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KINETIC STUDY ON HEAVY METALS ADSORPTION BY IMINODIACETATE CHELATING RESINS

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Abstract

Two chelating resins (CRs) bearing iminodiacetate (IDA) groups derived from acrylonitrile – divinylbenzene (AN-DVB) copolymers having 10 and 15 wt.% nominal cross-linking degrees were used as sorbents for removal of heavy metal ions like: Cu^{2+} , Ni^{2+} and Co^{2+} from aqueous solutions by batch technique. The experimental data were analyzed by pseudo-first order, pseudo-second order, and intra-particle diffusion equations. The adsorption kinetics was well described by the pseudo-second order equation, supporting the chemisorption would be the rate-determining step. CRs showed good retention ability for the metal ions in the following order: $\text{Cu}^{2+} > \text{Ni}^{2+} > \text{Co}^{2+}$, the retention capacity increasing with the decrease of the hydrated cation radius. Desorption of Cu^{2+} from the CRs was achieved in about 60 min using 1 M H_2SO_4 , and in about 40 min for Ni^{2+} and Co^{2+} with 1 M HCl.

Key words: adsorption, chelating resin, heavy metals, iminodiacetate groups, kinetics

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