Adsorption by Liquid-Solid extraction of mixture Nickel (II) and Copper (II) from aqueous solutions using chelating resin

A. Amara-Rekkab [(1)], M.A. Didi [(2)]

[(1)] *Institute of Science and Technology, Department of Hydraulics, University center of Maghnia Zouia maghnia street— 13000, Algeria*

[(2)] *Laboratory of Separation and Purification Technologies, Department of Chemistry — Faculty of Sciences, Box 119, University of Tlemcen — 13000, Algeria*

Phone : 00213556304515, Adresse e-mail : amarafaf@yahoo.fr

1. Introduction – Urbanization, industrial development, and heavy traffic lead to contamination of waters with heavy metals [1]. The extensive use of nickel (II) and copper (II) in metallurgy and other industries has resulted in the release of aqueous nickel and copper to the subsurface at numerous sites [2]. In this paper, was studied the optimization of nickel (II) and copper (II) mixture extraction by Amberlite XAD-1180 resin. Various parameters have been studied as contact time, the initial concentration of mixture Ni (II) and Cu (II), initial pH and ion strength effect, to assess at the performance of Amberlite XAD-1180 resin.

2. Experimental - The residual Ni (II) and Cu (II) concentrations in the aqueous solution after treatment were measured by Atomic Absorption Spectroscopy (AAS) -Perkin Elmer (PinAAcle 900 H), of Tlemcen University.

3. Results and Discussion - ELS studied extractions of the mixture of Ni (II) and Cu (II) by Amberlite XAD-1180 resin, which has an equilibrium time of 2 h. The sorption capacity increases with the increase of the initial concentration of Ni (II) and Cu (II). Pseudo-first-order model **is** more suitable for the sorption process, with the adsorption of metals being described for the Langmuir isotherm. The effects of pH, concentrations, temperature, ionic strength, amount of resin were examined. It is found that these extractions are selective for Cu (II).

4. Conclusions - The Amberlite XAD-1180 resin was tested on extraction of Ni (II) and Cu (II) mixture. The efficiencies were determined as a function of various parameters such as the time, pHi, mixture concentration, temperature and ionic strength effect. The results showed that the extraction yield and the extraction capacity of Ni (II) and Cu (II) by the resin Amberlite XAD-1180 increased averagely in time. Equilibrium was reached after 2 hours. The pseudo first order kinetic model was most appropriate to describe the extraction process, the extraction capacity increases with decreasing of the initial concentration of Ni (II) and Cu (II). The thermodynamic study showed that the extraction process was exothermic and not spontaneous.

5. References

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