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INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“INTEGRATING CLEANER PRODUCTION INTO SUSTAINABILITY STRATEGIES”

Electrodialysis as an Alternative for Treatment of Nickel Electroplating Effluent: Water and Salts Recovery

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Abstract

Galvanic processes are one of the main activities contributors of metal discharges into the environment. The wastewater generated contains high load of salts and metals that must be treated for recovery chemicals and water, saving resources. In this work the treatment of effluents from bright nickel electroplating process by electrodialysis (ED) was studied in order to concentrate and extract nickel (Ni) and its salts and recover water for reuse, saving industrial and environmental resources. This study was started as a case requested by an European company, manufacturer of ED plants, due the operation of equipment used in the treatment of nickel plating wastewater at an Brazilian enterprise. After many tests using real and synthetic nickel plating effluent and determination of limiting current value in previous works, one bench scale electrodialysis system was evaluated, containing five compartments cells separated by four 16cm² membranes. It was used a synthetic effluent based on industrial baths composition, including salts and organic additives. Nickel extraction, pH and conductivity were evaluated for all compartments. After ED, the treated effluent was evaluated by chemical analysis for verify its quality. It was found that ED treatment generates, as product, a very low conductivity solution, allowing the reuse as rinsewater, and a concentrated solution able to fortify the bath and recover volumes lost by evaporation and drag during the nickel electroplating process.

Keywords: *Nickel electroplating, effluent treatment, electrodialysis, reuse.*

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