Synthesis of poly- tetra-p-allylcalix[4]arene tetra acetic acid adsorbent for cr(iii) and pb(ii) metal ions

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Abstrak

This paper discusses the preparation, characterization, and the evaluation of adsorption properties of resin poly-tetra-p-allylcalix[4]arene tetra acetic acid from the p-t-butylphenol. The synthesized resins were applied as an adsorbent for Cr(III) and Pb(II) metal ions. The adsorption was conducted in a batch system by investigating the effects of acidity (pH), contact time and initial concentration of a heavy metal solution. The adsorption of Cr(III) and Pb(II) metal ions on the resin had the optimum pH rating in region of 4–6 and reached the equilibrium condition in 40 minutes. The adsorption of Cr(III) and Pb(II) metal ions on the resin follows the Langmuir isothermal pattern with the linearity constant (R2) of Cr(III) and Pb(II) adsorption, whose results were 0.9640 and 0.9716, respectively. The adsorption capacity of Cr(III) and Pb(II) metal ions is 323.0 µmole/g and 33.4 µmole/g, while the adsorption energy is 30.4 kJ/mole and 39.7 kJ/mole, respectively. Most parameters in batch systems confirm that resin is a good adsorbent for Cr(III) and Pb(II), though Cr(III) adsorption was more favorable than that of Pb(II). The outstanding adsorption abilities for Cr(III) and Pb(II) metal ions have exhibited good prospects for disposal application of polluted water and environmental protection.