

# FLOTATION

The objective is to **remove small hydrophobic particles** from an aqueous suspension (pulp) by causing them to collide with, and to **attach to, air bubbles**.

- The bubble-particle aggregates rise through the suspension forming a froth at the upper surface of the pulp.
- The froth, which consists of the bubble-particle aggregates with inter-bubble water containing both hydrophobic and hydrophilic particles, forms a second phase where further enhancement of the hydrophobic/hydrophilic particle separation occurs, by water draining back to the pulp.
- The final product in which the hydrophobic particles are concentrated is removed as a froth over-flow.



- The science of the separation is primarily concerned with **improving the selectivity of the hydrophobic particle** attachment in the pulp through the addition of **surface active chemicals**.
- The hydrodynamics of the bubble-particle collision in the aerated suspension is important, as is the regulation of the drainage of water-containing hydrophilic particles from the froth by controlling its structure, also with surfactants.
- The industrial practice of flotation is effective even in the absence of a complete understanding of its scientific basis.
- The successful application of flotation separations in industry can be classified into three areas.



## Flotation Separations In Industry

- Mineral processing
- Non-mineral processing recycling
  - Wastepaper deinking
  - Separation of plastic components from solid waste
  - Recovery of metals from refinery effluents
- Water and waste treatment



- **The selectivity of the separation** is commonly enhanced by the adsorption of **surface active chemicals** onto the surfaces of the solid particles.
- The choice of a suitable reagent is critical and is highly specific to a particular separation.



# Collectors

- A collector is a surface-active chemical which has a **polar and a non-polar group**.
- The collector molecule must be firmly **attached to the solid surface through its polar group** and must be able to **confer sufficient hydrophobicity** to the surface through the non-polar component to facilitate bubble attachment.
- For effective attachment, multilayer adsorption is required.

