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MAGNETIC POWDER MnO-Fe_2O_3@SMCOMPOSITE – A NOVEL MATERIAL FOR SEQUESTRATION OF ORGANIC DYE FROM AQUEOUS SOLUTION

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Abstract

A novel composite material was synthesized using metal chlorides and aquatic macrophytes by co-precipitation method. The resulting product, magnetic powder $MnFe_2O_4$@SM was characterized by Fourier transform infrared spectra (FTIR), X-ray diffraction (XRD), Energy-dispersive X-ray spectroscopy (EDX), Brunauer-Emmett-Teller (BET) and Scanning electron microscope (SEM). The adsorption performance of the magnetic powder $MnFe_2O_4$@SM was tested with removal of organic dye from aqueous solution. The effect of influencing parameters such as initial dye concentration, solution pHand agitation were investigated. The equilibrium isotherm was fine described by the Langmuir model with the maximum adsorption capacity of about 90 mg/g. Adsorption kinetics experiments were carried out and the data were well fitted by pseudo-second-order equation. The outcomes revealed that the magnetic powder $MnFe_2O_4$@SM could competently adsorb the organic dyes from aqueous solution, and the spentadsorbent material could be recovered completely by magnetic separation process. As a result, the prepared magnetic powder $MnFe_2O_4$@SM could thus be utilized as a promising super-adsorbent for the removal of organic dyes from textile effluent.

Keywords: *Magnetic powder $MnFe_2O_4$@SM;Magnetic separation; Adsorption;Organic dyes.*