

Technical Viability of Kaolinite-Goethite Soil for Chromium (VI) Removal from Contaminated Water

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Abstract

Chromium (VI) can be found in industrial wastewater in high concentration and it causes of dangerous effect on human health and the environment. This study was investigated to determine the efficiency of Cr (VI) ion removal from aqueous solution by using soil rich in kaolinite - goethite (SRKG). Each experiment was performed to evaluate the effects of shaker speed, contact time, adsorbent dose, pH solution, initial concentration, and particle size. Optimum condition for Cr (VI) removal were observed at contact time = 40 minutes, dosage = 3 g L⁻¹, pH = 2, initial concentration chromium (VI) = 1 mg L⁻¹ and particle size = 0.075 mm. Adsorption of Cr (VI) followed pseudo second-order kinetics ($R^2 = 0.999$). The result showed that Freundlich adsorption isotherm model was the better describe for the Cr (VI) adsorption onto SRKG with correlation coefficients (R^2) of 0.9489. Technical viability of the study was carried out to find the suitability of the process with wastewater discharge from industries.