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Adsorption of copper (II) ions on montmorillonite and sepiolite clays: equilibrium and kinetic studies

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ABSTRACT

The removal of Cu(II) with montmorillonite and sepiolite clays in aqueous solutions has been studied. The optimum conditions for adsorption using a batch method were evaluated by changing various parameters such as contact time, adsorbent amount, initial pH of the solution and initial metal concentration. The equilibrium adsorption data were analyzed by Langmuir, Freundlich and Temkin adsorption isotherm models. By comparing the Akaike's Information Criterion (AIC) and the sum of error squared (SSE) of these models in the three kinetic systems. The Freundlich isotherm best describe the adsorption of Cu(II) on montmorillonite and sepiolite. The adsorption kinetic data were modeled using the Lagergren-first order, pseudo-second order, and Elovich. Adsorption data of the Cu(II) were fitted well by the Elovich model. The results indicate that montmorillonite and sepiolite are good adsorbents for Cu(II) in aqueous solutions.

Keywords: Copper; Montmorillonite; Sepiolite; Adsorption; Isotherm; Kinetics

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