Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2013.861771

53 (2015) 2117–2124
February

Taylor & Francis
Taylor & Francis Group

Removal of zinc from a metal plating wastewater using an Iranian sepiolite: determination of optimum conditions

Saeid Hojati*, Ahmad Landi

Assistant Professor of Soil Science, College of Agriculture, Shahid Chamran University, Ahvaz, 6135783151, Khuzestan, Iran
Tel. +98 6113364054; Fax: +98 6113330079; email: s.hojati@scu.ac.ir

Received 22 May 2013; Accepted 29 October 2013

ABSTRACT

Removal of heavy metals from industrial wastewaters has recently received a lot of attention. Limited information is available about the feasibility of using clay minerals to remove heavy metals from the real wastewaters. This study was conducted to assess the influence of several variables including contact time, suspension pH (5, 7, and 9), temperature (20 and 40°C), size (< 2 μm, 2–20 μm, and 20–50 μm), and amount (2, 4, 8, 12, 16, and 20 g l^{-1}) of sepiolite application on the adsorption and removal of Zn^{2+} ions from a real metal plating wastewater. Results showed that the sorption of Zn on Iranian sepiolite is a relatively fast process with the equilibrium being attained within 12 h after the sorbent application. Results also illustrated that the removal efficiency of Zn^{2+} ions increases with the increase in suspension pH from 5 to 9, and dose of sepiolite application from 2 to 16 g l^{-1}. However, a decrease in sorbent size from 20–50 μm to < 2 μm favored the removal of Zn^{2+} ions from the wastewater studied. The results also indicated the sorption of Zn onto sepiolite as the temperature increased from 20 to 40°C. Iranian sepiolite appears to have a high potential to remove more than 95% of the total concentration of Zn^{2+} ions from the metal plating wastewater studied under the optimized conditions.

Keywords: Zinc; Wastewater; Sepiolite; Adsorption; Kinetics

*Corresponding author.