

# ELECTROMETALLURGY

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## PRINCIPLES OF ELECTROMETALLURGY

- ✚ Electrolysis is an electrochemical process involved in the inter conversion of electrical energy and chemical energy- generally in ionically conducting media. Such media include aqueous solutions molten salts and silicates, and organic liquids.

## FARADAY'S LAWS OF ELECTROLYSIS

- ✚ Faraday's first law states that during electrolysis, the chemical action produced by a current at an electrode is proportional to the quantity of electricity passed.
- ✚ Faraday's second law states that the masses of substances deposited on or dissolved at an electrodes by the passage of same quantity of electricity which are directly proportional to their chemical equivalent weights.
- ✚ The quantity of charge that generates 1 gm equivalent weight of any chemical is called a "Faraday". One Faraday is equal to 96,493.1 coulombs.

## ELECTRODE POTENTIAL

✚ An electrode is immersed in fused salt or aqueous solution having ionic conductivity. A potential difference builds up at the interface between the two phases. This potential difference is called electrode potential, which arises due to the transfer of ions or electrons on breaking their bonds with the substances in one phase and reacting to form new bonds with substances in the other phase.

✚ Such charge transfer reactions are electrochemical in nature. The metal electrode consists of metal ions bound together by the attraction of free electrons which enable it to conduct electricity.

✚ Electrode potentials are expressed with respect to a reference electrode. For an aqueous solution, the standard hydrogen electrode is conventionally used as the reference electrode.