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SYNTHESIS OF ALGINATE AMIDE COMPOSITE USING MICROWAVE AND ITS DYE REMOVAL ABILITY

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Abstract

In this work, magnetic alginate was synthesized by encapsulating of Nickel Zinc Ferrite nanoparticle within Ca-alginate. The synthesized magnetic alginate was modified by ethylenediamine using microwave radiation to remove anionic dye from wastewater. The characteristics of magnetic nanoparticle, magnetic alginate and magnetic alginate amide (MAA) were studied using Fourier transform infrared (FTIR) and Scanning electron microscope (SEM). FTIR analysis confirmed the amidation of alginate. Direct Red 31 (DR31) was used as model compound. The effect of operational parameters such as adsorbent dosage, pH and dye concentration on dye removal was evaluated. The kinetic, isotherm, and thermodynamic of dye adsorption was studied. Adsorption kinetic of DR31 was found to conform to pseudo-second order kinetics. It was found that adsorption of DR31 on MAA followed Langmuir isotherm. The thermodynamic study showed that dye removal using MAA was spontaneous, endothermic, and a physisorption reaction. The results indicate that MAA could be employed as a suitable alternative to remove dyes from wastewater.

Keywords: characterization, dye removal, magnetic alginate amide, microwave radiation, synthesis

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