A selective and easily recyclable dimer based on a Calix[4]pyrrole derivative for the removal of Mercury(II) from water

Salman S. Alharthi
Taif University, Saudi Arabia

A recyclable and mercury(II) selective dimer based on a calix[4]pyrrole amide derivative has been synthesised and characterised by Mass and FT-IR Spectrometry, Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray (EDX). The last three analytical techniques were also used to obtain information regarding the ability of the dimer to interact with metal cations Zn(II), Cu(II), Cd(II), Hg(II) and Pb(II). A striking feature of the micrographs of the dimer loaded with these cations is the change of morphology with the cation. Based on these results the optimal conditions for the removal of these cations from water were assessed taking into account the mass of the dimer, the pH of the aqueous solution, the temperature and the contact time. Results obtained demonstrate that the removal process is fast. Capacity values show that the dimer is selective for Hg(II) relative to other cations. Single-ion transfer Gibbs energies from water to a solvent containing common functionalities to those of the dimer were used to assess the counter-ion effect on the removal process

Keywords:

Mercury, Extraction, Dimer Material and Selectivity

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salmanalharthi@hotmail.com