TECHNICAL NOTE

Direct Electrowinning and Recovery of Copper and Elemental Sulphur from Matte : Ferric Chloride Process

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Copper matte supplied by M/s Hindustan Copper in various shapes and sizes has been crushed in a jaw crusher and ground in a roller mill to obtain varions size fractions Coarse fraction of +60 mesh has been utilized for casting into anode shapes. The mette has been cast in a metal mould after melting under controlled conditions to give cast anodes of 4×30×1 cms and cut to suitable size for use. The copper matte anode analyzes 40.56%Cu. Electrolysis has been carried out in a diapraghm cell using $FeCl_3$ + HCl mixture in the anode compartment and dilute HCl in the cathode compartment. A weighed copper sheet has been used as the cathode. The solution in the anode compartment has been stirred by means of a motor stirrer at a constant speed. Electrolysis has been carried out for 24 hours at an anode current density of 3.6A/dm^2. At the end of the experiment, the cathode was weighed, and the copper deposited in the cathode compartment was washed, dried and weighed to give the total copper deposited. The anode which had a crust of sulphur was weighed after removal of the crust, washing and drying. The crust together with the residue in the anode compartment after filtration of the anode solution was washed thoroughly and dried and treated with tetrachloroethylene to recover elemental sulphur. There was a rise in the cell voltage during the proeess because of the crust formed on the anode.

Preliminary studies were made with 5 wt% $FeCl_3$ and 4 Vol%HCl in the anode compartment and 4 vol% HCl in the cathode compartment. The copper metal powder recovery is of the order of about 50%. In addition to this, elemental sulphur has been recovered by treatment of the anode crust and sludge with tetrachloroethylene

The effects of (a) $FeCl_3$ and HCl concentrotion in the anolyte, (b) current density and (c) duration of electrolysis on the recovery of copper and sulphur are being investigated.

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