

Synthesize and characterization of Li⁺ recognition thermo-responsive polymer with crown ether

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The effects of the species and concentrations of metal ions on the thermo-responsive polymer with crown ether were investigated in this study. The thermo-responsive polymer (PNBN) was polymerized by N-isopropylacrylamide, N-methylolacrylamide and butyl acrylate as monomers. Hydroxy-dibenzo-14-crown-4 ether (HDB14C4) was synthesized and immobilized to the polymer. The lower critical solution temperature (LCST) values of PNBN and PNBN-HDB14C4 in deionized water and various metal ions solutions such as Li⁺, Na⁺, K⁺, Mg²⁺, Ca²⁺ and Sr²⁺ were tested. The results showed that the polymer PNBN-HDB14C4 had the property of Li⁺ recognition. FTIR, NMR SEM and GPC were applied to characterize the polymers. The adsorption efficiency and selectivity of the polymers to metal ions were analyzed by inductively-coupled plasma mass spectrometry (ICP-MS). This work was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) grant funded by the Ministry of Education (No. 2009-0093816).