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Sorption, Kinetic Modeling, and Selectivity of Selected Heavy Metal Ions onto *C*-4-Chlorophenylcalix[4]resorcinarene

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Abstract: The current study investigates the use of *C*-4-chlorophenycalix[4]-resorcinarene as an inexpensive and easy made adsorbent surface to remove Cu(II), Co(II), Zn(II), Mn(II) and Pb(II) heavy metal ions from aqueous solutions. The experiments were carried out to determine the optimum conditions and to examine different kinetic models for the adsorption processes. Finally, the selectivity of the adsorbent against a mixture of heavy metal ions adsorbates was studied and discussed. The optimum pH was found to be 5.6 at contact time of 30 min and initial concentration of 1 ppm for the adsorption of the heavy metal ions used in this study. Santosa first order, Lagergren pseudo first order and Ho pseudo second order were applied as kinetic models for the adsorption data and the results showed that all adsorption processes were followed pseudo second order kinetic model. Equilibrium % removal using our synthesized adsorbent was found to be 84.29%, 79.55%, 78.54%, 77.92%, 75.19% for heavy metal ions; Pb(II), Cu (II), Mn(II), Zn(II) and Co(II), respectively.When a mixture of Cu(II), Co(II), Zn(II), Mn(II) and Pb(II) ions with initial concentration of 1 ppm was used at shaking time of 10 min, removal percentage was ranked in the order Pb(II) > Cu(II) > Zn(II) > Mn(II) > Co(II).

Keywords: *adsorption kinetics, selectivity, toxic heavy metals, atomic absorption spectroscopy.*

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