Evaluation of porogen factors for the preparation of ion imprinted polymer monoliths used in mercury removal

ABSTRACT

In the present study, ion imprinted polymer monoliths (IIPMs) were developed to overcome the limitations of ion imprinted polymer particles (IIPPs) used for the removal of Hg(II) ions from waste water samples. The adsorbents preparation, characterization and Hg(II) removal were very well reported. The IIPMs on porogen optimization was prepared using the molding technique with Hg(II) as a template ion, [2-(methacryloyloxy)ethyl]trimethylammonium cysteine (MAETC) as ligand, methacrylic acid (MAA) as functional monomer, ethylene glycol dimethacrylamide (EGDMA) as cross-linker, benzoyl peroxide as an initiator and methanol and acetonitrile as porogen in the polypropylene tube (drinking straw) as mold. The IIPMs prepared with higher volumes of porogen were indicated to have a good adsorption rate for the Hg(II) removal along with good water permeability and larger porosity as compared to a lower volume of porogen. The IIPMs prepared using the binary porogen were able to improve the porosity and surface area of the monolithic polymers as compared to the single porogen added IIPMs. Finally, we indicate from our analysis that the IIPM having the efficient capacity for the Hg(II) ions is easy to prepare, and has higher water permeability along with high porosity and high adsorption capacity and all these factors making it one of the suitable adsorbent for the successful removal of Hg(II) ions.

Keyword: Ion imprinted polymer monoliths; Mercury removal; Waste water