**Planar chromatography**

**Planar chromatography** is a separation technique in which the stationary phase is present as or on a plane. The [solvent](http://en.wikipedia.org/wiki/Solvent) moves up the plate by [capillary action](http://en.wikipedia.org/wiki/Capillary_action). There are two types of planar chromatography: thin layer chromatography (TLC) and paper chromatography.

**Thin layer chromatography** (TLC) is a [chromatography](http://en.wikipedia.org/wiki/Chromatography) technique used to separate mixtures. Thin layer chromatography is performed on a sheet of glass, plastic, or aluminum foil, which is coated with a thin layer of [adsorbent](http://en.wikipedia.org/wiki/Adsorbent) material ([stationary phase](http://en.wikipedia.org/wiki/Stationary_phase_%28chemistry%29)), usually [silica gel](http://en.wikipedia.org/wiki/Silica_gel), or [aluminium oxide](http://en.wikipedia.org/wiki/Aluminium_oxide).

**In paper chromatography**, Separations in paper chromatography involve the same principles as those in thin layer chromatography. However, the paper is made of cellulose (stationary phase).

The [retention factor](http://en.wikipedia.org/wiki/Retention_factor) (R*ƒ*) may be defined as the ratio of the distance traveled by the substance to the distance traveled by the solvent. If R*ƒ* value of a solution is zero, the solute remains in the stationary phase and thus it is immobile. If R*ƒ* value = 1 then the solute travels with the solvent front. To calculate the R*ƒ* value, take the distance traveled by the substance divided by the distance traveled by the solvent (mobile phase).

Rf = Distance from origin to center of spot/Distance from origin to solvent front

The factors affect Rf value:

1. The nature of the mobile phase.
2. The nature of the stationary phase.
3. Temperature.

**(6): Choose the appropriate mobile phase**

**The idea of the experiment:**

Such series are useful for determining necessary solvents needed for [chromatography](http://en.wikipedia.org/wiki/Chromatography) of chemical compounds. Normally such a series progresses from non-polar solvents, such as [n-hexane](http://en.wikipedia.org/wiki/N-hexane), to polar solvents such as [methanol](http://en.wikipedia.org/wiki/Methanol) or [water](http://en.wikipedia.org/wiki/Water). Characteristics of the appropriate mobile phase:

1. Good separation between substances.
2. Rf ≠ 1
3. Achieve the desired resolution in an acceptable time.

**Materials and tools used:**

Thin layer (a sheet of glass coated with silica gel). Substances: Sudan yellow, Bromocresol purple, Bromophenol blue. Mobile phases: (Methanol 2:8 Ethyl acetate), (Methanol 8:2 Ethyl acetate), Benzene 8:2 Ethyl acetate).

**Procedure:**

1. Draw a line (in pencil not pen) across the bottom edge of the plate 1 cm up from the bottom.
2. Spot three spots along the line drawn on the plate.
3. Pour 10 ml of mobile phase in the jar and leave it few minutes to help to saturate the atmosphere with solvent vapor.
4. Put the plate inside the jar.
5. Remove the plate and mark the solvent front with a pencil.
6. Allow the plate to dry for a few minutes.
7. Calculate Rf for each substance.
8. Repeat the same steps for the other two phases.
9. Compare between the mobile phases, which one is the best?why?