Desalination and Water Treatment
www.deswater.com

doi: 10.5004/dwt.2017.21248

85 (2017) 206–214
August

Investigation of methylene blue adsorption in wastewater using nano-zeolite modified with copper

Farhad Salimi[a,*], Mehran Eskandari[a], Changiz Karami[b]

[a]*Department of Chemical Engineering, Faculty of Engineering, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran, Tel. +98 341 3221452; emails: f.salimi@iauksh.ac.ir (F. Salimi), mehran.eskandari2@gmail.com (M. Eskandari)*
[b]*Department of Chemistry, Faculty of Basic Science, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran, email: changiz.karami@gmail.com*

Received 8 December 2016; Accepted 26 July 2017

ABSTRACT

In this study, the adsorption of methylene blue (MB) dye using the nano-zeolite modified with copper (Cu–zeolite) was investigated. The modified zeolite was characterized by scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray powder diffraction and transmission electron microscopy. Moreover, the effect of experimental parameters such as pH, contact time and initial concentration on adsorption of dye was studied. Results indicated that the optimum conditions for maximum adsorption of 20 mg/L MB were 30 min contact time, pH = 7 and 8 g/L adsorbent; the remaining MB in the solution was 1.75%. The equilibrium data were found to be well represented by Langmuir isotherm equation and the adsorption process was described by pseudo-second-order kinetic model for MB.

Keywords: Adsorption; Modified nano-zeolite with copper; Methylene blue; Colored water

* Corresponding author.

1944-3994/1944-3986 © 2017 Desalination Publications. All rights reserved.