

عنوان مقاله:

Removal of copper (II) from aqueous solutions by sodium alginate/hydroxy apatite hydrogel modified by Zeolite

محل انتشار:

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خلاصه مقاله:

The study presented in this article investigated the removal of copper ions from aqueous solutions by a synthetic hydrogel-forming adsorbent polymer based on sodium alginate (SA) and hydroxy apatite (HA) nanoparticles. The effect of adding Zeolite on the adsorption performance of this hydrogel was also investigated, and the optimum amount of Zeolite was determined by changing its quantity. The FTIR spectrum determined the structure of the synthesized adsorbent; non-continuous adsorption tests were performed to study the kinetics and thermodynamics of adsorption and also the recovery of the adsorbent. The degree of adsorption of the synthesized nanocomposite was compared with that of Zeolite, and the results showed that the maximum adsorption capacities of Zeolite and the nanocomposite for Cu ions were 29.7 and 75.8 mg/g, respectively. The kinetic studies indicated that the process of adsorption of Cu ions on both adsorbents followed a pseudo second order kinetic equation. It took the Zeolite and the hydrogel 90 and 120 minutes, respectively, to reach equilibrium. The thermodynamic studies showed that Cu adsorption by both adsorbents matched the Langmuir isotherm very well ($R^2=0.99$). Since adsorbent recovery and its lifespan are of significant importance in absorption processes, recovery was carried out by hydrochloric acid (2% by weight). The repulsion coefficient of the recovered adsorbent and its efficiency in five recovery cycles were measured. The results of the tests indicated that the repulsion coefficient of Cu was 70-82.75 percent and the adsorption efficiency of Cu after 5 recovery cycles was 75 percent of the initial adsorbent.

کلمات کلیدی:

Copper, Hydrogel, Zeolite, Sodium alginate, Adsorption

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