

Removal characteristics of manganese-coated solid samples for Mn(II)

W.G. Kim^a, S.J. Kim^b, S.M. Lee^{b*}, D. Tiwari^c

^aGreenTech Co., Limchunli 7, Yangyang 215-802, Korea
email: tamtam7@nate.com

^bDepartment of Environmental Engineering, Kwandong University, Gangnung 210-701, Korea
email: leesm@kd.ac.kr

^cDepartment of Chemistry, Mizoram University, Aizawl 796-009, India
email: diw_tiwari@yahoo.com

Received 10 December 2008; Accepted 10 March 2009

ABSTRACT

Manganese-coated sand (MCS) and manganese-coated sericite (MCSe) were prepared at pH 4 and 9 (MCS4, MCS9, MCSe4 and MCSe9) and applied in the treatment of wastewater containing soluble Mn²⁺ in batch experiments under various pHs. The amount of Mn²⁺ adsorbed by manganese-coated solids increased as the solution pH increased from pH 4 to 11. In order to compare Mn²⁺ sorption onto manganese-coated solids in the presence of hypochlorite, 4 mg/L of NaClO was added into Mn²⁺ solution. It was observed that the presence of sodium hypochlorite dose significantly enhanced the uptake of Mn²⁺ from aqueous solutions for the entire pH range studied i.e., pH 4.0 to 11.0. In adsorption isotherm experiment, the results were fitted reasonably well for the Freundlich equation. Mn²⁺ breakthrough time in the effluent from both MCS and MCSe columns in the presence of hypochlorite was greatly enhanced. Among these manganese-coated solids, MCSe4 showed the highest adsorption capacity. Therefore, MCSe4 was identified as a better adsorbent and filter material for the treatment of wastewaters containing Mn²⁺.

Keywords: Manganese-coated solid; Sand; Sericite; NaClO; Column experiment; Manganese removal

* Corresponding author.