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Modeling, Simulation and Optimization

OPTIMIZATION OF PROCESS VARIABLES TO MAXIMIZE THE COPPER LOADING CAPACITY OF PUROLITE S930 RESIN

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Abstract

The practical capacity of an ion exchange or chelating resin depends on various process variables, such as initial solution pH, initial metal ion concentration, metal/resin ratio, contact time and temperature. This work presents the optimization of process variables to maximize the copper loading capacity of chelating resin Purolite S930. To study the combined effect of the initial solution pH, initial Cu (II) concentration and resin dosage were used a 2^3 orthogonal central composite design for experiments design and Response Surface Methodology (RSM) for analysis of experimental results. The Gradient method was used to optimize the regression equation. The optimum values of these variables were found to be pH = 4.77, C = 246.60 mg Cu/L and a = 0.394 g resin/L, respectively; in this point loading capacity is the maximum one (146.641 mg Cu(II)/g given by empirical model and 144.22 confirmed experimentally).

Key words: Copper (II) removal, Gradient method, Optimization, Purolite S 930, RSM

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