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Adsorption kinetics of Cd (II) from aqueous solution by magnetite

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ABSTRACT

Magnetite was applied to remove Cd (II) from aqueous solution. The influence of initial Cd (II) concentration, adsorbent concentration, particle size and reaction temperature on adsorption kinetics was investigated. The highly crystalline nature of the magnetite structure with diameter of around 10 ($\pm$3) nm (dry particles) was characterized with transmission electron microscopy (TEM) and X-ray diffractometry (XRD). The surface area was determined to be 115 ($\pm$10) m^2/g. The estimated value of the solid pH_{zpc} was found to be nearly 7.3. The Cd (II) uptake was governed by surface complexation adsorption. The Cd (II) adsorption was pH-dependent. Kinetics of adsorption of Cd (II) were found not to conform to the pseudo-first-order equation, pseudo-second-order equation and Elovich equation, but to follow the Fractional power equation well.

Keywords: Cd (II); Magnetite; Adsorption; Kinetics

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