

Synthesis and characterization of a molecularly imprinted polymer for Pb²⁺ uptake using 2-vinylpyridine as the complexing monomer

Abstract

Molecularly imprinted polymer (MIP) particles for selective extraction of Pb²⁺ from aqueous media were prepared using non-covalent molecular imprinting methods. 2-vinylpyridine was chosen as the complexing monomer. The imprinted polymer was synthesised by radical polymerisation. The template (Pb²⁺) was removed by leaching with 0.1 M HCl. The polymer particles (imprinted and non-imprinted) were characterised by IR spectroscopy. The effect of different parameters such as pH, kinetic, adsorption isotherm and selectivity were evaluated. The maximum adsorption capacity is 150 µg Pb²⁺/mg MIP. The adsorption efficiently occurred at pH 6. The selectivity coefficients of the imprinted polymer particles for Pb²⁺/Zn²⁺ and Pb²⁺/Al³⁺ were 13.55 and 1.71, respectively.

Keyword: Ion imprinting; metal extraction; molecular recognition; Pb²⁺ removal.