

## ELECTROLYTIC PRODUCTION OF HIGH PURITY IRON POWDER FROM PICKLE LIQUORS

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High purity iron powder is widely used in the chemical, electrical, electronics and metallurgical industries. Hence, in recent years the demand for high purity iron has been continuously increasing. Many chemical and electrochemical methods have been described in the past for the production of iron powder.

The objective of the present paper has been to produce high purity iron powder from sulphate and chloride pickle liquor baths of the Ceylon Steel Corporation using an electrolytic process. The amount of iron present in these liquors was of the order of  $120 \text{ g l}^{-1}$  thus, justifying its recovery as a valuable product. Experimental conditions such as, the cell voltage, the temperature, the pH, the current density and the degree of agitation were optimised to obtain the best current efficiency for the electrolytic reduction process.

It was found that the current efficiency of the chloride bath was always higher than that of the sulphate bath under identical conditions. Further, the use of two lead anodes and a single steel cathode gave the highest current efficiency of 83.1% under static conditions whereas a current efficiency of 91% was obtained with a rotating (750 rpm) iron cylinder cathode and a perforated lead anode for chloride baths. Under these conditions the energy consumption was 3.5 kWh/kg of iron powder the purity of which was better than 99.6%. Furthermore, this process increases the acidic strength of the pickle liquor to such an extent that it could be recirculated for further pickling operations.