

Characterization and evaluation of magnetic zeolite for adsorption of dye

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A new kind of composite constituted by magnetite nanoparticles conjugated with the powder synthetic zeolite, called magnetic zeolite, was prepared by an ex-situ method, characterized and evaluated for the possible application in the adsorption and separation of dye from wastewater. Magnetite nanoparticles in suspension were synthesized by precipitating Fe²⁺ ions in a basic solution. The synthetic zeolite was obtained from mineral coal fly ash. X-ray diffraction and scanning electron microscopy were applied to characterize the microstructure and morphology. Fourier transform infrared spectroscopy showed the principal absorption bands. The particles exhibited favorable superparamagnetic properties. The good performances for the Reactive Orange 16 dye adsorption, separation and recovery the dye-loaded particles from the aqueous solution using a magnetic field were obtained. The results showed that the low-cost magnetic composite has a potential application as a magnetic adsorbent for the removal of the reactive dye from the textile wastewater.

Keywords: Magnetic zeolite, magnetite nanoparticles, mineral coal fly ash, adsorbent, dyes

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