Nishant Jindal

① crushing | pulverisation | grinding

② Conc. | benefaction | dressing

Physical Chemical [Leaching]

→ gravity sep. method
- Wilfley table
- Hydraluic washing method

→ magnetic sep. method

→ Froth flotation method.

gangue | matrix

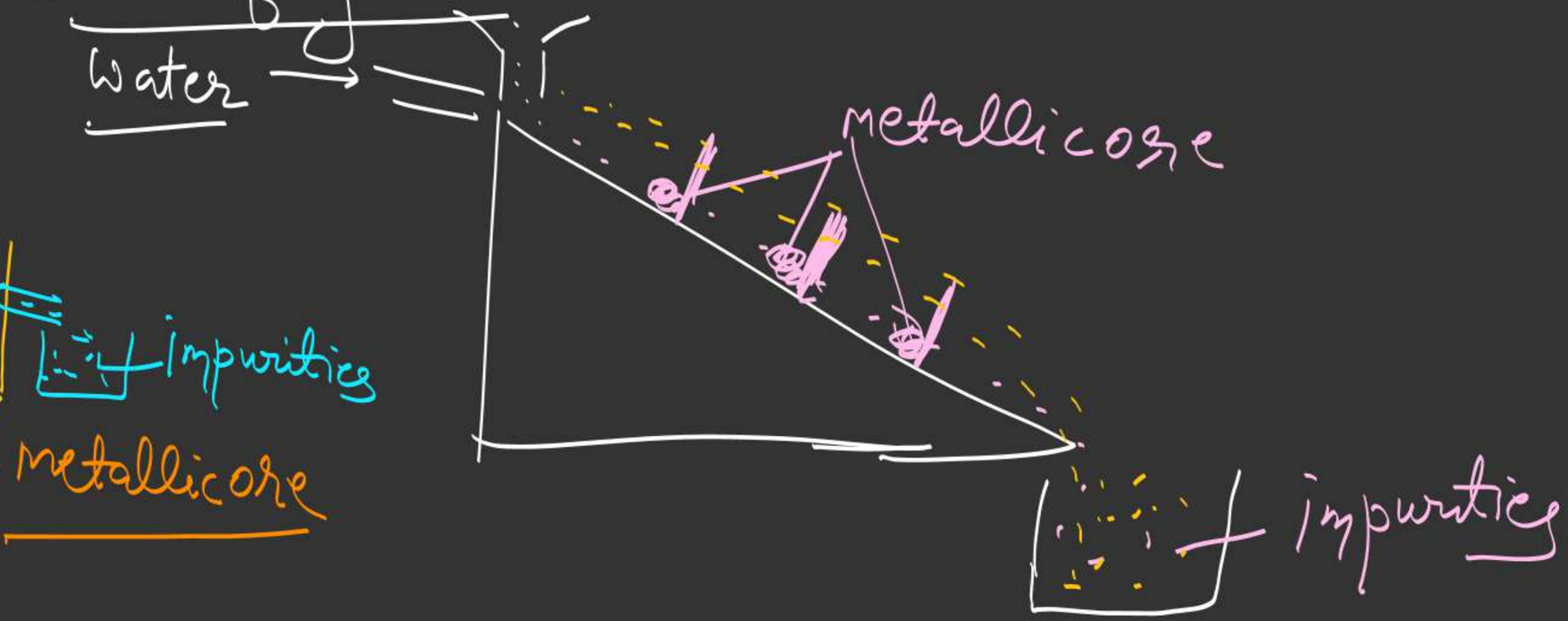
Nishant Jindal

① gravity sep. Method

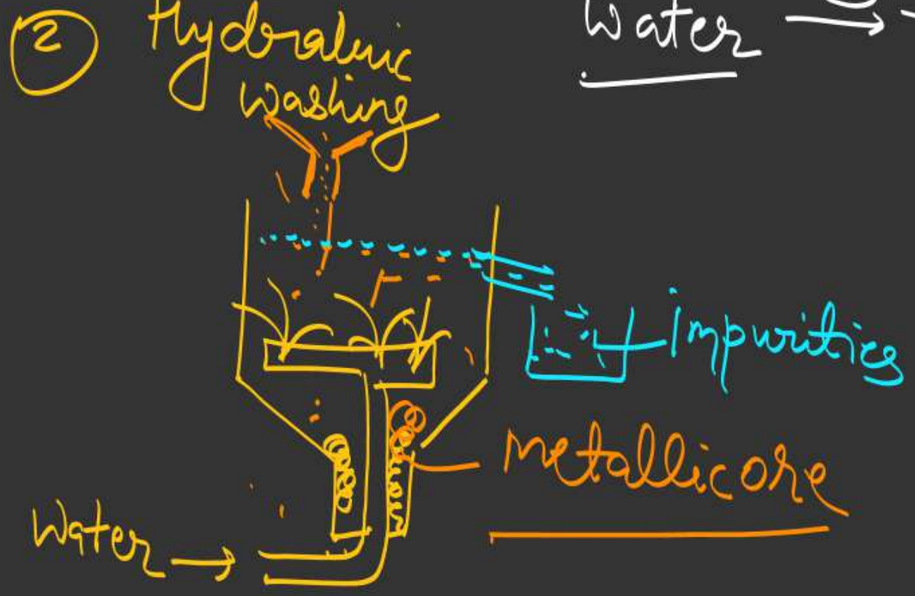
example → oxide and Carbonate

Concept ⇒ density diff. between metallic ore and impurities

① Wilfley table

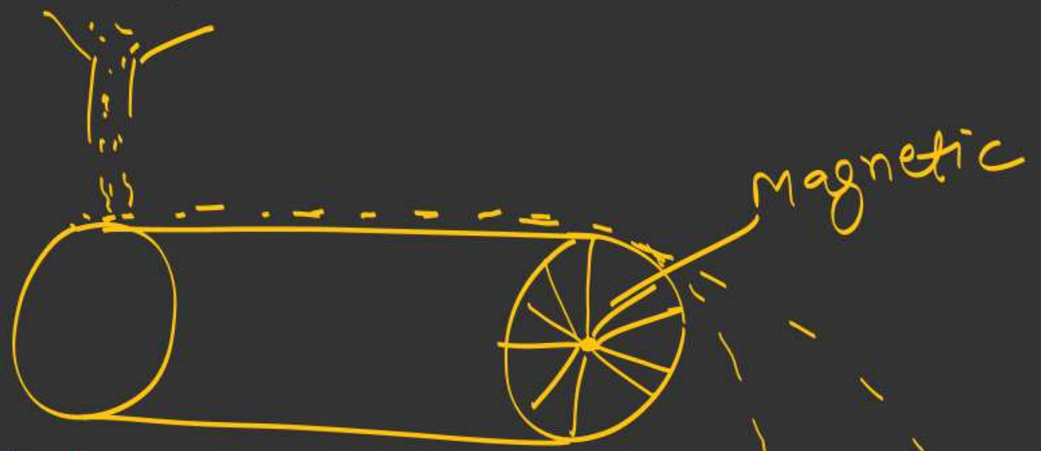


② Hydraulic washing



Nishant Jindal

Magnetic sep. method



(non magnetic) (magnetic)

SnO_2 + Wolframite

(tin stone)

(Cassiterite)

(ore of tungsten)

($FeWO_4 + MnWO_4$)

Fe_3O_4 + impurities

Fe_2O_3 + impurities

MnO_2 + impurities

$FeO \cdot Cr_2O_3$ + impurities

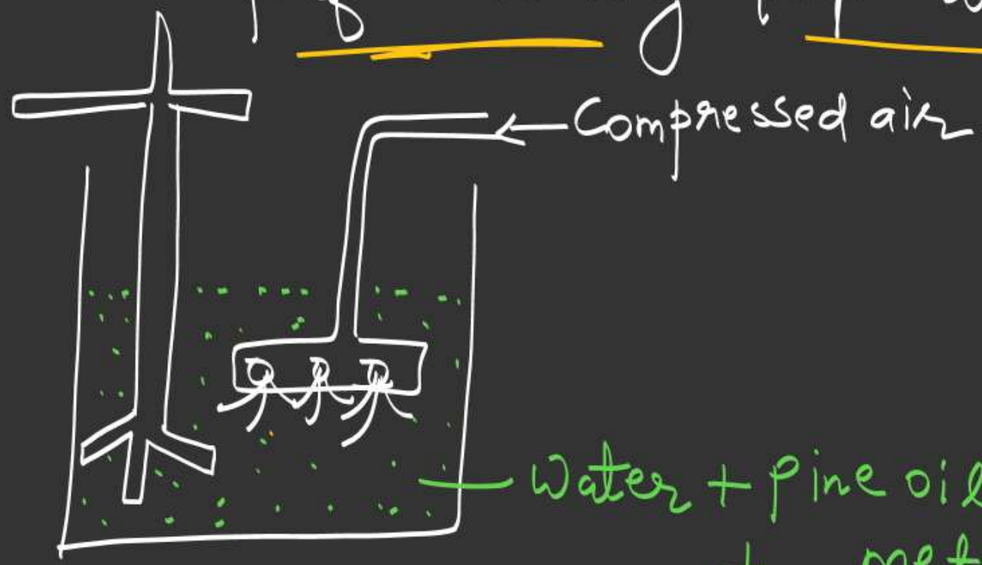
TiO_2 + Chlorapatite $3Ca_3(PO_4)_2 \cdot CaCl_2$

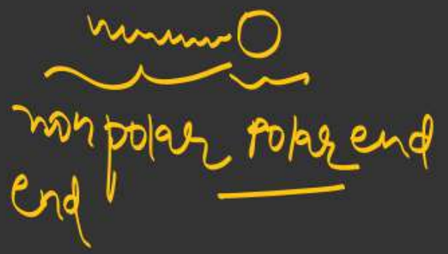
} non Mag.

Nishant Jindal

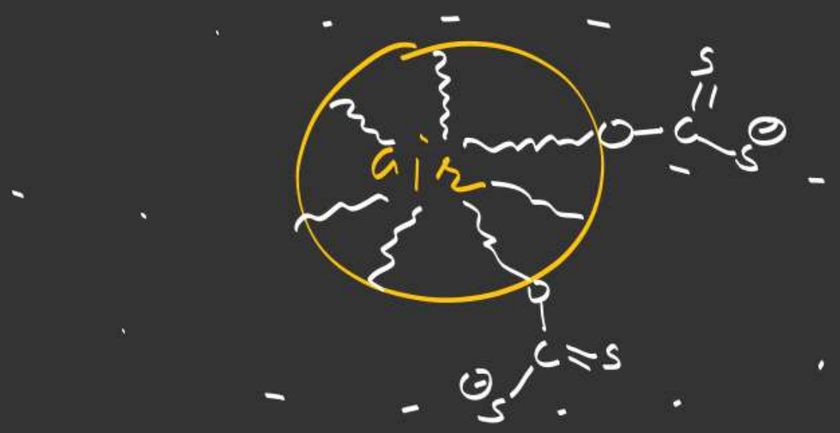
Froth flotation Method

Sulphide ore have pref. wetting prop. with pine oil and impurities have pref. wetting prop. with water





Nishant Jindal



Sodium ethyl xanthate = collector

Pine oil → Frothing agent

aniline / cresol → froth stabilizer

adsorption

Note ⇒ acc. to NCERT → Xanthate / fatty acids and pine oil → collector

$PbS + ZnS + NaCN \longrightarrow PbS +$ 

(depressent)

$Na_2[Zn(CN)_4]$

$CuSO_4$ activator

$[Cu(CN)_4]^{-3} + ZnS \uparrow$

Note ⇒ by adjusting oil water proportion.

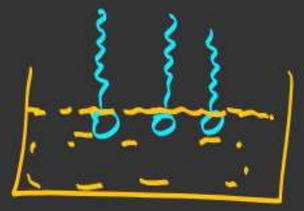
$$CuCO_3 \cdot Cu(OH)_2 + \underline{MS} \longrightarrow MS\uparrow + CuCO_3 \cdot Cu(OH)_2$$

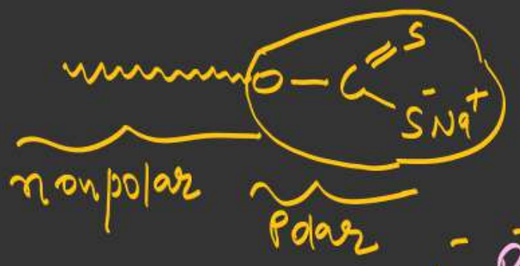
$CuCO_3 \cdot Cu(OH)_2 \xrightarrow{Na_2S}$ CuS CuS CuS CuS CuS $CuCO_3 \cdot Cu(OH)_2$ CuS CuS

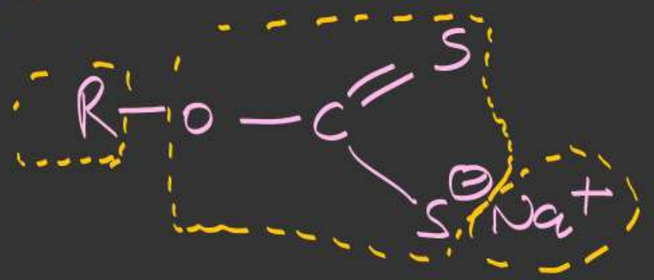
$$MS + PbSO_4 \longrightarrow MS\downarrow + PbSO_4$$

$PbSO_4 \xrightarrow{Na_2S}$ PbS PbS PbS $PbSO_4$

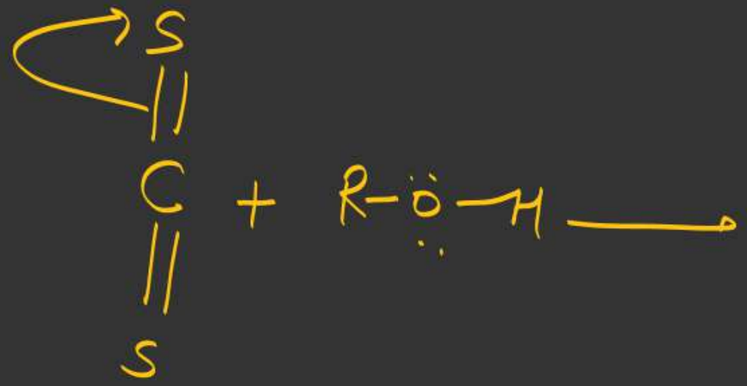
Nishant Jindal

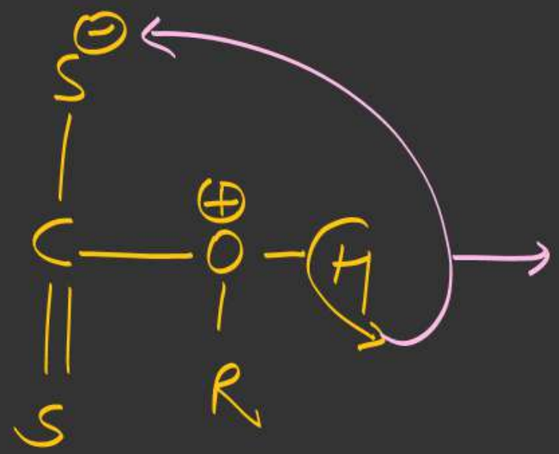


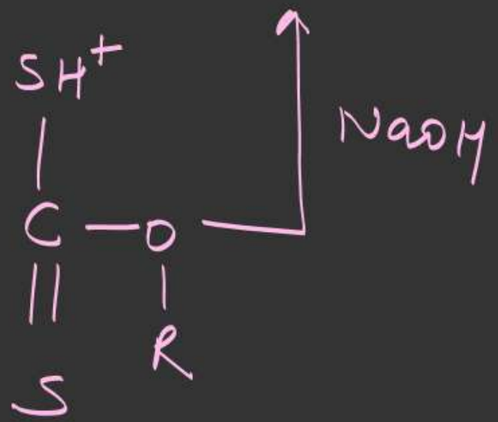




Sodium ethyl Xanthate







③ Conversion of conc. ore in to oxide ore

- Calcination
- Roasting

④ Reduction

(i) Electrolytic reduction
(ii) Carbon reduction [Smelting]
(iii) Al- reduction
(iv) Self reduction
(v) Thermal decomposition Reduction
(vi) Hydro metallurgic reduction.

Nishant Jindal

(5) Purification

1. Electrorefining
2. Zone refining
3. Vapour phase refining
   - Van Arkel debore process
   - Mond's Process

(4) Oxidation Method

(a) Bessemerisation
(b) Poling
(c) Cupellation

(5) Other method

(a) Amalgamation
(b) Liquation
(c) Distillation