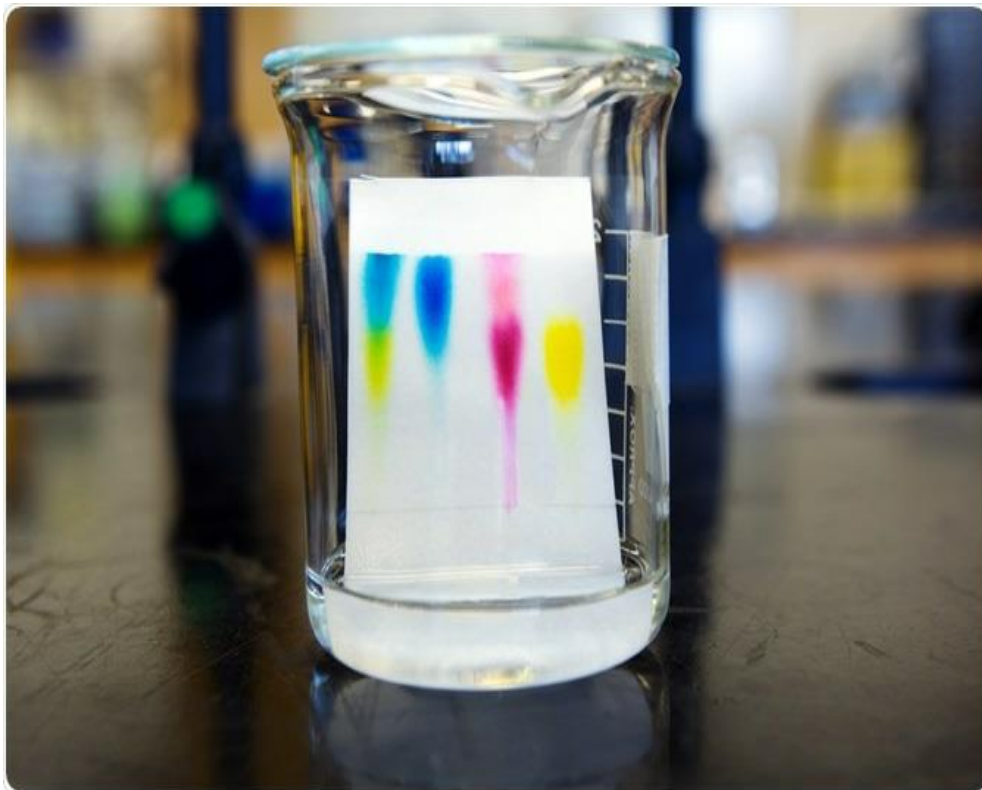


Thin layer chromatography (TLC)

Introduction-

Definition:- Thin-layer chromatography is a chromatography technique used to separate non-volatile mixtures. Thin-layer chromatography is performed on a sheet of an inert substrate such as glass, plastic, or aluminium foil, which is coated with a thin layer of adsorbent material, usually silica gel, aluminium oxide, or cellulose.

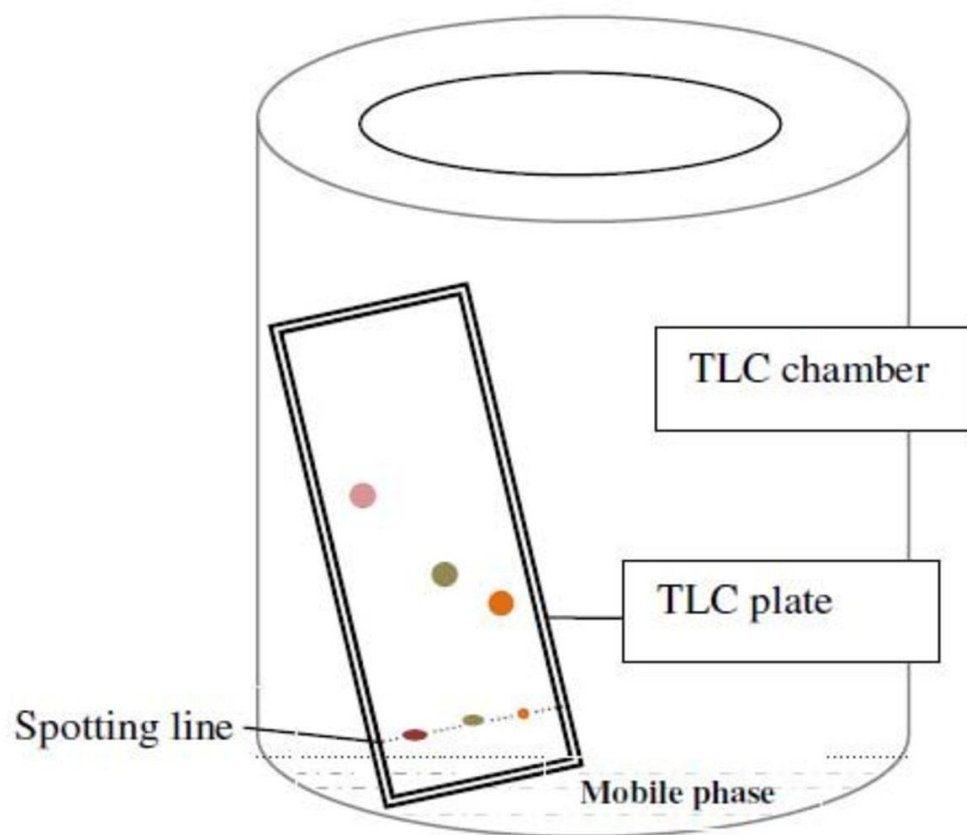


Principle :-

- TLC is based on the principle of separation through adsorption type.
- The separation relies on the relative empathy of compounds towards the mobile phase and stationary phase.
- The stationary phase used in paper chromatography Cellulose filter paper contains water in its pore whereas in TLC the stationary phase used is Glass plate coated with silica gel.
- Thin layer chromatography (TLC) is an affinity-based method used to separate compounds in a mixture.
- TLC is a highly versatile separation method that is widely used for both qualitative and quantitative sample analysis.
- distribution of a compound between a solid fixed phase (the thin layer) applied to a glass or plastic plate and a liquid mobile phase (eluting solvent) that is moving over the solid phase.

Technique of TLC -

Thin Layer Chromatography is a technique used to isolate non-volatile mixtures. The experiment is conducted on a sheet of aluminium foil, plastic, or glass which is coated with a thin layer of adsorbent material. The material usually used is aluminium oxide, cellulose, or silica gel.



Mobile phase -

The mobile phase is an inert gas that the sample is injected into that will carry it through the stationary phase, which is normally a solid. The sample solution is analyzed as it the mobile phases interacts and moves through the stationary phase.

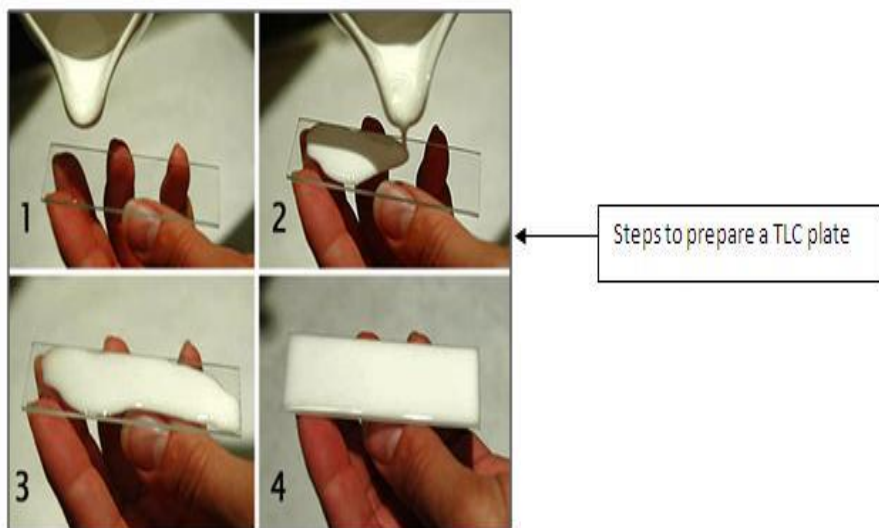
Stationery phase -

Thin layer chromatography is done exactly as it says - using a thin, uniform layer of silica gel or alumina coated onto a piece of glass, metal or rigid plastic. The silica gel (or the alumina) is the stationary phase. ... The mobile phase is a suitable liquid solvent or mixture of solvents.

Technique

The process is similar to paper chromatography with the advantage of faster runs, better separations, and the choice between different stationary phases. Because of its simplicity and speed, TLC is often used for monitoring chemical reactions and for the qualitative analysis of reaction products. Plates can be labeled before or after the chromatography process using a pencil or other implement that will not interfere or react with the process.

1. Coating material - allumina,silica gel, cellulose powder.
2. Preparation of tlc plate-
 - Pouring – in this method amount of slurry given on size plate is kept on level surface of plate.



- Dipping –the plate prepared by dipping at time to back in CHCl_3 on methanol slurry of adsorbent.
 - Spraying - The adsorbent is made into a suspension and is sprayed on a glass plate using a sprayer.
 - Spreading - The adsorbent is made into a slurry and is placed in an applicator and is spreaded on a plate by means of moving the applicator or plate.
3. Activation of absorbent
 4. Purification of silica gel

5. Sample application
6. Solvent system
7. Plate development
8. detection of components.

Separation process-

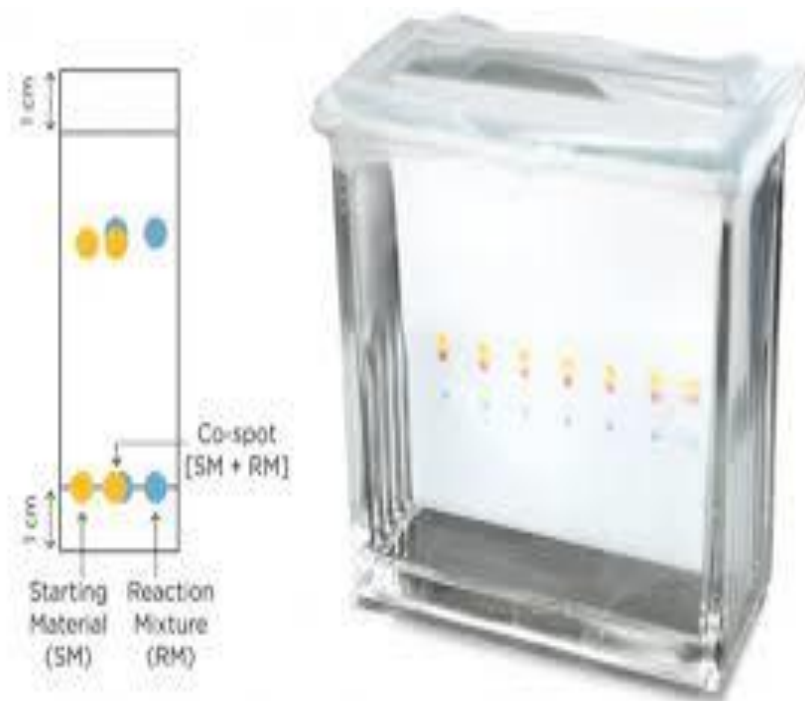
compounds in the sample mixture travel at different rates due to the differences in their attraction to the stationary phase and because of differences in solubility in the solvent. By changing the solvent, or perhaps using a mixture, the separation of components (measured by the R_f value) can be adjusted. Also, the separation achieved with a TLC plate can be used to estimate the separation of a flash chromatography column. (A compound elutes from a column when the amount of solvent collected is equal to $1/R_f$.) Chemists often use TLC to develop a protocol for separation by chromatography and use TLC to determine which fractions contain the desired compounds. Plate size in Tlc -TLC plates are available in the following standard sizes depending on the coating used: 20 x 20 cm, 10 x 20 cm, 5 x 20 cm, 5 x 10 cm & 10 x 10 cm.

Application -

- TLC is extremely useful in Biochemical analysis such as separation or isolation of biochemical metabolites from

its blood plasma, urine, body fluids, serum, etc. Thin layer chromatography can be used to identify natural products like essential oils or volatile oil, fixed oil, glycosides, waxes, alkaloids, etc.

- One of the most important applications of TLC is in separation of multicomponent pharmaceutical formulations. In food and cosmetic industry.



developing chamber

Refference-

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