

Ionic imprinting polymers using diallylaminomethyl-calix[4]resorcinarene host for the recognition of Pb (II) Ions

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Abstract

A novel ion-imprinted microspheres of copolymerized diallylaminomethyl-calix [4] resorcinarene and divinylbenzene were prepared through precipitation polymerization. These microspheres were used for the adsorption experiments of Pb (II) ions mixture solution containing Pb (II), Ni (II) and Cu (II). The selective complexation towards Pb (II) ions was examined. The adsorption was conducted in batches by investigating the effects of pH and initial concentration of a heavy metal solution. The adsorption of Pb (II) metal ions on the adsorbents had the optimum pH rating in region of 6. For single ion system, the imprinted polymer showed that the adsorption capacity of Pb (II) metal ions was 64 mg/g, while for Cu (II) and Ni (II) were 24 mg/g and 8 mg/g, respectively. Competitive extraction experiments in the presence of Cu (II) and Ni (II) ions were also carried out and high selectivity of the imprinted polymer adsorbents towards Pb (II) over Cu (II) and Ni (II) was found. In ternary mixture of heavy metal ions, the imprinted polymer showed effective adsorption to Pb (II) obeying Langmuir isotherm. The outstanding adsorption abilities for Pb (II) metal ion have exhibited good prospects for disposal application of polluted water and environmental protection.

Author keywords

Diallylaminomethyl-calix[4]resorcinarene; Ion imprinting polymers; Lead removal; Adsorption