Removal of nickel from aqueous solution using magnesite tailing

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Received 26 March 2014; Accepted 27 December 2014

ABSTRACT

The removal of nickel ions from aqueous solutions using magnesite tailing was studied in batch system. The effects of initial pH, adsorbent dosage, contact time, and temperature on nickel removal were investigated. Kinetic models were evaluated to describe the kinetics of nickel adsorption onto magnesite tailing. The adsorption kinetics conformed to the pseudo-second-order kinetic model. The Langmuir and Freundlich models were used for the analysis of adsorption equilibrium. The equilibrium data obeyed the Langmuir isotherm model. The thermodynamic parameters exhibited that the adsorption process was spontaneous and endothermic. The Fourier transform infrared spectroscopy analysis was applied to characterize the unloaded and nickel-loaded magnesite tailing. The functional groups such as hydroxyl, carbonate, silicon oxide, and iron oxide on the adsorbent surface may be responsible for nickel adsorption.

Keywords: Nickel removal; Adsorption; Magnesite tailing; Isotherm; Kinetics