Kinetics & thermodynamics of Cu(II) adsorption by imprinted salen-functionalized silica gel

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\textbf{ABSTRACT}

In this research, a novel Cu(II)-imprinted salen-functionalized silica gel was synthesized and applied for adsorption of Cu(II) from aqueous solutions. The solid phase extraction method was used and the equilibrium adsorption capacity of 67.27 mg g\textsuperscript{-1} was obtained. Equilibrium isotherms, kinetic data, and thermodynamic parameters of the process were evaluated. Equilibrium data agreed well with the Langmuir model of isotherm. The kinetic data were found to follow the pseudo-second-order and Elovich model. The order of reaction was determined by half-life method and was calculated as 2.6. Thermodynamic parameters of the adsorption were calculated and it was concluded that the process was endothermic in nature. The selectivity of the adsorbent was also examined. It was found that the synthesized imprinted silica gel had higher selectivity compared to the non-imprinted silica gel. The relative selectivity factor (\(\beta\)) of 50.32 and 31.94 was obtained, respectively, for Cu(II)/Ni(II) and Cu(II)/Zn(II) pairs.

\textit{Keywords:} Ion-imprinted silica gel; Kinetic; Isotherm; Thermodynamic; Half-lives method