Chapter 11

Principles of Metallurgy

The process of conversion of the compound or mineral of given metal into its metallic form is called as extraction of metal. The procedure used for the extraction of a crude metal depends upon reactivity of metal.

Extraction of more reactive metals:

The only method that can be used for the extraction of more reactive metals is electrolysis of their fused or molten compounds. Other techniques like, reduction cannot be used because these metals are more reactive and good reducing agents.

- Electrolysis of aqueous salts cannot be used because hydrogen being i.e., reactive reduced at cathode.

Ex. Extraction of sodium

Sodium is generally extracted from electrolysis of molten NaCl. NaCl is available in its solid form. We can suitable impurities to reduce melting point.

- Molten NaCl is electrolyzed using steel cathode and graphite anode.
- In NaCl, Na^+ ions being positive move towards cathode. While Cl^- ions being negative move towards anode.

At cathode:

Sodium takes electrons and converted into sodium atom.

$$Na^{+} + e^{-} \rightarrow Na_{(s)}$$

At anode:

Cl^- ions loses electrons and chlorine gas is liberated.

$$2Cl^{-} \rightarrow Cl_2 + 2e^{-}$$

- The other metals like potassium, calcium, magnesium and aluminium can also obtained by electrolysis of their molten compounds.