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LAYERED DOUBLE HYDROXIDES AS ADSORBENTS FOR ANIONIC DYE REMOVAL FROM AQUEOUS SOLUTIONS

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Abstract

Reactive Blue 19 (RB 19) dye removal from aqueous solutions by using layered double hydroxides containing nitrate as the intergallery anion (MgAILDH) as adsorbents was investigated. The adsorption process was found to be influenced by the contact time, the initial dye concentration, the presence of inorganic anions and the temperature. The XRD and FTIR analysis evidence two competitive processes: adsorption and/or intercalation of the molecules may take place, depending on the initial dye concentration. The equilibrium dye adsorption increased from 62 to 350 mg/g as the initial RB 19 concentration was risen from 0.5 to 3.0 mg/mL. The adsorption capacity decreases in the presence of electrolytes. The experimental data are well fitted with the Langmuir isotherm equation. The thermodynamic parameters were calculated. The resulting negative ΔS° value correlated with a positive value of ΔH° indicate that the adsorption process is spontaneous and endothermic. In addition, the regeneration of MgAILDH after RB 19 adsorption was also investigated and proved feasible only in the first cycle.

Key words: adsorption, layered double hydroxide, reactive blue 19, thermodynamic constants

Received: November, 2014; Revised final: February, 2015; Accepted: February, 2015

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