

## Extraction

Extraction is a method to separate compounds based on their relative solubilities in two different immiscible liquids.

Distribution coefficient is often quoted as a measure of how well-extracted a species is. The distribution coefficient is equal to the concentration of a solute in the organic phase divided by its concentration in the aqueous phase. A density difference is required between the two phases.

$$K = \frac{\textit{The concentration of the solute in the organic phase}}{\textit{The concentration of the solute in the aqueous phase}}$$

When choosing a solvent system for extraction, it is important to pick two immiscible solvents. Most extractions involve water because it is highly polar and immiscible with most organic solvents. The desired properties of solvents are good selectivity towards solute and little or no miscibility with feed solution. Other factors affecting solvent selection are boiling point, density, interfacial tension, viscosity, corrosiveness, flammability, toxicity, stability, availability and cost.

## **(1): The selection of a suitable solvent**

### **The purpose**

Choosing the suitable solvent for extraction by comparing between distribution coefficient of the solvents, the higher distribution coefficient is the better.

### **Tools and materials used**

Separatory funnel 100ml, pipette 10ml, Burette, funnel, conical flask, benzoic acid  $C_6H_5COOH$ , sodium hydroxide, diethyl ether, benzene, ph.ph. indicator.

### **Procedure**

- 1- Pipette 10 ml of benzoic acid into conical flask and add two drops from ph.ph.
- 2- Titrate with NaOH (repeat this step twice) and calculate the acid concentration.
- 3- Pipette 10 ml of acid into separatory funnel then add 10 ml benzene.
- 4- Shake gently and wait until the separation of layers.
- 5- Down precisely the aqueous layer in conical flask, then titrate with sodium hydroxide (add two drops from ph.ph) until the pink color appears.
- 6- Calculate acid concentration in the aqueous layer and organic layer.
- 7- Calculate the distribution coefficient.
- 8- Repeat all the steps with another solvent (diethyl ether).

