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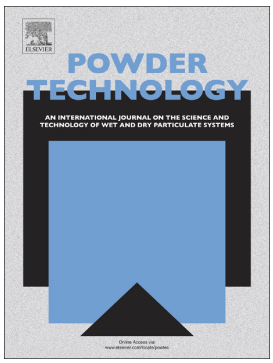

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Amino-modified γ-Fe_2O_3/sepiolite Composite with Rod-like Morphology for Magnetic Separation Removal of Congo Red Dye from Aqueous Solution

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Abstract

The new magnetic separation adsorbent is the key material for separation something that is hard to separate. In this article, an emerging γ-Fe_2O_3/sepolite nanocomposite modified with 3-aminopropyltriethoxysilane was prepared by chemical coprecipitation method. The magnetic adsorbent (γ-Fe_2O_3/Sep-NH_2) was used to remove anionic dye, Congo red (CR), from aqueous solution. The γ-Fe_2O_3/Sep-NH_2 composite exhibited high specific saturation magnetization (95.36 emu/g) with superparamagnetism without coercivity and residual magnetism, which could be easily separated from aqueous solution by the application of an external magnetic field. Batch adsorption experimental results showed that the magnetic absorbent showed high adsorption capacity of 126.4 mg/g for CR. The regeneration of the magnetic absorbent could be realized by soaking it in 0.1mol/L NaOH solution and the recovered γ-Fe_2O_3/Sep-NH_2 magnetic material could be reused for CR removal. The adsorption capacity for reusing ten times still remained 90% of initial adsorption capacity. Furthermore, the adsorption capacity decreases with the increase of temperature. The adsorption processes conform to pseudo-second-order model and Langmuir isotherm model, indicating that it is a single molecule chemical adsorption process. Understanding the characteristic of magnetic adsorbent is of great importance