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EVALUATION OF THE ADSORPTION OF COPPER (II) FROM AQUEOUS SOLUTION BY D151 RESIN

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Abstract

Studies about the adsorption behavior of Cu(II) on D151 resin were conducted. Parameters including the effects of pH, temperature, contact time and initial metal ion concentration were studied by batch methods. Results showed that the adsorption was strongly dependent on pH of the medium, and the maximum uptake was obtained at pH 6.90. In the batch system, the D151 resin exhibited the highest Cu(II) uptake as 277.8 mg/g at 318K, calculated by the Langmuir model. The adsorption kinetics were tested with Lagergren-first-order model, pseudo-second-order model and liquid film diffusion model. The adsorption data gave better fits with Langmuir than Freundlich isotherm. Thermodynamic parameters indicated that the adsorption process was spontaneous and it was endothermic in nature. Experimental column data fitted well with the Thomas model and it provide possibility for process design. Cu(II) adsorbed on D151 resin can be eluted by 0.5mol/L HCl solution and the D151 resin can be regenerated. Analysis of infrared spectra of resin both before and after adsorption of Cu(II) indicated the attendance of coordination.

Key words: D151 resin, Cu(II), Adsorption, kinetics, Thomas model

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