

عنوان مقاله:

Adsorption of Malachite Green from Aqueous Solution by Nanozeolite Clinoptilolite: Equilibrium, Kinetic and Thermodynamic Studies

محل انتشار:

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خلاصه مقاله:

The object of present study was to examine the adsorption potential of nanozeolite clinoptilolite (CP) for the removal of malachite green (MG) from aqueous phase in a batch equilibrium system. SEM, EDX, XRF, XRD and FT-IR techniques of characterization of zeolite were applied. The effects of initial pH solution, adsorbent dose, temperature, contact time and initial MG concentration on adsorption were evaluated. Adsorption experiments were conducted at initial concentrations in the range of 10–50 mg/L and temperatures at 25, 30 and 35°C. MG adsorption uptake was found to increase with an increase in contact time, initial MG concentration and solution temperature. The adsorption equilibrium data revealed the best fit with Koble-Corrigan model. The kinetics of MG on adsorbent followed the pseudo-second-order model. In addition, the assessment of kinetic data depicted that the adsorption rate was controlled by intraparticle diffusion mechanism. The negative values of standard Gibbs free energy represented the spontaneous adsorption at the stated temperature. The positive values of enthalpy and entropy changes also confirmed the increased randomness and endothermic nature of MG adsorption on nanozeolite CP adsorbent.

Furthermore, the obtained activation energy showed the physical adsorption process

کلمات کلیدی:

,Adsorption Kinetics, Thermodynamics, Malachite Green, Nanozeolite Clinoptilolite, Isotherm Models

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