Desalination and Water Treatment
www.deswater.com

24 (2010) 302–307
December

1944-3994/1944-3986
doi: 10.5004/dwt.2010.1404

Adsorptive removal of arsenite from water using nanomagnetite

T. Türk*, İ. Alp, H. Deveci

Karadeniz Technical University, Mining Eng. Dept., 61080 Trabzon Turkey
Tel. +904623774064; fax +904623257405; email: tugbaturk@yahoo.com.tr

Received 7 December 2009; accepted 17 May 2010

ABSTRACT

This paper describes a study of the sorptive removal of arsenite (As(III)) from aqueous solutions by commercial nanomagnetite (NM). We also investigated the adsorption mechanism of arsenite (As(III)) onto the NM. The influences of solution pH, initial arsenite (As(III)) concentration and sorbent concentration were investigated in multiple kinetic runs. The adsorption rates and isotherms were investigated in batch experiments. We evaluated fits to the experimental data of the pseudo-first-order and pseudo-second-order kinetic models and determined that our system was best described by the second-order model. Langmuir and Freundlich isotherms were used to fit the adsorption data from equilibrium experiments. According to results of As removal measurements, NM has a high arsenite removal efficiency, with the ability to reduce the concentration of arsenite in the aqueous solution from an initial value of 300 to <5 μg/L.

Keywords: Arsenite; Adsorption; Kinetics; Isotherm; Commercial nanomagnetite

*Corresponding author