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"Gheorghe Asachi" Technical University of Iasi, Romania

CHELATING SORBENT CONTAINING TWO TYPES OF FUNCTIONAL GROUPS – HYDROXAMIC ACID AND AMIDOXIME FOR LEAD (II) IONS EFFLUENT MANAGEMENT

Lavinia Tofan[1], Carmen Paduraru[1], Igor Crețescu[1*], Anca Ceica[2], Violeta Neagu[3]

[1] *"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 71A D. Mangeron Blvd, 700050 Iasi, Romania*
[1] *"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Chemical Engineering, 71A D. Mangeron Blvd, 700050 Iasi, Romania*
[3] *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*

Abstract

The removal efficiency of Pb(II) from aqueous solutions by sorption on a bifunctional acrylic ion exchange resin with groups of hydroxamic acid and amidoxime is presented. It was found that Pb(II) sorption potential varies as function of solution pH, initial metal concentration, contact time and temperature. From aqueous solutions with Pb(II) initial concentration of 82.96 μg/mL the sorption percentage is 98.64%. The Langmuir and Freundlich isotherms were used to model the Pb(II) sorption equilibrium. The Langmuir model has a better correlation with experimental data than the Freundlich model. The values of the Langmuir maximum capacity of Pb(II) sorption showed an increasing trend with temperature being of 0.9378, 1.0085 and 1.162 mmole/g at 4 °C, 25 °C and 50 °C, respectively. The thermodynamic quantities characteristic for Pb(II) sorption process suggest an affinity of the bifunctional ion exchanger on basis of ethylacrylate: acrylonitrile: divinylbenzene copolymers for Pb(II) ions. The kinetics of Pb(II) retention follows the Lagergren pseudo – first order model. The obtained results are significant for the future development of the tested sorbent into beneficial material for environmental applications.

Key words: amidoxime, hydroxamic acid, isotherm, sorption, wastewaters

[*] Author to whom all correspondence should be addressed: email: icre@ch.tuiasi.ro