

عنوان مقاله:

Enhanced adsorption of anionic diazo dye by magnetic layered double hydroxide ($\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4@\text{SiO}_2@\text{Ni-CrLDH}$) from aqueous solution

محل انتشار:

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خلاصه مقاله:

A novel magnetic layered double hydroxide known as $\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4@\text{SiO}_2@\text{Ni-Cr}$ layered double hydroxide was synthesized with $\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4$, SiO_2 and Ni-CrLDH by using coprecipitation method. In order to compare the adsorption efficiency, the Ni-CrLDH sample also was synthesized. The synthesized samples were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier transform infrared spectroscopy (FTIR). The adsorption of Congo red (CR) by magnetic layered double hydroxide depended upon the contact time, initial dye concentration and pH. The adsorption of the Congo red (CR) reached equilibrium at 180 min and followed the pseudo-second-order kinetic equation. The adsorption capacity of the magnetic layered double hydroxide changed significantly between pH 4–10 and the maximum dye removal were 88% for CR. Moreover, the magnetic layered double hydroxide can be quickly separated from the aqueous solution by an external magnet before and after adsorption process. This indicated that the $\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4@\text{SiO}_2@\text{Ni-CrLDH}$ composite was an effective adsorbent for CR dye removal with quick separation. The adsorption performance of the synthesized $\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4$, SiO_2 and Ni-CrLDH and comparing with Ni-CrLDH show that the $\text{Zn}_{0.5}\text{Cu}_{0.5}\text{Fe}_2\text{O}_4@\text{SiO}_2@\text{Ni-CrLDH}$ can be more efficient than Ni-CrLDH for removal of CR dye.

کلمات کلیدی:

Layered double hydroxide, Magnetic separation, Adsorption kinetics, Anionic diazo dye

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