo and wild animal welfare. *Zoo Biology*, **28** (6), 561-573.

Full Text: [2009\Zoo Bio28, 561.pdf](2009/Zoo%20Bio28,%20561.pdf)

Abstract: To investigate the science of animal welfare for zoo and wild animals in the period from 1966 to 2007, we conducted a bibliometric analysis of abstracts downloaded from The Web of Science (c) database using the keyword combination “Animal welfare, Zoo\* and wild” in the topic field. In total wedownloaded 1,125 abstracts, which were classified into the following categories: year of publication environment of the study (e.g., zoo) or theoretical; area of knowledge (e.g., conservation ill Situ); number of experimental animals used; species; addresses of authors: taxonomic classification; publication language; journal name; number of citations received. Since 1990, there has been a rapid increase in the number of articles published in this area of animal welfare. One worrying result was that published articles were predominately of a theoretical nature (58.65%, N = 563). Most of the articles were published by authors either in Europe (47.43%, N = 480) or North America (37.65%, N = 381) and written in English (87.71%, N = 971). The majority of experimental studies were conducted with mammals (75.92%, N = 391), and had small sample sizes (N = 7 for zoo-based Studies). In terms of impact factor (IF), the journals in this Study had a median factor equivalent to that for the area of biological sciences (median IF = 1.013). Little knowledge cross-over from farm animal welfare was found (only four articles) in this study. In Conclusion, Zoo and wild animal welfare as a science may benefit from it greater interaction with farm animal welfare. Zoo Biol 28:561-573, 2009. (C) 2009 Wiley-Liss, Inc.

Keywords: Animal Well-Being, Articles, Behavior, Bibliometric, Bibliometric Analysis, Citations, Classification, GAP Analysis, Impact, Impact Factor, Interaction, Journals, Protected Areas, Publication, Science-Based Assessment, Species, Topic, Web of Science, Wild Animal, Zoo Animal

# Title: Zoologia

Full Journal Title: Zoologia

ISO Abbreviated Title: Zoologia

JCR Abbreviated Title: Zoologia

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Brito, D., Oliveira, L.C., Oprea, M. and Mello, M.A.R. (2009), An overview of Brazilian mammalogy: Trends, biases and future directions. *Zoologia*, **26** (1), 67-73.

Full Text: [2009\Zoologia26, 67.pdf](2009/Zoologia26,%2067.pdf)

Abstract: Mammals are among the most charismatic and well-studied organisms, and Brazil harbors the largest mammal diversity of the world. The Brazilian Society of Mammalogy was established in 1985, and since 2001 it organizes the Brazilian Congress of Mammalogy. We used the proceedings of all three editions of this congress together with papers indexed in Web of Science and Scielo to evaluate trends in Brazilian mammalogy. All contributions were categorized according to mammalian order, biome, topic of research and state of authors’ affiliation, Our results show that mammalian orders with higher species richness receive more attention, but the ranking is different between abstracts and papers. Higher species richness did not translate into more attention for more speciose biomes, and again the ranking was different between papers and abstracts. There are research topics that receive much higher attention than others, and also other important ones, like Taxonomy, that have been neglected. States with greater human populations produce both more papers and abstracts. We conclude that the higher number of publication in the Atlantic Forest is caused by the concentration of mammalogists in the south and southeastern regions of the country. Contrary to what is normally believed, mammalian orders received attention according to their species richness, and not their charisma, probably because richer orders provide more study models. We suggest that additional funding mechanisms should be set in place in order to encourage more research on mammalian orders, topics, and states which have been neglected so far, in order to improve the knowledge on important Brazilian mammal biodiversity.

Keywords: Affiliation, Amazon, Atlantic Forest, Authors, Biodiversity, Biodiversity Hotspots, Biomes, Brazil, Conservation Priorities, Diversity, Extinction, Funding, Future, Knowledge, Meta-Analysis, Papers, Patterns, Priorities, Publication, Ranking, Regions, Research, Research Topics, Science, Scientometrics, Taxonomy, Topics, Trends, Web of Science, Wilderness

# Title: Zoological Studies

Full Journal Title: [Zoological Studies](http://zoolstud.sinica.edu.tw/)

ISO Abbreviated Title: Zool. Stud.

JCR Abbreviated Title: Zool Stud

ISSN: 1021-5506

Issues/Year: 4

Journal Country/Territory: Taiwan

Language: English

Publisher: Acad Sinica Inst Zoology

Publisher Address: Editorial Office, Taipei 115, Taiwan

Subject Categories:

Zoology: Impact Factor

? Lee, S.C., Cheng, H.L. and Chang, J.T. (1996), Allozyme variation in the large scale mullet liza macrolepis (Perciformes, Mugilidae) from coastal waters of Western Taiwan. *Zoological Studies*, **35** (2), 85-92.

Full Text: Zoo Stu35, 85.pdf

Abstract: Allozyme variation was studied in the large-scale mullet Liza macrolepis collected from 4 sites: 3 sites on the west coast of Taiwan, the Tanshui estuary, the Kaohsiung River (Love River) and Dapong Bay (Tungkang), and 1 site about 50 km off the west coast of Taiwan, the Penghu Islands. The genetic similarities among these 4 localities are rather high (0.992-0.999), indicating that they belong to the same population. The inter-sample comparisons of heterozygosity based on 10 polymorphic loci (sAAT-1, CK-B, GPI-A, GPI-B, IDHP-A, LDH-C, sMDH-A, sMDH-B, ME-1 and MPI-1) under the 0.99 criterion revealed that most loci conform with the Hardy-Weinberg Equilibrium, except those at GPI-B from Dapong Bay and IDHP-A from the Tanshui estuary. Analysis of overall mean heterozygosities among 4 inter-sample comparisons revealed that the samples from Dapong Bay and the Tanshui estuary have higher values (0.044 and 0.043, respectively) than those from the Kaohsiung River and Penghu (0.029 and 0.028, respectively), probably due to heavy organic pollution in Dapong Bay and colder temperatures in the Tanshui estuary. Comparisons of overall F-ST (local subpopulation differentiation) of Dapong Bay with those of the three other locations indicate a moderate genetic differentiation which is mainly contributed by the unusually high allele frequency of the MPI locus. A higher inbreeding coefficient (F-IS) in the Dapong sample corresponds to the high inbreeding potential at this site, probably due to its nearly land-locked habitat, which limits the exchange of individual fish between the bay and the open coast.

# Title: Zootaxa

Full Journal Title: Zootaxa

ISO Abbreviated Title: Zootaxa

JCR Abbreviated Title: Zootaxa

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

? Valdecasas, A.G. (2008), Confocal microscopy applied to water mite taxonomy with the description of a new genus of Axonopsinae (Acari, Parasitengona, Hydrachnidia) from Central America. *Zootaxa*, **1820**, 41-48.

Abstract: Vagabundia sci n. gen. n. sp. of the subfamily Axonopsinae is proposed and described. Confocal Laser Scanning Microscopy, not previously applied to water mite taxonomy, allowed the acquisition and posterior processing of clean optical slices. The new species is compared to other mites that have been described as ‘Axonopsella-like’. Vagabundia sci n. sp. is named after the Science Citation Index, a sociological tool that, as explained in the text, has done more harm than good to the population of taxonomists.

Keywords: Central America, Citation, New Species, Population, Science, Science Citation Index, Species, Taxonomy, Water

# Title: Zootecnia Tropical

Full Journal Title: [Zootecnia Tropical](http://www.bioline.org.br/toc?id=zt)

ISO Abbreviated Title:

JCR Abbreviated Title:

ISSN:

Issues/Year:

Journal Country/Territory:

Language:

Publisher:

Publisher Address:

Subject Categories:

: Impact Factor

Arenas, S. and Romero, A. (2003), Bibliometric indicators of the Journal Zootecnia Tropical, Venezuela/Indicadores bibliométricos de la revista científica Zootecnia Tropical. *Zootecnia Tropical*, **21** (3), 325-350.

Full Text: [2003\Zoo Tro21, 325.pdf](2003/Zoo%20Tro21,%20325.pdf)

Abstract: Zootecnia Tropical Journal, edited by the National Institute of Agricultural Research (Instituto Nacional de Investigaciones Agropecuarias, Venezuela) was analyzed through a set of bibliometric indicators. This analysis included 246 articles that constitute the collection from volume 1 to 19, 33 issues in total, between years 1985 and 2001. Venezuelan Agricultural Bibliography database was used as source of data, and an ad hoc procedure. There were determined several supply and demand indicators that characterize the journal, showing the first indicators about its impact on research and academic sectors in the country. Results showed that the journal had favorable bibliometric indicators, a growth index of 3.22 in average, a growing number of authors and institutions, as well as typical values of productivity indicators for domestic journals. Presence in internet is discussed in relation to the access of electronically available journals. Such information provides valuable indicators in the decision making process to help the improvement of the journal positioning and a more solid scientific status.

# Title: Thesis

[Thesis](http://thesis.lib.ncu.edu.tw/ETD-db/ETD-search/search)

? Zeldowitsch, J. (1936), ??. *Ph.D. Thesis*, Leningrad.

? Gangoli, N. (1971), Phosphate removal by activated alumina. *M.Sc. Thesis*, Northwestern University Evaston.

? Dunn, Jr., H. (1979), Bibliometric analysis of the patent literature and its relationship to the scientific journal literature. *Ph.D. Thesis*, Case Western Reserve University, Cleveland, U.S.A.

Full Text: [Thesis\Dunn, H.pdf](Thesis/Dunn,%20H.pdf)

McConvey, I.F. (1981), The isothermal mathematical modelling of physiochmical adsorption of dyes from solution using spruce wood particles. *Ph.D. Thesis*, The Queen’s University of Belfast, Belfast, U.K.

? Diluvio, C.Y. (1989), Science in the Philippines: A bibliographic and bibliometric analysis of the periodical literature. *Ph.D. Thesis*, University of Illinois at Urbana-Champaign, U.S.A.

Full Text: [Thesis\Diluvio CY.pdf](Thesis/Diluvio%20CY.pdf)

Asbtract: The contribution of Philippine scientists to the world periodical literature, and the sources cited by these scientists, were investigated. Eleven research questions provided focus for the study. A major source of data was the Science Citation Index for the period, 1975-1985. Almost all of the papers published by Philippine scientists are in English and appear in journals published internationally. A very high percentage (39 percent) of them appear in the US journals. The scatter of the papers over journal titles was plotted to show the influence of Philippine science. The most productive research centers in the Philippines are the internationally funded research institutions located in the country plus the largest state funded university. The leading international research center in terms of publication output is the International Rice Research Institute (IRRI). The majority (53 percent) of the papers produced by the international agencies in the Philippines are authored by non-Philippine scientists. Local Philippine scientists affiliated with these agencies contribute only 14 percent of these papers. One third of all papers from the international agencies are co-authored by Philippine and non-Philippine scientists. Citation analysis was used to compare the extent of Philippine literature cited (a) by Philippine authors publishing internationally and nationally, (b) by Philippine scientists collaborating with the nationals of other countries and those not collaborating. Philippine scientists tend to cite more Philippine literature when they publish in a major national journal than they do when they publish internationally. However, findings on whether Philippine scientists are less likely to cite Philippine literature when collaborating with other nationals is inconclusive. These results must be viewed cautiously because only one national journal was included in the study. Philippine scientists publish in a wide range of journals emanating from a wide range of countries but they contribute very little to the high impact journals as measured by citation. This is closely related to the focus on agriculture--agriculture journals tend not to have a high impact factor. Thus, the Philippines makes a relatively small contribution to world science.

? Thompson, C.E. (1989), Hard science or soft science: A bibliometric analysis of selected library science/information science journals (scientific literature, science). *Ph.D. Thesis*, Texas Woman’s University, U.S.A.

Full Text: [Thesis\Thompson, CE.pdf](Thesis/Thompson,%20CE.pdf)

Abstract: The purpose of this study was to determine whether the discipline of library science is presently a hard or a soft science according to Price’s Index, and to establish any trends developing over the last twenty years. In a 1978 dissertation by Cline, library science proved to be a soft science, with no discernible trends in the direction of a hard science. Five questions were answered: (1) Has there been a trend in the field of librarianship toward its becoming a hard science over the past twenty years? (2) Are the more traditional library science and less traditional information science journals different in regard to the issue of hard science vs. soft science? (3) How much self-citation occurs within the profession? (4) What are the more frequently cited journals? and (5) What are the more frequently cited journals from outside the profession? A basic list of journal titles was sent to library school professors for their selection of ten library science and ten information science journals. The twenty resulting titles were studied, using citation analysis, for the years 1965, 1970, 1975, 1980, and 1985, and the data collected was loaded into a database to be analyzed by StatPac. Major findings were: (1) According to Price’s Index, the literature was a hard science. Two other Price norms for a hard science were applied and the literature did not satisfy either of the norms; (2) A comparison of library science and information science showed that information science journals ranked higher on Price’s Index. When the other Price norms were applied, information science journals satisfied the citations per article norm and scored higher than the library science journals on the 80% periodical citation norm; (3) There is only a small percentage of author and journal self-citation, with a recent decline in both; (4) The list of most cited journal titles contained almost exclusively titles within the discipline; (5) There has been a continual increase in both the numbers of citations to journals outside the discipline and the ratio of these citations to the total journal citation count.

? Lee, Tai-Gyu (1991), Study of mercury kinetics and control methodologies in simulated combustion flue gases. *Ph.D. Thesis*, Yonsei University, Seoul, Korea.

Full Text: [Thesis\Lee, TG.pdf](Thesis/Lee,%20TG.pdf)

Ho, Y.S. (1993), Studies on oxa-axamacrocycles. *M.Phil. Thesis*, The University of Sheffield, Sheffield, U.K.

Ho, Yuh-Shan.-Studies on oxa-azamacrocycles, 1993.-z0940499

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Title Detail

Author: Ho, Yuh-Shan

Title: Absorption of heavy metals from waste streams by peat

Publisher: Birmingham: University of Birmingham, 1995

Notes: Thesis (Ph.D)-University of Birmingham, School of Chemical Engineering.

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Ho, Yuh-Shan.-Absorption of heavy metals from waste streams by peat.-Birmingham: University of Birmingham, 1995.-q5958222

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Title: Absorption of heavy metals from waste streams by peat

Date: 1995

Classmark: DISS.T2.B95

? Wilson, C.S. (1995), The formation of subject literature collections for bibliometric analysis the case of the topic of Bradford’s Law of Scattering. *Ph.D. Thesis*, University of New South Wales.

Full Text: Wilson, CS

? Babou, R.L. (1997), A bibliometric study of the reviews of small press sociology books. *Ph.D. Thesis*, San Jose State University, USA.

Full Text: [Thesis\Babou RL.pdf](Thesis/Babou%20RL.pdf)

Abstract: This thesis provides information regarding the effectiveness of book review resources as an aid in identifying small press sociology titles. Small Press Record of Books in Print was the source for the 290 book database, published 1985-89, with sociology subjects as defined by the Library of Congress classification system HM-HV. The study determines that small press sociology books, generally, receive as many reviews as other books. The review distribution conforms to Bradford’s law, with a small core of periodicals receiving a large percentage of the reviews. No relationship is found between publisher size and the number of reviews their books received. The study used five periodical indexes to identify reviews and found all were productive for the identification of reviews. The subject areas of women’s studies, sexuality, and gay and lesbianism received the most reviews, while marriage and family and substance abuse received the fewest reviews.

? Kaminer, N. (1997), Internet use and scholars’ productivity. *Ph.D. Thesis*, University of California, Berkeley, USA.

Full Text: [1997\Kaminer, N.pdf](1997/Kaminer,%20N.pdf)

Abstract: New network information technologies are penetrating almost every aspect of knowledge workers’ work. A simple question arises: Does the new information technology increase the productivity of these workers? This research project was undertaken to find out whether the use of the Internet affects the productivity of scholars. We have chosen to examine this question by exploring the use of the Internet by scholars in the College of Natural Resources at the University of California at Berkeley. We faced two main methodological problems in the pursuit of our objective. One, measuring scholars’ productivity and two, measuring Internet use. The first problem has been dealt with by bibliometric methods. Internet usage data has hitherto been based on questionnaires that reconstruct the individual’s use of the system. We add a complementary method by collecting data at the process level from the UNIX accounting system. Principal components analysis has been employed to weigh the different components (processes) of internet use and calculate units of internet usage. The results show that almost 100% of the CNR faculty were connected to the Internet by the end of 1995. The number of services used varies widely with electronic mail the most widely used service. The second most widely used service was telnet, heavily used to search and retrieve bibliographic records. Although the Internet does not seem to support collaboration for the majority of scholars in CNR its overall utility is perceived to be high. Our main finding is that Internet use is a significant factor in models of scholars’ productivity. We have processed Internet log data to calculate two factors of usage. Finger, FTP and the login processes loaded with coefficients larger than 0.7 to the first factor. Library use, telnet and Gopher loaded with coefficients greater than 0.7 to the second factor. We have found that adding the factors as explanatory variables to a traditional publication model adds explanatory power to the model. In the statistically significant models, the coefficients of all the factors were positive, indicating Internet use has a positive contribution to scholarly productivity.

? Nilsen, K.E. (1997), Social science research in Canada and federal government information policy: The case of Statistics Canada. *Ph.D. Thesis*, University of Toronto, Canada.

Full Text: [Thesis\Nilsen, KE.pdf](Thesis/Nilsen,%20KE.pdf)

Abstract: The effects of information policy on use and users of government information by focusing on social science researchers’ use of information from Canada’s central statistical agency, Statistics Canada. Two literature reviews cover social scientists’ use of statistics, and government information policy. A multi-method approach is used to examine the effects of specific Canadian federal government restraint and cost-recovery initiatives of the mid-1980s which applied to government information. Statistics Canada’s response to these initiatives is revealed using case study methodology. Bibliometric research objectively documents policy effects on social science researchers’ use of statistics sources by examining a sample of 360 articles published from 1982 to 1993 in 21 Canadian social science research journals in Economics, Education, Geography, Political Science and Sociology. Examination of citations, tables, and text in the sampled articles reveals extent of use of statistics from Statistics Canada and other governmental and nongovernmental sources, both Canadian and foreign, over a period before and after policy implementation. A survey of authors of sampled articles supplements the bibliometric findings. Results of the case study show that Statistics Canada sought to recover costs and achieve greater revenues through higher prices and increasing electronic data dissemination. Bibliometric analysis shows there was no significant change over time in use of statistics from Statistics Canada or any other governmental or nongovernmental source. The use of Statistics Canada paper products declined significantly. The survey reveals that social science researchers are unhappy with the price increases, but have not changed the statistics sources they use as a result. The movement of statistical information into electronic formats is well received, though more respondents (in 1995) still used paper products than electronic ones. Possible explanations for these findings are proposed. Alternative effects of increased prices and format changes are suggested which might be examined in future research. Additionally, the implications of the research findings in relation to these social scientists and the agencies involved in information and management are discussed as potential topics for further research.

? Hood, W. (1998), An informetric study of the distribution of bibliographic records in online databases a case study using the literature of Fuzzy Set Theory (1965-1993). *Ph.D. Thesis*, University of New South Wales.

? Quek, S.Y. (1998), Adsorption of heavy metal from aqueous solution by natural low-cost materials. *Ph.D. Thesis*, University of Birmingham, Birmingham, U.K.

? Russell, M.C. (1998), Appropriating Wittgenstein: Patterns of influence and citation in realist and social constructivist accounts of science. *?? Thesis*, ??.

Abstract: In this thesis, I draw attention to patterns at the intersection of (a) interpretations of science in two journals (Philosophy of Science, and Social Studies of Science) and (b) references to Wittgensteins writings. Interpretations of science can be classed according to the degree to which they support a realist or social constructivist understanding of the entities described by current scientific theories. By tracing the intellectual traditions from which these interpretations emerged, I develop an abstracted classification of these positions. Since this classification does not meaningfully map onto the positions articulated by the writers sampled here (which is telling about intellectual histories generally), I develop a new, more promising scheme of classification. I find that Wittgenstein is appropriated more often in support of social constructivist views of science, but that reasons for this support are generally weak. Using a novel measure of content which I call appeal-to-authority, I show that there is a significant difference between these journals in their use of Wittgensteins writings. But there is a subtle methodological argument at work here as well. I show that methods of analysis which rely exclusively on intellectual histories, bibliometrics, and globablizing statements about the products of science suffer serious limitations. In short, this thesis reflexively shows that the methods upon which it is based allow room for considerable bias and manipulation, and thereby implicates many bodies of work built upon these methods.

? Sandstrom, P.E. (1998), Information foraging among anthropologists in the invisible college of human behavioral ecology: An author co-citation analysis. *Ph.D. Thesis*, Indiana University.

Full Text: [1998\Sandstrom, PE.pdf](1998/Sandstrom,%20PE.pdf)

Abstract: This study develops an optimal foraging model for understanding how scholars seek and use information in creating new knowledge. It assumes that scholars attempt to maximize benefits and cut costs in pursuing useful information, analogous to the way that human and animal foragers search for and process food resources in unpredictable environments. The study focuses on human behavioral ecology, an interdisciplinary specialty created by anthropologists, psychologists, biologists, and others. By following the empirical trace of co-cited authors, the study analyzes specialty intellectual structure (bibliographic topography) from the perspective of its anthropological contributors. The problem investigated is how bibliographic artifacts and invisible college identity are related to information foraging behavior. From a purposive sample of five active contributors, I derived names of recently referenced authors and significant colleagues to create multidimensional scaling maps of areas of research concern. These renderings of the bibliographic topography reflect the consensual view of authors publishing in Social Sciences Citation Index source journals, but are based on the range of information sources actually selected by individual contributors. Cluster analysis classified co-cited authors into three center-periphery zones: contributor’s own cluster, other core clusters, and omitted clusters. Results show that scholars, searching and handling mechanisms vary by zone, variations that are accounted for by the optimal foraging model. Findings suggest that behaviors such as regular reading, browsing, or the deliberate information search (relatively solitary information-seeking activities) yielded resources belonging mostly to peripheral zones. Peripheral resources tended to be first-time references, previously unfamiliar to citing authors, and retrieved (handled) through temporary loan from colleagues or libraries. By contrast, resources belonging to core zones emerged from routine monitoring of key sources and such socially mediated activities as graduate training, colleague recommendation, review of prepublication drafts, and reprint exchange. Core resources had been referenced previously, retrieved from existing personal collections, and the authors were often collaborators or acquaintances. The center-periphery model illuminates how core-scatter bibliometric distributions describe the likelihood of encounter with given pairs of authors in a given bibliographic environment. A balance between the redundancy or novelty of resources relative to the overall scholarly resource mix is proposed as a measurable currency for scholarly information behavior. Repeated co-citation of others’ work is one mechanism whereby scholars create and maintain boundaries that facilitate the rejection of irrelevant information. Such boundaries constitute invisible colleges. A pair of maps of the specialty at large reveal boundaries to be both stable and permeable. Principal components analyses show boundary-spanning authors to integrate the bibliographic topography. Biologists and anthropologists have developed powerful theories to describe and explain the decision-making processes of animal and human foragers as they exploit variable habitats. This study applies some of the methods and principles developed in behavioral ecology to investigate the communication practices of its own members. Findings from the study make theoretical and methodological contributions to the synthesis of bibliometrics and the study of information users.

? Smith, S.S. (1998), A bibliometric analysis of the journal literature of academic librarianship as an indicator of professionalism. *Ph.D. Thesis*, University of Rochester.

Full Text: [Thesis\Smith, SS.pdf](Thesis/Smith,%20SS.pdf)

Abstract: This study, suggested by and largely replicating a 1991 study by John M. Budd, investigated whether academic librarianship is a profession. The general research question posed was: ‘does a bibliometric analysis of this sample of the journal literature of academic librarianship demonstrate the existence of a mature and unique knowledge base that is one component of a profession?’ This question was answered by applying four bibliometric measurements: (1) The Price’s Index for the sample demonstrated an adherence to the ‘research front,’ providing support for the general research question. (2) The mean number of references per source article in the sample fell within the range specified as the ‘norm of scholarship,’ lending support to the general research question. (3) The percentage of references that were to other journal articles in the sample did not meet the threshold level and did not support the general research question. (4) The disciplinary self-citation rate for journal article citations in the sample was above the threshold level and lent support to the general research question. Since the sample met only three of the four criteria above, the study does not fully demonstrate the existence of a mature, unique, and scholarly knowledge base and provides only limited support for the view of academic librarianship as a profession. Comparison of the present study to earlier bibliometric analyses of the literature of librarianship (most especially Budd’s 1991 study) revealed a high level of consistency in the studies, with most major differences likely being attributable to specific sampling decisions, e.g., narrowness of a sample drawn from only one journal title.

? Chun, K. (1999), Korean Studies in North America, 1977--1996: A bibliometric study. *Ph.D. Thesis*, University of North Texas.

Full Text: [1999\Chun, K.pdf](1999/Chun,%20K.pdf)

Abstract: This research is a descriptive bibliometric study of the literature of the field of Korean studies. Its goal is to quantitatively describe the literature and serve as a model for such research in other area studies fields. This study analyzed 193 source articles and 7,166 citations in the articles in four representative Korean and Asian studies journals published in North America from 1977 to 1996. The journals included in this study were Korean Studies (KS), the Journal of Korean Studies (JKS), the Journal of Asian Studies (JAS), and the Harvard Journal of Asiatic Studies (HJAS). Subject matters and author characteristics of the source articles were examined, along with various characteristics such as the form, date, language, country of origin, subject, key authors, and key titles of the literature cited in the source articles. Research in Korean studies falls within fourteen broad disciplines, but concentrated in a few disciplines. Americans have been the most active authors in Korean studies, followed closely by authors of Korean ethnicity. Monographic literature was used most. The mean age of publications cited was 20.87 and the median age of publications cited was 12. The Price Index of Korean studies as a whole is 21.9 percent. Sources written in English were most cited (47.1%) and references to Korean language sources amounted to only 34.9% of all sources. In general, authors preferred sources published in their own countries. Sources on history were cited most by other disciplines. No significant core authors were identified. No significant core literature were identified either. This study indicates that Korean studies is still evolving. Some ways of promoting research in less studied disciplines and of facilitating formal communication between Korean scholars in Korea and Koreanists in North America need to be sought in order to promote well-balanced development in the field. This study suggests that as many and as great a variety of titles in all formats as possible need to be collected to support research in Korean studies.

? Cruces, L. (1999), Arsenic removal from water using manga,nese greensand: laboratory scale batch and column studies. *Ph.D. Thesis*, New Mexico State University, USA.

Full Text: [Thesis\Cruces, L.pdf](Thesis/Cruces,%20L.pdf)

Abstract: Future drinking water regulations for arsenic arc expected to be lowered from the present 50 ug/L to somewhere between 2 and 20 ug/L. Two recent studies have indicated that manganese greensand could be very effective in removing arsenic. Manganese greensand is a mineral called glauconite that is coated with a manganese oxide coating and used to remove iron and manganese hardness from drinking water. The purpose of this study is to evaluate several important parameters for arsenic removal using manganese greensand. The parameters chosen to be evaluated were contact time, pH, iron concentration, and potential of sulfate interference. In addition both of the common oxidation forms of arsenic, arsenite and arsenate, were studied. The experimental procedure was carried out under laboratory conditions. Adjustment of pH was accomplished by the addition of acid or base. Iron-arsenic solutions were mixed for ten minutes. One gram of manganese greensand was added to solution and mixed for the contact time desired. The solution was filtered to separate the liquid phase from the sand. The solution was analyzed by a commercial 1,ab using inductively coupled plasma mass spectrophotometery with a detection limit for arsenic of ti.4 ug/L. A range of pH’s from 3 to 9 was evaluated. A pH of 5 was found to be optimal for arsenic removal in the arsenate and arsenite form. For an initial arsenic concentration of 50 ug/L, the final arsenic concentration ranged from 1.8 pg/L to 4.2 pg/L for a pH of 5. Two more batch sets were performed at this optimal pH with similar results. Varying ferrous chloride concentrations were added to the solution from zero to 20 times the arsenic concentration in terms of molar ratio of ferrous chloride to arsenic. At all the pHs no significant correlation between iron dose and arsenic removal can be seen. Contact times from 15 minutes to 24 hours were evaluated at a pH of 5. The results indicate that arsenic adsorption to manganese greensand has reached its maximum by 15 minutes of contact time. Sulfate interference was evaluated at a pH to 5. Based on the results from the batch testing, sulfate did not interfere with arsenic removal. The greensand columns successfully removed arsenic, but only after the media had been pretreated with dilute acid. A solution of dilute HCI was passed through the media until the influent and effluent pH came to steady state. This allowed the operator to control the operational pH. With the bed properly prepped, 400+ bed-volumes of water were treated with no evidence of impending breakthrough. The bed was regenerated and another 200+ bed-volumes were treated. It appears that the appropriate preparation of the media will allow manganese greensand to act as an effective arsenic removal media. It appears that neither BlRM nor Anthrasand is an adequate replacement for manganese greensand. There are a number of simple technologies, such as ion exchange, coagulation/microtiltration, iron oxide based filtration, and activated alumina, which are on the market for treatment of arsenic in water. In a situation where only arsenic is to be removed, or where arsenic and fluoride are to be removed, the technology discussed here is probably not cost effective. However, in a situation where Fe & Mn are present with As this technology has great promise. This technology is especially interesting to utilities where Fe and Mn are already being removed using a manganese greensand filter. It is possible that a small pH adjustment from 8+ to 6.5 may be all that is required to bring the facility into compliance.

? Lordgooei, M. (1999), Adsorption thermodynamics and mass transfer of toxic volatile organic compounds in activated-carbon fiber-cloth for air pollution control. *Ph.D. Thesis*, University of Illinois at Urbana-Champaign, USA.

Full Text: [Thesis\Lordgooei, M.pdf](Thesis/Lordgooei,%20M.pdf)

Abstract: Toxic volatile organic compounds (TVOCs) constitute 69% of the total air toxics emitted by major industrial point sources. Adsorption is one of the most practical mechanisms that can be used to separate and recover TVOCs before they are discharged into the atmosphere. Research on new adsorbent materials and adsorption processes were performed to achieve this goal. In this research, thermodynamic and transient behavior of TVOC adsorption in activated-carbon fiber-cloth were modeled. Experiments included steady-state and transient adsorption of acetone, as a surrogate for TVOCs, at select temperatures and partial pressures. The Dubinin-Astakhov model was modified to provide the ‘Thermal Equation of Equilibrium Adsorption’ (TEEA) model. Such model allowed for derivations of continuous functions describing adsorption thermodynamic parameters in the phase space of temperature, adsorbate partial pressure, and adsorption capacity. A new model was developed to define functionality of the relative pore filling pressure of vapors to the micropore size of the adsorbent using the classical thermodynamics and TEEA. Relative mesopore filling pressure was modeled by modifying the Kelvin equation. The Modified-Kelvin equation provided a convenient and reliable method to determine the mesopore size distribution of the adsorbent. Effective diffusivity of adsorbates into the fibers was then modeled as a function of temperature, adsorbate partial pressure and adsorbent pore size distribution. A non-dispersive finite difference analytical-numerical model was developed to define the local adsorption kinetics. The kinetic model was used to calculate the effective diffusivity of acetone from short length chromatography (SLC) experiments. A Lattice Boltzmann Method (LBM) was developed and used to model the longitudinal effective diffusivity of square matrices of fibers within miniature fixed beds. Reflective lattice boundary conditions were developed to define complex solid configurations and provide a second order accurate solution on the boundaries. The models developed for this research were then integrated into a numerical model to determine the adsorption dynamics of acetone through the ACFC adsorber. Results from this research provide predictive tools to characterize adsorption thermodynamics, kinetics, and dynamics of other TVOC-adsorbent systems.

? Shin, H.J. (1999), Research interactivity of cognitive science: A bibliometric analysis of interdisciplinarity. *Ph.D. Thesis*, University of Texas at Austin, USA.

Full Text: [Thesis\Shin, HJ.pdf](Thesis/Shin,%20HJ.pdf)

Abstract: This study attempts to understand the interdisciplinary dimensions of cognitive science by analyzing the overall research interactions among the contributing disciplines to cognitive science through citation analysis of its literature. Three approaches to achieve this purpose are used. First, citation patterns of six constituent disciplines represented in the journal Cognitive Science (anthropology, linguistics, philosophy, psychology, computer science, and neuroscience) are analyzed for the time period of 1977–1996. Second, based on a journal inter-citation network, research interactivity among the above disciplines is analyzed along with measures of relative journal importance. Third, clusters of journals based on co-citation similarity are formed and mapped to illustrate the structure of cognitive science literature. The analysis reveals that psychology, computer science, and linguistics were the key contributory and reference disciplines in Cognitive Science from 1977 to 1996. While the initial dominance of computer science gave way to psychology, computer science always remained prominent. Anthropology, philosophy, and neuroscience remained marginal. Authors from the dominant disciplines of psychology and computer science have tended to look inwards, drawing heavily on their own respective disciplines; conversely, authors from the less dominant disciplines tended to look outside their home areas in their research. The analysis of research interactivity in the journal citation network generally corroborated the above findings. Network analysis further revealed that the constituent disciplines progressed from internal modes of research interactivity to multidisciplinary research interactivity over time, and bonded together to form a stabilized platform of cognitive science. The latter made possible the designation and analysis of a key set of cognitive science journals. Co-citation patterns in general produced findings similar to the inter-citation patterns of journals. The broad picture that emerges indicates that cognitive science has formed into a relatively mature, open, stable, diffuse, and dynamic system of interactive disciplines. But two dominant orientations or schools (one centered on the mind and brain, and the other on computational intelligence) continue to exist as side-by-side competitors and collaborators.

? Wallace, J.D. (1999), An examination of computer-mediated communication’s scholarly communication. *Ph.D. Thesis*, University of Oklahoma.

Full Text: [1999\Wallace, JD.pdf](1999/Wallace,%20JD.pdf)

Abstract: This dissertation asks ‘what is meant by computer-mediated communication?’ CMC was defined as it exists in the scholarly communication concerning business, education, psychology, sociology, and social sciences. This exploratory longitudinal analysis: examined the dynamic of computer-mediated communication in general, identified where academic scrutiny was being focused, and gives a general sense of the kinds of issues that were dominant during the time of examination. Specifically, this study employed bibliometric analytical techniques to establish CMC’s artifacts, producers, and concepts within that domain. These were defined as journals, authors of those journals, and conceptual keywords. Artifacts and producers were identified based on their prevalence in the field and academic orientation. A more fine-grained analysis was applied to concepts. They were examined in terms of their prevalence, academic orientation and also their relationship to each other. What was found was an area of scholarly communication, heavily popularized in education-related journals. Psychology and other social science affiliated disciplines contributed in a less prolific fashion. There were disparate foci between disciplines of differing perspectives. Multi-disciplinary with some interdisciplinary linkages would be a good description of CMC. Where there was interdisciplinary overlap, the communication discipline appears to be the boundary spanner in the majority of cases. This role did not extend to the business index analyzed. The distribution of first authors was overwhelming populated by one-time authorship. This significantly differed from theoretically defined literatures associated with a field of study. Moreover, CMC’s articles tended to be localized in a relatively few journals. Clusters of conceptual topics tended to be database affiliated. Those with the most wide ranging support among all databases tended to come from topics traditionally associated with the communication discipline. Also ‘telecommunications’, ‘information network’ and ‘Internet’ affiliated topics were widely indicated from a number of the databases. This study was significant for three reasons. First, it documented CMC’s historical emergence. Second, it identified descriptive boundaries concerning CMC’s authors, journals, and areas of inquiry that were prevalent. Third, it examines the communication discipline’s role in the literature as defined. Additionally, it provides guidance concerning CMC’s future research.

? Andrews, J.E. (2000), A bibliometric investigation of medical informatics: A communicative action perspective. *Ph.D. Thesis*, University of Missouri-Columbia, USA.

Full Text: [Thesis\Andrews, JE.pdf](Thesis/Andrews,%20JE.pdf)

Abstract: Medical informatics is an interdisciplinary field that draws from and contributes to a number of disciplines, has a number of overlapping research foci within its own boundaries, and often requires significant interactive collaboration among heterogeneous researchers. Collectively, these qualities of the field can complicate the ability of researchers to access, communicate, and/or utilize the knowledge, tools, processes, methods, and methodologies needed to enable knowledge creation, communication, and growth within the field. The impetus for this study is the presumed likelihood of language-based impediments to knowledge sharing within medical informatics. Using established bibliometric techniques (namely, those used for Author Cocitation Analysis), a representation of the field of medical informatics was derived for the period, 1994--1998. Cocitation information and bibliographic citations from the fifty most cited American College of Medical Informatics Fellows were the subjects for this study. Further analyses investigating language and communication issues in the field were also conducted. The concepts (operationalized as Medical Subject Headings assigned to the authors’ articles) representing the authors’ subject area(s), and the language use of each author and groups of authors, were derived using basic statistical techniques. Correlations among authors based on subject area and language use were studied in order to better elucidate the maps generated through the author cocitation analysis. Interpretation of the results and suggestions for future research were informed by Jurgen Habermas’s Theory of Communicative Action. This study offers foundational knowledge for further investigations into the semantic linkages among related research domains within medical informatics, as well as the underlying implications for understanding semantic interoperability in the field.

? O’Connor, J.F. (2000), Bibliometric analysis of pedagogy literature in adapted physical activity. *Ph.D. Thesis*, Texas Woman’s University, USA.

Full Text: [Thesis\OConnor JF.pdf](Thesis/OConnor%20JF.pdf)

Abstract: The purpose of this study was to determine whether pedagogical serials published in the core serials that encompass adapted physical activity content from 1988 to 1998 adhere to the principles of a Bradford Distribution. Further, the question was asked whether Price’s Law would substantiate the findings of the Bradford Distribution by identifying a nucleus of the most productive authors in adapted physical activity pedagogy. An analysis for the presence of a Bradford Distribution was conducted on the 770 articles in 259 serials accepted for this study from the 4,130 serials initially identified in the four databases. Results of this study support the use of the Bradford Distribution to describe and quantify the literature of adapted physical activity pedagogy from the period of 1988 to 1998. Based on the analyses of the data, the applicability of Price’s Law to adapted physical activity pedagogy was not supported. Suggestions for future research are provided.

? Phelps, H.S. (2000), The Second Vatican Council and American Catholic theological research: A bibliometric analysis of “Theological Studies”, 1940-1995. *Ph.D. Thesis*, University of North Texas, USA.

Full Text: [Thesis\Phelps HS.pdf](Thesis/Phelps%20HS.pdf)

Abstract: A descriptive analysis was given of the characteristics of the authors and citations of the articles in the journal Theological Studies from 1940--1995. Data was gathered on the institutional affiliation, geographic location, occupation, and gender and personal characteristics of the author. The citation characteristics were examined for the cited authors, date and age of the citations, format, language, place of publication, and journal titles. These characteristics were compared to the time-period before and after the Second Vatican Council in order to detect any changes that might have occurred in the characteristics after certain recommendations by the council were made to theologians. Subject dispersion of the literature was also analyzed. Lotka’s Law of author productivity and Bradford’s Law of title dispersion were also performed for this literature. The profile of the characteristics of the authors showed that the articles published by women and laypersons has increased since the recommendations of the council. The data had a good fit to Lotka’s Law for the pre-Vatican II time period but not for the period after Vatican II. The data was a good fit to Bradford’s Law for the predicted number of journals in the nucleus and Zone 2, but the observed number of journals in Zone 3 was higher than predicted for all time-periods. Subject dispersion of research from disciplines other than theology is low but citation to works from the fields of education, psychology, social sciences, and science has increased since Vatican II.

? Price, M.S. (2000), Characterization of *Aspergillus niger* for removal of copper and zinc from swine wastewater. *M.Sc. Thesis*, North Carolina State University, USA.

Full Text: [Thesis\Price MS, 2000.pdf](Thesis/Price%20MS,%202000.pdf)

? Spoor, Peter Benjamin (2000), Removal of nickel ions from galvanic wastewater streams using a hybrid ion exchange – electrodialysis system. *Ph.D. Thesis*, Universiteit Eindhoven, Canada.

Full Text: [Thesis\Spoor, PB.pdf](Thesis/Spoor,%20PB.pdf)

? Vlugt, Thijs Joseph Henk (2000), Adsorption and diffusion in zeolites: A computational study. *Ph.D. Thesis*, Universiteit van Amsterdam.

Full Text: [Thesis\Vlugt TJH, 2000.pdf](Thesis/Vlugt%20TJH,%202000.pdf)

? Liu, M.H. (2001), Investigation on the adsorption of mercury chloride by powdered activated carbon: Operation parameters and adsorption isotherm. *M.Sc. Thesis*, National Sun Yat-sen University, Kaohsiung, Taiwan.

Full Text: [Thesis\Liu, MH.pdf](Thesis/Liu,%20MH.pdf)

? White, W.J. (2001), The communication of conceptual innovation in science: The case of chaos theory in psychology. *Ph.D. Thesis*, Rutgers The State University of New Jersey - New Brunswick.

Full Text: [2001\White, WJ.pdf](2001/White,%20WJ.pdf)

Abstract: This dissertation develops and empirically evaluates a communication-centered model of science that emphasizes the communicatively rational formulation and evaluation of innovation claims along multiple dimensions of validity as a fundamental component of scientific activity. The primary theoretical claim emerging from the development of this model is the association of a different type of discursive relation with different configurations of disciplinary integration (or cohesion) and ideational integration (or agreement) within heterogeneous networks of actors and ideas. The empirical evaluation of this claim occurs via the use of bibliometric and content analytic methods. A group of 120 articles published in psychology journals between 1994 and 1999 and indexed under the terms ‘chaos theory’ or ‘nonlinear dynamics’ in the Web of Science, the online version of the Institute for Scientific Information’s natural science, social science, and humanities citation indices, forms the dataset for this investigation. Analysis proceeds via the identification of groups of articles that are affiliated with the same blocks of structurally equivalent keywords and citations (obtained from Web of Science). These groups of articles are presumed to share the same discursive relation with other groups, and so are said to occupy the same discursive position. Analysis continues with the semantic network analysis of the article differences among the discursive position groups in terms of their semantic character. The structural properties of each discursive position in terms of semantic and bibliographic coupling are also considered. The results indicate some support for the theoretical claims generated by this dissertation. Some interesting qualifications to and modifications of the theory are suggested by the evidence as well. A discussion of the theoretical implications of the research touches upon the issues of disciplinarity and reflexivity.

? Ananthraman, V.K. (2002), Removal of phenol from an aqueous solution using lignite and perlite. *M.A.Sc. Thesis*, The University of Regina, Canada.

Full Text: [Thesis\Ananthraman, VK.pdf](Thesis/Ananthraman,%20VK.pdf)

Abstract: Pulp and paper production plants, chemical industries and petroleum refining units are the major contributors of phenol to receiving water bodies. Adsorption of phenols from water using activated carbon, though effective, is economically unattractive. Saskatchewan has large lignite reserves that have limited industrial utilization. Perlite is available in large quantities in North America. The objectives of the study were to examine the influence of contact time, pH and dosage on the phenol adsorption capacity of low cost adsorbents such as lignite and perlite. Batch kinetic and isotherm studies were conducted and the data evaluated for the applicability of the Langmuir, Freundlich and BET isotherm models. Column experiments were conducted using both adsorbents to study their performance under dynamic conditions. Batch kinetic studies indicated that lignite and perhte exhibited equal phenol removal capacities (66% and 67% respectively). The kinetics of phenol adsorption of lignite and perlite were described by both the first order Lagergren rate equation and psuedo second order rate equation. Batch pH studies indicated that both lignite and perlite displayed maximum efficiency for phenol removal at a pH of 4.0. At this pH, phenol existed as neutral species in solution. The effect of pH on the removal of phenol from solution by lignite and perlite seemed to be dependent upon the ionic nature of the phenol and the surface characteristics of the adsorbent. Overall, the study indicated that even though low cost adsorbents like lignite and perlite are not as effective as activated carbon in phenol adsorption, they can be considered as reasonable alternatives to activated carbon in terms of local availability and cost.

? Fu, Y.Z. (2002), Removal of dyes from aqueous solutions by the fungus *Aspergillus niger*. *Ph.D. Thesis*, The University of Regina, Canada.

Full Text: [Thesis\Fu, YZ.pdf](Thesis/Fu,%20YZ.pdf)

Abstract: Among industrial wastewaters, dye wastewater from textile and dyestuff industries is one of the most difficult to treat because of its synthetic origin and complex aromatic molecular structure of dyes. Biosorption using fungi is becoming a promising alternative to replace or supplement the present dye removal processes. In this study, the potential of using fungus <italic> Aspergillus niger</italic> for the removal of the four dyes, namely Basic Blue 9, Acid Blue 29, Congo Red and Disperse Red 1, from aqueous solutions was evaluated. The pretreatment of <italic>A. niger</italic> was dye specific. The effective pretreatment methods were autoclaving, H<sub>2</sub>SO<sub> 4</sub> plus autoclaving, NaHCO<sub>3</sub> plus autoclaving and NaOH plus autoclaving for biosorption of Basic Blue 9, Acid Blue 29, Congo Red and Disperse Red 1, respectively. Initial pH of dye solutions was found to have a significant influence on biosorption of dyes on fungal biomass. The effective initial pH values of the four dye solutions were all in the acid range. The equilibrium time for biosorption of the four dyes on fungal biomass were 30 h, 24 h, 42 h and 48 h for Basic Blue 9, Acid Blue 29, Congo Red and Disperse Red 1, respectively. The kinetics of biosorption of the dyes on fungal biomass were described by the Lagergren first order and the Ho et al. pseudo second order rate equations except in the case of Disperse Red 1 where the kinetics were decided by the first order and second order rate equations. The Langmuir, the Freudlich and the BET isotherm models were applicable to the biosorption of Basic Blue 9 and Acid Blue 29, while none of isotherm models used in this study were found to provide a realistic description for biosorption isotherm of Congo Red and Disperse Red 1 on the fungal biomass. Basic Blue 9 and Acid Blue 29 were easily eluted by the dilute HCl and NaOH solutions, respectively, while Congo Red and Disperse Red 1 were difficult to be eluted from the biosorbed fungal biomass. Deionized water was effective for the biomass regeneration used for Acid Blue 29, Congo Red and Disperse Red l, while NaOH solution was effective for the biomass regeneration used for Basic Blue 9. Four cycles of biosorption - elution - regeneration for each of the four dyes were studied. The pretreated <italic>A. niger</italic> fungal biomass was immobilized into polysulfone solid matrix to form spherical beads. The biomass beads used for biosorption of Acid Blue 29 in column studies possessed the highest adsorption capacity (64.7 mg/g) and could be regenerated and reused with a high retaining ability (91%).

? Lee, D.J. (2002), The characteristics of coconut based activated carbons prepared by ferrous sulfate activation. *M.Sc. Thesis*, Chia Nan University of Pharmacy and Science, Tainan, Taiwan.

Abstract: The influence of chemical activation by FeSO4 on physical and chemical properties of coconut-based activated carbons was investigated. The prepared conditions of activated carbon were considered with the immersing salt concentration, flow rate of CO2, activated temperature, and heating rate for improving the adsorption performance. The relationships between adsorption performances and above properties of those activated carbons were compared with the physical activated carbon. Based on the analysis of N2 isotherm, it was indicated that the Hysteresis loop of activated carbon was a typical Type II and H3 form. The D-R analysis showed that the pore distributions of activated carbon were almost ranged in 10-15 &Aring, and 30-40 &Aring,. Based on the BJH analysis method, it was found that the development of micropore was enhanced at low chemical activation concentration in carbon matrix. Otherwise, the mesopore was developed at high chemical activation concentration. This study also showed that the mesopore development was also dominated by the activation temperature and heating rate in the period of activation. The CO2 flow rate was not a dominated factor on the pore development of activated carbon.

The XRD analysis was made to identify the bonding structure of iron in carbon matrix. It was evidenced that the Fe2O3 was formed in activated carbon. The Boehm titration and FTIR analysis indicated that oxygenic group on activated carbon was strong dependent on the preparation condition. It was showed that carboxyl, carbonyl, aromatic, and phenolic groups were found on the activated carbon surface. The functional group analysis also showed that acidic group on activated carbon was proportional to the iron content in carbon matrix. Based on the kinetic study and isotherm analysis, it was found that the adsorption of phenol onto activated carbon was following in a pseudo second order mechanism. It was showed that the adsorption and desorption rate was showed a strong dependent on the pore structure of activated carbon. The Freundlich isotherm was well described the adsorption behavior in aqueous solution. It was also indicated that the adsorption capacity of activated carbon was influenced by the chemical properties on surface of activated carbon. The acidic functional group on activated carbon decreased the sorption capacity of activated carbon with activation by FeSO4.

? Vives Brosa, J. (2002), El diagn󳴩co de la sobredispersi󮠥n modelos de anᬩsis de datos de recuento. *?? Thesis*, Universitat Aut򮯭a de Barcelona.

Abstract: En primer lugar se presenta un estudio bibliom鴲ico con el objetivo de evaluar la frecuencia de uso de las variables de recuento en diferentes ᭢itos de investigaci󮠥n Psicolog asomo los modelos de anᬩsis que se aplican habitualmente a los datos de recuentos Para ello se selecciona una muestra de 168 artlos procedentes de dos de las diez revistas con mayor ice de impacto asignado por el ISI (ice JCR-SCI) para cada ᭢ito de aplicaci󮠥n Psicolog Los resultados muestran que las variables de recuento son de uso habitual en Psicolog puesto que aparecen en un 38.1% de los artlo revisados, y que existe una aplicaci󮠭asiva del modelo lineal general mientras que no se aplican modelos especcos para datos de recuento. Una vez establecida la importante presencia de las variables de recuento en Psicology constatado el notable problema de la aplicaci󮠤e modelos estadicos no adecuados para datos de recuentos, se expone la propuesta, ya conocida aunque poco aplicada en Psicolog de analizar los datos a trav鳠del modelado. De esta forma, y despu鳠de discutir las caractericas del modelado desde un punto de vista epistemol󧩣o, se repasan las caractericas bᳩcas del modelado estadico asomo del modelo lineal generalizado (MLG) puesto que forman parte de las bases te󲩣as de este trabajo. A continuaci󮠳e expone las caractericas distribucionales de las variables de recuento que permiten justificar la aplicaci󮠤e modelos lineales generalizados adecuados para este tipo de variables. Asen primer lugar se describe la distribuci󮠤e Poisson asomo el modelo de regresi󮠤e referencia en el ᭢ito de los recuentos: el modelo de regresi󮠤e Poisson (MRP). La restrictividad impuesta por los supuestos en los que se basa el MRP provocan que su ᭢ito de aplicaci󮠳ea restringido a un conjunto de situaciones que resultan poco habituales en la prᣴica. La m᳠importante de tales situaciones es la de equidispersi󮮠En ausencia de equidispersi󮠬a situaci󮠭᳠habitual es la sobredispersi󮮠En presencia de sobredispersi󮠤eben aplicarse modelos o procedimientos que permitan modelar la causa de sobredispersi󮬠que sean menos restrictivos en cuanto a la igualdad media-variancia condicionales o bien que corrijan el error estᮤar de las estimaciones del modelo de regresi󮠤e Poisson. Sin embargo, existe un paso previo que resulta de vital importancia: la detecci󮠤e la sobredispersi󮮠Para ello se exponen un conjunto de m鴯dos de diagn󳴩co de sobredispersi󮮊En la parte empca, se estudian diversos aspectos relacionados con el diagn󳴩co y el tratamiento de la sobredispersi󮬠que se concretan el estudio de la tasa nominal de error y de potencia de las pruebas diagn󳴩cas de sobredispersi󮻠la comparaci󮠤e procedimientos para la correcci󮠤el error estᮤar de las estimaciones del MRP en presencia de sobredispersi󮠹, adicionalmente se comprueba la incidencia de la sobredispersi󮠳obre las estimaciones de los coeficientes y de sus errores estᮤar. Para cubrir estos objetivos se han implementado 5 experimentos de simulaci󮠍onte Carlo en el entorno R, y han sido organizados en 3 estudios. En cuanto a los resultados, destaca la eficiencia, consistencia y potencia de las pruebas LR y c2 asomo superioridad de las estimaciones bootstrap y jackknife para la correcci󮠤el error estᮤar. A bibliometric study is presented which main aims are to evaluate the frequency of use of the count variables in different research areas in Psychology, as well as the statistical models that are habitually applied to count data variables. A random sample of 168 articles from two of the ten magazines with greater impact index (JCR-SCI index) for each area of Psychology is selected. The results show that count variables are habitual in Psychology, since they appear in 38,1% of the articles reviewed, and that there is a massive application of the general linear model whereas specific models for count data are not applied. Once established the important presence of count variables in Psychology and stated the remarkable problem of the application of suitable statistical models for count data, the proposal we make, already well-known although little applied in Psychology, is to analyze data through a modelling strategy. On this basis, and after discussing the aspects of modelling from an epistemologic point of view, statistical modelling as well as the generalized linear model (GLM) main features are reviewed since they are the theoretical bases of this work. Next, distributional characteristics of count variables that justify the application of suitable generalized linear models for this kind of variables are introduced. Thus, for a start it is described the Poisson distribution as well as the benchmark regression model for count variables: the Poisson regression model (PRM). The set of assumptions on which the PRM is based causes its application scope to be restricted to a set of situations that are not actually habitual. Maybe the most important of such situations is equidispersion. When there is no equidispersion the most habitual situation is overdispersion. In presence of overdispersion some models or procedures must be applied that allow, at least, on of the following: to model the overdispersion source, to relax the conditional mean-variance assumption or to correct the standard error of the PRM estimations. Nevertheless, there is a previous step exists that is of vital importance: the diagnostic of the overdispersion. In the empirical part, diverse issues related to the diagnosis and the treatment of overdispersion are treated: the study of the error nominal rate and power of overdispersion diagnostic; the comparison of standard error correction procedures of the PRM estimations in presence of overdispersion and, additionally, the verification of the incidence of overdispersion on the coefficients estimations and their standard errors. In order to cover these objectives 5 Monte Carlo experiments of simulation have been implemented in the R framework, and have been organized in 3 studies. The results show the efficiency, consistency and power of tests LR and c2 as well as the superiority of bootstrap and jackknife estimations for the correction of the standard error.

? Zhang, J. (2002), Stabilization/solidification treatment of mercury containing wastes using reactivated carbon and cement. *Ph.D. Thesis*, University of Cincinnati, OH, USA.

Full Text: [Thesis\Zhang, J.pdf](Thesis/Zhang,%20J.pdf)

Abstract: This paper presents the study results for a novel stabilization/solidification (S/S) process for high mercury wastes (Hg > 260 ppm). A relatively low-cost powder reactivated carbon (PAC) was used to stabilize mercury in solid wastes. Then the stabilized wastes were subjected to cement solidification. To improve the mercury adsorption capacity, PAC was impregnated with sulfides to obtain sulfurized PAC (SPAC). It was found that sulfurization of PAC by both CS2 and Na2S significantly improved the mercury stabilization efficiency. For a Hg(NO3)2 solution with 40 mg/L initial Hg2+, the equilibrium concentration of Hg2+ was lowered to 110 μg/L by SPAC, compared with an equilibrium concentration of 4310 μg/L by PAC. The adsorption efficiency was increased by more than one order of magnitude. The mechanism of sulfurization on mercury adsorption was investigated. It is believed that formation of low solubility mercury-sulfide species was the major cause of this phenomenon. The cement-solidified wastes were subjected to TCLP leach testing and constant pH leach testing. For the constant pH leach testing, the wastes were leached at constant pH values of 2, 4, 6, 8, 10, and 12 for 14 days. From the experimental results, it was found that, once in the solidified waste form, SPAC particles retained most of the adsorbed mercury, even in the presence of high chloride concentration, possibly due to the build-up of a gel-membrane outside the carbon pores as the hydration of cement proceeded. Experimental results from constant pH leaching tests indicated that the stabilized and solidified wastes were quite stable over a wide pH range after 14 days. A model was developed to simulate mercury sorption by reactivated carbon in stirred batch reactors. The model involved the coupling of a pseudo-second order kinetic model, surface equilibrium models, including the Langmuir isotherm and the Freundlich isotherm, and a material balance equation based on batch reactors. The predicted and real carbon dosages match each other very well. It can be concluded that the S/S process by reactivated carbon and cement is a robust and effective technology for immobilization treatment of high mercury wastes.

Keywords: Mercury, Activated Carbon, Stabilization/Solidification, Sulfurization, Cement

? Aboulezz, M.A. (2003), Mapping the construction engineering and management discipline, 1991-2000. *M.Sc. Thesis*, Worcester Polytechnic Institute.

? Breitenstein, M. (2003), Toward an understanding of visual literacy: Examination of conference papers of the International Visual Literacy Association, 1991-2000. *Ph.D. Thesis*, Long Island University, C. W. Post Center.

Full Text: [2003\Breitenstein, M.pdf](2003/Breitenstein,%20M.pdf)

Abstract: The field of visual literacy (VL) is thirty-four years old. It is an interdisciplinary convergence of interests arising from the more traditional disciplines of art, education, psychology, and others. The central aim is to further the education of the creators and the viewers of visual messages, so that the language of visual media can be used as accurately and effectively as verbal and spoken language. The main organization that brings proponents of visual literacy research and practice together is the International Visual Literacy Association (IVLA). This research was undertaken to gain a greater understanding of visual literacy by analyzing influences on the IVLA conference papers and relating those findings to the conference papers themselves. Four questions were posed: (1) Who are the most cited authors in IVLA conference papers, 1991–2000; (2) What are the most cited works of these authors in that literature; (3) What are the cocitation patterns of those authors; and (4) What does the content of the literature, expressed in a vocabulary of descriptive terms (derived from conference paper titles) reveal about the key concepts of visual literacy? Bibliometric and vocabulary analysis methods were applied to arrive at the answers. The forty most-cited authors and eighteen most-cited works were identified. Cocitation analysis using SPSS was performed on the cocitation data of the forty authors. All conference paper titles were analyzed. The results of the research revealed a predominance, in both the cited influences and conference paper titles, of the disciplines of education, psychology, and communications, combined with the use of visual arts and current technologies, to create and interpret visual messages. Visual literacy is a modern metadiscipline that has emerged from the intersection, in both research and practice, of these factors.

? Clemson, P.A. (2003), The relationship between backlinks and persistence on the WWW: A bibliometric approach. *Ph.D. Thesis*, University of Pittsburgh, U.S.A.

Full Text: [Thesis\Clemson PA.pdf](Thesis/Clemson%20PA.pdf)

Abstract: Search engines, searchers and cataloging agencies have a continuing interest in maintaining links to documents in the ever-changing and growing body of material on the World Wide Web. New models are needed for identifying useful and relevant materials from the millions of pages on the World Wide Web. The aim of this study was to determine if a statistically significant correlation exists between the number of links to a Web page and the length of time that a Web page exists. Related to this are the questions of whether there is a body of worthwhile material on the World Wide Web for bibliographic agencies to catalog and whether backlinking (i.e., citation by one Web page to another) would have any predictive value in identifying these materials. This study used a random sample of 2942 Web sites assembled by the Online Computer Library Center Web Characterization Project (WCP). These sites were searched on the Google search engine over a period of seven months and data were collected on the number of backlinks and the URLs of the top 20 backlinks to each site. Web sites with the highest numbers of backlinks were identified, along with sites having other rates of citation activity, sites with zero citations and those sites not found on the Google index. Analyses were performed on the sites with backlinks. The study provided confirmation for some theories about World Wide Web sites, and how people use and cite them. Observations about prevalence and the changing nature of U.S. commercial (.com) sites were reflected in the data. Merton’s concept of cumulative advantage was also reflected in the study’s results. Although stability was found to be a strong trait of backlinked Web sites backlinking was not found to be a predictor of stability. The study found no structures for self-organization in the WCP sample. Furthermore, persistence of a Web site may be a wholly independent issue from the measurement of backlinks to that site.

? H嫡nson, M.M. (2003), Genus och vetenskaplig publicering: En bibliometrisk studie av amerikansk biblioteksforskning. *?? Thesis*, ??.

Abstract: The purpose of this paper is to examine how the relationship between the socially constructed genders is manifested in American library science. To visualize gender, bibliometric analyses of peer reviewed articles published in three core journals of library science between 1980 and 2000 inclusive, are performed. The three journals are: College & Research Libraries, Journal of Academic Librarianship and Library Quarterly. Questions: 1. Does gender affect the publishing process regarding the distribution of female and male authors? 2. Does gender influence female and male authors’ choice of references? 3. Does gender affect the share of citations received by works of women and men respectively? 4. Does gender influence collaboration regarding the distribution of co-authoring female and male authors? The bibliometric analyses indicate differences between the shares of female and male authors, as well as differences in the attention women and men give to and receive from other female and male authors respectively. It is assumed that there exists a gender contract (an implicit agreement of how men and women are expected to behave towards each other) which is renegotiated during the period of time of this study, seemingly to the benefit of female authors as they are given a larger space in publishing. But concerning citations there is a delay in regard to male authors’ tendency to cite works by women. This might indicate that the importance of gender has not diminished but become more subtle and complex. The conclusion is that gender indeed influences publishing, referencing, citation and collaboration processes of library science.

? Lin, Y.C. (2003), Enzymatic grafting of carboxyl groups onto chitosan to confer chitosan property as wastewaters adsorbent. *M.Sc. Thesis*, National Central University, Taoyuan, Taiwan.

Full Text: [Thesis\Lin, YC.pdf](Thesis/Lin,%20YC.pdf)

Abstract: Phenolic compounds and dyes are commonly found in wastewaters. This study explores an enzymatic method for removal phenol and dyes from the wastewater. Three kinds of phenol derivatives: 3,4-dihydroxy benzoic acid (DBA), 3,4- dihydroxyphenyl- acetic acid (PA), hydrocaffeic acid (CA) were used individually as substrates of tyrosinase to graft onto chitosan (CTS).

FTIR analysis provided supporting evidence of phenol derivatives being grafted. The grafting conversion of these phenolic reactants on chitosan was examined by the adsorption of an anionic dye: acid red 27. Time course of enzymatic grafting reaction showed a saturated grafting extent of carboxyl groups onto chitosan. The highest content of carboxyl groups on modified chitosan beads was CTS-CA.

In this study, these modified beads were used in experiments on uptake of cationic dyes such as Crystal violet (CV) and Bismarck brown (BB). Adsorption of the cationic dyes onto modified chitosan gels is studied by batch adsorption technique at optimal pH (pH 7 for CV and pH9 for BB) under 30¢J. Langmiur type adsorption was found for both dyes, and the maximum adsorption capacities were decreased with the following order CTS-CA Ö CTS-AA Ö CTS-DBA > CTS-BA.

Tyrosinase converted p-cresol to polyquinones, and polyquinones was removed by adsorbing onto chitosan beads and tyrosinase was adsorbed by those carboxyl groups modified chitosan beads. Under low concentration, tyrosinase adsorbed by modified chitosan fitted pseudo-first order kinetic model, while at high level of tyrosinase, the adsorption fitted pseudo-second order kinetic model. The maximun adsorbed capacity and adsorbed rate constant were decreased with CTS-DBA > CTS-PA > CTS-CA.

Keywords: Adsorption, Dye, Phenol, Tyrosinase, Chitosan

? Ponzi, L.J. (2003), The evolution and intellectual development of knowledge management. *Ph.D. Thesis*, Long Island University, C. W. Post Center.

Full Text: [2003\Ponzi, LJ.pdf](2003/Ponzi,%20LJ.pdf)

Abstract: Knowledge Management (KM), a concept perceived by academics and practitioners as an emerging field, has little empirical lead evidence to support claims about its origin, growth, or constructs. The purpose of this research was to analyze systematically the 1991 to 2001 academic and industry literature to provide a better understanding of KM’s evolution and intellectual development. Given the limitation of the methodological approach in this study, the analysis presents an archival view of KM. The findings of this research illuminate the emergence of KM, and in so doing, this study unpacked the KM concept by employing seven different bibliometric techniques and analyses (Discourse Life Cycle, Co-Term Occurrence, Author Co-citation Analysis, Disciplinary Activity and Breadth, Author Influence Index, and Disciplinary Influence) to explore the main conceptual shifts in KM’s discourse, interdisciplinary nature, and intellectual structure. This methodological approach statistically analyzed data gathered from the occurrence and co-occurrence of key search phrases, cited authors, and cited references. Discourse life cycle and co-term occurrence analyses reveal that KM is still developing and that it has had three distinct evolutionary stages. The period 1991 to 1995 reflect KM’s origin and formation. The foundation of KM occurred in 1995, when Nonaka and Takeuchi’s seminal work, The Knowledge-Creating Company, was published. This work marked the tipping point to the growth stage as well as the birth of KM. Starting in 1996 and continuing through 1999 is a growth period, in which the KM literature reached exponential growth rates. During 2000--2001, the KM literature experienced a contraction and rebound. Disciplinary Activity measures show that KM’s rapid growth, contraction, and rebound was in large part a computer industry driven phenomenon. The intellectual development analyses support claims that KM has emerged from the organizational sciences and is predominantly a social science phenomenon. The intellectual structure supports the four proposed constructs of: (1) Creating a Knowledge-based Business Strategy; (2) Developing a Learning Organization; (3) Managing Intellectual Capital; and (4) Leveraging Information Technology. Future study of KM’s evolution and intellectual development is needed.

? Sneed, W.A. (2003), Knowledge synthesis in the biomedical literature: Nordihydroguaiaretic acid and breast cancer. *Ph.D. Thesis*, University of North Texas.

Full Text: [2003\Sneed, WA.pdf](2003/Sneed,%20WA.pdf)

Abstract: This dissertation refines knowledge synthesis from publicly accessible databases, based on the model of D. R. Swanson. Knowledge synthesis endeavors bring together two or more noninteractive literatures to create combinatorial research data on a specific topic. In this endeavor the biomedical literature was searched on the anti-neoplastic agent nordihydroguaiaretic acid (NDGA) for its potential role as a functional food in the chemoprevention of breast cancer. Bibliometric cocitation was utilized to identify complementary but non-interactive literatures in the disciplines of biomedicine and dietary science. The continuing specialization and fragmentation of the cancer literature degenerates the potential usefulness of cross-disciplinary research and information. As the biomedical sciences become more specialized the potential increases for isolation of discoveries and for failures to connect science to the needs of the people. Within the information science discipline several techniques are available to bridge the isolation between discoveries recorded in different sets of literatures. Electronic database searching with combinatorial keyword entries, syllogistic modeling and bibliometric author cocitation analysis are the principle techniques applied in this endeavor. The research questions are addressed to the absence or presence of human in vivo research on breast cancer with the potentially chemopreventative functional food NDGA. Utilizing a syllogistic model the literatures of functional foods, nordihydroguaiaretic acid and breast cancer were searched with designated combinatorial keywords. The documents retrieved were subjected to author cocitation analysis to demonstrate disjointness or connectivity of the two complementary literatures. The results demonstrated a possible preventative relationship between breast cancer in women and nordihydroguaiaretic acid, a phytochemical antioxidant and potential functional food. The results of the study are consistent with D. R. Swanson’s pioneering work in knowledge synthesis. Swanson’s methods can be used to identify non-interactive, disjoint literatures. Continuing support for his techniques has been demonstrated.

? Al Hawari, A. (2004), Biosorption of lead, copper, cadmium and nickel by anaerobic biomass. *Ph.D. Thesis*, Concordia University, Canada.

Full Text: [Thesis\Al Hawari, A.pdf](Thesis/Al%20Hawari,%20A.pdf)

Abstract: This study will introduce anaerobic granules as a novel type of biosorbent for the removal of lead, copper, cadmium, and nickel from aqueous solutions. The work investigated the equilibrium, batch dynamics and continuous column operation for the biosorption process. Binding capacity experiments using viable biomass revealed a higher value than those for nonviable biomass. Binding capacity experiments using non-viable biomass treated with Ca revealed a high value of metals uptake. The solution initial value affected metal sorption. Time dependency experiments for the metal ions uptake showed that adsorption equilibrium was reached almost 30 minutes after metal addition. It was found that the qmax for Pb2+, Cu2+, Cd2+ and Ni2+, were 2.46, 1.74, 1.06 and 0.88 meq/g respectively. The data pertaining to the sorption dependence upon metal ion concentration fitted the Langmiur isotherm model. The kinetics of sorption of Pb2+, Cu2+, Cd2+ and Ni2+ were modelled using a pseudo-second order rate equation. Column adsorption studies were performed for Pb2+, Cu2+, Cd2+, and Ni2+. The removal of Pb2+, Cu2+, Cd2+, and Ni2+ ions from the bed was accompanied by the elution of Ca2+ ions from the packed-bed. Ion exchange was identified to be the dominant mechanism for the biosorption of nickel by the anaerobic biomass. For copper and cadmium 77% and 82% of the total amount adsorbed was attributed to ion exchange respectively. 18% and 15% of the total amount adsorbed of copper and cadmium was attributed to the extent of a complexation process competing with the ion exchange one respectively. For the case of Pb ions it was found out that ion exchange was attributed to be almost 50% of the total uptake mechanism. 30% of the total uptake mechanism was attributed to precipitation mechanism. The remaining 20% was attributed to a complexation process competing with the ion exchange and precipitation. The affinity order of anaerobic biomass for the four metals under study has been established as: Pb > Cu > Ni > Cd. The selectivity of the biomass for Pb over the other three metals was well exhibited by the results obtained using the flow-through column.

? Atatürk, M.K. (2004), Investigation of adsorbability of Basic Blue 41 dye by anaerobic and activated sludge biomass. *Ms.C. Thesis*, Cukurova University, Adana, Turkey.

Full Text: Ataturk, MK

In this study, the adsorption of Basic Blue 41 (BB41) dye onto live activated sludge and anaerobic sludge was investigated. The results showed that both sludge were good adsorbents for BB41 dye, however, it was found that the adsorption capacity of activated sludge (Qmax = 437,0 mg/g) was higher than that of anaerobic sludge (Qmax = 232,6 mg/g). The adsorption isotherms of both adsorbents were described by Freundlich isotherm (activated sludge, R = 0,957, Kf = 11,06, n = 1,285) (anaerobic sludge, R = 0,998, Kf = 3,806, n = 1,209) better than Langmuir isotherm. Kinetics of both adsorption processes was best described by pseudo-second order model. The pseudo isotherms of both adsorption processes were also studied with the help of pseudo second order constants and it was concluded that the real isotherms described the anaerobic sludge/BB41 process better than the pseudo isotherms, but pseudo Freundlich isotherm (R = 0,9714) described the activated sludge/BB41 process better than the real isotherms. The thermodynamic calculations showed that Gibbs free energies of both processes (activated sludge, ΔG = -5,44 kJ/mol, anaerobic sludge, ΔG = -5,33 kJ/mol) have negative values indicating the spontaneous nature of the processes.

Keywords: Biosorption, Kinetics, Pseudo Isotherm, Thermodynamics

? Chen, C.Y. (2004), Characteristics differences of humic acids from lake sediments and uncultivated meountain soils and their sorption of toluene. *Ms.C. Thesis*, Chaoyang University of Technology, Taiwan

Full Text: [Thesis\Chen CY.pdf](Thesis/Chen%20CY.pdf)

? Chao, A.C. (2004), The fabrication of tyrosinase on chitosan using in chemical engineering process. *Ph.D. Thesis*, National Central University, Taoyuan, Taiwan.

Full Text: [Thesis\Chao AC.pdf](Thesis/Chao%20AC.pdf)

Abstract: In this study chitosan was modified to posses carboxyl group via the enzymatical grafting reaction of tyrosinase, or was used to immobilize tyrosinase. The purpose of this thesis was to find applications of these fabricated chitosans using in chemical process. In chapter three, 3,4-dihydroxybenzoic acid, 3,4- dihydroxyphenylacetic acid, and hydrocaffeic acid were used individually as substrates of tyrosinase to graft onto chitosan. The grafting amounts of these phenol derivatives onto chitosan were examined and the modified chitosan were used in experiments on uptake of the cationic dyes crystal violet and bismarck brown Y by a batch adsorption technique. In chapter four, tyrosinase was used to convert phenol to polyquinone, then polyquinone was removed by chitosan beads and tyrosinase was adsorbed by those carboxylly modified chitosan beads. The thermodynamic and kinetic models of tyrosinase adsorbed by modified chitosan were investigated. In chapter five, Chitosan was activated with glutaraldehyde, epichlorohydrin and ethylene glycol diglycidyl ether respectively in order to immobilize tyrosinase for the production of L-dopa from L-tyrosine. The effects of coupling agents and amine capping agents on the operation stability of immobilized tyrosinase were studied. A practical route to immobilize tyrosinase on chitosan for producing L-dopa from L-tyrosine was found. Finally in chapter six, chitosan was used to prepared tyrosinase-based biosensor on glassy carbon electrode for detecting the concentration of phenols. The effect of immobilizing methods, including chitosan gel mixed with enzyme, sandwich entrapped enzyme between two pieces of chitosan films, and covalently bonded enzyme on chitosan films, upon the apparent response of biosensor were studied. A highly stable biosensor was fabricated.

? Courseault, C.R. (2004), A text mining framework linking technical intelligence from publication databases to strategic technology decisions. *Ph.D. Thesis*, Georgia Institute of Technology.

Full Text: [2004\Courseault, CR.pdf](2004/Courseault,%20CR.pdf)

Abstract: This research developed a comprehensive methodology to quickly monitor key technical intelligence areas, provided a method that cleanses and consolidates information into an understandable, concise picture of topics of interest, thus bridging issues of managing technology and text mining. This research evaluated and altered some existing analysis methods, and developed an overall framework for answering technical intelligence questions. A six-step approach worked through the various stages of the Intelligence and Text Data Mining Processes to address issues that hindered the use of Text Data Mining in the Intelligence Cycle and the actual use of that intelligence in making technology decisions. A questionnaire given to 34 respondents from four different industries identified the information most important to decision-makers as well as clusters of common interests. A bibliometric/text mining tool applied to journal publication databases, profiled technology trends and presented that information in the context of the stated needs from the questionnaire. In addition to identifying the information that is important to decision-makers, this research improved the methods for analyzing information. An algorithm was developed that removed common non-technical terms and delivered at least an 89% precision rate in identifying synonymous terms. Such identifications are important to improving accuracy when mining free text, thus enabling the provision of the more specific information desired by the decision-makers. This level of precision was consistent across five different technology areas in clustering, while portraying the broad relationships as well.

? Fang, Y.C. (2004), Scientific research impact and data mining applications in hydrogeology. *Ph.D. Thesis*, Ohio State University.

Full Text: [2004\Fang, YC.pdf](2004/Fang,%20YC.pdf)

Abstract: This dissertation focuses on the use of citation data to evaluate the impactfulness of research in hydrogeology. This study not only explores research impact, but also applies one of the most useful information technologies: data mining techniques on textual data and a practical hydrogeological problem. Following the Schwartz, Fang and Ibaraki (2002) paper in Ground Water, I examined the citation data from ISI in order to check the stability of the bibliometric data and validation of use of this information. I looked at the citation growth patterns of highly-cited papers from the 80s and used that pattern to predict the citation growth for the highly-cited papers in the next decade. This exercise ensures me the use of citation data and gives us an overview of evolution of science in hydrogeology. ‘Innovation’ of the research is another important key to create its impact besides research topics. Water Resources Research papers from 1991 are selected to compare with papers before and follow-on. The most highly cited papers in 1991 appear to be unique in that there are relatively few papers like them that were published previously. Moreover, these papers were sufficiently influential to produce a relatively large number of similar follow-on papers. However, the citation pattern of some classic papers shows that the activities and impact of follow-on papers gradually decline with time. The results of this study reinforce the importance of being a pioneer in a research strand, strategically shifting research strands, adopting strategies that can facilitate really major research shifts. Applications of data mining techniques on two types of data show the advantage of information technology. I evaluated two general strategies and several variants thereof on the one type of database: textual data. The first strategy is based on Naive Bayes, a popular text classification algorithm. The second strategy is based on Principle Direction Divisive Partitioning, an unsupervised document clustering algorithm. While the performance of both approaches is quite good, some of the new variants that I examined including one, which involves a combination of these two approaches yield even better results. The other type of database is digital photo images. Statistics information (texture) of digital images (in grayscale) and spatial information along with measured hydraulic conductivities for some area in the outcrop are important attributes in the database. Self Organizing Maps (SOM) clustering with these attributes is applied to cluster small images extracted from the outcrop along with 122 sampling points and successfully predict the hydraulic conductivities for the whole section of the outcrop.

? Folk, L.C. (2004), A study of the veterinary medical database. *Ph.D. Thesis*, University of Missouri - Columbia.

Full Text: [2004\Folk, LC.pdf](2004/Folk,%20LC.pdf)

Abstract: The Veterinary Medical Database (VMDB), originally established by the National Cancer Institute to track cases of veterinary cancer, contains more than six million abstracts of veterinary case records collected over a period of more than forty years. This represents a significant repository of information potentially useful in epidemiologic research and the development of evidence-based standards for veterinary practice. However, the utility of the database is currently diminished by an out-of-date controlled terminology, an antiquated file format, and the absence of a direct user interface. These technical shortcomings constitute an impediment to the effective use of the data already deposited in the database and a barrier to the addition of new records. We analyzed and suggested solutions for each of the VMDB’s three problems. We examined the controlled terminology currently in use and experimentally demonstrated the feasibility of mapping it to an up-to-date nomenclature. We examined the current file format and developed a modern relational alternative designed to facilitate query access to the data. We examined the interface by which users’ query requests currently are fulfilled, experimentally assessed the current users’ query requirements, and proposed modifications to the current interface to enhance its usefulness to its users. Finally, we used bibliometric techniques to assess the extent to which the VMDB has contributed to scientific and public knowledge during its existence. We discovered a small but influential body of published research based upon VMDB data and a surprisingly wide-spread public awareness of the database.

? Huang, F.C. (2004), The effects of soil structure and chemical properties on the adsorption/desorption of volatile organic compounds. *Ph.D. Thesis*, National Central University, Taoyuan, Taiwan.

Full Text: [Thesis\Huang, FC.pdf](Thesis/Huang,%20FC.pdf)

Abstract: The effects of soil structure and chemical properties on the adsorption/desorption of volatile organic compounds were evaluated. The migration and the fates of nonionic organic compounds in soils are found to be highly depended on their vapor-phase sorptive behavior. However, it is difficult to explicit the mechanism of adsorption/desorption due to the complexity of environmental medium.

Vapor-phase adsorption/desorption isotherms of water, benzene, hexane, and cyclohexane on dry soil with different soil organic matters, such as Ca-montmorillonite, Ti-montmorillonite, Shamon Mountain Soil and Florida Peat, were gravimetrically measured under 15¢XC, 20¢XC and 25¢XC. The surface area, pore structure, and adsorption/desorption characteristic were analyzed to show the soil structure and chemical properties effect on the adsorption/desorption of VOCs.

After exchanged with metal cations, the porous structure of the soil mineral fraction was significanting changed. The results demonstrate that Ti-montmorillnite possess higher surface area, extensive pore size distribution, and better pore connection. Both the surface area and the pore structure of soil were characterized based on the classical and fractal analyses of the nitrogen adsorption isotherms. The surface fractal dimension D was calculated from their nitrogen isotherms using the fractal version of FHH (Frenkel-Halsay-Hill) equation. The results revealed that a smaller metal cation on the clay may slightly increase D values as a result of the increase in the BET surface area and the decrease in the pore size.

The adsorption capacity of Florida Peat is greater than that of the Shamon Mountain Soil for the sorption of water and benzene, owing to the Florida Peat contains aromatic groups. Conversely, the mineral fraction was significant for aliphatic compounds, and the soil organic matter was quite significant for aromatic compounds. The steric structure of molecular effect on VOCs adsorption for soil, following the order Gthe plane form-benzene Öthe chain form-hexane Öthe chair form-cyclohexane.

The experimental data were examined by the four sorption kinetic model Gthe pseudo-first order equation, the pseudo-second order equation, the intraparticle diffusion model and the Elovich rate equation. According to the sum of the errors squared (SSE), it showed that the intraparticle diffusion model fitted the data well, and the Elovich rate equation fitted the Florida Peat data well at relatively high pressure.

Keywords: Montmorillnite, Adsorption/Desorption, Isotherm, Peat

? Chang, Y.C. (2004), Preparation and applications of chitosan-coated multifunctional magnetic nano-carrier. *Ph.D. Thesis*, National Cheng Kung University, Tainan, Taiwan.

Full Text: Chang, YC

Abstract: This dissertation concerns the preparation of chitosan-coated multifunctional iron oxide magnetic nanoparticles and their uses as the magnetic nano-adsorbent, the magnetically manipulated catalyst carrier, and the magnetic targeting carrier for drugs.

The chitosan-coated iron oxide nanoparticles were prepared by the carboxymethylation of chitosan and the followed covalently binding on the surface of iron oxide nanoparticles via carbodiimide activation. Transmission electron microscopy (TEM) micrograph and dynamic light scattering (DLS) measurement showed that the chitosan-coated iron oxide nanoparticles were monodisperse with a mean core diameter of 13.5 nm and a mean hydrodynamic diameter of 17.1 nm. X-ray diffraction (XRD) patterns indicated the iron oxide nanoparticles were pure Fe3O4 with a spinel structure, and the binding of chitosan did not result in the phase change. In addition, the magnetic measurement revealed that they were superparamagnetic with a saturation magnetization of 63.2 emu/g, a remanent magnetization of 0.83 emu/g, a coercivity of 8.3 Oe, and a squareness of 0.013. The covalently binding of chitosan onto the surface of iron oxide nanoparticles was demonstrated by FTIR analysis and the measurement of zeta potential. The weight percentage of chitosan bound onto Fe3O4 nanoparticles was about 4.92 wt%, and the isoelectric point of the product was 5.95.

For the study on the use of the chitosan-coated iron oxide nanoparticles as a novel magnetic nano-adsorbent, its capability for the adsorption of metal cations, metal anions, and acid dyes from the aqueous solutions via chelating and/or anion exchange mechanism was examined. The results showed the adsorption capacity was quite high and the time required to reach the equilibrium was significantly shorter than those for the micro-sized adsorbents due to the high specific surface area and the absence of pore diffusion resistance. Moreover, the adsorption of Cu2+ ions, AuCl4- ions, and acid dyes AO12 and AG25 all obeyed the Langmuir equation, and the adsorption kinetics of AuCl4- ions and acid dyes revealed both the adsorption processes obeyed the pseudo-second-order kinetic model. Thus, the chitosan-coated iron oxide nanoparticles as a magnetic nano-adsorbent not only could be magnetically manipulated but also possessed the advantages of fast adsorption and high adsorption capacity. They are expected to be efficiently applied in separation processes.

The study on the use of the chitosan-coated iron oxide nanoparticles as a novel magnetically manipulated catalyst carrier, Cu2+ ions were adsorbed and their ability for the catalytic hydrolysis of bis(4-nitrophenyl) phosphate (BNPP) was examined. In addition, AuCl4- ions were adsorbed and reduced into Au nanoparticles. Their ability for the catalytic reduction of aromatic nitro compounds was investigated. The results showed both the Cu2+ ions and Au nanoparticles, adsorbed and supported chitosan-coated magnetic carriers respectively, exhibited high catalytic activities. Also, high catalytic activities retained after being reused and magnetically recovery several times, revealing the catalyst carrier had high stability. So, the chitosan-coated iron oxide nanoparticles could be used as a good catalyst carrier which could be magnetically manipulated and applied in catalytic reaction processes.

For the study on the use of the chitosan-coated iron oxide nanoparticles as a novel magnetic targeting carrier for drugs, the anti-cancer drug epirubicin was adsorbed and the in vitro anti-cancer efficacy of the conjugate was evaluated. The adsorption study indicated that the conjugate was stable at pH 3-7 and 25-40˚C and a high epirubicin loading could be achieved. The desorption kinetics showed that about 80% epirubicin released from the chitosan-coated magnetic carrier after 150 and 300 min in serum and 0.03 M phosphate buffer, respectively. In vitro cytotoxicity evaluation revealed that the epirubicin-loaded magnetic conjugate was able to exhibit comparable efficacy as free epirubicin did alone. Because of the combined functions of magnetic targeting Bdrug therapy, and MRI diagnosis, the chitosan-coated iron oxide nanoparticles will be quite useful in the field of biomedicine.

? Chao, A.C. (2004), The fabrication of tyrosinase on chitosan using in chemical engineering process. *Ph.D. Thesis*, National Central University, Taoyuan, Taiwan.

Full Text: [Thesis\Chao, AC.pdf](Thesis/Chao,%20AC.pdf)

Abstract: In this study chitosan was modified to posses carboxyl group via the enzymatical grafting reaction of tyrosinase, or was used to immobilize tyrosinase. The purpose of this thesis was to find applications of these fabricated chitosans using in chemical process. In chapter three, 3,4-dihydroxybenzoic acid, 3,4-dihydroxyphenylacetic acid, and hydrocaffeic acid were used individually as substrates of tyrosinase to graft onto chitosan. The grafting amounts of these phenol derivatives onto chitosan were examined and the modified chitosan were used in experiments on uptake of the cationic dyes crystal violet and Bismarck brown Y by a batch adsorption technique. In chapter four, tyrosinase was used to convert phenol to polyquinone, then polyquinone was removed by chitosan beads and tyrosinase was adsorbed by those carboxylly modified chitosan beads. The thermodynamic and kinetic models of tyrosinase adsorbed by modified chitosan were investigated. In chapter five, Chitosan was activated with glutaraldehyde, epichlorohydrin and ethylene glycol diglycidyl ether respectively in order to immobilize tyrosinase for the production of L-dopa from L-tyrosine. The effects of coupling agents and amine capping agents on the operation stability of immobilized tyrosinase were studied. A practical route to immobilize tyrosinase on chitosan for producing L-dopa from L-tyrosine was found. Finally in chapter six, chitosan was used to prepared tyrosinase-based biosensor on glassy carbon electrode for detecting the concentration of phenols. The effect of immobilizing methods, including chitosan gel mixed with enzyme, sandwich entrapped enzyme between two pieces of chitosan films, and covalently bonded enzyme on chitosan films, upon the apparent response of biosensor were studied. A highly stable biosensor was fabricated.

? Huang, C.T. (2004), Removal of lead ions from aqueous solution by using tree fern. *M.Sc. Thesis*, Taipei Medical University, Taiwan.

Full Text: Huang, CT

? Liu, J.Y. (2004), Removal of arsenic from water by chemical modified chitosan. *M.Sc. Thesis*, National Yunlin University of Science and Technology, Yunlin, Taiwan.

Full Text: Liu, JY

Abstract: The aim of this thesis was to study the removal of arsenic from water by chemical modification chitosan beads. Two types of chitosan beads, including uncrosslinked and crosslinked were prepared. Both beads were modified by impregnation with molybdate solution. A SEM was utilized to observe the surface structure of chitosan beads. An FTIR was used to conform crosslinking reaction. The equilibrium adsoption and kinetic experiments were conducted to gain the optimal pH value of arsenate solution by batch experimental process. The parameters such as the chitosan concentration, crosslinking agent concentration, crosslinking time and pH of solutions, were investigated.

The adsorption capacities of arsenic were 1.95 mgAs(III)g-1, 5.853 mgAs(V)g-1 on uncrosslinking chitosan beads. For crosslinking chitosan beads, the adsorption amounts were 0.931mg As(III)g-1, 5.115mg As(V)g-1. After chemical modification, the adsorption capacities increase to 2.746 mg As(III)g-1, 9. 5425 mg As(V)g-1, and 2.44 mg As(III)g-1, 7.635mg As(V)g-1 for uncrosslinking and crosslinking chitosan beads, respectively. The experimental equilibrium data fitted the Langmuir model well. The pseudo second order kinetic model was found to fit the kinetic experimental data. The regeneration process was performed by hydrochloric acid or phosphoric acid to desorb arsenic from chitosan beads. It was found that chitosan beads still have high adsorption capacity after five cycles of adsorption-desorption processes. The experimental results showed the impregnated molybdate chitosan beads were promised to remove arsenic from water.

? Lin, P.H. (2004), Adsorption of fluoride onto commercial activated alumina and novel magnetic fluoride selective nano-adsorbents from aqueous solutions. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Lin, PH

Abstract: The adsorption process applied in the removal of fluoride from aqueous solutions was investigated in this study. Commercial activated alumina (γ-Al2O3) and two novel magnetic alumina adsorbents, which were synthesized by precipitation method (MAP) and sol-gel method (MASG), were used as the alumina-type adsorbents. The physicochemical characteristics of three adsorbents and factors affecting the adsorption equilibrium and kinetics were further examined in this study.   
The Langmuir and Freundlich isotherms were successfully used to predict the adsorption behavior of fluoride ontoγ-Al2O3, MAP, and MASG, in which the monolayer adsorption capacity (qL) of MASG is the highest among three adsorbents. Furthermore, the linear isotherm also well described the adsorption behavior of fluoride onto both novel magnetic nano-adsorbents, MAP and MASG. Therefore, the novel magnetic nano-adsorbents, which were prepared by Fe3O4 coated with SiO2 and sequentially synthesized by means of precipitation and sol-gel methods in this study, can successfully be applied in the removal of fluoride from solutions. Regarding the adsorption kinetics of fluoride from solutions, among the tested kinetics models in this study (e.g. pseudo-first-order equation, pseudo-second-order equation and Elovich rate equation), both the pseudo-second-order equation and Elovich rate equation can well predict the adsorption kinetics of fluoride onto MASG in CFSTR.

The removal of fluoride by commercial Al2O3 was also carried out in the fixed-bed adsorber. The optimal operating conditions were the pH value of 4 for the fed fluoride solution, the regeneration agent (NaOH) of 0.01 N, and the neutralization pH of 4 by means of 3.16×10-4 N HNO3. Under the optimal conditions, the removal efficiency of fluoride from solutions was not reduced for at least fourteen runs. In addition, the fluoride adsorption capacity increased with decreasing pH of fluoride solution and can be divided into two parts: adsorbed by alumina and by aluminum hydroxide, in which the former might be the major mechanism in the whole adsorption process and the latter mainly influenced the adsorption in the plateau area.

The main composition and pH value of the aged scrubbing solution in the semiconductor manufacturing industries are fluoride of 40 ~ 60 mg/L, and 3.6, respectively. Therefore, on the basis of the data obtained from this study it is deduced that Al2O3, MAP and MASG possess high potential as the adsorbents for the application of adsorption process in the defluoridation from aged scrubbing solution.

? Wang, H.C. (2004), Adsorption of fluoride, chloride, bromide, sulfate and nitrate onto commercial and superparamagnetic activated alumina from aqueous solutions. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Wang, HC

Abstract: The main species of the aged scrubbing solution in the semiconductor manufacturing industries are F-, Cl-, Br-, NO3- and SO42- with concentrations of about 54, 2.2, 1.5, 10 and 2 mg/L respectively. The pH value of the solution is about 3.6. Therefore, on the basis of the results obtained from Lin (2004), the adsorption process applied in the removal of anions, including F-, Cl-, Br-, NO3- and SO42-, from the synthesized aqueous solutions was investigated in this study.

Commercial activated alumina activated using 0.01 N NaOH followed by 3.16×10-4 N HNO3 (noted as γ-Al2O3-N) or HClO4 (denoted as γ-Al2O3-P) and modified magnetic alumina adsorbent, which was synthesized employing sol-gel method (called as MMASG), were used as the alumina-type adsorbents. The physicochemical characteristics of two adsorbents and factors affecting the adsorption equilibrium and kinetics were further examined in the study.

The Langmuir and Freundlich isotherms were successfully used to predict the adsorption equilibrium behavior of the target anions onto γ-Al2O3-N and MMASG. The monolayer equilibrium adsorption capacity (qL) of MMASG is higher than that of γ-Al2O3-N. Besides, MMASG which was prepared by Fe3O4 coated with SiO2 and sequentially synthesized by sol-gel method in this study, can properly be applied in the removal of the said anions from solutions.

Regarding the adsorption kinetics of the target anions from solutions, among the kinetic models tested (e.g. pseudo-first-order equation, pseudo-second-order equation and Elovich rate equation), both the pseudo-second-order equation and Elovich rate equation can well predict the adsorption kinetics of the said anions onto γ-Al2O3-P and MMASG in a completely stirred tank reactor (CSTR).

The removal of anions by the commercial activated Al2O3-P was also carried out in a fixed-bed adsorber. The operating conditions were at pH value of 4 with various inlet concentrations for the fed anionic solutions. In addition, the adsorption patterns of anions can be divided into two types: inner-sphere (‘chemical bond’) adsorption, such as F- and SO42-, and outer-sphere complex (ion pair) adsorption, such as Cl-, Br- and NO3-. Besides, Yoon and Nelson equation for breakthrough modeling can well predict the adsorption kinetics of anions ontoγ-Al2O3-P in a fixed-bed adsorber.

This study takes into account for the practical data of the aged scrubbing solution in the semiconductor manufacturing industries. The results indicate that γ-Al2O3-P and MMASG possess proper potential as the adsorbents for the application of adsorption process in the defluoridation from aged scrubbing solution. As for the weak anions such as Cl-, Br- and NO3-, the applicabilities of theγ-Al2O3-P and MMASG are moderate.

? Chin, Y.C. (2005), Arsenic adsorption using citrate/Fe(III), silicate/Fe(III) synthetic iron oxides. *M.Sc. Thesis*, National Sun Yat-sen University, Kaohsiung, Taiwan.

Full Text: Chin, YC

Abstract: This study is to probe into the surface characteristics, crystalline identification and inner structural changes of the synthetic iron oxides which are synthesized from pure Fe(III), citrate/Fe(III) and silicate/Fe(III) solutions at different MRs respectively. This study is also to compare the adsorption capabilities of these synthetic iron oxides serving as the adsorptive materials in containing arsenic wastewater through adsorption experiments. By means of the XRD identification analysis, the synthetic iron oxides of pure Fe(III) and silicate/Fe(III) are non-crystal ferrihydrite, but the synthetic iron oxide of citrate/Fe(III) is crystal magnetite with magnetism. By means of IR spectrum analysis and comparison with the IR spectrum of iron mineral, the FTIR spectrum of pure Fe(III) and silicate/Fe(III) synthetic iron oxide are similar to that of ferrihydrite; The FTIR spectrum of citrate/Fe(III) synthetic iron oxide is similar to that of magnetite. The degree of pore volume and surface area for synthetic iron oxides are as follows: silicate/Fe(III) > Fe(III) > citrate/Fe(III). With the citrate/Fe(III) MRs increasing, the pore volume and surface area of synthetic iron oxide will decrease. However, with the silicate/Fe(III) MRs increasing, the pore volume and surface area of synthetic iron oxide do not make great difference. Results of kinetic adsorption experiments show that the synthetic iron oxides of citrate/Fe(Ⅲ) or silicate/Fe(III) at different MRs will adsorb arsenic better at low pH. With the pseudo-first order and the second order kinetic adsorption model to simulate the adsorption experiment data, the results show that the simulation results are consistent with the pseudo-second order kinetic adsorption model. The equilibrium adsorption experiments show that the adsorption capacity of arsenic for synthetic iron oxides is as follows: citrate/Fe(III) > Fe(III) > silicate/Fe(III), and that the adsorption capacity will decrease with the pH increasing.

? Čivilienė, L. (2005), Kinetics and equilibrium adsorption of dye on crabs chitin and chitosan. *Ph.D. Thesis*, Vilnius Pedagogical University, Vilnius, Lithuania.

Full Text: Civiliene L

Abstract: Chitin, chitosan recovered from fly crabs shells have been investigated by the elemental analysis, potentiometric titraton and FT–IR spectrometry methods. The molecular weght of chitosan was determined by measuring their viscosity.

The adsorption kinetics of reactive dye and equilibrium conditions has been investigated.

The adsorption of reactive dye on chitin and chitosan proceeds according to pseudo – second – order kinetic equation.

Adsorption investigations under equilibrium conditions showed that. Theses results were fitted by both Langmuir and Freudlich models.

? Fiol Santaló, N. (2005), Aprofitament de residus vegetals per a la concentració I separació d’ions metàl lics de solucions aquoses. *Ph.D. Thesis*, Universitat de Girona, Girona, Span.

Full Text: [Thesis\Fiol Santalo, N.pdf](Thesis/Fiol%20Santalo,%20N.pdf), [Thesis\Fiol Santalo, N-1.pdf](Thesis/Fiol%20Santalo,%20N-1.pdf), [Thesis\Fiol Santalo, N-2.pdf](Thesis/Fiol%20Santalo,%20N-2.pdf), [Thesis\Fiol Santalo, N-3.pdf](Thesis/Fiol%20Santalo,%20N-3.pdf), [Thesis\Fiol Santalo, N-4.pdf](Thesis/Fiol%20Santalo,%20N-4.pdf)

Abstract: Adsorption with activated carbon is a usual treatment to remove metals from wastewater. In order to reduce the cost of the treatment, several studies have been carried out to evaluate the use of low cost sorbents as an alternative to conventional sorbents used in wastewater treatment. In this work, the use of different vegetable wastes from agricultural or industrial processes has been evaluated as sorbents for metal removal from aqueous solutions. The aim of this work was to study first, the usefulness of olive stones as a sorbent for divalent metals such as Cd(II), Cu(II), Ni(II) and Pb(II) from aqueous solutions and then the use of four vegetable wastes (yohimbe bark, grape stalks, cork and olive stones) for the removal of Cr(VI) from aqueous solutions. The vegetable waste powder was encapsulated in calcium alginate to obtain spherical gel beads that were used in continuous flow process for Cr(VI) removal.

In all sorption experiments, kinetic data were modeled by the pseudo-second order kinetic equation and determine the constants sorption rates. Langmuir and Freundlich model isotherms were use to describe sorption equilibrium data and to obtain the isotherm parameters. In binary mixtures, the extended Langmuir isotherm model was used. The results showed that olive stones are a good sorbent for studied divalent metal. Metal uptake was pH dependent and the presence of salts in solution provokes a decrease in metal uptake. A clear competence between metals to be adsorbed on the waste was observed in metal binary mixtures. Although results obtained in Cr(VI) removal studies show that the four studied wastes can adsorb Cr(VI), grape stalks and yohimbe bark wastes showed the best chromium sorption capacity. X-Ray Photoelectron Spectroscopy analysis on grape stalks and yohimbe chromium loaded samples put into evidence that both Cr(VI) and Cr(III) were sorbed on wastes surface indicating that Cr(VI) sorption process involves a redox reaction.

The gel beads obtained when encapsulating grape stalks in calcium alginate showed a significant increase in Cr(VI) sorption capacity compared to the original grape stalks waste. A diffusion model was used to analyze the experimental data and to determine the diffusion coefficient for Cr(VI) sorption by beads containing different percentage of grape stalks encapsulated in calcium alginate.

Finally, preliminary studies of Cr(VI) removal in continuous flow using the beads containing grape stalks powder gel in laboratory columns have been carried out. The effect of operating parameters such as feed metal concentration, flow rate and bed depth was studied. The mass transfer and diffusion model used to describe column data showed the effect of feed metal concentration and flow rate in both, diffusion and mass transfer coefficients, respectively. The bed depth service time model (BDST) failed in predicting the service time when changing operating parameters due to the complexity of the sorption process. With these preliminary column experiments we established the basis for Cr(VI) sorption by the proposed sorbent in continuous flow process for further development of the process to be used in higher scale columns.

? Lin, H.Y. (2005), Investigation on adsorption of vapor-phase mercury chloride on powdered activated carbon derived from recycled waste. *Ph.D. Thesis*, National Sun Yat-sen University, Kaohsiung, Taiwan.

Full Text: [Thesis\Lin, HY.pdf](Thesis/Lin,%20HY.pdf)

Abstract: This study investigated the production of powdered activated carbon derived from carbon black of pyrolyzed waste tires, and their adsorptive capacity on vapor-phase mercury chloride (HgCl2) using both adsorption column and thermogravimetric adsorption systems. The adsorption isotherms and kinetic models were further simulated in the study. In addition, an innovative compositive impregnation process was developed to increase the sulfur content of powdered activated carbon derived from waste tires.

The activation of carbon black to form powdered activated carbon was performed in a tubular oven. The operating parameters including activation temperatures, activation time, and water feed rates were investigated in this study. Experimental results indicated that the yield of carbon-black derived powdered activated carbon (CBPAC) decreased with the increase of activation temperature, activation time, and water feed rate, while the BET surface area and pore volume decreased. In the comparison of activation time and water feed rate in the activation process, activation time had an important impact on the production of specific surface area than water feed rate. The optimal operating parameters included activation temperature of 900°C, activation time of 180min, water feed rate of 0.5 mLH2O/gC-sec, and water injection behind activation process of 17.5 min.

From the analysis of carbon surface, the carbon contents of powdered carbon black (PCB), CBPAC, commercial powdered activated carbon (CPAC) were 89.5%, 87.6%, and 88%, respectively. The C (1s) peak region of PCB consisted of 49.8% C-C, 38.9% C-O, 10.5% C=O or O-C-O. Similar analysis results showed that the total area of the C (1s) peak region of CBPAC consisted of 57.5% C-C, 26.8% C-O, 8.1% C=O or O-C-O, and 7.6% O-C=O. Similar to CPAC, the C (1s) peak region consisted of 42.6% C-C, 41.8% C-O, and 15.6% O-C=O. Furthermore, the sulfur contents of PCB and CBPAC were both 0.5%. The S (2p) peak region of PCB consisted of 58.9% ZnS (zinc sulfide) and 41.1% S=C=S. For CBPAC, the S (2p) peak region solely contained S=C=S.

The comparison of two sulfur impregnation processes revealed that the innovative compositive impregnation process could simultaneously increased the sulfur content and the BET surface area of powdered activated carbon (PAC), however, the direct impregnation process increased the sulfur content while the BET surface area of PAC decreased linearly. Without the disadvantages of time and energy consumption associated with direct impregnation, the compositive impregnation is an efficient and energy-saving process for producing sulfurized PAC with a high BET surface area and high sulfur content.

Experimental results obtained from the adsorption column tests indicated that the influence of the adsorption depth on the adsorptive capacity of CBPAC did not vary much, while the adsorptive capacity of CBPAC increased with HgCl2 concentration. Furthermore, the adsorptive capacity of CBPAC on vapor-phase HgCl2 was less than that of CPAC at the adsorption temperatures of 25~150°C and high humidity of 12.3 wt %. The difference of adsorptive capacity for CBPAC and CPAC correlated closely with BET surface area and sulfur content.

Results form the thermogravimetric adsorption analysis indicated that the adsorptive capacity of CBPAC and initial adsorption rate on vapor-phase HgCl2 increased with HgCl2 concentration and decreased with adsorption temperature. In the kinetic modeling, the deviation of experimental and simulated values simulated by the pseudo-first-order model was lower than those of pseudo-second-order models. Furthermore, the r (correlation coefficient) of pseudo-first-order and pseudo-second-order models were 0.9745~0.9977 and 0.9217~0.9780, respectively. It suggested that the pseudo-first-order model could simulate the adsorption of HgCl2 onto CBPAC better than pseudo-second-order model.

? Lin, P.H. (2005), Adsorption of fluoride, chloride, bromide, sulfate and nitrate onto commercial and superparamagnetic activated alumina from aqueous solutions. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Lin, PH

Abstract: The adsorption process applied in the removal of fluoride from aqueous solutions was investigated in this study. Commercial activated alumina (γ-Al2O3) and two novel magnetic alumina adsorbents, which were synthesized by precipitation method (MAP) and sol-gel method (MASG), were used as the alumina-type adsorbents. The physicochemical characteristics of three adsorbents and factors affecting the adsorption equilibrium and kinetics were further examined in this study.

The Langmuir and Freundlich isotherms were successfully used to predict the adsorption behavior of fluoride onto γ-Al2O3, MAP, and MASG, in which the monolayer adsorption capacity (qL) of MASG is the highest among three adsorbents. Furthermore, the linear isotherm also well described the adsorption behavior of fluoride onto both novel magnetic nano-adsorbents, MAP and MASG. Therefore, the novel magnetic nano-adsorbents, which were prepared by Fe3O4 coated with SiO2 and sequentially synthesized by means of precipitation and sol-gel methods in this study, can successfully be applied in the removal of fluoride from solutions. Regarding the adsorption kinetics of fluoride from solutions, among the tested kinetics models in this study (e.g. pseudo-first-order equation, pseudo-second-order equation and Elovich rate equation), both the pseudo-second-order equation and Elovich rate equation can well predict the adsorption kinetics of fluoride onto MASG in CFSTR.

The removal of fluoride by commercial Al2O3 was also carried out in the fixed-bed adsorber. The optimal operating conditions were the pH value of 4 for the fed fluoride solution, the regeneration agent (NaOH) of 0.01 N, and the neutralization pH of 4 by means of 3.16×10-4 N HNO3. Under the optimal conditions, the removal efficiency of fluoride from solutions was not reduced for at least fourteen runs. In addition, the fluoride adsorption capacity increased with decreasing pH of fluoride solution and can be divided into two parts: adsorbed by alumina and by aluminum hydroxide, in which the former might be the major mechanism in the whole adsorption process and the latter mainly influenced the adsorption in the plateau area.

The main composition and pH value of the aged scrubbing solution in the semiconductor manufacturing industries are fluoride of 40~ 60 mg/L, and 3.6, respectively. Therefore, on the basis of the data obtained from this study it is deduced that Al2O3, MAP and MASG possess high potential as the adsorbents for the application of adsorption process in the defluoridation from aged scrubbing solution.

? Liu, C.W. (2005), Hexavalent chromium removal by zerovalent iron. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Liu CW

Abstract: Chromium is a common pollutant in groundwater in industrial region because it is a raw material which is often used by many industries. Zero valent iron has been widely used in remediation of groundwater pollution. The potential for using zero valent iron to treat chromium pollution in situ has been concerned in recent years. The surface area and the passivity of the passive film on the iron surface are very important factors for chromium removal by zero valent iron. The surface area for nanolized iron is much larger and the passive film for nanolized iron is much thinner than that for commercial powder iron. Therefore, the chromium removal rate in nanolized iron system should be much higher than that in commercial powder iron system. The efficiencies of chromium removal in nanolized iron and commercial powder iron (J. T. Baker) systems were compared in this work.

Three factors, co-existing anions (Cl-, SO42-, NO3-, ClO4- and PO43-), initial pH and temperature affected on chromium removal were investigated in commercial powder iron system. The same factors except the temperature were investigated in nanolized iron system. The kinetics of the chromium removal reaction was also examined in this study.

The results show that the existence of chloride and sulfate ions can increase the rate of chromium removal by zero valent iron in commercial powder iron system. Otherwise existence of the phosphate, perchloride and nitrate ions can reduce the rate of chromium removal by zero valent iron in commercial powder iron system. However, in nanolized iron system, the influences of chloride, sulfate, nitrate and perchloride ions on chromium removal rate were very relatively insignificant. But the existence of phosphate ion can still decrease the chromium removal rate.

The chromium removal per unit weight of iron in nonalized iron system was much larger than that in commercial powder iron system. This phenomenon indicates the destruction of passive film is the rate-determining step for chromium removal by zero valent iron in commercial powder iron system but is not in nonalized iron system.

Both the removal rate of chromium decreased when the initial pH of chromium is higher. As chromium involves chloride, the kinetic of chromium removal by commercial powder iron follows pseudo-first-order reaction. But in the nanolized iron system, the kinetic follows pseudo-second-order. The chromium removal rate increased with the increase of temperature.

Keywords: Chromium, Commercial Powder Iron, Nanolized Iron, pH, Kinetic

? Lorenc-Grabowska, E. (2005), Adsorption of organic compounds from aqueous solution on activated carbons. *Ph.D. Thesis*, Politechnika Wroclawska, Poland.

Full Text: Lorenc-Grabowska, E

Abstract: In this work the influence of porous texture and the surface chemistry of activated carbons (ACs) on the adsorption process of selected organic compounds that represent typical water contaminations was studied. The first part of this work deals with preparation of mesoporous activated carbons and the modification of surface of microporous ACs. The second part describes the adsorption of humic acids, vitamin B<sub>12</sub>, Congo Red, 2-chlorophenol, 4-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichlorophenol and 4-nitrophenol on selected carbons. For efficient removing humic acids, Vitamin B<sub>12</sub> and Congo Red, the ACs with developed mesopores structure are required. A number of mesoporous activated carbons were prepared by carbonization and subsequent steam activation of doped flame coal (subA) and gas coal (hvBb). The two different pretreatments such as impregnation with yttrium, cerium and titanium oxide acetyloacetonate and loading of the calcium exchanged coal with iron by ion-exchange process were performed to modify the coals. To obtain materials with different surface properties the commercial activated carbon was modified by different chemical and thermal treatment. The activated carbon was oxidized with 40% HNO<sub>3</sub> and 20% H<sub> 2</sub>O<sub>2</sub>, treated with HCl and HF. The starting carbon was also heated in the atmosphere of NH<sub>3</sub> (450&deg;C) and N<sub>2 </sub> (800&deg;C). The adsorption tests were carried out in static conditions. At first the equilibrium time was estimated for a given adsorptive/ACs system. The kinetics of adsorption process have been analysed by three kinetic model, the pseudo first order model, a pseudo second order model and intraparticle diffusion model. The Langmuir and Freundlich models were applied to analyse adsorption isotherms. For Congo Red, an influence of ionic strength of solution on the extent of adsorption on ACs was studied. An effect of solution pH was studied in the case of humic acid adsorption.

? Lussky, J.P. (2005), Bibliometric patterns in an historical medical index: Using the newly digitized ‘Index Catalogue of the Library of the Surgeon General’s Office, United States Army’. *Ph.D. Thesis*, Drexel University.

Full Text: [Thesis\Lussky, JP.pdf](Thesis/Lussky,%20JP.pdf)

Abstract: The newly digitized Index Catalogue of the Library of the Surgeon-General’s Office, United States Army (IndexCat) provides powerful opportunities for the application of bibliometric techniques to support research in the history of medicine. It far exceeds any other medical bibliographic tool in its total number of documents indexed, span of decades represented in the publication dates of the indexed documents, international inclusiveness, and breadth of subject indexing. The work presented here will explore the viability of the IndexCat as a dataset for bibliometric research and as an adjunct to contemporary, qualitative research on the history of medicine. A bibliometric analysis of the subject headings and title words within the IndexCat demonstrates that they can be combined to link developing theories of disease causation with developing understandings of specific diseases. Furthermore, these bibliometric patterns compliment and enrich contemporary, historical accounts of the research on specific diseases.

? Ma, J.H. (2005), Evaluation of output of chemical research in china by bibliometric methods. *Ph.D. Thesis*, Peking University, Bejing, China.

Full Text: Ma, JH

Abstract: Science and technology are playing very important roles in promoting the development of society. More and more people have realized that science and technology have strong relations with economical development, security of country, and international competition. Many countries have put S&T in the priority position and give a great deal of support of human, material and financial resources. However, with the contradiction between the demands of S&T and the limited resources, the evaluation of S&T is inevitable. Reasonable and effective S&T assessment system is very essential in inspiring researchers, building up innovative environment, and promoting the formation of national innovative systems. Bibliometrics is a quantitative method and has been used widely in S&T evaluation. Chemistry is a major scientific field and is chosen as an exploration in assessment of output of scientific field. By combining several methods such as bibliometrics, questionnaire of peer review, comprehensive analysis and comparative analysis, the research is focused on the productivity, international impact or visibility and innovative ability of chemical research in China. The main research is conducted in following aspects: time sequence distribution of journal article in chemistry and international comparison, average impact of journal article in ISI database, dynamic impact in past ten years, the position of Chinese institutions in chemical research, the contribution of Chinese chemists in highly cited papers, patent output in chemistry and metallurgy.The results show that productivity and impact of Chinese chemical research are growing rapidly, but the problems are very severe. Academic institutions and state institutes are key force in producing high quality papers. Chemistry is relatively strong in comparison with other scientific fields in China. Original creativity is very limited. There is a great lack of outstanding or influential chemists in China. The output in chemical patents is far below the main industrial countries and some emerging countries. This should arouse great attention in government and related sectors. Different indicators are used in evaluating different stages of chemical research. For basic research and some applied research, journal article and citation are used as the indicators of output. For applied research, which is one stage of development of R&D, patent indicator is chosen. Journal article and patent indicators covered the whole process of R&D. Bibliometrics and peer review are combined together first time in macro level of evaluation of a research field in China. Questionnaire of chemists can provide some explanation on the evaluation results and avoid some disadvantages of bibliometric methods. The correlation between the expenditure of R&D in China and the number of journal article has been analyzed. Suggestions have been made in S&T resource management and strategic policy-making.

? Morris, S.A. (2005), Unified mathematical treatment of complex cascaded bipartite networks: The case of collections of journal papers. *Ph.D. Thesis*, Oklahoma State University.

Full Text: [2005\Morris, SA.pdf](2005/Morris,%20SA.pdf)

Abstract: A mathematical treatment is proposed for analysis of entities and relations among entities in complex networks consisting of cascaded bipartite networks. This treatment is applied to the case of collections of journal papers, in which entities are papers, references, paper authors, reference authors, paper journals, reference journals, institutions, terms, and term definitions. An entity-relationship model is introduced that explicitly shows direct links between entity-types and possible useful indirect relations. From this a matrix formulation and generalized matrix arithmetic are introduced that allow easy expression of relations between entities and calculation of weights of indirect links and co-occurrence links. Occurrence matrices, equivalence matrices, membership matrices and co-occurrence matrices are described. A dynamic model of growth describes recursive relations in occurrence and co-occurrence matrices as papers are added to the paper collection. Graph theoretic matrices are introduced to allow information flow studies of networks of papers linked by their citations. Similarity calculations and similarity fusion are explained. Derivation of feature vectors for pattern recognition techniques is presented. The relation of the proposed mathematical treatment to seriation, clustering, multidimensional scaling, and visualization techniques is discussed. It is shown that most existing bibliometric analysis techniques for dealing with collections of journal papers are easily expressed in terms of the proposed mathematical treatment: co-citation analysis, bibliographic coupling analysis, author co-citation analysis, journal co-citation analysis, Braam-Moed-vanRaan (BMV) co-citation/co-word analysis, latent semantic analysis, hubs and authorities, and multidimensional scaling. This report discusses an extensive software toolkit that was developed for this research for analyzing and visualizing entities and links in a collection of journal papers. Additionally, an extensive case study is presented, analyzing and visualizing 60 years of anthrax research. When dealing with complex networks that consist of cascaded bipartite networks, the treatment presented here provides a general mathematical framework for all aspects of analysis of static network structure and network dynamic growth. As such, it provides a basic paradigm for thinking about and modeling such networks: computing direct and indirect links, expressing and analyzing statistical distributions of network characteristics, describing network growth, deriving feature vectors, clustering, and visualizing network structure and growth.

? Moya de la Calle, M. (2005), Spanish medical literature (‘La Gaceta Medica Catalana’, 1900--1922). *Ph.D. Thesis*, Universidad de Valladolid, Spain.

Full Text: Moya de la Calle, M

Abstract: I have done a bibliometric research about the Spanish medical literature. For that purpose I have used one of the most important medical publications of that period, <italic>La Gaceta M&eacute;dica Catalana</italic>, as a support. I have study the second period of the magazine, from 1900 to its extinction in December of 1921, through the permanent section called Publicaciones recibidas. In this section we can find the editorial novelties in medicine in the period. Likewise, it provides the theoretical basis of my research. A double view on the thesis is presented: on the one hand, a bibliometric study applying the main bibliometric laws; and on the other hand, a historical study with a complete analysis of the situation. I have gone through the historical period in which the publication is framed, in general terms, as well as focusing on the history of Spanish edition. We have also analyzed the magazine, its history, its main events, etc. I contribute a new comparative study with the most relevant medical reviews in those years to evidence the importance of the publication above mentioned. I have gone deep into the identity of the director and founder of the magazine, Rafael Rodriguez M&eacute;ndez, his life, his career, etc. He was the soul of the magazine until his death and one of the main medical figures at this time. Finally, I have enclosed three appendixes: the first including the bibliographic information about the books, obtained from the research; the second being a summary of Rafael Rodriguez M&eacute;ndez’s main academic achievements; and the third one containing the articles written by Santiago Ram&oacute;n y Cajal and published in the magazine.

? Ramos Rodriguez, A.R. (2005), Intellectual structure of entrepreneurship research: A bibliometric study, 1956--2003. *Ph.D. Thesis*, Universidad de Cadiz, Spain.

Full Text: [Thesis\Ramos Rodriguez AR.pdf](Thesis/Ramos%20Rodriguez%20AR.pdf)

Abstract: Entrepreneurship is &ldquo;a burning&rdquo; subject for the society, educative institutions and the academic investigation. In individual, generally it is accepted by academic and professional the affirmation of which the scientific discipline of entrepreneurship is a young and emergent field. Nevertheless, little empirical evidence exists that sustains the appreciations made on its origin, evolution, social structure and thematic of investigation. On the contrary, it exists a clear discord between the academic ones on its definition, scope and other numerous aspects. In this sense, he is habitual to find valuations little encouraging because the state of development of the investigation on entrepreneurship is in its pre-theoretical state (D&eacute;ry and Toulouse, 1996), happens through its stage of adolescence (Gr&eacute;goire, D&eacute;ry and B&eacute;chard, 2001) and has obtained to a progress limited towards its consolidation like discipline of knowledge (Aldrich and Baker, 1997; Romano and Ratnatunga, 1996; Busenitz et al., 2003). All these appreciations and still more disquieting others cause that entrepreneurship research deserves to be analyzed. For that reason, there is interesting similarity to explore the development of the academic investigation on the entrepreneurship phenomenon with the intention to obtain a general vision of the discipline that studies it and that allows to its suitable valuation and understanding. This generic objective has taken shape with the exposition of a series of questions of investigation related to four concrete aspects: the evolution of the scientific production, the social structure of its authors, the most influential documents and the structure of its knowledge base. In order to approach these questions it has been chosen to use a quantitative approach. In particular, after making a revision of literature on bibliometric methods and another one on investigations that have used to the own discipline of entrepreneurship as study object, a collection of representative works of the investigation in this discipline has been compiled by means of a search by key words and has been analyzed systematically with bibliometric techniques.

? Shih, C.C. (2005), Single- and multi-metal biosorption by an indigenous isolate *Enterobacter* sp. and recombinant *Escherichia coli* strains expressing metallothionein. *M.Sc. Thesis*, National Cheng Kung University, Tainan, Taiwan.

Full Text: [Thesis\Shih, CC.pdf](Thesis/Shih,%20CC.pdf)

? Wang, H.C. (2005), Adsorption of fluoride, chloride, bromide, sulfate and nitrate onto commercial and superparamagnetic activated alumina from aqueous solutions. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Wang HC

Abstract: The main species of the aged scrubbing solution in the semiconductor manufacturing industries are F-, Cl-, Br-, NO3- and SO42- with concentrations of about 54, 2.2, 1.5, 10 and 2 mg/L respectively. The pH value of the solution is about 3.6. Therefore, on the basis of the results obtained from Lin (2004), the adsorption process applied in the removal of anions, including F-, Cl-, Br-, NO3- and SO42-, from the synthesized aqueous solutions was investigated in this study.

Commercial activated alumina activated using 0.01 N NaOH followed by 3.16×10-4 N HNO3 (noted asγ-Al2O3-N) or HClO4 (denoted as γ-Al2O3-P) and modified magnetic alumina adsorbent, which was synthesized employing sol-gel method (called as MMASG), were used as the alumina-type adsorbents. The physicochemical characteristics of two adsorbents and factors affecting the adsorption equilibrium and kinetics were further examined in the study.

The Langmuir and Freundlich isotherms were successfully used to predict the adsorption equilibrium behavior of the target anions onto γ-Al2O3-N and MMASG. The monolayer equilibrium adsorption capacity (qL) of MMASG is higher than that of γ-Al2O3-N. Besides, MMASG which was prepared by Fe3O4 coated with SiO2 and sequentially synthesized by sol-gel method in this study, can properly be applied in the removal of the said anions from solutions.

Regarding the adsorption kinetics of the target anions from solutions, among the kinetic models tested (e.g. pseudo-first-order equation, pseudo-second-order equation and Elovich rate equation), both the pseudo-second-order equation and Elovich rate equation can well predict the adsorption kinetics of the said anions onto γ-Al2O3-P and MMASG in a completely stirred tank reactor (CSTR).

The removal of anions by the commercial activated γ-Al2O3-P was also carried out in a fixed-bed adsorber. The operating conditions were at pH value of 4 with various inlet concentrations for the fed anionic solutions. In addition, the adsorption patterns of anions can be divided into two types: inner-sphere (‘chemical bond’) adsorption, such as F- and SO42-, and outer-sphere complex (ion pair) adsorption, such as Cl-, Br- and NO3-. Besides, Yoon and Nelson equation for breakthrough modeling can well predict the adsorption kinetics of anions onto γ-Al2O3-P in a fixed-bed adsorber.

This study takes into account for the practical data of the aged scrubbing solution in the semiconductor manufacturing industries. The results indicate that γ-Al2O3-P and MMASG possess proper potential as the adsorbents for the application of adsorption process in the defluoridation from aged scrubbing solution. As for the weak anions such as Cl-, Br- and NO3-, the applicabilities of the γ-Al2O3-P and MMASG are moderate.

? Yin, X. (2005), Analysis of the traditional Chinese treatment regulation of chloasma from the related essays for 15 years. *M.Sc. Thesis*, Guangzhou University of Traditional Chinese Medicine, China.

Full Text: Yin, X

Abstract: Background of the study Chloasma is a kind of common skin disease with pigmentation on the face. The young girls and the women at middle age more easily suffer from Chloasma. Chloasma is a chronic disease which have a unprogressive course and affect the patients’ appearance seriously. The etiological factor and pathogenesis of Chloasma are fairly complicated and no substantial progress had been made up to now since middle period of 19 centuries although the relevant research is extensively. For there’s no...

Keywords: Chloasma, Traditional Chinese Treatment, Bibliometrics Analysis

? Chu, Y.C. (2006), The preparation of the amino acid grafted chitosan macroporous membranes and their applications. *M.Sc. Thesis*, National United University, Taiwan.

Full Text: [2006\Chu YC.pdf](2006/Chu%20YC.pdf)

Abstract: In this study, nine compounds (L-Histidine (His), L-Cysteine (Cys), L-Aspartic acid (Asp), L-Tryptophan (Try), L-Glutamic acid (Glu), L-Tyrosine (Tyr), L-3,4-dihydroxyphenyl-alanine (L-DOPA), p-Aminobenzoic acid (BA), p-Aminophenylacetic acid (PA))with bifunctional groups (amino and carboxyl groups) were grafted onto marcroporous chitosan membrane as ligand by the linkage of genipin. The prepared chitosan membranes were aimed to purify tyrosinase from *Agaricus bisporus.*

FTIR spectrum indicate the amino group of the nine compounds was coupled with the amino group of chitosan via the linkage of genipin. After working at different pH environments, the p-Aminobenzoic acid grafted chitosan exhibited the excellent adsorbing capacity by a 0.1 M PBS buffer as the extracting solution of *Agaricus bisporus* acetone powder at pH 4. The p-Aminobenzoic acid showed a competitive inhibition with tyrosinase. The analysis of the purified tyrosinase by SDS-PAGE showed only one band on the electrophoresis gel, this identified the selectivity of the BA grafted chitosan toward tyrosinase. The molecule weight of the purified tyrosinase is 111 kD which is almost the same as the molecule weight of the Sigma prepared tyrosinase (119 kD). The maximum adsorption capacity of the BA grafted chitosan toward tyrosinase reached 145 mg/g at 10℃, so this BA grafted chitosan membrane can be served as an affinity membrane on tyrosinase for commercial application.

The thermodynamic data showed the adsorption of tyrosinase by the BA grafted chitosan membrane obeyed Freundlich isotherm. The negative value of the adsorption ΔG and ΔH indicated the adsorption behavior is a spontaneous and exothermic process, and the adsorption capacity will decrease as the operation temperature increase. The negative value of the adsorption ΔS showed the arrangement of the protein molecule was more regulated on the BA grafted chitosan membrane than on the solution state. The kinetic data showed the adsorption of tyrosinase by the BA grafted chitosan membrane can be well expressed by pseudo second order kinetics.

Keywords: Macroporous Chitosan Membrane, Grafting, Ligand, Affinity Membrane, Tyrosinase

? Hsu, G.E. (2006), A study of application of novel adsorbents on the removal of pesticides from water. *M.Sc. Thesis*, National Taiwan University, Taiwan.

Full Text: Hsu GE

Abstract: Activated carbon (F-400) and novel hypercrosslinked polymer (Macronet MN-100, MN-150, and MN-500) were used as the adsorbents for the removal of pesticide (i.e., methomyl) from the aqueous solution. The physicochemical characteristics of adsorbents, and adsorption behaviors including adsorption kinetics and dynamics were investigated. Furthermore, factors affecting the adsorption equilibrium and kinetics were also examined in this study.

Marcronet resins and activated carbon F-400 possess high specific surface areas and all are microporous due to the high micropore volume. In addition, Marcronet resins are more uniform and homogeneous than activated carbon F-400. The Langmuir and Freundlich isotherms successfully predicted the adsorption equilibrium behaviors of methomyl onto F-400 and Marcronet resins. Furthermore, the monolayer adsorption capacity (qL) of F-400 for methomyl (145 g kg-1) was higher than that of Marcronet resins. The natural organic matter decreased the adsorption capacity of methomyl onto F-400 and MN-150 because of the competitive adsorption.

Regarding the adsorption kinetics of methomyl on various adsorbents from solutions in completely stirred tank reactor (CSTR), global kinetics (pseudo-first-order, pseudo-second-order, and Elovich rate equations) and traditional kinetics (surface, pore, and branched pore diffusion kinetics) models were investigated in this study. The pseudo-second-order, Elovich rate equations and traditional kinetics models can well predict the adsorption kinetics of methomyl onto F-400 and Marcronet resins.

The adsorption dynamics of methomyl in the fixed bed showed that the adsorption capacity of methomyl on F-400 was the highest among the adsorbents investigated. The parameters obtained from surface diffusion model combined with linear driving force model, and Yoon and Nelson equation can well describe the breakthrough curve of adsorption of methomyl in the adsorber systems. The organic solvent (i.e., methanol) can completely regenerate the exhausted adsorbent without reducing the original adsorption capacity of methomyl.

Keywords: Methomyl, Activated Carbon, Hypercrosslinked Polymer, Adsorption Isotherm, Adsorption Kinetics, Adsorption Dynamics

? Hsu, Y.L. (2006), Adsorption of aqueous copper(II) and Cadmium(II) onto carbon nanotubes. *M.Sc. Thesis*, National Yunlin University of Science and Technology, Taiwan.

Full Text: [Thesis\Hsu YL.pdf](Thesis/Hsu%20YL.pdf)

? Huang, L.Y. (2006), Influences of sulfur impregnation on the properties of activated carbons and adsorption of low-concentration mercury in flue gases. *M.Sc. Thesis*, National Sun Yat-sen University, Kaohsiung, Taiwan.

Full Text: Huang LY

Abstract: Activated carbons derived from two precursors (coal and coconut shell) were used to develop low-concentration (i.e., ppb level) mercury adsorbents with various physical and chemical properties via gas- and liquid-phase sulfur impregnation methods. The goal is to achieve a full-scale production of mercury adsorbents. Results showed that sulfur impregnation altered the physical properties of activated carbons. Sulfur impregnation assembled chemical activation, which created new porous structure as well as sulfur doping. When the impregnation process was scaled-up, gas-phase sulfur impregnation significantly blocked the porous structure, indicating that sulfur impregnation simultaneously causes the pore opening and blocking. Liquid-phase impregnation did not act as activation, the resulting surface area and pore volume thus decreased as the sulfur amount increased, which was more significant in pilot-scale samples. Mercury adsorption capacity was proportional to the sulfur content of resulting samples, however, with an insignificant correlation. This result suggests that other factors, beside sulfur content, controls the adsorption behaviors as well. The pilot-scale carbon products had an adsorption capacity > 1000 g/g. Results also showed that a pseudo-first-order model can successfully simulate the adsorption behaviors of all tested adsorbents, indicating that Hg0 adsorption by tested samples was in a unimolecular reaction form. In addition, the kinetic study also showed that the tested samples with large adsorption capacities typically had poor adsorption kinetics, indicating that the Hg0 adsorption equilibrium and kinetics of sulfur-impregnated activated carbon were not able to be well correlated.

? Ling, C.N. (2006), Destructive adsorption mechanisms for the treatment of dye wastewater by nanoscale magnesium oxide. *M.Sc. Thesis*, National Sun Yat-sen University, Kaohsiung, Taiwan.

Full Text: Ling, CN

Abstract: This study was to prepare nanoscale MgO using the homogeneous precipitation process and to investigate its destructive adsorption with dye wastewater of reactive black-5 and reactive blue-19. In addition, UV-vis Spectrophotometer, Matrix-Assisted Laser Desorption/Ionization Time of Flight Mass Spectrometry (MALDI-TOF/MS) and Gas Chromatograph/Mass Spectrometer (GC/MS) were used to analyze the intermediates resulting from destructive adsorption. Based on the results obtained, the destructive adsorption mechanisms for the treatment of dye wasterwater by nanoscale MgO were proposed in this study.

In this work, the optimal operating conditions for nanoscale MgO synthesis were determined to be the following: (1) a chemical reaction time of 7 hr, (2) reaction temperature of 125, (3) molar ratio of 9 for urea/MgCl2 6H2O, (4) water addition of 250 mL, (5) mixing intensity of 90 strokes per min, (6) calcination at 450 for 4 hr, (7) reflux time of 24 hr, (8) freeze-drying method, (9) two stage calcinations. Using these operating conditions one is able to prepare 2-D nanoscale MgO of hexagonal platelets with a thickness of 20-30 nm and BET surface area of 120-125 m2/g.

The adsorption model of nanoscale MgO for RB-5 and RB-19 was fitted to the Langmuir equation and their adsorption capacity were 196.08 mg/g and 163.93 mg/g, respectively. Both of them were fitted to the pseudo-second-order kinetic model equation. The optimal operating conditions of nanoscale MgO for destructive adsorption of both dyes were determined to be the following: (1) an initial dye concentration of 1000 mg/L, (2) a nanoscale MgO dose of 15 g/L, (3) a vigorous mixing of 30 min, (4) no need of system pH adjustment. Under such conditions, chemical oxygen demand (COD) and American Dye Manufacturers Institute (ADMI) of RB-5 and RB-19 were lower than the textile effluent standards.

According to the UV-vis spectrophotometer scanning results, the color removal of nanoscale MgO for RB-5 and RB-19 was good. At the same time, the absorbance of their second maximal peaks was decreased and some peaks were observed. Therefore, it proved that the model dyes were destroyed. Experimental results have shown that nanoscale MgO has a better performance of destructive adsorption on RB-5 than that of RB-19. This might be ascribed to the following reasons: (1) a greater molecular weight, (2) a longer molecule structure, (3) more sulfate ethyl sulfone groups for RB-5, and (4) a hard to be destroyed structure of anthraquinone for RB-19.

The destructive adsorption of dye wastewater by nanoscale MgO presumably took place mainly on the surface active sites of nanoscale MgO, including anion/cation vacancies, superoxide anion, edge, corner, isolated OH, lattice bound OH and assiocited-OH groups. According to the results of MALDI-TOF/MS and GC/MS analysis, the relevant reaction mechanism for RB-5 could be divided into three stages: (1) adsorption and water-soluble groups exfoliation stage, (2) chromophor decomposition and decolorization stage, and (3) further degradation stage for light-color intermediates. On the other hand, the relevant reaction mechanism for RB-19 might involve only the adsorption and auxochrome exfoliation stage and chromophor decomposition and decolorization stage.

? Liu, C.T. (2006), A study on the sorption of nickel(II) from water with purified carbon nanotubes. *M.Sc. Thesis*, National Chung Hsing University, Taiwan.

Full Text: Liu CT

Abstract: Single-walled carbon nanotubes (SWCNT) and multi-walled carbon nanotubes (MWCNT) were purified by sodium hypochlorite solutions and were employed as sorbents to study sorption characteristics of nickel(II) from aqueous solution. The surface properties of purified CNTs such as functional groups, total acidities and negatively charged surface carbon were greatly improved after purification and thus resulted in sorption of more Ni2+. The Ni2+ removal by CNTs quickly increased with initial solution pH in the range 1–12 and temperatures. The thermodynamic analysis revealed that the Ni2+ sorption by CNTs is endothermic and spontaneous. The sorption/desorption study showed that the Ni2+ could be easily removed from the CNTs surface by a 0.1 M HNO3 solution and the sorption capacity was maintained after 10 cycles of sorption/desorption process.

A comparative study on the Ni2+ sorption between CNTs and activated carbons was also conducted. The maximum Ni2+ sorption capacities of Purified-SWCNT, Purified-MWCNT, Purified-GAC, PAC and GAC calculated by the Langmuir model are 47.85, 38.46, 26.39, 16.29 and 14.53 mg/g, respectively, with an initial Ni2+ concentration range 10 - 80 mg/L. The shorter equilibrium time as well as the better sorption capacity as compared to activated carbons suggests that both possess highly potential applications for the removal of Ni2+ from aqueous solution.

Keywords: Carbon Nanotubes, Sorption, Purification, Nickel, Thermodynamics, Activated Carbons, Desorption

? Lundber, J. (2006), Bibliometrics as a research assessment tool – impact beyond the impact factor. *Ph.D. Thesis*, Karoliska Institutet, Sweden.

Full Text: [Thesis\Lundber, J.pdf](Thesis/Lundber,%20J.pdf)

? Su, F.S. (2006), A study on the adsorption of dissolved organic matters from drinking water by multiwalled carbon nanotubes. *M.Sc. Thesis*, National Chung Hsing University, Taiwan.

Full Text: Su FS

Abstract: Multi-walled carbon nanotubes (MWCNTs) were thermally treated and employed as adsorbents to study adsorption characteristics of dissolved organic matters (DOMs) and assimilable organic carbon (AOC) from drinking water. The adsorption capacity of DOC and AOC onto MWCNTs increased with the decrease of pH and temperature of the solution but increased with the increase of ionic strength of the solution in the range of 0 - 0.01 M. The maximum adsorbed amounts of DOC and AOC onto heated MWCNTs calculated by the Langmuir model at 25°C were 26.138 mg/g and 0.548 mg/g respectively, which were much higher than that onto commercially available granular activated carbon (DOC:14.710 mg/g, AOC:0.341 mg/g). The activity energies for adsorption of DOC and AOC onto MWCNTs indicated the film diffusion is the rate-controlling mechanism in the reaction. According to thermodynamic analysis, the adsorption of DOC and AOC onto MWCNTs is an exothermic and spontaneous process. A comparative study on the adsorption of DOMs among heated MWCNTs and GAC was also conducted. Heated MWCNTs possess superior capacities for adsorption of DOMs and AOC than GAC. The better capacity, much regeneratation times and durability as compared to GAC suggest that heated MWCNTs have highly potential applications for the removal of DOMs and AOC from aqueous solution.

Keywords: Adsorption, Carbon Nanotubes, Dissolved Organic Matter, Assimilable Organic Carbon, Regeneration, Thermal Treatment

? Hua, T.S. (2007), Sorption behavior of zeolite p and its modified forms in the removal of some heavy metals and oxyanions from aqueous media. *M.Sc. Thesis*, Universiti Teknologi Malaysia, Malaysia.

Full Text: [Thesis\Hua TS.pdf](Thesis/Hua%20TS.pdf)

Abstract: Disebabkan oleh ketoksikan dan kekekalan yang wujud, ion-ion logam Me rbahaya seperti plumbum (Pb2+), Kadmium (Cd2+) and Zink (Zn2+) serta oksianion seperti selenit, Se(IV) and selenat, Se(VI) memaparkan sebagai ancaman terhadap alam sekitar dan kesihatan manusia apabila mereka dilepaskan ke dalam sumbersumber air sebagai bahan sisa. Penyelidikan ini merangkumi kerja-kerja sintesis, pencirian dan analisis ke atas pembangunan suatu penjerap tak organik yang murah dan cekap, iaitu zeolit Na-P2 di mana ia disintesis dengan menggunakan abu sekam padi tempatan sebagai bahan mentah. Produk itu dicirikan dengan pelbagai jenis teknik yang canggih dan seterusnya ia dimodifikasi kepada bentuk natrium dan kalsium hampir-homoionik agar dapat mengkaji tabiat penjerapan bagi sampel zeolit yang berbentuk kationik ini terhadap ion-ion logam merbahaya terpilih. Penjerapan ion-ion logam terpilih seperti Pb2+, Cd2+ and Zn2+ telah dibuktikan sebagai proses penukargantian ion melalui kajian penjerapan berkelompok. Kecekapan penyingkiran bagi spesies-spesies zeolit ini telah dikaji melalui beberapa pembolehubah seperti masa, kepekatan, pH and persaingan di antara bahan terjerap. Isoterma penukargantian ion binari telah dibina dengan menggunakan model keseimbangan termodinamik dan tenaga bebas piawai bagi penukargantian juga telah dikira. Susunan kepilihan bagi zeolit Na-P2 adalah Pb2+>Cd2+>Na+>Zn2+ manakala bagi garronit tertukarganti kalsium yang dilabel sebagai Homo-Ca, susunan kepilihannya adalah Pb2+>Ca2+>Cd2+>Zn2+. Penukargantian komponen multi bagi zeolit Na-P2 juga dikaji. Di samping itu, zeolit Na-P2 asal dimuatkan dengan menggunakan aluminium sulfat selepas penyingkiran silika untuk mengkaji kecekapannya dalam penyingkiran spesies selenit and selenat dalam air. Pembolehubah bagi penjerapan spesies-spesies selenium ke atas zeolit Na-P2- ter muat-aluminium seperti masa, kepekatan dan kekuatan ionik juga telah dikaji. Keputusan menunjukkan zeolite Na-P2-termuat-aluminium (sampel 10Al-P) mempunyai prestasi yang baik berbanding dengan bahan-bahan lain dalam penyingkiran oksianion selenium daripada air. Sebagai kesimpulannya, zeolit Na-P2 dan bentuk-bentuk terubahsuai dapat digunakan sebagai agen penyingkiran logam yang cekap dalam proses penulenan air.

? Yaghi, N.Z.A. (2007), Iron oxide based materials for the removal of copper from drinking water - A study of Freundlich adsorption isotherms, site energy distributions and energy frequency distributions. *M.Sc. Thesis*, Chalmers University of Technology, Göteborg, Sweden.

Full Text: [Thesis\Yaghi NZA.pdf](Thesis/Yaghi%20NZA.pdf)

Abstract: This study describes experiments in which iron oxide coated sand and iron oxide coated LECA were used to study the removal of copper ion in drinking water. Two possible compounds were used to prepare Iron oxide coated with LECA and sand. The isotherm study results showed that the observed data fitted well with the Freundlich model. Isotherm studies were conducted by varying the mass of adsorbents and all experiments were conducted at room temperature, at pH =6.5, initial concentration 100μg/L and with a duration of 17 hours. The results shows that LECA coated with ferric nitrate and LECA coated with ferric chloride seems to have higher removal than other adsorbents, whereas it gives efficiency of removal in the case of LECA nitrate rated from 82% to 98% and in the case of LECA Chloride rated from 80% to 96%. using adsorption isotherms and values of n and Kf (Freundlich constants), the third size of LECA coated with nitrate gave best value of n and Kf, estimated to 0.9997 and 3.4750 respectively and in second rank comes when LECA coated with ferric chloride size five which gave value for n and kf of 0.9998 and 3.8645 respectively. After studying the adsorption isotherm, site energy distribution and energy frequency distribution to all adsorbents using the theory of heterogeneity have been studied. The results shows that the loss occurs preferentially across sites having highest energy frequency distribution with the number of sites in the lowest energy range, as what is happened in uncoated LECA and uncoated sand. The final result and occurrence of the value of site energy distribution and energy frequency distribution showed that LECA coated nitrate is the best adsorbent among the other category and uncoated LECA is the worst.

Keywords: Copper, Drinking Water, Iron Oxide Coated Sand With, Iron Oxide Coated LECA, Ferric Nitrate, Ferric Chloride, Freundlich Isotherm Model, Freundlich Constants, Site Energy Distribution, And Energy Frequency Distribution

# 江西农业大学学报

? 郑小坚，张雨青（2000），加强实验室软硬件建设,促进”211工程”重点建设学科发展。*江西农业大学学报*，**22** (6), 231.

Full Text:

# 研究与发展管理

? 赵纯善，冯冠平，邓春春（1997），浅论高校学科群建设。*研究与发展管理*，**9** (5), 49.

Full Text: [1997\9, 49.pdf](1997/9,%2049.pdf)

Keywords:重点大学, “211工程”, 学科群

# 现代情报

? 王文凤（2003），2000年《图书馆》载文及作者统计分析。*现代情报*，**3**, 169-171.

Full Text: [2003\3, 169-171.pdf](2003/3,%20169-171.pdf)

Keywords: Library, papers’ analysis, authors’ analysis, statistical analysis,

Abstract: Applying bibliometric Statistical methods to count and analysis the papers and authors deh’vered in Library in 2000, the characteristics of those papers and authors are expounded.

? 王素琴（2004），《图书馆杂志》与《图书馆工作与研究》的比较研究。*现代情报*，**1**, 39-41.

Full Text: [2004\1, 39-41.pdf](2004/1,%2039-41.pdf)

Abstract: Applying bibliometric statistical methods to count and compare analysis the characteristics of Library Journal and Library Work and Study from four aspects including capacity and columns of two publications, author and citation of the ariticles.

Keywords: Citation Analysis, Library Journal, Library Work And Study

王素琴（2004），网络环境下信息资源研究论文的计量分析。*现代情报*，**9**, 26-28.

Full Text: [2004\9, 26-28.pdf](2004/9,%2026-28.pdf)

Keywords: Networked Environment, Information Resources, Quantitative Analysis

Abstract: Applying bibliometric statistical methods, the paper counts up the papers on information resources in the networked environment delivered in 1999 to 2003, and makes a comparatively and integratedly analysis on the distribution of time, journals, the characteristics of thesis and the fund projects, and the regional distribution of the papers and their corresponding authors on the data base of CNKI.

? 王进常，闫芬（2005），《现代情报》载文被引分析。*现代情报*，**1**, 54-57+60.

Full Text: [2005\1, 54-57+60.pdf](2005/1,%2054-57+60.pdf)

Keywords: Contemporary Information, Citation Analysis, Chinese Academic Journals（CD）

Abstract: This paper is about citation analysis and statistics ofthat is cited by the Chinese Academic Journals (CD) in 2003, applying bibliometric statistical methords.The author analyze the citing periodicals, the time, the subjects, and the authors of cited papers.Then draw a conclusion that theis becoming one of the important information sources of studying science of library and information.

? 王进常，闫芬（2005），《图书馆工作与研究》2001～2003年载文及引文分析。*现代情报*，**2**, 9-11.

Full Text: [2005\2, 9-11.pdf](2005/2,%209-11.pdf)

Abstract: A bibliometric analysis was made for the citation of the Library Work and Study from 2001～2003 in order to bring to light the general citation rules in the journal.

Keywords: The Library Work and Study, Bibliometries, Citation Analysis,

? 刘晓凤，钟萍，李轶（2005），2003年度《情报杂志》载文、作者及引文分析。*现代情报*，**2**, 145-147.

Full Text: [2005\2, 145-147.pdf](2005/2,%20145-147.pdf)

Abstract: A statistical analysis of the 606 articles issued in Journal of Information in 2003 with the bibliometric methods is made.This article gives a count and analyses of the papers, authors and quotations, and reveals some of its specific properties in carrying articles and its current situation.

Keywords: Journal of Information, Papers Analysis, Authors Analysis, Quotations Analysis

? 王云娣（2005），我国OPAC文献的计量分析研究。*现代情报*，**5**, 8-11.

Full Text: [2005\5, 8-11.pdf](2005/5,%208-11.pdf)

Abstract: This paper is quantitatively analyzed in the growth condition, the periodicals, the subjects and the authors distribution condition of the OPAC literature in our country by using bibliometric analysis. The study explores the characteristics of the OPAC literature in our country. According to the problems existing, puts forward some suggestions.

Keywords: Online Public Access Catalog, OPAC, WebPAC, Bibliometric

? 屈健民（2006），国内网络参考咨询研究（1998～2005）的文献计量学分析。*现代情报*，**3**, 140-143.

Full Text: [2006\3, 140-143.pdf](2006/3,%20140-143.pdf)

Abstract: Applying bibliometric statistical methods, the paper counts up the treatises on network reference service in 1998～2005 from CNKI and makes a metrology analysis on the numbers, times, organizations, areas, journals, and the characteristics of thesis.

Keywords: Network, Digital, Virtual, Network Service for Reference, Bibliometrics

? 王伟，范静（2006），光盘数据库统计分析软件（CDSAS）的研制与应用。*现代情报*，8, 114-117.

Full Text: [2006\8, 114-117.pdf](2006/8,%20114-117.pdf)

Abstract: The CD-ROM Database Statistical Analysis System(CDSAS)is a software of computer aided bibliometric analysis.It is designed for the format of the copy files from CD-ROM databases.It can realize the format conversion of the copy files from CD-ROM databases, create the special subject database, which can be recognized and processed by Visual FoxPro. Using CDSAS, several fields in the copy files can be processed and sorted according to the demands of bibliometric research. It has been used in the researc...

Keywords: CD-ROM Database, Software, Statistical Analysis, Development and Application

? 黄秋梨（2007），近5年我国信息资源共享研究论文计量分析。*现代情报*，**5**, 92-96.

Full Text: [2007\5, 92-96.pdf](2007/5,%2092-96.pdf)

Abstract: In the hope of providing certain reference and the model for the following researches on information resources sharing in China,this paper makes a statistical analysis of the articles relating to information resources sharing and issued from 2001 to 2005 in China by using the method of bibliometrics, including time distribution,origin periodical,author distribution,and content distribution.

Keywords: Information Resources Sharing, Bibliometric, China

? 胡俊荣，翁佩萱，崔宗熹（2007），中国高等师范院校产出科技论文的计量分析。*现代情报*，**5**, 158-163.

Full Text: [5, 158-163](2007/5,%20158-163.pdf)

Abstract: Based on the network database of by ISI Web of Science and 15122 sci-tech papers belonging to China’s Normal Colleges and Universities during 2000-2005 which are recorded in SCI database, the current status and trend of sci-tech paper’s output of China’s normal colleges and universities from seven aspects, including the time, organization, subject author, language distribution, periodical distribution and cited situation.

Keywords: Science Citation Index (SCI), China’s Normal Colleges and Universities, Sci-Tech papers, Bibliometric

? 黄成（2007），关于开放存取出版文献的计量分析。*现代情报*，**1**, 169-171.

Full Text: [2007\1, 169-171.pdf](2007/1,%20169-171.pdf)

Abstract: Analyzing the number of publications of a certain subject can help us understand the level and direction of the research on this subject. Started from 1990s, Open Access (OA), whose research needs to be perfect, is still at the trial-and-error phase. This paper, therefore, analyzes the thesis, citations, authors, and core journals, as well as the subjects in the filed of OA with a view to objectively true reflection of China Open Access Publishing research situation. It wishes to grasp the development tendency of OA so ...

Keywords: Open Access, Bibliometric Analysis

# 数理统计与管理

? Cui, D.Q. (2005), Analysis and making good fitting degree test for logistic curve regression equation.*数理统计与管理*, **24** (1), 112-115.

Full Text: [2005\24(1), 112-115.pdf](2005/24(1),%20112-115.pdf)

Abstract: To make full use of the information of Logistic curve we obtained the cut points : beginning fast growth period, the fastest growth period, lowest growth period were t1 = (ln a - 11317)/b, t2 = (ln a)/b, t3 = (ln a + 11317)/b, by first and second derivative of velocity function of increasing or growth process of logistic curve. And using two yieding point of the velocity function, the increasing or growth process of Logistic curve was divided into gradually growth period (t = 0～ (ln a - 11317)/b) fast growth period (t = (ln a - 11317)/b～ (ln a + 11317)/b) solw growth period (t = (ln a + 11317)/b) ～ ∞). for fitting a good Logistic curve regression equation the adopting χ2 test was recommended. And a living example was analyzed and discussed.

Keywords: Logistic Curve, Analysis, Key Period, χ2 Test, Making Good of Fitting Degree