Removal and recovery of Cr (VI) by magnetite nanoparticles

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Received 3 September 2012; Accepted 17 June 2013

ABSTRACT

The removal efficiency of Cr (VI) from aqueous solutions using magnetite nanoparticles was investigated. Structural characterization of the nanoparticles prepared by the coprecipitation method showed that an average particle size of 2 and 7nm confirmed by transmission electron microscopy image. The surface area was determined to be 125 m²/g using Brunauer-Emmet-Teller method. Batch experiments were carried out to determine the adsorption equilibrium of Cr (VI) by these magnetite nanoparticles as a function of contact time, pH, initial metal concentration, and adsorbent dose. Adsorption equilibrium was reached within 30 min and independent of initial Cr (VI) concentration. The adsorption process was found to be pH dependent and fits well with the Langmuir and Freundlich isotherm equations. Kinetics of the adsorption followed the pseudo-second-order model.

Keywords: Magnetite; Nanoparticles; Chromium; Adsorption; Recovery

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