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Comments on using of "pseudo-second-order rate equation" in *Journal of Radioanalytical and Nuclear Chemistry*, Volume 283

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Accuracy of referencing is important for the transmission of scientific knowledge. However, an unacceptable rate of citation and quotation errors has been found in the literature [1, 2]. Greater emphasis and responsibility must be placed on authors to check the accuracy of cited references in their submitted manuscripts [2]. In *Journal of Radioanalytical and Nuclear Chemistry*, Volume 283, two articles, entitled "influence of contact time, pH, soil humic/fulvic acids, ionic strength and temperature on sorption of U(VI) onto MX-80 bentonite" [3] and "effect of pH, fulvic acid and temperature on sorption of Th(IV) on zirconium oxophosphate" [4], presented a "pseudo-second-order rate equation," but cited 2 and 3 secondary material, respectively, as references.

In these two articles, the authors presented the "pseudo-second-order rate equation" with equation $\frac{t}{q_t} = \frac{1}{2kq_e^2} + \frac{t}{q_e}$ while in fact, the definition of the equation for the adsorption systems of divalent metal ions using sphagnum moss peat has been presented by Ho [5], and this expression has also been published in 1996 [6]. A modified equation was presented in 1998 to correct a mistake in the previous paper published in 1996 [7, 8]. Two most suggested papers for the pseudo-second-order kinetic equation were published in 1984 and 1995 by Blanchard et al. [10] and Ho [5, 9], respectively. Blanchard et al. noticed the overall exchange reaction of NH_4^+ ions fixed in zeolite by divalent metallic ions in the solution using a second-order kinetic model $\frac{1}{(n_0-n)} - \alpha = Kt$ where n is amount of M^{2+} fixed or the amount of NH_4^+ released at each instant, n_0 is exchange capacity, and K is rate constant [10]. Ho used the pseudo-second-order kinetic model to the divalent metal ions/sphagnum moss peat adsorption system. The adsorption involved not only cation exchange but also chemical bonding [5, 11]. The pseudo-second-order kinetic model has a non-linear form $q_t = \frac{q_e^2 kt}{1+q_e kt}$ and four linear forms such as $\frac{t}{q_t} = \frac{1}{kq_e^2} + \frac{1}{q_e}t$, $\frac{1}{q_t} = \left(\frac{1}{kq_e^2}\right)\frac{1}{t} + \frac{1}{q_e}$, $q_t = q_e - \left(\frac{1}{kq_e}\right)\frac{q_t}{t}$, and $\frac{q_t}{t} = kq_e^2 - kq_e q_t$ [12].

I would suggest that Ren et al. and Qian et al. should cite the original research articles that presented the pseudo-second-order rate equation to provide accurate and detail information about kinetic expression for readers who wish to follow up the research.

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