

Doctoral thesis abstract

"Research on the electrodialysis application for the selected transition-metal ions recovery from galvanic industry waste solutions"

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The aim of this work was to examine the usefulness of electrodialysis for the selected transition-metal ions recovery from galvanic industry waste solutions. The research were carried out on the selected real waste waters from nickel electroplating and model zinc electroplating baths.

Depending on the concentration of the recovered metal salts in the examined solutions, and the presence of ionic and nonionic impurities in waste solutions of the electroplating industry, the use of electrodialysis may allows for the metal salt concentration and its separation from nonionic compounds. Unfortunately, in the case of the waste solutions contaminated with ionic compounds, the selectivity of electroalytic metal salt recovery is limited.

In the doctoral thesis the results of research on the application of electrodialysis for the recovery of metals salts from selected electroplating wastes were discussed. The overall research plan included two main tasks:

- studies on the usefulness of electrodialysis for the recovery and concentration of nickel salts from nickel electroplating waste waters,
- studies on the usefulness of electrodialysis enhanced with complex formation for the selective recovery of zinc ions from model zinc electroplating baths contaminated with iron(III) and copper(II) ions.

It was found that electrodialysis allows for the concentration of nickel salts from the nickel electroplating industry waste waters to the metal concentration enabling its further recovery by electrolysis. Moreover, electrodialysis of nickel electroplaing waste waters contaminated with nonionic (H_3BO_3) and organic compounds (surfactants, brighteners) allows for separation of these compounds from nickel salts. In the case of electroalytic desalination of waste waters contaminated with ionic compounds (salts of iron and zinc), it causes their concentration together with nickel salt. It was also demonstrated, that electrodialysis enhanced with complex formation allowed for an efficient zinc ions separation from iron(III).