This method is used for the separation of lead sulphide (good conductor) which is charged immediately in an electrostatic field and is thrown away from the roller from zinc sulphide (poor conductor) which is not charged and hence, drops vertically from the roller.

**Chemical Method-Leaching**
Leaching is the process in which the ore is concentrated by chemical reaction with a suitable reagent which dissolves the ore but not the impurities, e.g., bauxite is leached with a hot concentrated solution of NaOH which dissolves aluminium while other oxides ($\text{Fe}_2\text{O}_3$, $\text{TiO}_2$, $\text{SiO}_2$), remain undissolved and noble metals (Ag and Au) are leached with a dilute aqueous solution of NaCN or KCN in the presence of air.

$$\text{Al}_2\text{O}_3 + 2\text{H}_2\text{O} + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + 3\text{H}_2\text{O}$$

and

$$\text{Ag}_2\text{S} + 4\text{NaCN} \rightarrow 2\text{Na}[\text{Ag(CN)}_2] + \text{Na}_2\text{S}$$

**Extraction of Crude Metals from Concentrated Ore**
The concentrated ore is usually converted to oxide before reduction, as oxides are easier to reduce. Thus, the process of crude metal from concentrated ore involves two major steps:
1. Conversion to oxide.
2. Reduction of the oxides to metal.

**Conversion to Oxides**
(i) **Calcination** It is the process of converting an ore into its oxides by heating it strongly, below its melting point in a limited supply of air or in absence of air. During calcination, volatile impurities as well as organic matter and moisture are removed.
gently heated. The metal melts and flows down leaving behind the non-fusible impurities.

(ii) **Distillation** This is useful for low boiling metals such as Zn, Hg. The impure liquid metal is evaporated to obtain the pure metal as distillate.

(iii) **Cupellation**
This method is used when impure metal contains impurities of other metals which form volatile oxides.
e.g., traces of lead ore removed from silver (as volatile PbO) by this process.

**Chemical Methods**
(i) **Poling**
This method is used when the impure metal contains impurities of its own oxide,
e.g., Cu₂O in blister copper and SnO₂ in impure Sn. The molten impure metal is stirred with green wood poles. At this high temperature, wood liberates gases such as CH₄ which reduces any oxides present in the metal.

(ii) **Electro-refining**
In this method, impure metal forms the anode while the cathode is a rod or sheet of pure metal.
The electrolytic solution consists of a soluble salt of the metal.

On passing electricity, the pure metal gets deposited on the cathode while the insoluble impurities settle down below the anode as anode mud or anode sludge. Metals like Cu, Ag, Au, Cr, Zn, Ni, etc are purified by this method.

(iii) **Zone-refining**
This method is based upon the principle of fractional crystallisation, i.e., difference in solubilities of impurities in molten and solid state of metal.
Semiconductors like...