Cr(VI) adsorption from aqueous solutions onto Mg–Zn–Al LDH and its corresponding oxide

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ABSTRACT

Mg–Zn–Al LDH and its corresponding oxide were successfully employed for Cr(VI) removal from aqueous solutions. Maximum adsorption capacity of 29.25 and 33.82 mg g\(^{-1}\) for Mg–Zn–Al LDH and calcined Mg–Zn–Al LDH, respectively, was achieved using Cr(VI) initial concentration of 70 mg L\(^{-1}\), 0.2 g L\(^{-1}\) of adsorbent, stirring rate of 160 rpm, pH 6, a contact time of 105 min, and a reaction temperature of 298 K. The results show that the adsorption of Cr(VI) through the rehydration of calcined Mg–Zn–Al LDH is considerably higher than that through the anion exchange of Mg–Zn–Al LDH. Cr(VI) removal from aqueous solutions takes place via either anion exchange between interlayer anions of LDHs and Cr(VI) oxyanions or surface complexation between Cr(VI) oxyanions and inner and outer hydroxyl groups of LDH surfaces.

Keywords: Layered double hydroxide; Cr(VI); Adsorption; Wastewater treatment

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