Adsorption Partition Chromatography

Defination Of Chromatogaraphy-

The chromatography is defined as a technique for the separation of a mixture by passing it in solution or suspension through a medium in which the components move at different rates. This process is known as the Chromatography.

Introduction Of Chromatography-

- Chromatography is a non-destructive procedure for resolving a multi-component mixture of trace minor, or major constituents into its individual fractions. Different variations may be applied solid, liquids, and gases.
- Chromatography is probably the most important single analytical technique used today probably continue to be so far the foreseeable future. It is a cornerstone of molecular analytical chemistry in particular. Chromatography is relatively a new technique which was first invented by M. Tswett, a botanist in 1906 in Warsaw.
- Chromatography may be regarded as a method of separation in which separation of solutes occur between a stationary phase and a mobile phase. Chromatheraphy can be used for qualitative and quantitative analysis.
- Chromatography as a method of separating a mixture of components into individual components through equilibrium distribution between two phases.
- The chromatographic method of separation, in general, involves the following steps-

1.Adsorption or retention of a substance or substances on the stationary phase.
2. Separation of the adsorbed substances by the mobile phase.
3. Recovery of the separated substances by a continuous flow of the mobile phase the method being called elution.
4. Qualitative and quantitative analysis of the eluted substances.

Definations-

Influent- The liquid entering into column.
Effluent- The liquid leaving the column.
Ellution- Is the process by which adsorb ions are removed from the column.
Elluent- Solution used for Ellution.
Eluate- Solution obtained as of elution a result.

Types Of Chromatography-

- Chromatography, the stationary phase may be a solid or a liquid and the mobile phase may be liquid or a gas.
- Depending on the stationary and the mobile phase used, separation occurs because of a combination of two or more factors such as rates of migration, capillary action, extent of adsorption etc.,
- Chromatographic methods can be classified on the basis of the stationary and the mobile phases used -

Various types of Chromatography are-

Techniques	Stationary Phase	Mobile Phase
1.Column chromatography or Adsorption chromatography	Solid	Liquid
2. Partition chromatography	Liquid	Liquid
3. Paper chromatography	Liquid	Liquid
4.Thin layer chromatography (TLC)	Liquid or Solid	Liquid
5. Gas-liquid chromatography (GLC)	Liquid	Gas
6. Gas-solid chromatography (GSC)	Solid	Gas
7.lon exchange chromatography	Solid	Liquid

Adsorption Chromatography

Introduction-

- A mixture of liquids can be separated by being passed over a solid substrate in the same manner as gases are separated by being passed over a liquid substrate.
- The liquid solvent is the mobile phase and the solid is stationary phase.
- The difference in the flow rate of components of the mixture depends on how much time is spent by each component in the stationary phase and how much is spent in the mobile phase.
- An adsorbent may be described as a solid which has property of holding molecules at its surface, particularly when it is porous and finely divided.

Theory-

- The mass of solute adsorbed per unit weight of adsorbent (m) depends on the concentration of the solute (c) and Langmuir derived an equation on the basis that (a) only a monolayer is adsorbent, and (b) only a proportion of the molecules in collision will result in adsorption. This is known as the Langmuir adsorption

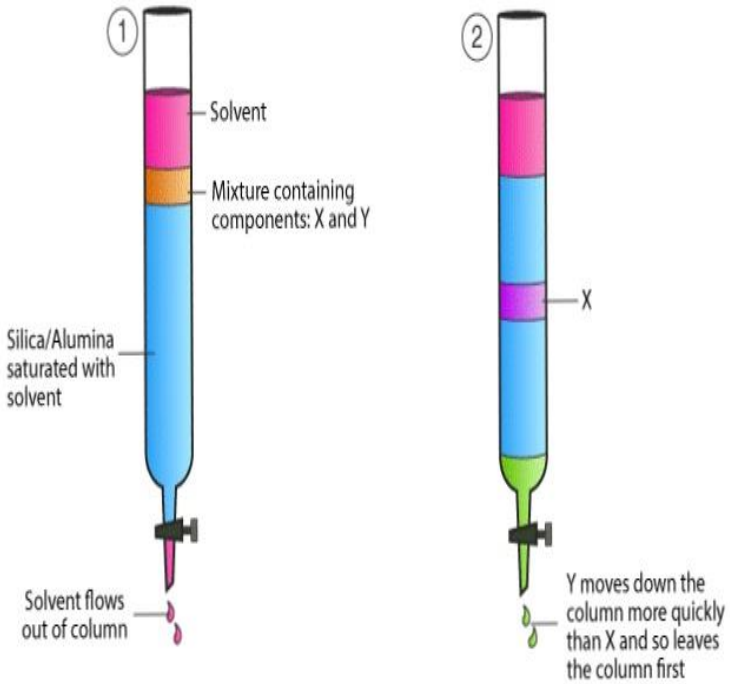
m= K1K2C

1+K2C

Where,

K2 is a measure of the affinity of solute for the adsorbent

K1 is a measure of the number of active adsorption sites per unit weight



Adsorption Chromatography

Partition Chromatography

Introduction-

- In normal phase partition chromatography, the stationary phase is water supported by a matrix.
- The factors that affect peak broadening are similar to those encountered in gas-liquid chromatography liquid-solid chromatography.
- The mobile solvent phase is generally an organic solvent immiscible with water or a mixture of aqueous organic solvents which have a dielectric constant less than that of water.Very often the solvent is miscible with water.
- In reverse phase partition chromatography, the stationary phase is a non-polar compound such as liquid paraffin supported by a matrix similar to those employed in normal phase systems. The solvent is subsequently removed by evaporation.

Theory-

- Consider a column packed with a finely divided chemically inert solid. which is coated with a thin layer of liquid. This coating is the stationary phase of Liquid-liquid chromatography.
- If the solution (the mobile phase) containing the components A & B is poured into top of the column, each component will have an affinity for the liquid of the stationary phase have a tendency to dissolve in it.

- The relative attraction of each solute species for each of the plates represented by their respective partition coefficients.

KA=concentration of A in the stationary phase

concentration of A in the mobile phase

KB = concentration of B in the stationary phase

concentration of B in the mobile phase

Where,

KA & KB is partition coefficients

Partition Chromatography

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