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KINETIC STUDY OF HEXAVALENT CHROMIUM REMOVAL FROM WASTEWATERS BY ION EXCHANGE

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Abstract

In spite of the fact that concern on water quality protection raised in the last decades heavy metals pollution still represents a great threat for both human health and environment quality. Ion exchange proved to be an effective technique for industrial wastewaters treatment, as long as it ensures an effective recovery of valuable compounds. The main purpose of this work is to assess the performances of a commercial ion resin sort (a strong basic anionic resin – VIONIT AT 21), to remove chromate species from an electroplating wastewater. In this paper, influence of wastewater pH and exchange ion nature on the kinetics of hexavalent chromium removal from electroplating wastewaters was studied. To calculate the ion exchange rate, the pseudo-2nd kinetic model was successfully used. In order to describe the dependence of ion exchange rate on chromium concentration in aqueous phase and in resin, a Langmuirian kinetic model was used. The results shown that the proposed model can successfully describe the ion exchange kinetics at pH values in the range 2 to 5, and exchange ion Cl⁻, but the model is inappropriate to describe the ion exchange kinetics at pH = 1 when exchange ion is Cl⁻, and at pH = 5 if exchange ion is OH⁻.

Key words: hexavalent chromium, ion exchange, sorption capacity, Langmuirian kinetics

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