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SORPTION OF HEXAVALENT CHROMIUM ION ONTO A STRONG BASIC ANION EXCHANGER: EQUILIBRIUM ISOTHERMS AND KINETIC STUDIES

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Abstract

Hexavalent chromium can contaminate drinking water resources and should therefore be removed from industrial waste effluents. The use of ion exchange resin was examined in batch tests to remove Cr (VI) from acidic solution by Amberlite IRA 410. Equilibrium data were analyzed and modelled using Freundlich and Langmuir adsorption isotherms and the results showed that the adsorption behaviour of Cr (VI) could be accurately described by means of a Langmuir model. The monolayer adsorption capacity was found to be 222.2 mg g⁻¹ at an optimum pH of 3. The Lagergren pseudo-first-order and pseudo-second-order models were used to represent kinetic. Results showed that the sorption kinetics data followed a pseudo-second order model. It was also found that pore diffusion played an important role in the adsorption, and intra particles diffusion was the rate-limiting step during the first 30min for Cr (VI) concentrations in the range of 10 – 200 mg L⁻¹.

Key words: anion exchanger, batch kinetics, Cr (VI), Freundlich and Langmuir isotherms, sorption

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