

MASTER THESIS

Influence of different pre-treatments on the stability of anodes during zinc electrowinning

Introduction

Lead-silver alloy are used as anode material during industrial zinc electrowinning. During the process a conductive layer of PbO_2 is formed on the anode surface, which provides the oxygen formation reaction. In order to improve the adhesion of the PbO_2 layer formed on the anode and thus its properties, the industrial partner of this master thesis (JL Goslar) blasts the surface of the PbAg anodes. The abrasive agent corundum creates sharp-edged indentations on the anode surface. However, blasting with corundum causes enormous abrasion in the blasting system and is also a cost-intensive work step. For this reason, this master thesis aims to investigate different types of surface treatment and their effect on the properties of the PbO_2 layer. The aim is to find an alternative surface treatment, which thus contributes to cost savings by replacing the abrasive process.

Tasks

- Research the literature on
 - formation of PbO_2 -layer on anodes
 - influences on the evolution of oxygen on the surface of the anode
 - possibilities of pre-treatments of lead alloy anodes
- Preparation of PbAg0.6 anodes with different pre-treatment steps
- Characterization of the surface of the anodes after pre-treatment
- Formation of a reproducible and stable layer of PbO_2 on the surface of the anodes
- Operation of a zinc electrowinning under given parameters
- Characterization of the surface of the anodes after electrowinning
- Evaluation of the results and presenting the results in an adequate form

Requirements

- ✓ Knowledge in electrometallurgy and material science
- ✓ Experience in lab work
- ✓ Requirement of short monitoring electrowinning at evenings/weekends (possibility of HiWi position)
- ✓ Start Date: 01.09.2024

Contact

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