



Adsorption of acid blue 25 from aqueous solution using zeolite and surfactant modified zeolite

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Received 17 April 2018; Accepted 31 December 2018

ABSTRACT

In the present study, we have demonstrated the Indonesian natural zeolite and modified zeolite was used to remove the acid blue 25 (AB25) from wastewater. The adsorption capacity of AB25 on zeolite and modified zeolite (zeolite-CTAB) were investigated by various batch adsorption experiments. The modification effect on the surface of zeolite was analyzed using Fourier transforms infrared spectra, scanning electron microscopy, energy-dispersive X-ray spectroscopy, X-ray fluorescence, and X-ray diffraction, respectively. The maximum removal of AB25 was obtained under acidic conditions at pH 2. The kinetic experimental results imply that the adsorption of AB25 onto these adsorbents well followed the second-order kinetic model. The maximum adsorption capacity of 64.2 mg/g was found in Zeolite at 30°C and 112.44 mg/g for zeolite-CTAB at 60°C. The results revealed that the adsorption of AB25 onto zeolite-CTAB fitted better to Langmuir model and Zeolite fitted better with Freundlich model. The AB25 adsorption on zeolite-CTAB increases with an increasing temperature indicates that the preferential adsorption may occur at a higher temperature. The positive value of ΔH° in zeolite-CTAB material thermodynamic parameters indicates that the process was an endothermic process. These results indicate that zeolite-CTAB has high adsorbent efficiency and it is promising adsorbents for removing the dye AB25.

Keywords: Zeolite; Zeolite-CTAB; Acid Blue 25; Adsorption; Wastewater

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