Desalination and Water Treatment
www.deswater.com

37 (2012) 31–37
January

doi: 10/5004/dwt.2012.1423

Taylor & Francis
Taylor & Francis Group

Adsorption of copper (II) onto molecular sieves NaY

Ahmed Krobba, Djamel Nibou*, Samira Amokrane, Hadj Mekatel

Laboratoire de Technologie des Matériaux, Faculté de Génie Mécanique et Génie des Procédés, Université des Sciences et de la Technologie Houari Boumediene, B.P. 32, El-Alia, Bab-Ezzouar, Alger, Algérie
Tel. +213 6 63 77 97 54; Fax: +213 21 24 79 19; email: dnibou@yahoo.fr

Received 3 June 2010; Accepted 30 June 2011

ABSTRACT

The adsorption of Cu^{2+} onto NaY zeolite was investigated. The effects of pH, initial concentration, solid/liquid ratio and temperature were studied in batch experiments. The Freundlich and the Langmuir models were applied and the adsorption equilibrium followed Langmuir adsorption isotherm. The uptake distribution coefficient (K_d) indicated that the Cu^{2+} removal was the highest at maximum concentration. Thermodynamic parameters were calculated. The negative values of standard enthalpy of adsorption revealed the exothermic nature of the adsorption process whereas the negative activation entropies reflected that no significant change occurs in the internal structure of the zeolites solid matrix during the sorption of Cu^{2+}. The negative values of Gibbs free energy were indicative of the spontaneity of the adsorption process. Analysis of the kinetic and rate data revealed that the pseudo second-order sorption mechanism is predominant.

Keywords: Adsorption; Copper (II) ions; NaY zeolite; Kinetic; Thermodynamic; Diffusion

*Corresponding author.