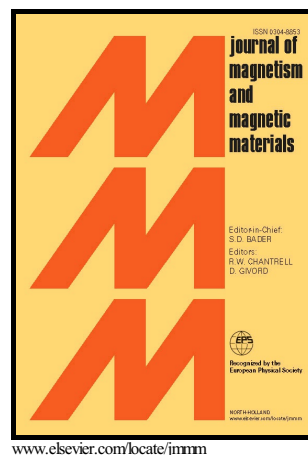


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Study on the adsorption of Cu(II) by folic acid functionalized magnetic graphene oxide

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Abstract

The folic acid functionalized magnetic graphene oxide (FA-mGO) as a new adsorbent has been synthesized in this work for the elimination of Cu(II) from waste water. The as-prepared FA-mGO was tested by SEM, TEM, particle size analyzer, FTIR, XRD, Roman spectrum, TGA and magnetic properties analyzer. Some factors, such as adsorbent dose, pH, contact time, initial concentration of adsorbate and temperature were explored. The results showed that the FA-mGO had the better adsorption performance than mGO. After 40 min, the adsorption equilibrium could be reached. Furthermore, the adsorption property obeyed the pseudo-second order kinetic model and the Temkin isotherms well. The maximum adsorption capacity was 283.29 mg g⁻¹ for Cu(II) from Pseudo-second-order model at pH = 5 and 318 K. The chelation action between FA and Cu(II) along with electrostatic incorporation between GO and Cu(II) determined the favourable adsorption property. Besides, thermodynamic studies results $\Delta G^0 < 0$, $\Delta H^0 > 0$, $\Delta S^0 > 0$ suggested that the adsorption mechanism was an endothermic and spontaneous process essentially. Finally, desorption and reusability studies imply FA-mGO has an excellent reproducibility and is benefit to environmental protection and resource conservation.

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