

Synthesis and evaluation of a molecularly imprinted polymer for 2,4-Dinitrophenol

Abstract

Molecular imprinted polymers (MIP) are considered one of the most promising selective and novel separation methods for removal phenolic compound in wastewater treatment. MIP are crosslinked polymeric materials that exhibit high binding capacity and selectivity towards a target molecule (template), purposely present during the synthesis process. In this work MIP were prepared in a bulk polymerization method in acetonitrile using 2,4-dinitrophenol, acrylamide, ethylene glycol dimethacrylate, and benzoyl peroxide as template, functional monomer, cross-linker and initiator, respectively. An adsorption process for removal of nitrophenol using the fabricated MIP was evaluated under various pH and time conditions. The parameters studied for 2,4-dinitrophenol includes adsorption kinetics, adsorption isotherm, and selectivity. The maximum adsorption of nitrophenol by the fabricated MIP was 3.50 mg/g. The adsorption of 2,4-dinitrophenol by the fabricated MIP was found effective at pH 6.0. A kinetics study showed that nitrophenol adsorption follows a second order adsorption rate and the adsorption isotherm data is explained well by the Langmuir model.

Keyword: Molecular Imprinted Polymer; 2,4-dinitrophenol; separation.