

Chapter 11

Principles of Metallurgy

During extraction of ore, we use different procedures.

- Concentration of ore (or) dressing of ore
- Extraction of ore
- Refining of metal

Concentration of ore:

The process of removal of earthily impurities from ore.

- The impurities present in ore is called as gangue.
- The gangue particles like sand, silica etc. will be always present in the ore.
- The different methods used for concentration (or) dressing (or) enrichment of the ore will be,
 - Hand picking
 - Froth flotation
 - Washing
 - Magnetic separation

Hand picking:

Hand picking is manual separation. We can use this method, when impurities are present in ore are differing in size, colour etc.

Ex. The removal of stones from seeds, rice flakes etc.

Washing:

We can use washing when gangue particles are lighter and ore particles are denser comparatively.

- Powdered ore is placed on a sloppy surface and water is sprinkled in a controlled manner. The lightweight impurities are washed away with water. Whereas denser ore stays back on surface.

Froth flotation:

Froth flotation can be used when ore particles and gangue particles differ in their wetting properties. Froth flotation is most commonly used technique for sulphides ores because sulphides ores are wetted by oil whereas gangue particles are wetted by water.

Finely powdered ore is mixed with water and pine oil. Air is blown from the bottom and agitated continuously to produce froth. Froth can be collected separately and ore can be removed by evaporation.

Magnetic separation:

We can use this method when either ore (or) gangue particles are magnetic and other is nonmagnetic.

Finely powdered ore is placed on roller, fitted on one side with magnetic role. Due to magnetic property, either ore or gangue particles are carried away with roller and separately collected whereas nonmagnetic particles will be collected over there itself.

